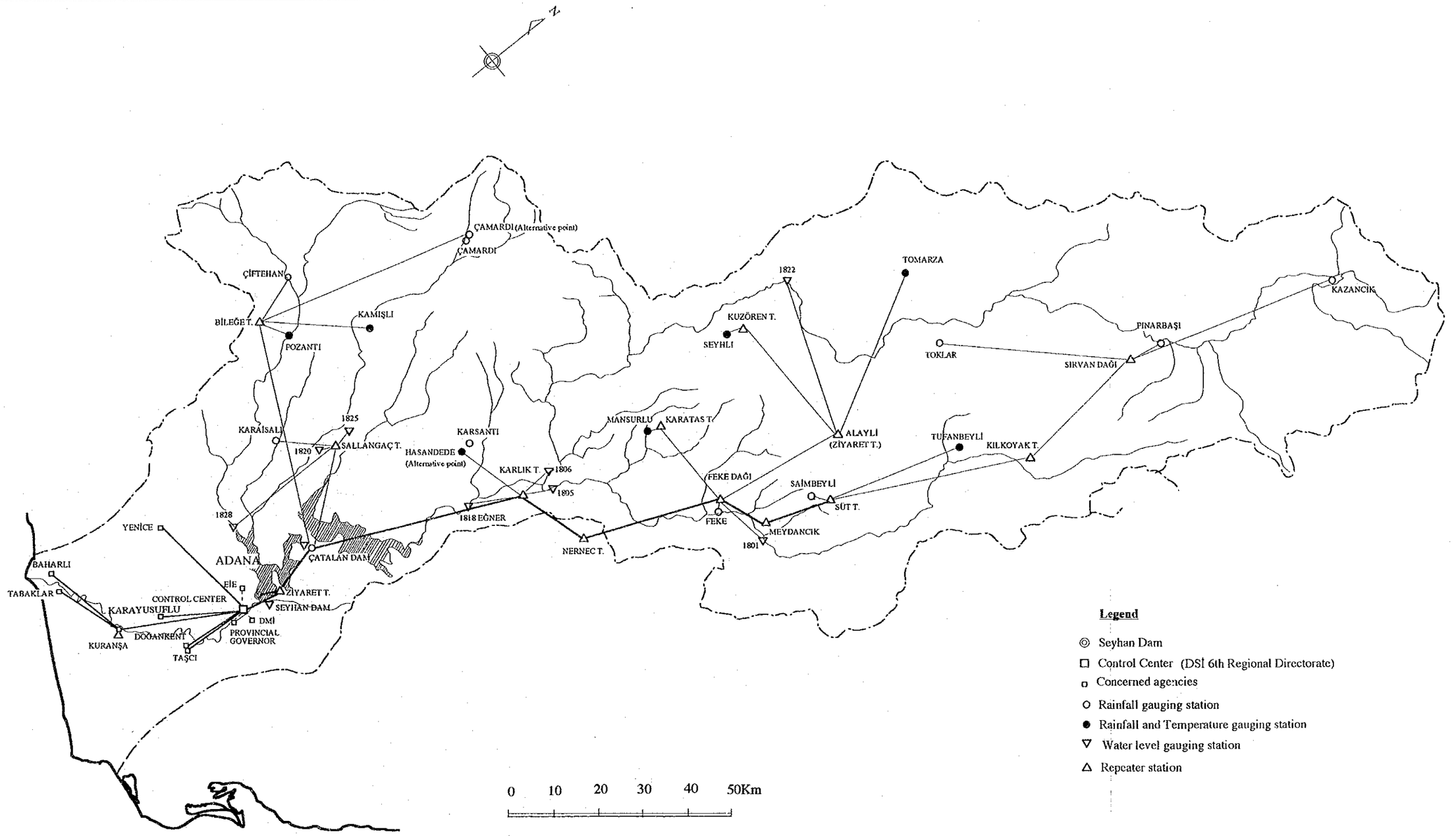

Legend

- ◎ Seyhan Dam
- □ Control Center (DSİ 6th Regional Directorate)
- ▫ Concerned agencies
- ○ Rainfall gauging station
- ● Rainfall and Temperature gauging station
- ▽ Water level gauging station
- △ Repeater station

—— Multiplex radio link 2GHz band

—— Simplex or Duplex raio link for voice communication 400MHz band

—— Simplex radio link for telemetry 70MHz band

--- PTT line

THE REPUBULIC OF TURKEY DEVLET SU İŞLERİ GENEL MÜDÜRLÜĞÜ	**FLOOD CONTROL, FORECASTING AND WARNING SYSTEM FOR SEYHAN RIVER BASIN** JAPAN INTERNATIONAL COOPERATION AGENCY	TITLE Figure 3.3.1 TELECOMMUNICATION NETWORK DIAGRAM

SUPPORTING REPORT C

OPTIMUM COMPREHENSIVE RIVER CONTROL

THE FEASIBILITY STUDY
ON
FLOOD CONTROL, FORECASTING AND WARNING SYSTEM
FOR
SEYHAN RIVER BASIN

Supporting Report C Optimum Comprehensive River Control

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1. INTRODUCTION

The study on the optimum comprehensive river control presents the basic and necessary information to determine the optimum flood flow dam operation and water use operation for the formulation of flood forecasting and warning plan in the Seyhan River basin.

The study items are composed of the following;

(1) Collection and analysis of the existing data
(2) Study on water surface routing
(3) Study on flood flow dam operation
(4) Study on water use operation

The contents of the following chapters are briefly explained below.

(1) Chapter 2 : General Situation of Flood Control
(2) Chapter 3 : Flood Control Facilities
(3) Chapter 4 : Historical Floods
(4) Chapter 5 : Present Water Use
(5) Chapter 6 : Flood Inundation and Damage
(6) Chapter 7 : Optimum Comprehensive River Control

2. GENERAL SITUATION OF FLOOD CONTROL

The Çukurova plain irrigation project was initiated by construction of the main canal at the right and left bank of the Seyhan River from 1937 to 1947. In order to protect the irrigation farm from flood, the Seyhan River levee was constructed at the right and left bank from 1949 to 1953. The total length of the levee was about 100 km along the right/left levee. The levee was designed to have flood capacity of 1,200 m^3/s with 1 m free-board. After the flood in 1975, a part of levee stretch was heightened or reinforced. After the flood in 1980, the levee on the left bank was extended at a few kilometers distance toward the Mediterranean sea to protect two villages.

The Seyhan Dam at the immediate upstream of Adana city was constructed from 1953 to 1956, as a multi-purpose dam for flood control, irrigation and hydropower water use. A lot of sediment were deposited in the Seyhan Dam reservoir at about 300 x 106 m^3 up to the present, which corresponds to 1.1 times to the designed sediment quantity. While the Seyhan Dam degraded the flood control function, the huge flood attacked the Seyhan Dam at March and April 1980. The peak inflow into the reservoir and the maximum spillout discharge from the dam was respectively estimated at 6,040 m^3/s and 2,671 m^3/s. The flood invited the destructive damage at the Çukurova plain.

To control floods and utilize water resource more effectively, construction of another multi-purpose dam, the Çatalan Dam, was started from 1982. The dam is located at the immediate upstream of the Seyhan Dam. The dam is scheduled to be completed in 1995. The dam is designed to protect the downstream area against the 500-year probable flood by joint operation with Seyhan Dam.

3. FLOOD CONTROL FACILITIES

3.1 Seyhan River

Depending on land use and population density, flood protection stretch of the Seyhan River is limited to Adana city and the downstream area from there. The upstream river remains as a natural river. Exceptionally, river bank protection at a short distance was made at a tributary of the Göksu River in the town of Feke, and along the Çakıt River near Pozantı city, which flows into the Seyhan reservoir.

The Seyhan River meanders largely from the downstream of Adana city. The river length of the high water channel between the right and left levees is 51 km, while that of the low water channel of the original river bed is 86 km. The groyne structures were constructed at many curved locations in the low water channel. Through experience, the low water channel may have a bankfull flow capacity of 500 m^3/s.

The river levee at the downstream of Adana city was constructed from 1949 to 1953. The total length of the right and left levees was about 100 km. The average levee height was at about 2.0 m. The levee has 3.5 m crest width and 1:3 slope at the river side and 1:2 slope at the land side. The average distance between right and left levees is about 2 km. Originally, the levee was designed to have a flood capacity of 1,200 m^3/s with 1 m free-board. The expropriated land boundary of the levee is at 9 m to the river side and land side, or 18 m in total.

Sluice-ways were constructed at 48+810 km and at 31+882 km at the left bank levee for irrigation intake. Those sluice-ways were not used at present because irrigation channels were developed intensively in farm land. The right bank levee was opened at about 10 km downstream of the Seyhan Dam to function as spillway. The discontinued levee at the distance of 400 m is connected to the drainage canal TD0, that is an old river bed channel, to increase high water channel flood capacity. The capacity is estimated at 400 m^3/s through the flood experience in 1980.

The upstream regulatory structure for irrigation intake was constructed at the location of 2-km downstream of the Seyhan Dam in 1943. The downstream regulatory structure was constructed at the location of 4.5-km downstream of the upstream regulatory structure in 1989, which aims to generate hydro-power and to raise river water level in Adana city during summer time. The gates are opened twice a month during summer time to change the stored water and to prevent malaria disease. Those structures crosses the Seyhan River and flood capacity has at 2,500 m^3/s.

The distance between right and left levees in Adana city varies from 300 m to 800 m at present. River improvement project was planned by DSİ to narrow the river width so as to develop the present high water channel as shopping center or recreation center. The river width is designed at 120 m with 1,800 m^3/s flood capacity. The river bank will be retained by concrete wall, and earth fill levee will be embanked above the ground between the Girne bridge and the upstream regulatory structure. River bed will be also dredged to increase flood flow capacity. Adana municipal authority will carry out the construction.

A few buildings have been constructed at the present high water channel. Retaining walls have been constructed between the downstream regulatory structure and the Stone bridge by the Çukurova Electric Company at the time of the construction of the downstream regulatory structure. The existing wall between the Stone bridge and Girne bridge will be renewed or heightened.

The Sarcam River enters into the Seyhan River from the left bank at the immediate upstream of the Köprü bridge.

3.2 Dams

(1) Seyhan Dam

A feasibility study for the Seyhan Dam was carried out in 1949 to 1951, and was constructed in 1953 to 1956.

Major physical characteristics of the dam is listed in Table 3.2.1. The dam is characterized by the design of the emergency spillway. The emergency spillway is located at the right bank. The original right-bank mountain was excavated with 260-m width and crest elevation of the spillway was set up at 67.5 m, while the dam crest is elevated at 72.7 m. The emergency spillway functions to spill-out flood water above El. 67.5 m automatically when the gated spillway can not spill-out a flood. The approach road to the spillway crest was made gentler in 1987 so that a big bus could pass on the crest. The spillway crest was paved at that time also.

The gated spillway is located between the emergency spillway and the dam body. Radial gates of 6 nos. with 7.0 m width x 6.1 m height are installed on the spillway weir. The spillway has the capacity of 2,500 m^3/s discharge.

The power plant is located at the left bank, of which design discharge is 231 m^3/s (3 unit x 77 m^3/s). Irrigation outlet is equipped on the penstock of the power plant, which is connected to the irrigation channel YS1 with 11 m^3/s capacity. On the right bank of the dam, pump

station for irrigation intake is located, which is connected to the irrigation channel TS1 with 21 m3/s capacity. No other outlet facility is equipped with the Seyhan Dam.

The reservoir mapping is being carried out at every 5-year intervals by means of echo sounding to estimate the reservoir volume. The results are listed in Table 3.2.2 and shown in Figure 3.2.1. The reservoir storage volume are summarized below, in comparison with the original volume in 1956 and the latest volume in 1986.

Item	El. (m)	Volume ($\times 10^6$ m³) in 1956	Volume ($\times 10^6$ m³) in 1986	Decrease ($\times 10^6$ m³)
Dead Storage	30.0 to 49.0	269	159	110
Active Storage	49.0 to 67.5	948	720	228
Flood Control Storage	61.0 to 67.5	421	366	55
Total Storage	30.0 to 67.5	1,217	879	338

Catchment area of the Seyhan Dam is 19,337 km^2. Average specific sediment quantity is estimated at 593 m^3/year/km^2(=338x10^6/30/19,337). In accordance with DSİ investigation, the specific sediment quantity is estimated at 250 m^3/year/km^2 at upper catchment area and at 1,000 m^3/year/km^2 at lower catchment area. It is measured at 380 m^3/year/km^2 at 1818-measurement station.

The sediment volume in the reservoir decreased remarkably from 1980. The Çakıt River, which flows into the Seyhan reservoir, is one of the biggest sediment source. Land reservation in the Çakıt River basin was started with reforestation or constructing check dams from around 1980. Construction activity was so prevailed from 1980 in Adana and Mersin cities that a lot of sand and gravel as concrete material were taken at the reservoir entrance of the Çakıt River. The Çatalan Dam construction was started from 1982 by coffering the Seyhan River. Then, sediment from the upper catchment was trapped at the Çatalan Dam. A big flood did not hit the Seyhan Dam after 1980. They are mainly why the reservoir sediment decreased in the recent decade.

(2) Çatalan Dam

The first investigation of the Çatalan Dam was made in 1966. The 6th regional DSİ office shifted the dam axis toward 8-km downstream from the original dam axis location because of geology. The Çatalan Dam was studied in the Lower Seyhan Master Plan Report in 1980. The flood damage in 1980 harnessed an urgent implementation of the Çatalan Dam construction.

The dam construction was started.on 12 February 1982. The construction cost of civil work is estimated at 31 billion T.L including escalation cost and additional work. The contract price for hydro-mechanical and hydro-electrical equipment is 29 million D.M and 1,155 million T.L, equivalent to 9.5 billion T.L. It is scheduled to impound the reservoir and start power generation of the Unit 1 turbine/generator in 1995.

Major physical characteristics of the dam is listed in Table 3.2.1. The reservoir volume is shown in Figure 3.2.2. After the dam completion, the Çatalan/Seyhan Dams will be able to protect the downstream area against 500-year probable flood. The Çatalan Dam will firm up power generation at the Seyhan Dam.

4. HISTORICAL FLOODS

4.1 Floods Record

Yearly peak discharge at major discharge stations is listed in Table 4.1.1. The recorded fifth biggest discharges at Sta.No.1818 are summarized below.

	No.1	No.2	No.3	No.4	No.5
Disch. (m^3/s)	3,800	3,348	2,700	2,200	1,957
Date	28 Mar. '80	3 Jan. '79	19 Dec. '63	9 Jan. '58	29 Apr. '75

Monthly occurrence of peak discharge is tabulated below.

Month	St. 1818	St. 1820	St. 1821	St. 1817
Oct.				
Nov.	1 time		3 times	1 time
Dec.	6 times		1 time	
Jan.	7 times		2 times	1 time
Feb.	4 times	1 time	1 time	
Mar.	9 times	1 time	1 time	1 time
Apr.	14 times	3 times	3 times	3 times
May.				2 times
Jun.		1 time		1 time
Jul.		1 time		1 time
Aug.		1 time		
Sep.				1 time

From the above table, it is obvious that flood season is from November to April. Rain fall increases in this season and melting snow boosts up the river discharge. Some yearly-peak-discharges in summer season are recorded at the tributaries of the Seyhan River.

The major flood records are listed in Table 4.1.2. Only the flood in 1980 over-flowed the levee. Other floods damaged the area in the high water channel. The flood in 1980 was the biggest flood and gave the biggest damage.

Flood damage took place not only at the Çukurova plain but also at the upstream area and tributaries of the Seyhan River. Around Feke district, floods hit in 1979 and 1980. The flood in 1980 destroyed 21 buildings and damaged 76 buildings. After the flood, the river bed was

widened from 16-17 m to 30 m. Revetment with stone pitching was constructed at some stretch.

Traffic line of highway road and railway was damaged as listed in Table 4.1.3 and 4.1.4. Total repairing costs for the damaged structure are 65,400 million T.L for the highway road and 118 million T.L for railway.

4.2 Flood in 1980

The flood season high water level of the Seyhan reservoir at El. 61.0 m was ended at the middle of March 1980 in accordance with the reservoir operation rule curve. The reservoir was scheduled to impound up to the high water level at El. 67.5 m by the beginning of May 1980. The spillway gates of the Seyhan Dam were opened from 7 March 1980 so that the reservoir water level could be maintained to meet the rule curve. The spillway gate opening clearance was at 0.8 m from 7 to 13 March, at 1.5 m from 14 to 16 March and at 3.0 m from 17 March. Under this gate operation, reservoir water was accordingly spilled out with free-flow status. In spite of the gate operation, the reservoir water level could not be lowered to the scheduled water level because of small capacity of the spillway, as listed below.

Date	14	15	16	17	18	19	20
Scheduled RWL.	61.00	61.00	61.14	61.29	61.43	61.58	61.72
Actual RWL.	62.08	62.09	62.12	62.15	62.16	62.20	62.20

Date	21	22	23	24	25	26
Scheduled RWL.	61.87	62.01	62.16	62.30	62.44	62.59
Actual RWL.	62.20	62.18	62.28	62.45	63.04	63.80

On 24 March 1980, it rained with 15 to 30 mm daily density in most of the basin. On 25 and 26 March 1980, precipitation decreased very much, but atmosphere temperature rose on 26 March 1980. This weather condition accelerated snow-melting. On 27 March 1980, precipitation increased again to above 100 mm daily density in some rain-fall stations. Thus, the recorded flood hit the Seyhan Dam on 28 March 1980.

Reservoir water level of the Seyhan Dam and the spillway gate opening clearance were recorded at 1-hour interval during the flood. Spill-out discharge and reservoir inflow were estimated by use of the recorded data, as computed in Table 4.2.1. The computation results are shown in Figure 4.2.1. It is estimated that peak inflow at 6,040 m^3/s took place at around 5 a.m. on 28 March 1980. The reservoir water level reached to El. 67.5 m at 10:45 a.m. on 28

March 1980. The reservoir water started to spill out over the emergency spillway automatically.

Maximum bank-full discharge of river channel was at 1,800 m^3/s for the downstream river stretch of the Seyhan Dam. Flood water at about 400 m^3/s discharge diverted through the disconnected right bank levee and drainage canal TD0. It is estimated that spill-out flow from the dam exceeded the discharge of 2,200 m^3/s at around 24:00 p.m. on 28 March 1980. The flood water might over-flow above the levee since then. The spill-out discharge continued to increase and reached to the maximum outflow of 2,671 m^3/s at 21:00 p.m. on 29 March 1980. The maximum reservoir water level at 69.72 m was recorded at 16:00 p.m. on 29 March 1980. Flood inflow volume is estimated at 1,808 million m^3 from 26 to 31 March 1980. Stored water volume in the reservoir is estimated at 390 million m3. The flood is equivalent to 100-year probable flood.

In order to protect Adana city, left-bank levee was destroyed intentionally and artificially at around Sta. 13 km on 30 March 1980, which aimed to discharge flood water into the drainage canal YD5. Flood water over-flowed above the levee at 5 locations of the left- bank levee and at 6 locations of the right-bank levee, on 30 March 1980. Some locations where the flood water over-flowed the levee were collapsed, as listed below.

No.	St.	Location	Status
(Right bank levee)			
1		Near K. Yalmanlı village	Over-flow
2		Near Koyuncu village	Over-flow
3	24+000	Between Salmanbey and Dervişler village	Broken
4	40+000	Around Yaramıs	Broken
5	43+000		Broken
6	45+000		Over-flow
(Left bank levee)			
7	13+000	Near Klavur village	Artifi. breking
8	16+600	Downstream of klavur village	Broken
9	21+000	Near Verdelen village	Over-flow
10	34+000	Near Klavur village	Over-flow
11	40+000	Between Ziyamet and Ganime village	Broken
12	47+000	Near Ganiment village	Broken

On 2 April 1980, it rained in the basin again. Another small flood hit the Seyhan Dam on 3 April 1980, of which inflow peak discharge was estimated at 2,738 m^3/s. The Seyhan Dam spilled out the flood water at 1,870 m^3/s to the downstream river. Çukurova plain was inundated additionally. The inundated area through the flood is listed below.

Date	Left bank	Right bank	Total
30 Mar. '80	8,390	9,280	17,670
31 Mar. '80	5,670	8,600	14,270
1 Apr. '80	0	1,300	1,300
3 Apr. '80	600	8,250	8,850
Betweenlevees			5,000
Total	14,660	27,430	47,090

After the flood, repairing levee and irrigation canals was started. The repairing work is listed below.

Levee	St.	Repairing Date	Emb. Vol. (m³)
Left-bank levee	16+600	10 Apr. to 17 Apr. '80	6,290
Left-bank levee	40+000	18 Apr. to 26 May.'80	13,170
Left-bank levee	47+000	25 Apr. '80	125
Right-bank levee	24+600	16 Apr. to 25 Apr. '80	8,585
Right-bank levee	40+000	12 May.to 20 May. '80	8,350
Total			36,520

Irrigation canals, left main conveyance channel, YS6 and YS7 are repaired, either.

5. PRESENT WATER USE

5.1 Irrigation

The upstream regulatory structure aims to divert the river flow into the right and left main irrigation canals, TS0 and YS0 respectively. The main canals were constructed from 1937 to 1947. The diversion capacity is at 54 m^3/s and 90 m^3/s for the right and left canals. The structure is equipped with 24 nos. sluice gates. The crest length is 157 m, elevated at 23 m.

The fertile area, Çukurova plain, is developed at the downstream of Adana city on the right and left bank of the Seyhan River. The right bank is called as Tarsus plain between the Berdan River and the Seyhan River, the left bank is called as Yuregir plain between the Ceyhan River and the Seyhan River. The irrigation project on the area was implemented under the following three stages.

Stage	Const. year	Tarsus	Yuregir	Total
1st Stage	1957 to 1968	27,800ha	37,200ha	65,000ha
2nd Stage	1969 to 1974	21,400ha	27,200ha	48,600ha
3rd Stage	1975 to 1981	19,000ha	0ha	19,000ha
Total		68,200ha	64,400ha	132,600ha

An investigation study for irrigation and drainage was carried out in 1956. Canal lining was started in 1957 for the 1st-stage project. In 1963, IDA (International Development Agency) financed 20 million US$ for the project. The irrigation canal and drainage canal were constructed respectively at the length of 3,000 km and 2,500 km in the above irrigation area. Another irrigation area of 40,700 ha is under planning as 4th stage development.

In order to irrigate the upstream area of the upstream regulatory structure, intake facility at the Seyhan Dam was constructed. In 1974, intake facility from the power plant penstock was operational to supply water to the left bank area with the capacity of 11 m^3/s connecting with the irrigation canal YS1. In 1974, intake facility near the emergency spillway was constructed to supply water to the right bank area with gravity flow, connecting with the irrigation canal TS1. To increase the capacity to 21 m^3/s, pumps were installed there in 1979.

5.2 Hydropower Generation

The hydro power plant was constructed at the left bank of the Seyhan Dam in 1956. Unit 1 and Unit 2 generators were serviceable from then. Unit 3 generator were installed in 1964.

The Çatalan Dam power plant is scheduled to start the power generation by Unit 1 generator at August 1994. Physical characteristics are summarized below.

		Seyhan Dam	Çatalan Dam
Unit of turbine/generator		3	3
Type of turbine		Fransis, vertical shaft	
Gross head (max)	(m)	46.5	61.0
Net head (min)	(m)	32.0	59.9
Discharge	(m^3/s)	3x77=231	3x120=360
Installed capacity	(MW)	3x28=54	3x56.3=168.9
Annual generated energy	(GWh)	350	596

The Yuregir power plant was completed at April 1972 on the way of the left main irrigation canal YS0, at 12+828 km. The power plant generates the average annual energy of 20 GWh during irrigation season by running a Kaplan turbine. The installed capacity is at 6 MW by use of 8.7 m water head and 90 m^3/s discharge.

The power plant was completed at the downstream regulatory structure in 1991. The installed capacity is at 7.5 MW with 3 units of Kaplan turbines by use of 3.5 m water head and 255 m^3/s discharge.

The Seyhan River has hydro power potential to generate energy of 4,146 GWh with installed capacity of 1,128 MW. The river has 4 to 6.3 billion m^3 annual flow and 460 to 480 m gross head for hydro power generation. Other hydro power plants are planned as listed in Table 5.2.1.

5.3 City Water

City water is now sourced from underground water at about 114 x 10^6 m^3/year (3.6 m^3/s). Assuming the population in Adana city at 917,000 persons, daily water consumption per capita is at 340 lit/person/day. Adana municipal authority planned to construct the intake weir on the tributary of the Körkün River, which scheduled to intake water at 3 m^3/s. Water treatment plant will be located at the south hilly land of the Seyhan reservoir. However, it was found that the intake quantity would not meet with increased demand. The 6th regional DSİ office investigated Körkün and Eğlence Dams. The dams will supply water at 9 m^3/s to the treatment plant.

The census in 1990 revealed that the above water supply would not meet the future demand due to population increase. DSİ decided recently to intake city water from the Çatalan Dam at the discharge of 16.7 m^3/s.

6. FLOOD INUNDATION AND DAMAGE

6.1 General

The Seyhan River levee had been constructed from 1949 to 1953. The downstream river stretch of Adana City is remained mostly as same after the levee construction. The river section consists of low water channel (natural river section) and high water channel formed by the levee. The general plan of the river is shown in Figure 6.1.1. The river channel width varies as follows.

(Unit : m)	Min.	Max.	Avg.
Low water channel	68	238	119
High water channel	1,097	2,426	1,841

The river stretch in Adana city was improved at some length. Namely, concrete wall was constructed between the Stone Bridge and the downstream regulatory structure. The general plan in Adana City is shown in Figure 6.1.2. The river stretch in Adana City is scheduled to improve moreover to utilize the present high water channel as a shopping or recreation zone. The typical river cross section is shown in Figure 6.1.3. The typical section-1 was applied for the stretch between Girne Bridge and the downstream regulatory structure, and for the left bank between the Girne Bridge and the Section 7. The typical section-2 will be applied for the remaining stretch up to the upstream regulatory structure as shown in Figure 6.1.2.

6.2 Water Surface Routing

River cross sections at the downstream stretch are shown in Figure 6.2.1. The coordinates of the sections are listed in Table 6.2.1. As seen in the cross section figures, the width of low water channel and high water channel, as well as river slope gradient, vary at every section. Non-uniform flow analysis method is applied to routine the river water surface to the above irregular river cross section. Assuming the section-I and section-II at the downstream and the upstream, the following equation can be applied.

$$Z_I + H_I + \beta Q/(2gA_I^2) = Z_{II} + H_{II} + \beta Q/(2gA_{II}^2) - h_f$$

Where is,

- Z : River bed elevation at Section-I and -II
- H : Water depth at Section-I and -II
- Q : Discharge
- g : Gravity acceleration
- A : Sectional area under water
- ß : Energy adjustment coefficient

h_f : Friction head loss between Section-I and -II

Friction head loss, h_f , can be calculated by the following formula which is introduced by Manning's formula.

$$h_f = (n^2/R_I^{4/3}/A_I^2 + n^2/R_{II}^{4/3}/A_{II}^2) \times Q^2 \times L/2$$

Where is,

R : Wetted perimeter

n : Manning's roughness coefficient

L : Length between Section-I and -II

In accordance with DSI's experience, low water channel capacity is estimated at about 500 m^3/s. That of high water channel is experienced at 1,200 m^3/s with 1.0 m free-board and at 1,800 m^3/s without free-board. The discharges of 200, 300, 400 and 500 m^3/s are examined for the low water channel. Those of 1,200, 1,600 and 2,000 m^3/s are examined for the high water channel. Manning's roughness coefficient is assumed at 0.03 for the low water channel in compliance with Japanese practice. Because some farming vegetables or trees are planted at the high water channel, that coefficient is assumed at 0.04 for the high water channel.

The section No., Sec-26A, is the most downstream section among the available cross sections. The section is located at about 11 km far from the river mouse. Uniform flow depth at the section is shown in Figure 6.2.2. The initial water surface elevation is assumed upon the figure as follows.

Discharge (m^3/s)	200	300	400	500	1,200	1,600	2,000
Initial water surface El. (m)	0.75	1.92	2.11	2.25	2.65	2.96	3.27

The hydraulic energy at this section is calculated and shown in Figure 6.2.3. The water surface elevation with minimum energy corresponds to critical depth, which classifies super-critical flow or sub-critical flow. The critical depth upto 500 m^3/s discharge does not appear for the low water channel, which indicates that water flow is at sub-critical flow status always. While, critical depth at the high water channel appears at the water surface elevation of 2.1 m, 2.2 m and 2.25 m to the discharges of 1,200 m^3/s, 1,600 m^3/s and 2,000 m^3/s. Depending on sea water level, river flow status changes to super-critical flow. However, the section is so far as about 11 km away from the sea, hydraulic jump may take place at just near the sea. Trial calculation proves that variation of initial water surface elevation effects upstream water surface within a few km only.

6.3 River Capacity

The calculation results of the above analysis are listed in Table 6.3.1, and water surface are shown in Tables 6.3.2 and 6.3.3. The calculation results are summarized in Supporting Report C. The calculated water surface profile is shown in Figures 6.3.1 and 6.3.2.

As seen in Figure 6.3.1, the clearance between the river water surface and low water channel shoulder is bigger where the low water channel width is wider and the channel depth is deeper. The river flow discharge less than 300 m^3/s does not inundate the high water channel. The discharge of 500 m^3/s inundates the high water channel until 20 km from Sec-26A. The inundated area is shown in Figure 6.3.3. The river flow discharge above 700 m^3/s inundates the high water channel at the full stretch.

The Japanese criteria stipulates the levee free board as follows.

River flow discharge		Free board (m)
Less than 200	m^3/s	0.6
200 to 500	m^3/s	0.8
500 to 2,000	m^3/s	1.0
2,000 to 5,000	m^3/s	1.2
5,000 to 10,000	m^3/s	1.5
More than 10,000	m^3/s	2.0

The free board to the calculated river water surface is listed in Table 6.3.3 and summarized as follows.

(Unit : m)

Discharge	Min.	Max.	Avg.
1,200 m^3/s	0.59	1.31	0.98
2,000 m^3/s	0.07	0.88	0.48

The bankfull discharge is estimated at 2,000 m^3/s or river flow may over-flow at some stretch. If the above Japanese criteria is applied, the designed discharge is attained at 1,200 m^3/s, though free board is less than 1.0 m at some stretch.

The Seyhan River in Adana city is designed with constant width and slope gradient. The river bed slope gradient is designed at 0.07 % (1/1,429). Uniform flow analysis is applied to estimate the water depth for the river in Adana city. Flood flow capacity at the stretch in Adana city is bigger than that at the downstream stretch. The uniform flow depth and free board are summarized as follows.

	Discharge (m^3/s)	Water depth (m)	Free board (m)
Typical Section-1	1,200	3.86	3.17
	2,000	5.27	1.76
Typical Section-2	1,200	4.08	2.14 (Min.)
	2,000	5.53	0.69 (Min.)

The present capacity of high water channel of the downstream river is carefully checked by the past flood records and the operation records of flood routing activity at the Seyhan Dam.

7. OPTIMUM COMPREHENSIVE RIVER CONTROL

7.1 Flood Flow Dam Operation

7.1.1 General

An effective dam-flood-control rule will mitigate flood damage. As well, an effective reservoir operation rule can generate optimum hydro power energy. Dam flood control rule and reservoir operation rule are studied hereunder.

DSİ established flood hydrograph at the place of the Çatalan Dam and Seyhan Dam. The flood hydrograph are listed in Tables 7.1.1 and 7.1.2. Flood flow dam operation is studied on a basis of the hydrograph. The peak discharge is summarized below.

Probable	Çatalan Dam		Seyhan Dam*1	
Flood	Peak (m^3/s)	Volume (x 10^6)	Peak (m^3/s)	Volume (x 10^6)
2-year	1,175	538.1	280	14.1
5-year	1,740	656.4	435	53.4
10-year	2,130	762.5	550	68.7
25-year	2,650	870.3	705	86.0
50-year	3,045	963.7	825	100.8
100-year	3,455	1,063.3	955	114.0
200-year	3,850	1,191.5	1,075	138.0
500-year	4,375	1,286.4	1,235	154.9
Catastrophy	9,376	2,310.4	6,731	617.9

Note *1 : Çakıt River and the Körkün River

DSİ made dam flood control plan against 500-year probable flood.

This report makes flood routing study to the respective probable floods. Dam safety is checked by applying the catastrophy flood estimated by DSİ.

Spill-out discharge through the tenter gate is calculated by applying the following equation.

$$Q = (2g)^{0.5} \times 2/3 \times \mu \times B \times (H_1^{3/2} - H_2^{3/2})$$

Where is,

g	Gravity acceleration
μ	Discharge coefficient introduced by U.S.B.R
B	Spill-out width
H_1	Water head from water surface to spillway crest
H_2	Water head from water surface to the bottom of the gate

The reservoir flood routine is carried out to examine reservoir water level while changing spilling-out discharge. The following formula is applied for the analysis.

$(I_1 + I_2) \times \Delta t/2 = (S_2 - S_1) + (O_1 + O_2) \times \Delta t/2$

Where is,

Suffix 1 Each value at the time of t_1

Suffix 2 Each value at the time of $t_2=t_1+\Delta t$

Δt Duration time

I Inflow discharge into reservoir

S Storage volume in reservoir

O Outflow discharge from reservoir

Spill-out discharge is to be minimized so as to decrease flood damages at the downstream, or flood water is to be stored in the reservoirs as much as possible. There are two methods on dam gate operation rule to regulate flood flow. One is called as "constant outflow operation" and the other is as "constant ratio operation". Operation rule is explained below.

"Constant outflow operation"

Flood water shall be spilled out, until flood inflow reaches to a target spill-out discharge (Q_t), so that a reservoir water level shall be maintained at the flood season low water level. In other words, no flood water is stored in a reservoir during this operation because flood inflow into a reservoir shall be spilled out at the same time. Flood water shall be spilled out at the rate of Q_t after flood inflow exceeds the discharge of Q_t. Flood water is stored in a reservoir during this operation. This operation is applied for Çatalan Dam flood routing by DSİ.

"Constant ratio operation"

Variables are defined as follows.

Q_i : Inflow discharge

Q_t : Target spill-out discharge

Q_P : Inflow peak discharge

Q_0 : Initial spill-out

T_p : Time at inflow peak

Spill-out discharge shall be increased up to T_p with the following equation.

$Q = (Q_i - Q_0) \times (Q_t - Q_0)/(Q_p - Q_0) + Q_0$

Spill-out discharge shall be maintained constantly at Q_t after T_p. This operation can regulate even small flood flow.

Japanese criteria to design dam height is listed below.

$H = H_n + h_w + h_e + 1.5$ or $H_n + 2$ in case of $(h_w + h_e) < 1.5$

$H = H_s + h_w + h_e/2 + 1.5$ or $H_s + 2$ in case of $(h_w + h_e)/2 < 1.5$

$H = H_d + h_w + 1.5$ or $H_d + 2$ in case of $(h_w + h_e)/2 < 1.5$

Where, H_n : Normal high water level H_s : Surcharge water level

H_d : Design flood water level

h_w : Wave height due to wind

Assuming wind velocity at 30 m/s and reservoir length at 8,000 m (Çatalan Dam and Seyhan Dam), h_w is calculated at 1.6 m by applying S.M.B and Saville method.

h_e : Wave height due to earth quake

Assuming earth quake coefficient at 0.15 and water depth at 32 m (Seyhan Dam) and 63 m (Çatalan Dam), h_e is calculated at 0.42 m (Seyhan Dam) and 0.59 m (Çatalan Dam) by applying Japanese standard.

7.1.2 Çatalan Dam

The gated spillway is located at the left bank with 6 nos. radial gates, of which dimension is of 11-m width and 15.1-m height. Weir crest is elevated at 109.9 m.

The reservoir area and volume of the Çatalan Dam is shown in Figure 7.1.1. Reservoir volume curve is assumed with the following equation.

$$Vol. = 0.886 \times (El.)^2 - 138.648 \times (El.) + 5625.835$$

Where, Vol. : Reservoir volume ($\times 10^6$ m^3)

El. : Elevation (m)

Çatalan Dam has the following capacity of reservoir.

	Elev. (m)	Volume (x 10^6 m^3)
Dead Storage	Less than 115.0	1,399
Active Storage	115.0 to 125.0	740
Flood Control Storage	118.6 to 125.0	494
Total Storage	Less than 125.0	2,139

Flood routing is carried out by "constant ratio operation" to examine the optimum spill-out discharge. Flood hydrograph at 500-year probability is adopted in the analysis. Target spill-out discharge (Q_t) is changed at 600 m^3/s, 800 m^3/s, 1,000 m^3/s and 1,200 m^3/s. The flood season high water level is set up at El. 118.60 m. The initial reservoir water level is assumed at 118.60 m for this simulation study. The calculation results are tabulated in Tables 7.1.3 to 7.1.6, and shown in Figure 7.1.2. The results are summarized as follows.

Inflow peak	Spill-out dis.	Stored vol.	Max. RWL
4,375 m^3/s	600 m^3/s	555.9 x 10^6 m^3	125.74 m
4,375 m^3/s	800 m^3/s	447.4 x 10^6 m^3	124.43 m
4,375 m^3/s	1,000 m^3/s	391.2 x 10^6 m^3	123.74 m
4,375 m^3/s	1,200 m^3/s	345.4 x 10^6 m^3	123.17 m

Therefore, assuming that ;

(a) Flood control volume = 628 x 10^6 (m^3)

(b) Safety factor = 1.2

(c) Flood control volume with safety factor = 628 x 10^6 /1.2 = 523.3 x 10^6 (m^3)

Spillout discharge of 800m^3/sec.is selected for Çatalan Dam.

7.1.3 Seyhan Dam

The reservoir volume curves in 1956, 1986 and 1991 are shown in Figures 7.1.3. The reservoir volume curve is assumed with the following equation.

$$Vol. = 1.499 \times (El.)^2 - 136.998 \times (El.) + 3285.871$$

Where, Vol. : Reservoir volume (x 10^6 m^3)

El. : Elevation (m)

The emergency spillway is located at the right bank with 260-m width. The spillway crest elevation is at 67.5 m, while the dam crest is elevated at 72.7 m. The emergency spillway functions to spill-out flood water above El. 67.5 m automatically when the gated spillway can not spill-out a big flood. The gated spillway is located between the emergency spillway and the dam body. Weir crest is elevated at 61.0 m. Flood season low water level is set up at 61.0 m. Preferably, flood flow shall be controlled not to over-top the emergency spillway because the spillway is not lined and the mountain will be eroded by flood flow.

Seyhan Dam has the following capacity of reservoir.

	Elev. (m)	Volume (x 10^6 m^3)
Dead Storage	Less than 49.0	171
Active Storage	49.0 to 67.5	710
Flood Control Storage	61.0 to 67.5	370
Total Storage	Less than 67.5	881

The spilled-out flood water from Çatalan Dam and flood water from the remaining catchment area inflow into Seyhan Dam reservoir at flood time. The spilled-out flood from Çatalan Dam is changed as calculated in the above. The flood water from the remaining area flows along the Çakıt River and the Körkün River.

A trial study reveals that a gated operation does not make benefit for reservoir operation, it is because reservoir water level reaches to emergency spillway crest shortly after flooding and it is enforced to open the gates. Therefore, non gated operation, or free flow operation, is adopted for the Seyhan Dam.

Comparison at the Seyhan Dam between "constant outflow operation" and "constant ratio operation" operated at the Çatalan Dam is made in Figure 7.1.4 to 7.1.7. The results are summarized as follows. The results of calculation are listed in Tables 7.1.7 to 7.1.10.

Constant ratio operation at Çatalan Dam

	Spill-out from Çatalan	Inflow from subbasin	Inflow peak	Stored vol.	Max. RWL	Outflow
1/2	582 m^3/s	280 m^3/s	861 m^3/s	132.2x10^6 m^3	63.73 m	591 m^3/s
1/5	622 m^3/s	435 m^3/s	1,054 m^3/s	148.6x10^6 m^3	64.03 m	659 m^3/s
1/10	647 m^3/s	550 m^3/s	1,195 m^3/s	162.9x10^6 m^3	64.29 m	720 m^3/s
1/50	715 m^3/s	825 m^3/s	1,534 m^3/s	194.0x10^6 m^3	64.84 m	856 m^3/s
1/100	738 m^3/s	955 m^3/s	1,691 m^3/s	206.6x10^6 m^3	65.06 m	913 m^3/s

Constant outflow operation at Çatalan Dam

	Spill-out from Çatalan	Inflow from subbasin	Inflow peak	Stored vol.	Max. RWL	Outflow
1/2	1,175 m^3/s	280 m^3/s	1,455 m^3/s	158.1x10^6 m^3	64.20 m	699 m^3/s
1/5	1,200 m^3/s	435 m^3/s	1,635 m^3/s	210.6x10^6 m^3	65.13 m	931 m^3/s
1/10	1,200 m^3/s	550 m^3/s	1,750 m^3/s	247.7x10^6 m^3	65.76 m	1,102 m^3/s
1/50	1,200 m^3/s	825 m^3/s	2,025 m^3/s	287.3x10^6 m^3	66.40 m	1,288 m^3/s
1/100	1,200 m^3/s	955 m^3/s	2,155 m^3/s	288.7x10^6 m^3	66.42 m	1,293 m^3/s

7.2 Water Use Operation

7.2.1 Alternative reservoir rule curve

The operation rule curve of the Çatalan Dam is studied hereunder. Hydropower is generated by water head and flow discharge. If the reservoir water level is set up at higher level to obtain higher water head for power generation in rainy season, the dam can not regulate flood flow and flood water can not be stored in the reservoir to be utilized for power generation in dry season. If the reservoir water level is set up at lower level on the contrary, less water head generates less power energy and minimum guarantee energy (firm energy) becomes less in

drought year because of less stored water in the reservoir. The reservoir operation rule curve shall be optimized.

Monthly average inflow discharge is recorded from 1940 to 1980 for 40 years as follows. Irrigation water and evaporation discharge are assumed as in the below.

	Inflow into Çatalan Dam (m^3/s)	Irrigation Water (m^3/s)	Monthly Evaporation (mm/month)	Evaporation (m^3/s)	Water for Hydro Power (m^3/s)
Oct.	79.0	6.3	87.2	2.4	70.4
Nov.	91.7	0.0	49.6	1.4	90.3
Dec.	137.4	0.0	31.3	0.8	136.6
Jan.	165.3	0.0	31.9	0.8	164.5
Feb.	196.7	0.0	39.8	1.1	195.6
Mar.	286.8	0.0	62.4	1.6	285.2
Apr.	359.3	3.3	84.9	2.4	353.6
May	245.3	11.7	124.4	3.6	230.0
Jun.	147.2	36.9	155.6	4.9	105.4
Jul.	102.3	70.9	175.4	5.1	26.2
Aug.	85.3	57.6	161.8	4.6	23.1
Sep.	79.3	29.3	128.0	3.7	46.4
Avg.	164.6	18.0	94.4	2.7	143.9

Monthly inflow discharge from January to May exceeds the average one. Therefore, the reservoir shall be filled during January to May ("storing period"). The average inflow in the "storing period" is at 246.1 (m^3/s). The stored water in the reservoir shall be consumed from June to December ("consuming period"). The average inflow in the "consuming period" is at 71.1 (m^3/s). The reservoir active storage volume is 740 x 10^6 m^3 (El. 115.0 to 125.0 m). Storing discharge and consuming discharge on average are respectively calculated at 56.7 m^3/s (=740 x 10^6 m^3/151 days/24 hrs./3,600 sec.) during the "storing period" (151 days) and at 40.0 m^3/s (=740 x 10^6 m^3/214 days/24 hrs./3,600 sec.) during the "consuming period" (214 days). Alternative rule curves are established as follows.

Case-1

The consuming discharge is distributed to a month depending on monthly average inflow during the "consuming period". Hydropower is generated by monthly inflow added with the distributed discharge. The storing discharge is distributed to a month depending on monthly average inflow during the "storing period". Hydropower is generated by monthly inflow deducted the distributed discharge. Power discharge is expressed as follows.

"Consuming period : $Q_p = Q_i + 40.0 \times Q_i/71.1$

"Storing period : $Q_p = Q_i - 56.7 \times Q_i/246.1$

Where, Q_p : Monthly power discharge

Q_i : Monthly average inflow

Case-2

The average inflow during the "consuming period" is 71.1 m³/s. Hydropower is generated by the discharge of 111.1 m³/s (=71.1 + 40.0) during the "consuming period". The average inflow during the "storing period" is 246.1 m³/s. Hydropower is generated by the discharge of 189.4 m³/s (=246.1 - 56.7) during the "storing period".

Case-3

The rule curve of Case-2 operates reservoir water level at lower level in the "consuming period". Firm energy may not be dependable. It is because the reservoir water level reaches to minimum operation level in November to February and power generation is enforced to be made by inflow discharge only. In order to increase firm energy, power discharge is set up at 101.1 m³/s (=111.1 - 10) during the "consuming period", decreasing 10 m³/s than that in Case-2. Instead, power discharge is set up at 199.4 m³/s (=189.4 + 10) during the "storing period", increasing 10 m³/s than that in Case-2.

Assuming the reservoir water level at 125.0 m at the beginning of June, the reservoir water level for the above cases are calculated in Table 7.2.1. The operation rule curve (R.C) is summarized below.

		Case-1		Case-2		Case-3	
Avg.Inf.		Q(m³/s)	R.C(m)	Q(m³/s)	R.C(m)	Q(m³/s)	R.C(m)
Jan.	164.5	126.6	115.0	189.4	116.0	199.4	117.6
Feb.	195.6	150.6	116.5	189.4	115.0	199.4	116.2
Mar.	285.2	219.5	118.1	189.4	115.3	199.4	116.1
Apr.	353.6	272.2	120.5	189.4	119.0	199.4	119.4
May	230.0	177.0	123.3	189.4	124.5	199.4	124.5

		Case-1		Case-2		Case-3	
Avg.Inf.		Q(m³/s)	R.C(m)	Q(m³/s)	R.C(m)	Q(m³/s)	R.C(m)
Jun.	105.4	164.6	125.0	111.1	125.0	101.1	125.0
Jul.	26.2	41.0	123.1	111.1	124.8	101.1	125.0
Aug.	23.1	36.1	122.6	111.1	122.0	101.1	122.5
Sep.	46.4	72.5	122.2	111.1	118.8	101.1	119.8
Oct.	70.4	110.0	121.3	111.1	116.4	101.1	117.8
Nov.	90.3	141.1	119.9	111.1	115.0	101.1	116.6
Dec.	136.6	213.5	118.1	111.1	115.0	101.1	116.2

Monthly maximum operation level is set up as follows.

	Max.El.(m)		Max.El.(m)
Jan.	118.6	Jul.	125.0
Feb.	118.6	Aug.	125.0
Mar.	118.6	Sep.	125.0
Apr.	120.7	Oct.	125.0
May	125.0	Nov.	120.7
Jun.	125.0	Dec.	118.6

The monthly reservoir rule curve and monthly maximum operation level is shown Figure 7.2.1.

In addition to the above rule curves, power energy is estimated in case that maximum operation level (flood control water level) is assumed as a rule curve.

7.2.2 Operation rule

Reservoir operation rule is established as follows.

(a) Target discharge shall be maintained at least for power generation except when reservoir water level is below minimum operation level. Reservoir water level reaches to minimum operation level, target discharge shall be decreased to maintain the reservoir water level at the minimum operation level. In other words, power discharge shall be at inflow discharge.

(b) When the reservoir water level is above minimum operation level and below the rule curve level, power is generated with target discharge.

(c) When the reservoir water level is below the maximum operation level and the rule curve level, design discharge of 360 m^3/s shall be discharged for power generation. Therefore, secondary discharge is at (360 m^3/s - target discharge) under this operation.

(d) When reservoir water level reaches to the maximum operation level, excessive water shall be spilled out.

7.2.3 Power simulation

Inflow discharge at Çatalan Dam site is available from 1940 to 1980, after deducting irrigation water use by İmamoğlu Project which is under construction. Generating energy is simulated for 20 years from 1960 to 1979 by applying the above operation rule. Power output is calculated with the following equation.

$$P = g \times Q \times H \times \mu$$

Where,

P Power output (kW)

g Gravity acceleration (9.8 m/s^2)

Q Power discharge (m^3/s)

H Head = Reservoir WL - T.W.L (64.0 m) - Head loss

μ Generator/Turbine efficiency

Head loss curve and generator/turbine efficiency curve is shown in Figure 7.2.2 and the following regression is adopted.

Head loss $h_l = 0.138 \times P_w^2 + 1.053 \times P_w + 460.513$

Where, h_l : Head loss (mm)

P_w : Power (MW)

Efficiency $\mu = - 1.645 \times 10^{-4} \times P_w^2 + 0.019 \times P_w + 0.382$

Where, μ : Generator/turbine efficiency

P_w : Power (MW)

Target discharge is changed to see energy output. Simulation results are listed Tables 7.2.2 for Case-1 with the target discharge of 80 m^3/s. The energy output is listed in Tables 7.2.3 to 7.2.6. If operation rule curve is assumed on flood control curve, annual average output energy is at 545.2 GWh in case of 70 m^3/s target discharge as shown in Table 7.2.3. Simulation results are summarized below.

	Case-1			Case-2			Case-3		
Target dis. (m^3/s)	70.0	80.0	90.0	30.0	40.0	50.0	50.0	60.0	70.0
Average firm dis. (m^3/s)	67.9	76.3	79.8	30.0	39.5	48.1	50.0	59.3	67.6
Secondary dis. (m^3/s)	61.4	52.1	54.9	92.8	85.4	80.0	81.2	71.9	62.6
Spill-out dis. (m^3/s)	8.5	8.7	4.3	9.4	5.6	3.8	2.7	3.1	2.3
Firm energy (GWh/yr)	285.2	322.0	337.5	117.3	157.0	192.9	133.9	243.6	278.0
Second. engy (GWh/yr)	264.6	227.4	236.7	383.6	353.8	331.2	341.1	302.2	262.7
Total energy (GWh/yr)	549.8	549.4	574.2	500.9	510.9	524.2	545.0	545.8	540.6

If target discharge is aimed at higher discharge, total energy becomes larger but firm energy dependability becomes less. Through the above simulation, operation rule curve of Case-1 with the target discharge of 80 m^3/s is recommendably adopted because it can generate power energy more and firm energy is acceptably dependable.

7.2.4 Power simulation without- and with- flood forecasting warning system

Daily power generation is simulated in case of "without system" and "with system". Operation rule is set up as follows.

(a) Maximum power discharge shall be at 360 m^3/s.

(b) Reservoir water level shall be followed the reservoir operation rule curve of Case-1.

(c) "Recovery discharge" (Q_r) is defined as the discharge to recover the reservoir water level (RWL) on the previous day to the rule curve (RC) on the operation day.

$Q_r = (V_{RWL} - V_{RC})/24$ hrs./3,600 sec.

Where, Q_r : Recover discharge (m^3/s)

V_{RWL} : Reservoir volume on the previous day (m^3)

V_{RC} : Reservoir volume on the operation day (m^3)

Power discharge shall be daily inflow discharge (Q_i) added with Q_r.

(d) Minimum power discharge shall be at 80 m^3/s.

(e) If RWL exceeds flood control level, reservoir water shall be spilled out.

(f) If RWL is less than the minimum operation level (115.0 m), power discharge shall be at Q_i.

Daily power simulation is made on a basis of the above operation rule. Daily inflow (Q_i) in 1970, 1975 and 1988 are adopted. Daily inflow (Q_i) on the operation day is assumed as same as the Q_i on the previous day, in case of "without system" operation. It is assumed that Q_i on the operation day can be forecasted in advance, in case of "with system" operation. The results of daily power simulation are tabulated in Tables 7.2.7 to 7.2.12 and shown in Figures 7.2.3 to 7.2.5.

(Unit : MWh)

Year	Probability	"Without system"	"With system"
1970	1/2	715,962	717,567
1975	1/5	790,301	791,919
1988	1/10	992,199	996,315

It can be found that power operation "with system" can generate energy more stably than power operation "without system".

Additional energy production obtained by the difference of operation is calculated and tabulated below. The difference of storage volume which can be obtained by the difference between constant outflow operation and constant ratio operation is considered to be used for energy production. T.W.L and He for Çatalan and Seyhan Dams are assumed below.

(a) Çatalan Dam (T.W.L = 64.0m, he = 3.0m)

	2-year	5-year	10-year	50-year	100-year
Difference of Storage Volume (x 10^6 m^3)*	44.1	86.9	124.3	178.5	198.4
Ave. Water Level	118.9	119.3	119.7	120.5	120.9
Ave. Head (m)	51.9	52.3	52.7	53.5	53.9
Energy output (MWh)	5,296	10,516	15,157	22,097	24,744

(b) Seyhan Dam (T.W.L = 30.3m, he = 3.5m)

	2-year	5-year	10-year	50-year	100-year
Difference of Storage Volume (x 10^6 m^3)*	25.9	62.0	84.4	93.3	82.1
Ave. Water Level	62.6	63.1	63.4	63.7	63.7
Ave. Head (m)	28.8	29.3	29.6	29.9	29.9
Energy output (MWh)	1,726	4,203	5,780	6,455	5,680

* : Storage volume by constant outflow operation - Storage volume by constant ratio operation

Tables

Table 3.2.1 Major Characteristics of Seyhan Dam and Çatalan Dam

Item	Seyhan Dam	Çatalan Dam
Purpose *1	F.C + H.P + Irr.	F.C + H.P + C.W.
(Note *1 F.C=Flood control, H.P=Hydro power, Irr.=Irrigation, C.W=City water)		
Completion year	1956	1995 (Schedule)
Dam type	Earth fill dam	Earth fill dam
Dam slope	Upstream 1:2.5	Upstream 1:4.0
	Downstream 1:2.0	Downstream 1:3.0
Dam volume (m^3)	7,500,000	14,000,000
Height (m)	77.0	82.0
Crest length (m)	1,955.0	894.0
Reservoir Volume (x 10^6 m^3)		
Dead volume	159	1,422
Active volume	720	704
(Flood control volume)	(366)	(526)
Total	879	2,126
Reservoir surface area (km^2)	68.69	84.50
Elevation (m)		
Minimum operation level	49.0	115.0
Spillway crest	61.0	110.0
Flood season high water level	61.0	118.0
Normal high water level	67.5	125.0
Dam crest	72.7	130.0
Water use (m3/s)		
Irrigation	32	-
City water	-	16.7
Power Plant		
Design discharge	231	360
Unit numbers	3	3
Installed capacity (MW)	3x18=54	3x56.3=168.9
Annual energy generation (GWh)	350	596

Table 3.2.2 Seyhan Dam Reservoir Surface Area and Volume

1. Reservoir Water Surface Area (x mil. m2)

Elv.	1956	1966		1971		1976		1980		1986	
(m)	Area	Area	Decrs.	Area	Decrs.	Area	Decrs.	Area	Decrs.	Area	Decrs.
75.0	100.00										
72.5	91.30										
70.0	83.00	78.20	4.80	77.20	5.80	75.80	7.20	79.44	3.56	78.16	4.84
67.5	75.00	73.10	1.90	69.20	5.80	68.20	6.80	68.98	6.02	68.69	6.31
65.0		66.70		61.60		60.90		58.52		58.31	
62.5	61.70	60.50	1.20	53.10	8.60	53.30	8.40	51.20	10.50	50.39	11.31
60.0		48.10		45.60		45.60		43.88		43.38	
57.5	48.90	42.30	6.60	40.70	8.20	38.40	10.50	36.22	12.68	35.17	13.73
55.0		37.80				31.40		28.56		26.99	
52.5	37.00	33.60	3.40	29.50	7.50	26.90	10.10	25.32	11.68	22.56	14.44
50.0		30.10		24.40		22.70		22.67		18.16	
47.5	27.50	25.60	1.90	21.10	6.40	20.30	7.20	19.21	8.29	16.10	11.40
45.0		21.00		18.40		18.00		16.55		14.16	
42.5	19.70	17.80	1.90	15.60	4.10	14.80	4.90	12.77	6.93	11.50	8.20
40.0		16.00		12.60		11.40		8.99		9.15	
37.5	12.00	12.00	0.00	9.10	2.90					6.54	5.46
35.0				6.10						3.54	
32.5	4.00	4.00	0.00	3.20						0.66	3.34
30.0	0.00	0.00	0.00	0.00		0.00		0.00		0.00	0.00

2. Reservoir Storage Volume (x mil. m3)

Elv.	1956	1966		1971		1976		1980		1986	
(m)	Volume	Volume	Decrs.	Volume	Decrs.	Volume	Decrs.	Volume	Decrs.	Volume	Decrs.
75.0											
72.5											
70.0	1,415.0	1,333.0	82.0	1,209.0	206.0	1,100.0	315.0	1,069.0	346.0	1,063.6	351.4
67.5	1,217.0	1,145.0	72.0	1,028.0	189.0	920.0	297.0	883.5	333.5	878.9	338.1
65.0		968.0		866.0		762.0		724.1		720.1	
62.5	886.0	809.0	77.0	720.0	166.0	620.0	266.0	586.9	299.1	583.7	302.3
60.0	742.0	677.0	65.0	595.0	147.0	495.0	247.0	468.1	273.9	465.9	276.1
57.5	620.0	565.0	55.0	486.0	134.0	392.0	228.0	367.9	252.1	367.1	252.9
55.0	500.0	464.0	36.0	395.0	105.0	304.0	196.0	287.0	213.0	290.0	210.0
52.5	400.0	378.0	22.0	312.0	88.0	235.0	165.0	219.6	180.4	228.1	171.9
50.0	303.0	298.0	5.0	247.0	56.0	175.0	128.0	160.4	142.6	177.2	125.8
47.5	225.0	225.0	0.0	190.0	35.0	119.0	106.0	108.7	116.3	134.9	90.1
45.0	158.0	171.0	-13.0	138.0	20.0	71.0	87.0	63.8	94.2	96.7	61.3
42.5	94.0	122.0	-28.0	94.0	0.0	29.0	65.0	27.2	66.8	64.6	29.4
40.0	72.0	78.0	-6.0	61.0	11.0	0.0	72.0	0.0	72.0	38.6	33.4
37.5				36.0						19.0	
35.0	16.0	20.0		17.0						5.9	
32.5										1.5	
30.0	0.0	0.0		0.0						0.0	

Note;
"Decrs" stands for decreased value of area or volume in comparison with the original reservoir in 1956.

Table 4.1.1 Yearly Peak Discharge

Date	Seyhan River Main Stem Sta.No. 1806 (m3/s)	Sta.No. 1805 (m3/s)	At Confluence (m3/s)	Sta.No. 1818 (m3/s)	Körkün River Sta. No. 1820 Date	(m3/s)	Eğlence River Sta. No. 1821 Date	(m3/s)	Çakıt River Sta. No. 1817 Date	(m3/s)
17 Mar. '39	214.1	590.6	804.7	890.0						
3 Apr. '40	382.0	567.4	949.4	1,050.0						
29 Jan. '41	203.2	578.2	781.4	870.0						
2 Apr. '42	271.8	464.8	736.6	820.0						
5 Apr. '43	319.0	569.6	888.6	990.0						
8 Mar. '44	335.8	678.4	1,014.2	1,130.0						
7 Apr. '45	182.0	198.8	380.8	410.0						
15 Feb. '46	192.2	550.9	743.1	830.0						
14 Mar. '47	140.6	443.2	583.8	650.0						
27 Nov. '48	340.0	826.4	1,166.4	1,300.0						
19 Apr. '49	276.0	440.5	716.5	800.0						
6 Mar. '50	289.0	385.0	674.0	760.0						
21 Jan. '51	190.0	543.0	733.0	819.0						
13 Dec. '52	327.4	670.0	997.4	1,120.0						
4 Apr. '53	329.5	543.0	872.5	970.0						
20 Jan. '54	276.0	719.0	995.0	1,120.0						
31 Jul. '55	224.6	801.0	1,025.6	1,140.0						
4 Feb. '56	167.9	410.8	578.7	645.0						
3 Mar. '57	490.0	926.0	1,416.0	1,600.0						
9 Jan. '58	750.0	1,187.4	1,937.4	2,200.0						
15 Apr. '59	235.0	464.8	699.8	780.0						
26 Apr. '60	245.0	503.4	748.4	840.0						
6 Feb. '61	103.0	158.0	261.0	285.0						
17 Dec. '62	202.0	675.0	877.0	980.0						
19 Dec. '63	970.0	1,440.0	2,410.0	2,700.0						
25 Mar. '64	151.0	198.0	349.0	385.0					25 Mar. '64	41.6
18 Apr. '65	253.0	485.0	738.0	820.0					'65	-
5 Jan. '66	363.0	1,150.0	1,513.0	1,700.0			23 Jan. '66	68.5	29 Jan. '66	74.7
16 Dec. '67	279.0	570.0	849.0	1,046.0			20 Dec. '67	52.6	3 May '67	119.0
14 Mar. '68	249.0	870.0	1,119.0	1,224.0			3 Nov. '68	139.0	6 Jun. '68	96.4
28 Dec. '69	313.0	676.0	989.0	1,331.0			27 Nov. '69	153.0	'69	-
18 Dec. '70	277.0	870.0	1,147.0	1,258.0	24 Feb. '70	40.3	'70	-	'70	-
17 Apr. '71	180.0	330.0	510.0	705.0	8 Aug. '71	138.0	2 Nov. '71	190.0	27 Nov. '71	88.0
30 Apr. '72	330.0	461.0	791.0	672.0	30 Apr. '72	273.0	30 Apr. '72	195.0	30 Apr. '72	143.0
26 Feb. '73	154.0	253.0	407.0	405.0	12 Jul. '73	94.0	27 Feb. '73	233.0	12 Jul. '73	33.0
15 Mar. '74	283.0	386.0	669.0	934.0	15 Mar. '74	135.0	14 Mar. '74	144.0	26 Sep. '74	146.0
29 Apr. '75	789.0	1,043.0	1,832.0	1,957.0	18 Apr. '75	210.0	9 Jan. '75	320.0	18 Apr. '75	195.0
12 Apr. '76	190.0	510.0	700.0	759.0	24 Jun. '76	55.8	16 Apr. '76	106.0	25 May '76	66.0
23 Apr. '77	372.0	608.0	980.0	1,208.0	23 Apr. '77	356.0	23 Apr. '77	228.0	23 Apr. '77	124.0
1 Jan. '78	201.0	450.0	651.0	988.0						
3 Jan. '79	519.0	1,963.0	2,482.0	3,348.0						
28 Mar. '80	576.0	2,000.0	2,576.0	3,800.0						
Max.	970.0	2,000.0	2,576.0	3,800.0		356.0		320.0		195.0
Avg.	312.7	670.4	983.2	1,148.5		162.8		152.4		80.5
Min.	103.0	158.0	261.0	285.0		40.3		0.0		0.0
Catchment Area (km2)	8,698	4,242		13,846		1,441		690		1,910

Table 4.1.2 Histrical Flood List

No.	Date	Rainfall Location(mm)	Max. Discharge Sta.No.	Max. Discharge (m3/s)	Seyhan Dam Outflow	Damages Area(ha)	Damages Villages	Damages Dead	No.	Description
1	5 Dec. '37			2,550		45,000	15 nos.	0	1	
2	10 May '46						15 nos.	0	2	
3	9 Nov. '47	Dörtyol(60.7) Feke(56.1)	1805	504		5,000		11	3	Adana city and Seyhan plain were inundated. Houses of 279 nos. were damaged, 254 animals were lost.
4	27 Nov. '47	Ceyhan(68.2) Feke(54.0)	1805	825		(Some villages)		0	4	
5	5-6 Dec. '47	Feke(54.0) Adana(52.8)						0	5	Adana city was inundated.
6	6-22 Feb. '48	Tarsus(74.6) Adana (65.5)	1805	478		70,000	115 nos.	26	6	Mazimum discharge was 2,100 m3/s. Adana city and Seyhan plain were inundated. 170 houses were damaged.
7	12-17 May '50	Adana(41.7)	1805	280				1	7	Adana city and Seyhan plain were inundated.
8	10-11 Feb. '52	Feke(87.5) Kozan(84.5)	1805	635		(Çukurova plain)		0	8	
9	17-18 Mar. '52	Feke(40.0)	1805	592		(Tarsus plain)		0	9	
10	3 Apr. '52		1805	559				0	10	
11	3-4 Apr. '53	Mersin(66.6) Feke(33.4)	1805	530				0	11	
12	14 Jun. '57					(Ulukışla city)		0	12	
13	28 Jun. '57					84 ha at Çakit river		0	13	
14	28-29 Jun. '57					85 ha at Yenice river		0	14	
15	2 Jul. '57					83 ha at Yenice river		0	15	
16	2 Dec. '58	Adana(102.5)	18-004	3,600	563			0	16	Seyhan dam was completed in 1956. The flood was controlled by the dam. Farm land between levees was flooded.
17	8-17 Dec. '61	Karaisali(67.2) Adana(65.7)	18-001	1,400	831	960 ha at Çukurova		0	17	
18	25 Dec.-2 Jan.'69	Karaisali(154) Adana(110)	1818	1,331	1,186			0	18	Reservoir water level was at 68.81 m. Total damage was of 41 million TL.
19	9 Jun. '72	Pozanti(40.5)	Hesaplanan	74		(Çakit river)		0	19	
20	29 May '73	Orman(98.5)				114		4	20	
21	17 Apr.-9 May '75	Adana(110.7 in total)	Dam	1,992	1,188	4,700 ha at Çukurova		0	21	Reservoir water level was at 69.07 m. Total damage was of 51 million TL.
22	3 Jan. '79								22	Reservoir water level was so low that the flood was controlled by the dam.
23	27 Mar.-7 Apr.'80	Pozanti(148.7)	Dam	6,040	2,671	47,000 ha at Çukurova		1	23	Adana city has little damages. Flood water was over-topped the levee. The worst damage was recorded.
24	21-25 Dec. '87	Karaisali(231)	Dam	1,884	1,179	(None)		0	24	

Table 4.1.3 Highway Road Flood Damage

(unit : billion T.L)

Flood Year	Road Line	Bridge		Road		Total
		Name	T.L	L(km)	T.L	
1980	Tarsus-Pozantı	Çakıt 15	2.4	4.0	16.0	18.4
1980	Tarsus-Pozantı	Taşobası	1.0	-	-	1.0
1991	Tarsus-Pozantı	Tarihi	2.8	3.0	12.0	14.8
1980	İmamoğlu-Karsantı	Egner	4.4	1.0	2.5	6.9
1980	Karaisalı -Aladağ	Eğlence	1.3	0.5	1.5	2.8
1980	Kozan-Feke	Göksu	3.2	1.0	2.5	5.7
1980	Kozan-Feke	Feke	1.3	-	-	1.3
1980	Feke-Mansurlu	Mansurlu	1.2	2.0	5.0	6.2
1980	Feke-Saimbeyli	Işıklı	0.6	0.5	1.5	2.1
1980	Kozan-Mansurlu	Gökdere	1.2	2.0	5.0	6.2
		Total	19.4	14.0	46.0	65.4

Table 4.1.4 Railway Flood Damage

Flood Year	Km Location	Description
<Km 271+500 - Pozantı>		
1980	271+600/800	Embankment was washed away.
1991	271+700/800	Embankment was washed away.
1980	271+900/272+300	Retaining wall was fallen down.
1980	272+300	Retaining wall was damaged.
1991	272+800/273+350	Inundated.
	273+300/350	Embankment was washed away.
1980	273+500/700	Embankment and retaining wall was damaged.
1980,1991	273+900/274+700	Retaining wall was fallen down.
1980,1991	274+700/275+200	Inundated.
1988	275+744	Train slided out.
1980	276+300/400	Embankment was damaged.
<Pozantı - Belemedik>		
1980,1991	283+500/600	Embankment was damaged. Retaining wall was fallen down.
1980	283+600/700	Embankment was damaged.
1980,1991	284+550/600	Embankment was damaged. Retaining wall was fallen down.
1980,1991	284+900/285+200	Embankment was damaged. Retaining wall was fallen down.
1991	285+210/250	Retaining wall was fallen down.
1980	285+250/400	Retaining wall was damaged.
1991	285+400/450	Retaining wall was fallen down.
1991	285+450/500	Embankment was damaged.
1980	285+600/750	Embankment was damaged.
1980	286+100/400	Embankment was damaged.
1980	287+300/600	Embankment was damaged.
1991	287+700/750	Embankment was damaged.
1980,1991	288+000/400	Embankment was damaged. Retaining wall was fallen down.
1991	288+400/600	Embankment was damaged.
1980	289+000/050	Embankment was damaged.
1980	289+200/250	Embankment was damaged.
1980,1991	289+800/290+500	Railway was washed away. Retaining wall was fallen down.
<Belemedik - Hacıkırı>		
	291+200/800	Scouring.
1983	291+926	Conduit was collapsed.
1980	292+000/100	Embankment was damaged.
1981	292+500/700	Embankment was slided.

Table 4.2.1 Seyhan Dam Flood Routing for 1980-Flood (1/2)

Date	Time	Resvr. Inflow (m3/s)	HEP Outflow (m3/s)	Spilling Outflow Open. (m)	Coeff.	Disch. (m3/s)	Emrgcy. (m3/s)	Total Outflow (m3/s)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
26		581	344	Full	2.16	264	0	608	-2.36	655.7	63.80
27	16:00	959	241	Full	2.14	421	0	662	17.10	672.8	64.10
	24:00	2,350	241	3.00	2.13	485	0	726	46.76	719.6	64.92
28	01:00	4,160	236	3.00	2.12	612	0	848	11.92	731.5	65.12
	02:00	4,210	236	3.00	2.10	633	0	869	12.03	743.5	65.32
	03:00	5,470	236	3.00	2.09	656	0	892	16.48	760.0	65.59
	04:00	4,860	236	3.00	2.06	677	0	913	14.21	774.2	65.82
	05:00	5,980	236	3.00	2.03	693	0	929	18.18	792.4	66.11
	06:00	5,200	236	3.00	2.00	714	0	950	15.30	807.7	66.35
	07:00	5,450	236	3.00	1.98	731	0	967	16.14	823.9	66.60
	08:00	5,350	236	3.00	1.97	749	0	985	15.71	839.6	66.84
	09:00	5,790	236	3.00	1.95	765	0	1,001	17.24	856.8	67.10
	10:0:30	5,390	236	3.00	1.94	783	0	1,019	23.60	880.4	67.45
	11:00	5,250	236	3.00	1.93	806	0	1,042	7.57	888.0	67.56
	12:00	4,730	236	3.00	1.92	814	7	1,056	13.22	901.2	67.75
	13:00	5,030	236	3.00	1.91	826	57	1,120	14.08	915.3	67.95
	14:00	5,180	236	3.00	1.91	839	139	1,214	14.28	929.6	68.15
	15:00	5,130	236	3.00	1.90	852	241	1,329	13.68	943.3	68.34
	16:00	4,690	236	3.00	1.90	864	353	1,454	11.65	954.9	68.50
	17:00	4,430	236	3.00	1.89	874	459	1,569	10.30	965.2	68.64
	18:00	4,150	236	3.00	1.89	883	559	1,678	8.90	974.1	68.76
	19:00	3,840	236	3.00	1.89	891	649	1,776	7.43	981.5	68.86
	20:00	4,990	236	3.00	1.89	897	728	1,861	11.26	992.8	69.01
	21:00	3,880	236	3.00	1.88	906	852	1,994	6.79	999.6	69.10
	22:00	3,760	236	3.00	1.88	912	929	2,077	6.06	1,005.6	69.18
	23:00	3,630	236	3.00	1.88	917	999	2,152	5.32	1,011.0	69.25
	24:00	3,920	236	3.00	1.88	921	1,063	2,219	6.12	1,017.1	69.33
29	01:00	3,370	241	3.00	1.88	926	1,136	2,303	3.84	1,020.9	69.38
	02:00	3,420	241	3.00	1.88	929	1,183	2,353	3.84	1,024.8	69.43
	03:00	3,480	241	3.00	1.88	932	1,231	2,403	3.88	1,028.6	69.48
	04:00	3,530	241	3.00	1.88	935	1,279	2,455	3.87	1,032.5	69.53
	05:00	3,360	241	3.00	1.87	938	1,328	2,506	3.07	1,035.6	69.57
	06:00	3,050	241	2.50	1.86	790	1,367	2,398	2.35	1,037.9	69.60
	07:00	3,080	241	2.50	1.86	792	1,397	2,430	2.34	1,040.3	69.63
	08:00	3,110	241	2.50	1.86	793	1,427	2,461	2.34	1,042.6	69.66
	09:00	2,710	241	2.50	1.86	795	1,457	2,493	0.78	1,043.4	69.67
	10:00	2,940	241	2.50	1.86	796	1,467	2,504	1.57	1,045.0	69.69
	11:00	2,740	241	2.50	1.86	797	1,488	2,525	0.77	1,045.7	69.70
	12:00	2,540	241	2.50	1.86	797	1,498	2,536	0.02	1,045.8	69.70
	13:00	2,530	241	2.50	1.86	797	1,498	2,536	-0.02	1,045.7	69.70
	14:00	2,750	241	2.50	1.86	797	1,498	2,536	0.77	1,046.5	69.71
	15:00	2,770	241	2.50	1.86	798	1,508	2,547	0.80	1,047.3	69.72
	16:00	2,560	241	2.50	1.86	798	1,518	2,557	0.01	1,047.3	69.72
	17:00	2,340	241	2.50	1.86	798	1,518	2,557	-0.78	1,046.5	69.71
	18:00	2,540	241	2.50	1.86	798	1,508	2,547	-0.02	1,046.5	69.71
	19:00	2,330	241	2.50	1.86	798	1,508	2,547	-0.78	1,045.7	69.70
	20:00	2,380	241	2.70	1.86	857	1,498	2,596	-0.78	1,045.0	69.69
	21:00	2,450	241	2.70	1.86	942	1,488	2,671	-0.79	1,044.2	69.68
	22:00	2,230	241	2.90	1.87	945	1,477	2,663	-1.56	1,042.6	69.66
	23:00	2,210	241	2.90	1.87	944	1,457	2,642	-1.55	1,041.0	69.64
	24:00	2,190	241	2.90	1.87	942	1,437	2,620	-1.55	1,039.5	69.62

Table 4.2.1 Seyhan Dam Flood Routing for 1980-Flood (2/2)

Date	Time	Resvr. Inflow (m3/s)	HEP Outflow (m3/s)	Spilling Outflow Open. (m)	Coeff.	Disch. (m3/s)	Emrgcy. (m3/s)	Total Outflow (m3/s)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
30	01:00	2,140	247	2.90	1.87	913	1,417	2,577	-1.57	1,037.9	69.60
	02:00	2,340	247	2.90	1.87	913	1,397	2,557	-0.78	1,037.1	69.59
	03:00	1,900	247	2.90	1.87	913	1,387	2,547	-2.33	1,034.8	69.56
	04:00	2,090	247	2.90	1.87	914	1,357	2,518	-1.54	1,033.3	69.54
	05:00	1,850	247	2.90	1.87	914	1,337	2,498	-2.33	1,030.9	69.51
	06:00	2,040	247	2.90	1.87	914	1,308	2,469	-1.54	1,029.4	69.49
	07:00	1,810	247	2.90	1.87	914	1,289	2,450	-2.30	1,027.1	69.46
	08:00	2,040	247	3.10	1.88	963	1,259	2,470	-1.55	1,025.5	69.44
	09:00	2,050	247	3.20	1.89	992	1,240	2,479	-1.54	1,024.0	69.42
	10:00	1,820	247	3.20	1.89	990	1,221	2,458	-2.30	1,021.7	69.39
	11:00	1,900	247	3.60	1.91	1,107	1,193	2,546	-2.33	1,019.4	69.36
	12:00	1,790	247	4.00	1.93	1,223	1,164	2,634	-3.04	1,016.3	69.32
	13:00	1,950	247	4.00	1.93	1,220	1,127	2,594	-2.32	1,014.0	69.29
	14:00	1,720	247	4.00	1.93	1,218	1,099	2,564	-3.04	1,011.0	69.25
	15:00	1,670	247	4.00	1.94	1,215	1,063	2,524	-3.08	1,007.9	69.21
	16:00	1,860	247	4.00	1.94	1,211	1,026	2,485	-2.25	1,005.7	69.18
	17:00	1,820	247	4.00	1.94	1,209	999	2,456	-2.29	1,003.4	69.15
	18:00	1,790	247	4.00	1.94	1,207	973	2,427	-2.29	1,001.1	69.12
	19:00	1,980	247	4.00	1.94	1,204	946	2,398	-1.50	999.6	69.10
	20:00	1,750	247	4.00	1.94	1,203	929	2,379	-2.26	997.3	69.07
	21:00	1,460	247	2.40	1.86	736	903	1,886	-1.53	995.8	69.05
	22:00	1,870	247	2.40	1.86	735	886	1,867	0.01	995.8	69.05
	23:00	1,660	247	2.40	1.86	735	886	1,867	-0.75	995.0	69.04
	24:00	1,670	247	3.20	1.89	966	877	2,090	-1.51	993.5	69.02
31	01:00	1,730	239	3.50	1.91	1,051	860	2,151	-1.51	992.0	69.00
	02:00	1,720	239	3.50	1.91	1,050	843	2,132	-1.48	990.5	68.98
	03:00	1,490	239	3.50	1.91	1,049	826	2,114	-2.25	988.3	68.95
	04:00	1,520	239	3.70	1.93	1,104	801	2,145	-2.25	986.0	68.92
	05:00	1,700	239	3.70	1.93	1,102	777	2,118	-1.50	984.5	68.90
	06:00	1,470	239	3.70	1.93	1,100	760	2,100	-2.27	982.3	68.87
	07:00	1,570	239	4.10	1.96	1,214	736	2,189	-2.23	980.0	68.84
	08:00	1,540	239	4.10	1.96	1,211	712	2,162	-2.24	977.8	68.81
	09:00	1,520	239	4.10	1.96	1,209	688	2,136	-2.22	975.6	68.78
	10:00	1,340	239	4.30	1.98	1,264	665	2,168	-2.98	972.6	68.74
	11:00	1,370	239	3.80	1.94	1,117	634	1,990	-2.23	970.4	68.71
	12:00	1,560	239	3.80	1.94	1,115	611	1,965	-1.46	968.9	68.69
	13:00	1,100	239	3.00	1.89	886	596	1,721	-2.24	966.7	68.66
	14:00	1,150	239	2.50	1.87	743	573	1,556	-1.46	965.2	68.64
	15:00	1,190	239	2.00	1.85	600	559	1,398	-0.75	964.5	68.63
	16:00	1,390	239	2.00	1.85	600	551	1,390	-0.00	964.5	68.63
	17:00	1,390	239	2.00	1.85	600	551	1,390	-0.00	964.5	68.63
	18:00	1,240	239	2.50	1.87	742	551	1,532	-1.05	963.4	68.62
	19:00	1,200	239	2.50	1.87	741	544	1,524	-1.17	962.2	68.60
	20:00	1,310	239	2.50	1.87	740	530	1,509	-0.71	961.5	68.59
	21:00	1,290	239	2.50	1.87	739	522	1,501	-0.76	960.8	68.58
	22:00	1,290	239	2.50	1.87	739	515	1,493	-0.73	960.0	68.57
	23:00	1,080	239	2.50	1.87	738	508	1,485	-1.46	958.6	68.55
	24:00	1,060	239	2.50	1.87	737	494	1,470	-1.48	957.1	68.53

Table 5.2.1 Scheduled Hydropower Plant in Master Plan

	Göktaş	Menge	Köprü	Kavsak	Yedigöze	İmamoğlu
Dam	Conc.	Rock-fill	Rock-fill	Weir	Rock-fill	Weir
Height (m)	170	88	136	36	107	30
Reservoir (x 10^6 m^3)						
Dead	84.0	73.3	54.0	-	207.0	-
Active	127.0	230.7	206.0	-	448.0	-
Total	211.0	304.0	260.0	-	655.0	-
Inflow (m^3/s)	64.7	47.4	59.0	125.9	145.8	146.5
H.W.L (m)	650.0	525.0	445.0	318.0	235.0	135.0
Power Tunnel						
Length (km)	16.2	0.4	0.8	8.6	0.7 x 2	-
Diameter (m)	6.0	9.0	7.0	7.5	8.0 x 2	-
Dischage (m^3)	116.0	166.0	186.0	272.8	221.0	385.0
Irrig. Tunnel						
Length (km)	-	-	-	-	-	9.5
Diameter (m)	-	-	-	-	-	4.8
Gross Head (m)	332.0	80.0	127.0	83.0	100.0	31.0
Unit No.	3	2	3	2	4	2
Capacity (MW)	243.9	89.0	189.0	120.0	315.2	40.0
Annual E. (GWh)	1,108.0	247.0	480.9	563.8	950.5	148.0
Firm E. (GWh)	429.1	117.7	248.6	296.0	413.8	34.7
E. Cost (TL/kWh)	2.21	1.95	2.56	1.37	1.66	1.37

Table 6.2.1 (1/6) River Cross Section Data (Sec.26A-Sec.20A)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-26A		Sec-25A		Sec-24A		Sec-23A		Sec-22A		Sec-21A		Sec-20A	
1	0	1.88	0	1.74	0	1.94	0	1.89	0	2.76	0	2.61	0	2.67
2	4	3.73	4	3.80	6	3.91	7	4.12	5	4.33	6	4.54	6	4.66
3	8	3.73	8	3.80	10	3.91	11	4.12	9	4.33	10	4.54	10	4.66
4	13	1.88	14	1.74	14	1.94	15	1.89	12	2.76	14	2.61	14	2.67
5	200	1.72	110	1.61	170	1.75	160	2.39	120	3.03	100	2.85	147	3.21
6	360	1.74	310	1.91	370	1.79	370	3.01	124	2.96	300	3.12	160	4.03
7	590	1.80	314	0.31	610	1.69	377	0.04	128	0.10	540	3.07	164	3.81
8	790	1.75	319	-1.37	830	1.73	382	-1.26	129	-1.40	780	2.76	167	1.36
9	910	1.90	323	-2.77	1,060	2.05	386	-1.76	134	-2.00	1,040	2.83	169	0.16
10	916	0.08	335	-2.67	1,310	2.32	390	-1.76	138	-2.10	1,270	2.75	181	0.16
11	920	-1.52	347	-2.67	1,550	2.02	402	-1.26	142	-2.00	1,530	3.14	193	0.06
12	924	-2.78	359	-2.07	1,730	2.58	414	-1.06	154	-1.00	1,750	2.87	205	-0.34
13	936	-2.82	371	-1.27	1,736	0.34	426	-0.96	166	-0.90	1,950	3.17	217	-0.44
14	948	-2.52	383	-0.77	1,737	-0.06	438	-0.86	178	-0.70	1,952	3.29	225	-0.54
15	960	-2.32	395	-0.13	1,741	-0.66	450	-0.34	190	-0.60	1,956	1.00	237	0.26
16	972	-1.32	400	2.31	1,745	-0.86	452	0.54	202	-0.50	1,960	0.60	249	1.36
17	984	-0.52	560	1.72	1,757	-0.76	459	2.98	214	0.00	1,972	0.20	255	3.34
18	996	0.08	760	1.88	1,769	-0.36	489	2.56	218	2.72	1,984	-0.30	258	3.80
19	1,002	2.23	1,000	1.98	1,781	-0.26	649	2.15	318	2.72	1,996	-0.70	478	2.61
20	1,102	1.70	1,180	1.81	1,797	-0.26	829	2.67	508	2.75	2,008	-0.90	708	2.36
21	1,312	1.86	1,410	1.60	1,801	-1.86	1,029	2.10	718	2.72	2,024	-1.30	918	2.16
22	1,512	1.95	1,600	1.73	1,813	-2.66	1,239	1.98	948	2.37	2,032	-1.20	1,108	2.03
23	1,752	1.85	1,840	1.83	1,817	-2.46	1,429	2.15	1,158	2.59	2,035	1.00	1,303	2.02
24	1,952	1.49	2,040	1.64	1,821	-0.96	1,619	2.12	1,388	2.25	2,039	3.76	1,518	1.91
25	1,959	3.73	2,160	1.75	1,824	0.34	1,829	2.66	1,618	2.28	2,070	3.06	1,728	1.93
26	1,963	3.73	2,166	3.80	1,830	3.06	1,999	2.40	1,858	1.83	2,110	2.66	1,968	2.10
27	1,967	1.49	2,170	3.80	2,030	1.86	2,069	2.40	2,058	1.95	2,260	2.17	2,098	2.27
28			2,174	1.75	2,210	1.52	2,074	4.12	2,258	2.19	2,267	4.54	2,105	4.66
29					2,217	3.91	2,078	4.12	2,264	4.33	2,271	4.54	2,109	4.66
30					2,224	3.91	2,081	2.40	2,268	4.33	2,276	2.17	2,114	2.27
31					2,229	1.52			2,272	2.19				
Min.		-2.82		-2.77		-2.66		-1.76		-2.10		-1.30		-0.54

Table 6.2.1 (2/6) River Cross Section Data (Sec.19A-Sec.8A)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-19A		Sec-16A		Sec-14A		Sec-12A		Sec-10A		Sec-9A		Sec-8A	
1	0	2.16	0	2.70	0	3.00	0	3.30	0	4.10	0	4.12	0	5.11
2	8	4.73	5	5.12	5	5.41	5	5.87	4	6.11	5	6.59	3	6.61
3	12	4.73	9	5.12	9	5.41	9	5.87	8	6.11	9	6.59	7	6.61
4	17	2.16	16	2.70	16	3.00	17	3.30	14	4.10	16	4.12	12	5.11
5	90	2.14	164	2.98	160	3.39	90	4.08	100	4.67	70	4.22	110	5.00
6	310	3.07	404	3.25	390	3.11	240	3.88	300	4.80	200	4.63	120	3.50
7	560	3.22	490	3.35	620	3.46	340	4.82	420	4.88	350	4.74	170	2.04
8	564	3.46	510	4.23	860	3.54	346	2.13	424	2.45	500	5.06	230	3.90
9	589	1.50	514	4.00	1,110	3.86	350	1.23	428	1.05	660	5.06	240	5.10
10	603	0.50	522	0.61	1,240	4.36	362	1.33	440	1.15	820	5.31	390	5.25
11	607	0.40	530	0.56	1,244	2.10	374	1.33	456	1.25	900	5.45	540	5.50
12	619	-1.10	538	0.71	1,253	1.80	386	1.53	472	1.35	1,130	5.58	840	5.75
13	627	-1.70	550	0.71	1,261	1.30	390	1.33	488	1.55	1,310	5.71	1,090	6.00
14	631	-1.80	562	0.41	1,273	-0.60	398	1.43	504	1.65	1,490	5.69	1,160	6.48
15	635	-1.70	574	0.41	1,285	-1.00	410	1.23	520	1.85	1,670	5.21	1,162	5.38
16	639	-1.40	586	0.61	1,297	-1.10	430	0.63	528	1.95	1,770	5.21	1,164	2.65
17	645	1.50	598	0.41	1,299	0.10	434	0.93	532	2.65	1,777	3.71	1,169	1.25
18	647	3.89	610	0.91	1,302	2.10	439	1.53	537	4.68	1,805	2.79	1,173	-0.85
19	648	3.83	615	1.91	1,308	4.35	441	2.33	539	5.06	1,816	1.89	1,185	0.35
20	848	2.60	631	4.12	1,338	3.94	445	4.38	744	4.72	1,828	1.49	1,197	1.15
21	1,028	2.40	847	3.26	1,348	3.26	625	4.34	944	4.16	1,840	0.89	1,209	1.65
22	1,208	2.17	1,027	2.76	1,488	3.11	875	4.01	1,184	3.70	1,852	0.59	1,221	1.95
23	1,358	2.00	1,237	2.63	1,495	5.41	1,115	3.37	1,384	3.73	1,860	0.29	1,233	2.65
24	1,548	1.92	1,411	2.35	1,499	5.41	1,345	3.26	1,649	3.62	1,868	0.19	1,239	2.95
25	1,556	4.73	1,419	5.12	1,505	3.11	1,545	3.38	1,889	3.72	1,872	2.79	1,332	5.65
26	1,560	4.73	1,423	5.12			1,552	5.87	2,119	3.90	1,875	5.40	1,402	5.70
27	1,566	1.92	1,429	2.35			1,556	5.87	2,126	6.11	1,960	5.25	1,642	5.25
28							1,561	3.38	2,130	6.11	1,970	4.37	1,872	5.00
29									2,134	3.90	2,065	4.17	2,092	4.21
30											2,255	3.80	2,099	6.61
31											2,263	6.59	2,103	6.61
32											2,267	6.59	2,108	4.21
33											2,273	3.80		
Min.		-1.80		0.41		-1.10		0.63		1.05		0.19		-0.85

Table 6.2.1 (3/6) River Cross Section Data (Sec.6A-Sec.6)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-6A		Sec-5A		Sec-4A		Sec-2A		Sec-1		Sec-4		Sec-6	
1	0	5.21	0	5.29	0	6.27	0	5.26	0	6.41	0	7.26	0	7.81
2	5	7.51	6	8.17	4	8.51	7	8.73	5	8.99	4	9.10	4	9.59
3	9	7.51	10	8.17	8	8.51	11	8.73	9	8.99	8	9.10	8	9.59
4	16	5.21	19	5.29	15	6.27	21	5.26	17	6.41	14	7.26	13	7.81
5	110	5.40	145	5.74	80	6.29	140	5.24	70	6.90	110	8.25	70	7.97
6	120	3.09	160	6.78	210	6.46	270	6.38	210	7.95	235	7.39	260	8.17
7	160	2.09	161	6.78	410	6.74	370	6.53	212	4.97	300	8.12	410	8.10
8	210	3.46	165	5.94	610	6.73	470	6.90	224	3.62	390	8.08	590	8.02
9	230	5.34	168	3.75	800	6.83	570	7.26	228	3.77	394	5.31	592	8.03
10	430	5.46	176	1.90	980	6.33	660	7.12	240	3.22	396	4.21	594	7.16
11	630	5.62	180	1.70	1,160	6.75	720	7.50	256	2.97	408	4.16	597	5.63
12	790	5.49	188	2.10	1,340	7.00	726	5.36	264	3.17	416	4.01	601	3.73
13	800	3.60	200	2.10	1,349	3.95	794	4.39	272	2.97	436	4.41	605	3.53
14	840	3.50	204	2.90	1,361	3.55	814	3.49	284	4.24	440	4.41	613	3.33
15	870	5.00	208	2.40	1,381	3.35	834	2.59	296	4.57	456	4.21	621	3.28
16	910	3.60	228	2.60	1,401	2.95	846	2.09	316	4.77	472	3.91	645	4.13
17	960	3.65	248	2.50	1,421	2.25	862	1.49	324	4.47	484	3.86	649	4.03
18	970	5.74	268	2.55	1,433	-0.25	866	4.39	350	4.37	496	3.81	657	4.43
19	1,170	5.80	273	2.80	1,441	-0.85	868	7.33	364	5.44	508	3.81	661	4.38
20	1,370	5.70	276	3.70	1,449	3.95	990	6.31	388	4.67	516	3.71	665	4.63
21	1,600	5.93	280	6.96	1,450	5.55	1,150	5.85	404	5.07	518	6.31	669	4.63
22	1,820	6.32	500	6.50	1,453	6.18	1,350	5.20	410	7.31	520	8.16	677	4.53
23	1,822	6.01	780	6.38	1,518	6.88	1,361	8.73	413	7.87	545	7.21	681	4.43
24	1,827	3.34	910	6.50	1,533	5.93	1,365	8.73	613	6.87	680	6.67	685	5.63
25	1,831	2.24	980	6.75	1,623	5.82	1,372	5.20	813	6.39	840	6.02	687	8.37
26	1,851	1.74	1,100	6.25	1,713	6.29			1,013	6.10	1,000	5.22	692	7.57
27	1,863	1.74	1,300	6.11	1,768	6.09			1,213	6.24	1,020	7.78	832	7.27
28	1,871	1.84	1,500	6.00	1,775	8.51			1,413	6.28	1,160	6.86	992	7.15
29	1,879	1.74	1,650	6.20	1,779	8.51			1,523	6.14	1,320	6.79	1,097	6.92
30	1,895	1.84	1,880	5.29	1,784	6.09			1,673	6.51	1,480	6.77	1,105	9.59
31	1,903	1.94	1,889	8.17					1,680	8.99	1,540	6.91	1,109	9.59
32	1,907	3.34	1,893	8.17					1,684	8.99	1,580	4.53	1,114	6.92
33	1,908	6.32	1,899	5.29					1,689	6.51	1,640	3.70		
34	1,943	4.92									1,705	4.41		
35	1,988	5.15									1,765	3.41		
36	2,188	4.93									1,825	4.45		
37	2,196	7.51									1,840	6.60		
38	2,200	7.51									1,905	6.65		
39	2,205	4.93									1,950	6.48		
40											1,954	9.10		
41											1,958	9.10		
42											1,961	6.48		
Min.		1.74		1.70		-0.85		1.49		2.97		3.41		3.28

Table 6.2.1 (4/6) River Cross Section Data (Sec.7-Sec.19)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-7		Sec-16		Sec-16A		Sec-17		Sec-17A		Sec-18		Sec-19	
1	0	7.39	0	11.22	0	10.29	0	10.63	0	11.13	0	11.53	0	12.37
2	6	10.47	2	12.03	5	12.65	5	12.98	4	13.20	4	13.54	3	13.92
3	10	10.47	6	12.03	9	12.65	9	12.98	9	13.20	9	13.54	7	13.92
4	19	7.39	8	11.22	16	10.29	16	10.63	15	11.13	15	11.53	12	12.37
5	116	7.70	32	10.51	200	10.50	62	10.87	90	11.26	15	11.44	106	12.12
6	123	8.83	202	10.65	300	10.55	81	10.80	153	11.37	237	12.13	124	12.16
7	160	9.05	352	10.91	410	10.61	99	11.39	176	12.14	396	12.13	129	13.27
8	161	8.87	600	10.49	417	8.27	105	9.41	273	11.36	396	12.03	135	10.39
9	163	6.26	717	10.27	429	6.57	115	6.91	376	11.55	552	11.98	141	7.49
10	166	5.66	788	9.37	444	5.97	125	6.16	485	11.45	784	11.75	159	6.39
11	178	5.26	944	9.91	454	6.57	150	6.59	568	11.35	962	11.72	189	7.39
12	182	5.06	1,016	10.37	469	6.77	165	6.88	702	11.60	1,128	12.43	209	8.79
13	194	4.86	1,065	10.47	489	6.27	175	8.06	794	11.56	1,325	12.17	219	9.39
14	206	4.46	1,075	8.71	504	6.77	200	8.33	926	11.52	1,532	12.03	234	9.69
15	214	4.41	1,090	7.41	518	8.27	230	8.61	977	11.34	1,721	11.21	242	12.82
16	218	4.26	1,100	7.31	524	10.65	240	9.41	1,003	11.61	2,059	11.19	331	12.35
17	234	5.06	1,125	7.11	590	11.00	256	11.18	1,007	9.29	2,135	11.74	443	11.73
18	238	5.06	1,155	6.81	740	11.26	292	11.26	1,014	7.29	2,146	9.50	536	11.57
19	242	4.96	1,180	5.71	830	11.42	390	10.82	1,029	6.89	2,176	8.22	659	11.72
20	258	5.11	1,184	9.41	900	11.52	480	10.82	1,044	6.79	2,211	8.07	744	12.18
21	262	5.16	1,190	10.34	960	11.31	635	10.79	1,049	7.09	2,226	7.60	794	11.96
22	298	5.36	1,210	9.40	1,020	11.06	678	10.52	1,059	6.59	2,251	8.22	934	11.83
23	302	5.26	1,273	9.61	1,110	10.78	807	11.25	1,069	7.19	2,263	11.80	1,038	11.53
24	306	5.46	1,355	9.46	1,210	10.78	830	10.67	1,094	6.99	2,298	11.44	1,141	11.76
25	310	6.26	1,363	12.03	1,300	10.27	865	11.34	1,098	9.29	2,426	11.01	1,319	12.87
26	312	9.03	1,367	12.03	1,360	9.92	920	11.51	1,103	11.63	2,434	13.54	1,381	14.10
27	472	8.23	1,372	9.46	1,368	12.65	962	11.75	1,193	12.02	2,438	13.54	1,409	12.49
28	632	7.92			1,372	12.65	1,330	10.34	1,263	11.28	2,443	11.01	1,611	12.26
29	792	7.73			1,377	9.92	1,537	10.15	1,337	11.10			1,678	12.65
30	952	7.26					1,626	10.28	1,551	10.94			1,893	12.81
31	972	8.93					1,634	12.98	1,637	10.72			1,908	12.00
32	1,138	7.77					1,638	12.98	1,759	10.72			1,990	11.51
33	1,146	10.47					1,643	10.28	1,766	13.20			2,141	12.70
34	1,150	10.47							1,770	13.20			2,145	13.92
35	1,155	7.77							1,775	10.72			2,149	13.92
36													2,151	12.70
Min.		4.26		5.71		5.97		6.16		6.59		7.60		6.39

Table 6.2.1 (5/6) River Cross Section Data (Sec.19A-Sec.39)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-19A		Sec-20		Sec-21		Sec-21A		Sec-42		Sec-41		Sec-39	
1	0	12.36	0	12.77	0	11.57	0	12.84	0	14.00	0	15.08	0	14.70
2	4	14.57	4	15.01	7	15.24	6	15.89	4	16.16	1	16.58	1	17.37
3	8	14.57	8	15.01	11	15.24	10	15.89	8	16.16	5	16.58	5	17.37
4	15	12.36	14	12.77	22	11.57	19	12.84	14	14.00	6	15.08	6	14.70
5	45	12.49	142	13.00	92	12.11	78	12.95	195	14.30	300	14.50	200	15.50
6	146	12.20	154	14.31	237	12.45	190	12.97	198	16.31	440	15.65	350	15.45
7	245	12.36	157	11.80	407	12.65	278	12.98	200	16.31	458	12.63	500	15.50
8	331	12.76	162	8.10	551	13.51	366	12.95	202	14.26	468	11.73	750	16.25
9	490	12.82	182	8.40	676	13.24	437	14.51	240	15.19	483	11.73	950	16.35
10	701	13.56	202	8.20	828	13.28	486	14.30	246	12.30	498	11.33	1,210	16.25
11	1,257	12.93	222	10.80	960	13.24	575	14.03	251	10.60	518	8.43	1,610	16.56
12	1,462	12.98	226	11.80	973	12.70	617	13.88	266	10.10	523	8.93	1,642	14.48
13	1,833	13.28	235	14.00	1,221	12.81	697	13.31	281	10.50	528	11.23	1,654	14.18
14	2,012	13.30	348	12.98	1,521	14.64	770	13.83	296	10.40	531	12.63	1,662	13.42
15	2,065	13.90	586	12.65	1,526	12.14	834	15.21	311	10.85	533	15.73	1,681	12.72
16	2,070	12.96	723	12.87	1,536	11.64	836	15.11	326	11.05	588	15.00	1,696	12.27
17	2,081	11.52	906	13.06	1,556	11.34	837	12.34	341	10.30	723	14.50	1,706	11.57
18	2,090	11.02	1,254	12.72	1,581	10.05	843	11.29	343	12.30	813	14.50	1,721	11.74
19	2,120	10.42	1,493	13.46	1,611	8.14	861	9.64	353	15.40	993	15.00	1,736	11.17
20	2,130	10.02	1,586	13.39	1,616	12.14	879	8.84	523	14.50	1,093	15.25	1,746	11.09
21	2,160	8.52	1,735	13.13	1,618	15.28	891	8.84	838	14.00	1,263	15.00	1,748	12.10
22	2,170	8.62	1,741	15.01	1,644	14.21	909	9.74	1,188	14.25	1,663	15.10	1,749	15.42
23	2,172	11.52	1,745	15.01	1,650	15.37	927	12.34	1,538	14.00	1,863	15.20	1,751	16.40
24	2,173	14.00	1,749	13.13	1,657	14.23	931	14.93	2,018	14.50	2,012	15.10	1,754	17.16
25	2,226	13.66			1,731	13.72	935	15.10	2,058	14.50	2,013	16.58	1,759	17.16
26	2,289	12.72			1,736	15.24	966	15.16	2,270	14.44	2,017	16.58	1,771	15.29
27	2,295	14.57			1,740	15.24	977	14.22	2,275	16.16	2,018	15.10	1,782	14.63
28	2,299	14.57			1,744	13.72	1,111	14.08	2,279	16.16			1,795	15.69
29	2,304	12.72					1,186	13.86	2,283	14.44			1,907	15.24
30							1,267	14.14					1,984	14.92
31							1,341	14.13					1,985	17.37
32							1,485	14.13					1,989	17.37
33							1,565	14.75					1,990	14.92
34							1,634	15.45						
35							1,635	15.89						
36							1,639	15.89						
37							1,640	15.45						
Min.		8.52		8.10		8.14		8.84		10.10		8.43		11.09

Table 6.2.1 (6/6) River Cross Section Data (Sec.38-Sec.27)

Joint No.	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)	x	y (El.)
	Sec-38		Sec-35		Sec-27									
1	0	15.49	0	15.57	0	16.30								
2	1	18.37	1	18.63	41	16.50								
3	5	18.37	5	18.63	42	19.36								
4	6	15.49	6	15.57	46	19.36								
5	91	15.40	18	15.59	47	16.50								
6	98	17.91	24	16.69	80	16.50								
7	101	17.14	160	16.50	136	17.50								
8	127	14.15	288	16.44	140	18.92								
9	132	11.00	355	16.24	142	18.92								
10	142	10.85	463	16.66	145	17.90								
11	162	12.70	621	16.64	171	17.75								
12	182	13.31	733	16.83	172	15.79								
13	202	13.92	850	16.82	175	13.57								
14	207	14.15	903	16.78	190	13.69								
15	216	15.62	1,021	16.99	205	13.29								
16	222	17.24	1,052	16.78	230	14.64								
17	242	17.12	1,055	18.06	235	14.54								
18	372	14.00	1,058	16.95	250	14.69								
19	462	17.00	1,081	14.50	255	15.79								
20	672	16.75	1,082	13.90	260	18.50								
21	1,137	16.50	1,095	13.42	280	18.52								
22	1,399	16.08	1,115	13.27	380	18.60								
23	1,400	18.37	1,125	13.12	500	18.10								
24	1,404	18.37	1,130	13.15	680	18.70								
25	1,405	16.08	1,150	12.70	840	18.48								
26			1,165	12.78	1,316	18.80								
27			1,172	14.18	1,632	18.00								
28			1,174	15.82	1,722	17.00								
29			1,198	16.07	1,735	17.50								
30			1,214	15.12	1,883	17.50								
31			1,229	18.53	1,888	18.14								
32			1,231	18.53	1,891	18.14								
33			1,280	16.80	2,218	16.73								
34			1,413	16.50	2,219	19.36								
35			1,492	16.57	2,223	19.36								
36			1,493	18.63	2,224	16.73								
37			1,497	18.63										
38			1,498	16.57										
Min.		10.85		12.70		13.29								

Table 6.3.1 (1/7) River Water Surface Routing (Q = 200 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	-2.820	3.570	0.750	0.985	0.811	0.000	203	2.8	0.030
Sec-25A	860	-2.770	3.702	0.932	0.914	0.984	0.173	219	2.9	0.030
Sec-24A	2720	-2.660	4.147	1.487	0.943	1.545	0.561	212	2.5	0.030
Sec-23A	1490	-1.760	3.567	1.807	0.910	1.856	0.311	220	2.8	0.030
Sec-22A	940	-2.100	4.067	1.967	0.780	2.004	0.148	256	3.0	0.030
Sec-21A	2620	-1.300	3.652	2.352	0.890	2.399	0.396	225	2.9	0.030
Sec-20A	2650	-0.500	3.314	2.814	0.864	2.858	0.458	231	2.8	0.030
Sec-19A	1125	-1.800	4.789	2.989	0.990	3.054	0.196	202	3.3	0.030
Sec-16A	2251	0.410	2.960	3.370	0.733	3.401	0.347	273	2.7	0.030
Sec-14A	1644	-1.100	4.682	3.582	1.008	3.646	0.245	198	3.6	0.030
Sec-12A	1780	0.630	3.266	3.896	0.780	3.931	0.284	256	2.6	0.030
Sec-10A	1560	1.050	3.067	4.117	0.694	4.145	0.213	288	2.6	0.030
Sec-9A	1440	0.190	4.106	4.296	0.838	4.342	0.197	239	2.9	0.030
Sec-8A	1450	-0.850	5.346	4.496	0.714	4.533	0.190	280	2.9	0.030
Sec-6A	1250	1.740	2.934	4.674	0.905	4.721	0.188	221	2.7	0.030
Sec-5A	2005	1.700	3.316	5.016	0.718	5.046	0.325	278	2.6	0.030
Sec-4A	1595	-0.850	6.046	5.196	0.732	5.234	0.189	273	3.1	0.030
Sec-2A	1420	1.490	3.932	5.422	0.910	5.483	0.249	220	2.3	0.030
Sec-1	1530	2.970	2.816	5.786	0.677	5.817	0.334	296	1.8	0.030
Sec-4	2100	3.410	2.688	6.098	0.368	6.106	0.289	543	2.0	0.040
Sec-6	1100	3.280	2.979	6.259	1.019	6.321	0.215	196	2.3	0.030
Sec-7	1225	4.260	2.405	6.665	0.847	6.707	0.386	236	1.7	0.030
Sec-16	8115	5.710	3.366	9.076	0.911	9.126	2.419	219	2.1	0.030
Sec-16A	1090	5.970	3.348	9.318	0.755	9.351	0.225	265	2.6	0.030
Sec-17	1510	6.160	3.392	9.552	0.774	9.593	0.241	259	2.3	0.030
Sec-17A	1190	6.590	3.168	9.758	0.835	9.799	0.206	240	2.7	0.030
Sec-18	1370	7.600	2.512	10.112	0.987	10.170	0.371	203	1.9	0.030
Sec-19	3570	6.390	4.559	10.949	0.655	10.976	0.806	305	3.3	0.030
Sec-19A	980	8.520	2.827	11.347	1.617	11.525	0.549	124	1.8	0.030
Sec-20	4300	8.100	5.727	13.827	0.573	13.847	2.321	349	4.9	0.030
Sec-21	1950	8.140	5.778	13.918	0.631	13.943	0.096	317	3.7	0.030
Sec-21A	1040	8.840	5.139	13.979	0.551	13.997	0.054	363	4.2	0.030
Sec-42	1910	10.100	3.973	14.073	0.583	14.093	0.096	343	3.4	0.030
Sec-41	1400	8.430	5.742	14.172	0.818	14.216	0.123	245	3.4	0.030
Sec-39	2150	11.090	3.429	14.519	0.903	14.570	0.354	221	2.5	0.030
Sec-38	1900	10.850	4.109	14.959	1.045	15.033	0.463	191	2.6	0.030
Sec-35	1040	12.700	2.596	15.296	1.024	15.357	0.324	195	2.1	0.030
Sec-27	3010	13.290	3.028	16.318	1.073	16.386	1.028	186	2.3	0.030

Table 6.3.1 (2/7) River Water Surface Routing (Q = 300 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	-2.820	4.740	1.920	0.690	1.973	0.000	435	2.4	0.030
Sec-25A	860	-2.770	4.808	2.037	0.731	2.086	0.112	411	2.8	0.030
Sec-24A	2720	-2.660	5.092	2.432	0.991	2.493	0.407	303	3.4	0.030
Sec-23A	1490	-1.760	4.448	2.688	1.018	2.749	0.256	295	3.6	0.030
Sec-22A	940	-2.100	4.938	2.838	0.232	2.849	0.100	1292	1.3	0.034
Sec-21A	2620	-1.300	4.381	3.081	1.047	3.146	0.297	286	3.6	0.030
Sec-20A	2650	-0.500	4.059	3.559	1.005	3.618	0.472	298	3.5	0.030
Sec-19A	1125	-1.800	5.536	3.736	0.374	3.756	0.138	803	1.9	0.034
Sec-16A	2251	0.410	3.550	3.960	0.884	4.006	0.250	340	3.2	0.030
Sec-14A	1644	-1.100	5.308	4.208	1.252	4.307	0.302	240	4.1	0.030
Sec-12A	1780	0.630	3.902	4.532	0.257	4.541	0.233	1167	1.5	0.035
Sec-10A	1560	1.050	3.598	4.648	0.858	4.691	0.150	349	3.1	0.030
Sec-9A	1440	0.190	4.674	4.864	1.013	4.929	0.238	296	3.3	0.030
Sec-8A	1450	-0.850	5.957	5.107	0.820	5.156	0.226	366	3.2	0.030
Sec-6A	1250	1.740	3.562	5.302	1.097	5.371	0.215	274	3.3	0.030
Sec-5A	2005	1.700	3.983	5.683	0.849	5.725	0.354	353	3.2	0.030
Sec-4A	1595	-0.850	6.727	5.877	0.868	5.928	0.204	346	3.7	0.030
Sec-2A	1420	1.490	4.610	6.100	0.949	6.164	0.235	316	2.7	0.030
Sec-1	1530	2.970	3.439	6.409	0.719	6.442	0.278	417	2.3	0.030
Sec-4	2100	3.410	3.267	6.677	0.417	6.687	0.245	719	2.5	0.040
Sec-6	1100	3.280	3.546	6.826	1.212	6.913	0.225	248	2.8	0.030
Sec-7	1225	4.260	2.970	7.230	0.938	7.281	0.368	320	2.2	0.030
Sec-16	8115	5.710	3.851	9.561	1.095	9.633	2.351	274	2.6	0.030
Sec-16A	1090	5.970	3.872	9.842	0.933	9.893	0.260	322	3.1	0.030
Sec-17	1510	6.160	3.952	10.112	0.890	10.164	0.271	337	2.7	0.030
Sec-17A	1190	6.590	3.742	10.332	1.022	10.392	0.228	294	3.2	0.030
Sec-18	1370	7.600	3.089	10.689	1.111	10.763	0.370	270	2.4	0.030
Sec-19	3570	6.390	5.125	11.515	0.823	11.557	0.794	365	3.8	0.030
Sec-19A	980	8.520	3.352	11.872	1.748	12.075	0.518	172	2.2	0.030
Sec-20	4300	8.100	6.051	14.151	0.145	14.154	2.080	2067	1.7	0.036
Sec-21	1950	8.140	6.085	14.225	0.866	14.271	0.117	346	4.0	0.030
Sec-21A	1040	8.840	5.490	14.330	0.758	14.364	0.092	396	4.5	0.030
Sec-42	1910	10.100	4.383	14.483	0.774	14.518	0.154	387	3.8	0.030
Sec-41	1400	8.430	6.199	14.629	1.059	14.702	0.184	283	3.8	0.030
Sec-39	2150	11.090	3.982	15.072	1.059	15.142	0.441	283	2.9	0.030
Sec-38	1900	10.850	4.707	15.557	1.205	15.654	0.512	249	3.0	0.030
Sec-35	1040	12.700	3.203	15.903	1.162	15.983	0.329	258	2.6	0.030
Sec-27	3010	13.290	3.625	16.915	1.265	17.009	1.026	237	2.9	0.030

Table 6.3.1 (3/7) River Water Surface Routing (Q = 400 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	-2.820	4.930	2.110	0.640	2.175	0.000	625	1.9	0.031
Sec-25A	860	-2.770	5.024	2.254	0.804	2.320	0.146	497	2.7	0.031
Sec-24A	2720	-2.660	5.285	2.625	0.269	2.639	0.319	1487	1.2	0.035
Sec-23A	1490	-1.760	4.550	2.790	1.317	2.893	0.253	304	3.7	0.030
Sec-22A	940	-2.100	5.132	3.032	0.232	3.043	0.150	1723	1.3	0.035
Sec-21A	2620	-1.300	4.590	3.290	1.314	3.392	0.412	304	3.7	0.030
Sec-20A	2650	-0.500	4.300	3.800	0.126	3.801	0.368	3175	1.8	0.038
Sec-19A	1125	-1.800	5.637	3.837	0.461	3.867	0.065	868	1.9	0.034
Sec-16A	2251	0.410	3.710	4.120	0.324	4.131	0.184	1234	1.8	0.035
Sec-14A	1644	-1.100	5.404	4.304	1.625	4.471	0.339	246	4.2	0.030
Sec-12A	1780	0.630	4.188	4.818	0.265	4.826	0.355	1512	1.7	0.035
Sec-10A	1560	1.050	3.893	4.943	0.810	4.997	0.171	494	2.6	0.030
Sec-9A	1440	0.190	5.011	5.201	1.208	5.294	0.296	331	3.6	0.030
Sec-8A	1450	-0.850	6.362	5.512	0.930	5.575	0.281	430	3.4	0.030
Sec-6A	1250	1.740	3.994	5.734	1.289	5.830	0.255	310	3.8	0.030
Sec-5A	2005	1.700	4.483	6.183	0.975	6.237	0.408	410	3.7	0.030
Sec-4A	1595	-0.850	7.249	6.399	0.987	6.464	0.227	405	4.1	0.030
Sec-2A	1420	1.490	5.143	6.633	1.018	6.703	0.239	393	3.1	0.030
Sec-1	1530	2.970	3.955	6.925	0.770	6.961	0.259	519	2.8	0.030
Sec-4	2100	3.410	3.758	7.168	0.376	7.179	0.217	1064	2.4	0.040
Sec-6	1100	3.280	4.019	7.299	1.374	7.409	0.230	291	3.3	0.030
Sec-7	1225	4.260	3.456	7.716	1.020	7.776	0.366	392	2.7	0.030
Sec-16	8115	5.710	4.288	9.998	1.230	10.088	2.313	325	3.0	0.030
Sec-16A	1090	5.970	4.330	10.300	1.074	10.368	0.279	372	3.5	0.030
Sec-17	1510	6.160	4.435	10.595	0.981	10.657	0.289	408	3.1	0.030
Sec-17A	1190	6.590	4.230	10.820	1.175	10.899	0.243	340	3.7	0.030
Sec-18	1370	7.600	3.585	11.185	1.212	11.272	0.373	330	2.9	0.030
Sec-19	3570	6.390	5.622	12.012	0.957	12.068	0.796	418	4.3	0.030
Sec-19A	980	8.520	3.813	12.333	1.853	12.556	0.488	216	2.6	0.030
Sec-20	4300	8.100	6.360	14.460	0.143	14.463	1.907	2789	1.9	0.037
Sec-21	1950	8.140	6.407	14.547	1.060	14.616	0.154	377	4.3	0.030
Sec-21A	1040	8.840	5.851	14.691	0.930	14.743	0.126	430	4.8	0.030
Sec-42	1910	10.100	4.795	14.895	0.925	14.944	0.202	433	4.1	0.030
Sec-41	1400	8.430	6.642	15.072	1.242	15.171	0.227	322	4.1	0.030
Sec-39	2150	11.090	4.485	15.575	1.164	15.660	0.489	344	3.3	0.030
Sec-38	1900	10.850	5.222	16.072	1.322	16.187	0.527	303	3.4	0.030
Sec-35	1040	12.700	3.718	16.418	1.169	16.506	0.319	342	2.8	0.030
Sec-27	3010	13.290	4.110	17.400	1.434	17.520	1.014	279	3.4	0.030

Table 6.3.1 (4/7) River Water Surface Routing (Q = 500 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	-2.820	5.070	2.250	0.430	2.297	0.000	1162	1.2	0.033
Sec-25A	860	-2.770	5.148	2.378	0.321	2.403	0.106	1558	1.2	0.034
Sec-24A	2720	-2.660	5.308	2.648	0.327	2.667	0.264	1527	1.2	0.035
Sec-23A	1490	-1.760	4.642	2.882	1.604	3.034	0.367	312	3.8	0.030
Sec-22A	940	-2.100	5.330	3.230	0.231	3.239	0.205	2169	1.4	0.036
Sec-21A	2620	-1.300	4.743	3.443	0.379	3.478	0.239	1320	1.1	0.034
Sec-20A	2650	-0.500	4.300	3.800	1.558	3.942	0.693	321	3.7	0.030
Sec-19A	1125	-1.800	5.967	4.167	0.189	4.170	0.229	2643	2.0	0.038
Sec-16A	2251	0.410	3.827	4.237	0.259	4.244	0.074	1927	1.7	0.036
Sec-14A	1644	-1.100	5.460	4.360	0.329	4.379	0.110	1521	1.4	0.036
Sec-12A	1780	0.630	3.917	4.547	0.422	4.569	0.190	1184	1.5	0.035
Sec-10A	1560	1.050	3.774	4.824	1.351	4.929	0.360	370	3.3	0.030
Sec-9A	1440	0.190	5.092	5.282	1.438	5.419	0.489	348	3.6	0.030
Sec-8A	1450	-0.850	6.563	5.713	0.554	5.755	0.337	902	2.0	0.032
Sec-6A	1250	1.740	4.171	5.911	1.537	6.047	0.291	325	3.9	0.030
Sec-5A	2005	1.700	4.798	6.498	1.119	6.570	0.523	447	4.0	0.030
Sec-4A	1595	-0.850	7.605	6.755	1.091	6.837	0.267	458	4.2	0.030
Sec-2A	1420	1.490	5.527	7.017	1.114	7.098	0.262	449	3.5	0.030
Sec-1	1530	2.970	4.352	7.322	0.836	7.364	0.266	598	3.2	0.030
Sec-4	2100	3.410	4.151	7.561	0.356	7.571	0.207	1405	2.4	0.040
Sec-6	1100	3.280	4.395	7.675	1.534	7.812	0.241	326	3.6	0.030
Sec-7	1225	4.260	3.863	8.123	1.104	8.193	0.381	453	3.1	0.030
Sec-16	8115	5.710	4.630	10.340	1.010	10.424	2.145	495	2.5	0.031
Sec-16A	1090	5.970	4.644	10.614	1.077	10.699	0.275	464	3.2	0.030
Sec-17	1510	6.160	4.787	10.947	1.085	11.021	0.322	461	3.4	0.030
Sec-17A	1190	6.590	4.599	11.189	1.328	11.291	0.270	376	4.0	0.030
Sec-18	1370	7.600	3.984	11.584	1.317	11.687	0.396	380	3.2	0.030
Sec-19	3570	6.390	6.056	12.446	1.075	12.516	0.829	465	4.6	0.030
Sec-19A	980	8.520	4.223	12.743	1.949	12.985	0.469	256	2.9	0.030
Sec-20	4300	8.100	6.675	14.775	0.150	14.778	1.793	3337	2.2	0.037
Sec-21	1950	8.140	6.658	14.798	0.159	14.800	0.023	3135	2.2	0.037
Sec-21A	1040	8.840	5.963	14.803	1.135	14.879	0.078	440	4.9	0.030
Sec-42	1910	10.100	4.989	15.089	1.101	15.160	0.280	454	4.3	0.030
Sec-41	1400	8.430	6.891	15.321	1.452	15.455	0.296	344	4.3	0.030
Sec-39	2150	11.090	4.840	15.930	1.286	16.035	0.580	389	3.6	0.030
Sec-38	1900	10.850	5.619	16.469	1.444	16.606	0.571	346	3.7	0.030
Sec-35	1040	12.700	4.133	16.833	1.224	16.931	0.326	408	3.1	0.030
Sec-27	3010	13.290	4.527	17.817	1.584	17.963	1.032	316	3.7	0.030

Table 6.3.1 (5/7) River Water Surface Routing (Q = 1,200 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	1.180	1.470	2.650	0.528	2.669	0.000	1704	0.89	0.039
Sec-25A	340	1.430	1.354	2.784	0.414	2.794	0.125	2174	1.02	0.039
Sec-24A	630	1.520	1.428	2.948	0.422	2.959	0.165	2132	1.03	0.040
Sec-23A	710	1.890	1.310	3.200	0.501	3.215	0.254	1795	0.91	0.040
Sec-22A	810	1.830	1.634	3.464	0.378	3.473	0.258	2381	1.13	0.040
Sec-21A	750	2.170	1.541	3.711	0.494	3.726	0.254	1821	0.84	0.040
Sec-20A	725	1.910	2.011	3.921	0.276	3.925	0.198	3261	1.69	0.040
Sec-19A	455	1.920	2.046	3.966	0.435	3.977	0.053	2071	1.51	0.040
Sec-16A	2395	2.350	2.087	4.437	0.481	4.451	0.473	1871	1.46	0.040
Sec-14A	1245	3.000	1.738	4.738	0.488	4.752	0.301	1845	1.31	0.040
Sec-12A	1105	3.260	1.776	5.036	0.500	5.052	0.300	1800	1.30	0.040
Sec-10A	1215	3.620	1.685	5.305	0.373	5.314	0.262	2415	1.31	0.040
Sec-9A	410	3.800	1.709	5.509	0.795	5.554	0.242	1132	0.97	0.039
Sec-8A	740	2.040	3.984	6.024	0.529	6.050	0.495	1701	1.27	0.039
Sec-6A	1370	2.090	4.257	6.347	0.400	6.362	0.312	2252	1.51	0.040
Sec-5A	1010	5.290	1.569	6.859	0.709	6.896	0.534	1269	0.85	0.038
Sec-4A	480	5.820	1.443	7.263	0.664	7.296	0.400	1355	0.87	0.038
Sec-2A	950	5.200	2.511	7.711	0.451	7.725	0.429	1995	1.72	0.039
Sec-1	1490	6.100	1.823	7.923	0.395	7.933	0.209	2280	1.49	0.038
Sec-4	1660	3.410	4.665	8.075	0.299	8.082	0.149	3015	2.29	0.039
Sec-6	1075	6.830	1.733	8.563	0.901	8.628	0.546	999	1.12	0.037
Sec-7	1345	7.230	2.173	9.403	0.541	9.424	0.796	1664	1.60	0.037
Sec-16	5780	9.370	1.891	11.261	0.638	11.291	1.864	1411	1.24	0.038
Sec-16A	850	9.840	1.838	11.678	0.699	11.717	0.425	1287	1.14	0.037
Sec-17	740	10.110	1.877	11.987	0.454	12.002	0.285	1983	1.33	0.038
Sec-17A	715	10.330	1.871	12.201	0.561	12.227	0.224	1605	1.05	0.038
Sec-18	840	10.690	1.828	12.518	0.464	12.536	0.310	1938	0.99	0.038
Sec-19	830	11.510	1.353	12.863	0.571	12.887	0.351	1577	0.93	0.038
Sec-19A	875	11.870	1.648	13.518	0.744	13.576	0.693	1210	0.78	0.037
Sec-20	740	12.650	1.434	14.084	0.509	14.099	0.523	1768	1.11	0.040
Sec-21	895	11.570	2.758	14.328	0.436	14.340	0.241	2063	1.50	0.040
Sec-21A	725	12.840	1.783	14.623	0.723	14.661	0.324	1244	1.12	0.040
Sec-42	830	14.000	1.122	15.122	0.479	15.135	0.474	1877	0.88	0.039
Sec-41	680	14.500	1.119	15.619	0.679	15.650	0.515	1325	0.72	0.039
Sec-39	680	14.630	1.702	16.332	0.866	16.384	0.738	1039	0.98	0.037
Sec-38	910	14.000	3.131	17.131	0.749	17.175	0.791	1202	1.14	0.038
Sec-35	510	15.570	1.895	17.465	0.677	17.502	0.326	1329	1.00	0.037
Sec-27	1200	16.300	2.003	18.303	0.854	18.356	0.854	1054	1.12	0.036

Table 6.3.1 (6/7) River Water Surface Routing (Q = 1,600 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	1.180	1.780	2.960	0.563	2.980	0.000	2309	1.20	0.039
Sec-25A	340	1.430	1.640	3.070	0.466	3.083	0.104	2792	1.30	0.039
Sec-24A	630	1.520	1.702	3.222	0.475	3.236	0.153	2737	1.28	0.040
Sec-23A	710	1.890	1.562	3.452	0.561	3.471	0.234	2318	1.15	0.040
Sec-22A	810	1.830	1.877	3.707	0.444	3.719	0.248	2931	1.36	0.040
Sec-21A	750	2.170	1.774	3.944	0.554	3.962	0.243	2347	1.06	0.040
Sec-20A	725	1.910	2.235	4.145	0.348	4.152	0,191	3731	1.90	0.040
Sec-19A	455	1.920	2.283	4.203	0.533	4.221	0.069	2438	1.72	0.040
Sec-16A	2395	2.350	2.400	4.750	0.562	4.768	0.546	2313	1.75	0.040
Sec-14A	1245	3.000	2.060	5.060	0.560	5.078	0.309	2323	1.62	0.040
Sec-12A	1105	3.260	2.094	5.354	0.567	5.373	0.295	2291	1.59	0.040
Sec-10A	1215	3.620	2.001	5.621	0.421	5.632	0.258	3084	1.59	0.040
Sec-9A	410	3.800	1.988	5.788	0.769	5.831	0.199	1691	1.08	0.039
Sec-8A	740	2.040	4.197	6.237	0.609	6.269	0.438	2136	1.39	0.039
Sec-6A	1370	2.090	4.524	6.614	0.459	6.631	0.363	2835	1.67	0.040
Sec-5A	1010	5.290	1.802	7.092	0.763	7.132	0.499	1704	1.04	0.038
Sec-4A	480	5.820	1.652	7.472	0.754	7.512	0.379	1725	1.05	0.038
Sec-2A	950	5.200	2.746	7.946	0.562	7.966	0.454	2312	1.92	0.039
Sec-1	1490	6.100	2.113	8.213	0.470	8.226	0.260	2765	1.76	0.038
Sec-4	1660	3.410	4.982	8.392	0.358	8.402	0.176	3627	2.47	0.039
Sec-6	1075	6.830	2.023	8.853	0.987	8.926	0.525	1318	1.36	0.038
Sec-7	1345	7.230	2.457	9.687	0.654	9.716	0.791	1987	1.86	0.037
Sec-16	5780	9.370	2.220	11.590	0.700	11.624	1.909	1857	1.52	0.038
Sec-16A	850	9.840	2.138	11.978	0.767	12.022	0.398	1695	1.39	0.038
Sec-17	740	10.110	2.171	12.281	0.528	12.300	0.277	2461	1.60	0.038
Sec-17A	715	10.330	2.158	12.488	0.616	12.516	0.216	2110	1.30	0.038
Sec-18	840	10.690	2.092	12.782	0.504	12.802	0.285	2580	1.20	0.038
Sec-19	830	11.510	1.593	13.103	0.627	13.130	0.328	2072	1.12	0.039
Sec-19A	875	11.870	1.853	13.723	0.783	13.780	0.646	1661	0.92	0.038
Sec-20	740	12.650	1.630	14.280	0.618	14.303	0.521	2103	1.29	0.040
Sec-21	895	11.570	3.007	14.577	0.524	14.595	0.292	2479	1.69	0.040
Sec-21A	725	12.840	2.045	14.885	0.794	14.928	0.333	1638	1.30	0.040
Sec-42	830	14.000	1.364	15.364	0.537	15.381	0.453	2419	1.11	0.039
Sec-41	680	14.500	1.317	15.817	0.755	15.853	0.473	1721	0.90	0.039
Sec-39	680	14.630	1.896	16.526	0.936	16.593	0.736	1389	1.05	0.038
Sec-38	910	14.000	3.382	17.382	0.838	17.435	0.843	1551	1.33	0.038
Sec-35	510	15.570	2.151	17.721	0.764	17.764	0.330	1702	1.23	0.037
Sec-27	1200	16.300	2.259	18.559	0.931	18.624	0.858	1396	1.27	0.036

Table 6.3.1 (7/7) River Water Surface Routing (Q = 2,000 m^3/sec.)

Sec. Name	Di'ce (m)	Bed El. (m)	Depth (m)	W.S.El. (m)	V'ty (m/s)	E'ngy (m)	Hf (m)	Area (m2)	Rm (m)	Nm
Sec-26A0	0.03	1.180	2.090	3.270	0.583	3.291	0.000	2914	1.51	0.039
Sec-25A	340	1.430	1.931	3.361	0.497	3.375	0.086	3420	1.59	0.039
Sec-24A	630	1.520	1.975	3.495	0.509	3.510	0.136	3340	1.55	0.039
Sec-23A	710	1.890	1.809	3.699	0.601	3.720	0.209	2828	1.39	0.040
Sec-22A	810	1.830	2.106	3.936	0.493	3.951	0.231	3448	1.58	0.040
Sec-21A	750	2.170	1.991	4.161	0.599	4.182	0.230	2836	1.28	0.040
Sec-20A	725	1.910	2.446	4.356	0.407	4.365	0.183	4174	2.10	0.040
Sec-19A	455	1.920	2.502	4.422	0.612	4.444	0.079	2777	1.92	0.040
Sec-16A	2395	2.350	2.667	5.017	0.632	5.041	0.596	2690	2.00	0.040
Sec-14A	1245	3.000	2.336	5.336	0.622	5.358	0.318	2734	1.89	0.040
Sec-12A	1105	3.260	2.369	5.629	0.626	5.652	0.295	2716	1.84	0.040
Sec-10A	1215	3.620	2.275	5.895	0.464	5.908	0.256	3665	1.84	0.040
Sec-9A	410	3.800	2.234	6.034	0.757	6.075	0.167	2246	1.24	0.039
Sec-8A	740	2.040	4.389	6.429	0.671	6.465	0.390	2533	1.52	0.039
Sec-6A	1370	2.090	4.747	6.837	0.511	6.858	0.392	3324	1.84	0.040
Sec-5A	1010	5.290	2.003	7.293	0.816	7.338	0.479	2084	1.21	0.039
Sec-4A	480	5.820	1.836	7.656	0.829	7.703	0.365	2051	1.23	0.038
Sec-2A	950	5.200	2.948	8.148	0.658	8.175	0.473	2584	2.10	0.039
Sec-1	1490	6.100	2.360	8.460	0.535	8.478	0.303	3179	1.99	0.038
Sec-4	1660	3.410	5.253	8.663	0.409	8.675	0.197	4155	2.66	0.039
Sec-6	1075	6.830	2.276	9.106	1.065	9.187	0.511	1596	1.58	0.038
Sec-7	1345	7.230	2.707	9.937	0.748	9.975	0.788	2271	2.10	0.037
Sec-16	5780	9.370	2.510	11.880	0.755	11.919	1.943	2250	1.79	0.038
Sec-16A	850	9.840	2.407	12.247	0.825	12.295	0.377	2061	1.63	0.038
Sec-17	740	10.110	2.432	12.542	0.589	12.565	0.269	2885	1.85	0.038
Sec-17A	715	10.330	2.413	12.743	0.665	12.774	0.210	2558	1.54	0.038
Sec-18	840	10.690	2.330	13.020	0.539	13.041	0.267	3156	1.41	0.038
Sec-19	830	11.510	1.810	13.320	0.674	13.350	0.308	2522	1.32	0.039
Sec-19A	875	11.870	2.027	13.897	0.827	13.956	0.609	2054	1.05	0.038
Sec-20	740	12.650	1.799	14.449	0.709	14.479	0.521	2397	1.45	0.040
Sec-21	895	11.570	3.217	14.787	0.599	14.810	0.331	2837	1.86	0.040
Sec-21A	725	12.840	2.262	15.102	0.861	15.152	0.343	1975	1.47	0.040
Sec-42	830	14.000	1.575	15.575	0.587	15.595	0.443	2898	1.31	0.039
Sec-41	680	14.500	1.495	15.995	0.817	16.037	0.443	2080	1.07	0.039
Sec-39	680	14.630	2.056	16.686	0.998	16.762	0.726	1703	1.14	0.038
Sec-38	910	14.000	3.580	17.580	0.931	17.642	0.880	1827	1.49	0.038
Sec-35	510	15.570	2.364	17.934	0.844	17.984	0.343	2014	1.43	0.037
Sec-27	1200	16.300	2.471	18.771	0.944	18.843	0.857	1800	1.32	0.036

Table 6.3.2 Low Water Channel Water Profile

Sec. Name	Km Distance	Single Distance	Accum. Distance	Lowest Elev.	Shoulder Elev.			Channel Width	Water Surface Profile (m3/s)				Shoulder - W.Surface
					Left	Right	Min.		200	300	400	500	
Sec-26A	85 + 980	0	0	-2.82	1.90	2.23	1.90	92	0.75	1.92	2.11	2.25	-0.35
Sec-25A	85 + 120	860	860	-2.77	1.91	2.31	1.91	90	0.93	2.04	2.25	2.38	-0.47
Sec-24A	82 + 400	2,720	3,580	-2.66	2.58	3.06	2.58	100	1.49	2.43	2.63	2.65	-0.07
Sec-23A	80 + 910	1,490	5,070	-1.76	3.01	2.98	2.98	89	1.81	2.69	2.79	2.88	0.10
Sec-22A	79 + 970	940	6,010	-2.10	3.03	2.72	2.72	98	1.97	2.84	3.03	3.23	-0.51
Sec-21A	77 + 350	2,620	8,630	-1.30	3.29	3.76	3.29	87	2.35	3.08	3.29	3.44	-0.15
Sec-20A	74 + 700	2,650	11,280	-0.54	4.03	3.80	3.80	98	2.81	3.56	3.80	3.80	0.00
Sec-19A	73 + 575	1,125	12,405	-1.80	3.46	3.89	3.46	83	2.99	3.74	3.84	4.17	-0.71
Sec-16A	71 + 324	2,251	14,656	0.41	4.23	4.12	4.12	121	3.37	3.96	4.12	4.24	-0.12
Sec-14A	69 + 680	1,644	16,300	-1.10	4.36	4.35	4.35	68	3.58	4.21	4.30	4.36	-0.01
Sec-12A	67 + 900	1,780	18,080	0.63	4.82	4.38	4.38	105	3.90	4.53	4.80	4.55	-0.17
Sec-10A	66 + 340	1,560	19,640	1.05	4.88	5.06	4.88	119	4.12	4.64	4.93	4.82	0.06
Sec-9A	64 + 900	1,440	21,080	0.19	5.21	5.40	5.21	105	4.30	4.86	5.20	5.28	-0.07
Sec-8A	63 + 450	1,450	22,530	-0.85	6.48	5.65	5.65	172	4.50	5.10	5.51	5.71	-0.06
Sec-6A	62 + 200	1,250	23,780	1.74	6.32	6.32	6.32	88	4.68	5.30	5.73	5.91	0.41
Sec-5A	60 + 195	2,005	25,785	1.70	6.78	6.96	6.78	119	5.02	5.68	6.18	6.50	0.28
Sec-4A	58 + 600	1,595	27,380	-0.85	7.00	6.88	6.88	113	5.20	5.88	6.40	6.76	0.12
Sec-2A	57 + 180	1,420	28,800	1.49	7.50	7.33	7.33	148	5.42	6.10	6.63	7.02	0.31
Sec-1	55 + 650	1,530	30,330	2.97	7.95	7.87	7.87	203	5.79	6.41	6.93	7.32	0.55
Sec-4	53 + 550	2,100	32,430	3.41	8.08	8.16	8.08	130	6.10	6.68	7.17	7.56	0.52
Sec-6	52 + 450	1,100	33,530	3.28	8.03	8.37	8.03	95	6.26	6.83	7.30	7.68	0.35
Sec-7	51 + 225	1,225	34,755	4.26	9.05	9.03	9.03	152	6.66	7.23	7.72	8.12	0.91
Sec-16	43 + 110	8,115	42,870	5.71	10.47	10.34	10.34	125	9.08	9.56	10.00	10.34	0.00
Sec-16A	42 + 20	1,090	43,960	5.97	10.61	10.65	10.61	114	9.32	9.84	10.30	10.67	-0.06
Sec-17	40 + 510	1,510	45,470	6.16	11.39	11.18	11.18	157	9.55	10.11	10.60	10.99	0.19
Sec-17A	39 + 320	1,190	46,660	6.59	11.61	11.63	11.61	100	9.76	10.33	10.82	11.22	0.39
Sec-18	37 + 950	1,370	48,030	7.60	11.74	11.80	11.74	128	10.11	10.69	11.19	11.61	0.13
Sec-19	34 + 380	3,570	51,600	6.39	13.27	12.82	12.82	113	10.95	11.52	12.01	12.45	0.37
Sec-19A	33 + 400	980	52,580	8.52	13.90	14.00	13.90	108	11.35	11.87	12.33	12.75	1.15
Sec-20	29 + 100	4,300	56,880	8.10	14.31	14.00	14.00	81	13.83	14.15	14.46	14.77	-0.77
Sec-21	27 + 150	1,950	58,830	8.14	14.64	15.28	14.64	97	13.92	14.22	14.55	14.79	-0.15
Sec-21A	26 + 110	1,040	59,870	8.84	15.21	15.10	15.10	101	13.98	14.33	14.69	14.80	0.30
Sec-42	24 + 200	1,910	61,780	10.10	16.31	15.40	15.40	153	14.07	14.48	14.89	15.08	0.32
Sec-41	22 + 800	1,400	63,180	8.43	15.65	15.73	15.65	93	14.17	14.63	15.07	15.32	0.33
Sec-39	20 + 650	2,150	65,330	11.09	16.56	17.16	16.56	144	14.52	15.07	15.57	15.93	0.63
Sec-38	18 + 750	1,900	67,230	10.85	17.91	17.24	17.24	124	14.96	15.56	16.07	16.47	0.77
Sec-35	17 + 710	1,040	68,270	12.70	18.06	18.53	18.06	174	15.30	15.90	16.42	16.83	1.23
Sec-27	14 + 700	3,010	71,280	13.29	18.92	18.60	18.60	238	16.32	16.92	17.40	17.82	0.78
Min.								68					-0.77
Max.								238					1.23
Avg.								119					

Table 6.3.3 High Water Channel Water Profile

Sec. Name	Km Distance	Single Distance	Accum. Distance	Levee Elevation	Channel Width	Water Profile			Free Board	
						1,200	1,600	2,000	1,200	2,000
Sec-26A	51 + 90	0	0	3.73	1,952	2.65	2.96	3.27	1.08	0.46
Sec-25A	50 + 750	340	340	3.80	2,160	2.78	3.07	3.36	1.02	0.44
Sec-24A	50 + 120	630	970	3.91	2,210	2.95	3.22	3.50	0.96	0.41
Sec-23A	49 + 410	710	1,680	4.12	2,069	3.20	3.45	3.70	0.92	0.42
Sec-22A	48 + 600	810	2,490	4.33	2,258	3.46	3.71	3.94	0.87	0.39
Sec-21A	47 + 850	750	3,240	4.54	2,260	3.71	3.94	4.16	0.83	0.38
Sec-20A	47 + 125	725	3,965	4.66	2,098	3.92	4.15	4.36	0.74	0.30
Sec-19A	46 + 670	455	4,420	4.73	1,548	3.97	4.20	4.42	0.76	0.31
Sec-16A	44 + 275	2,395	6,815	5.12	1,411	4.44	4.75	5.02	0.68	0.10
Sec-14A	43 + 30	1,245	8,060	5.41	1,488	4.74	5.06	5.34	0.67	0.07
Sec-12A	41 + 925	1,105	9,165	5.87	1,545	5.03	5.35	5.63	0.84	0.24
Sec-10A	40 + 710	1,215	10,380	6.11	2,119	5.31	5.62	5.90	0.80	0.21
Sec-9A	40 + 300	410	10,790	6.59	2,255	5.51	5.79	6.04	1.08	0.55
Sec-8A	39 + 560	740	11,530	6.61	2,092	6.02	6.24	6.43	0.59	0.18
Sec-6A	38 + 190	1,370	12,900	7.51	2,188	6.34	6.61	6.84	1.17	0.67
Sec-5A	37 + 180	1,010	13,910	8.17	1,880	6.86	7.09	7.29	1.31	0.88
Sec-4A	36 + 700	480	14,390	8.51	1,768	7.26	7.47	7.66	1.25	0.85
Sec-2A	35 + 750	950	15,340	8.73	1,350	7.71	7.95	8.15	1.02	0.58
Sec-1	34 + 260	1,490	16,830	8.99	1,673	7.92	8.21	8.46	1.07	0.53
Sec-4	32 + 600	1,660	18,490	9.10	1,950	8.07	8.39	8.66	1.03	0.44
Sec-6	31 + 525	1,075	19,565	9.59	1,097	8.56	8.86	9.11	1.03	0.48
Sec-7	30 + 180	1,345	20,910	10.47	1,138	9.40	9.69	9.94	1.07	0.53
Sec-16	24 + 400	5,780	26,690	12.03	1,355	11.26	11.59	11.88	0.77	0.15
Sec-16A	23 + 550	850	27,540	12.65	1,360	11.68	11.98	12.25	0.97	0.40
Sec-17	22 + 810	740	28,280	12.98	1,626	11.99	12.28	12.54	0.99	0.44
Sec-17A	22 + 95	715	28,995	13.20	1,759	12.20	12.49	12.74	1.00	0.46
Sec-18	21 + 255	840	29,835	13.54	2,426	12.52	12.78	13.02	1.02	0.52
Sec-19	20 + 425	830	30,665	13.92	2,141	12.86	13.10	13.32	1.06	0.60
Sec-19A	19 + 550	875	31,540	14.57	2,289	13.52	13.72	13.90	1.05	0.67
Sec-20	18 + 810	740	32,280	15.01	1,735	14.08	14.28	14.45	0.93	0.56
Sec-21	17 + 915	895	33,175	15.24	1,731	14.33	14.58	14.79	0.91	0.45
Sec-21A	17 + 190	725	33,900	15.89	1,634	14.63	14.88	15.10	1.26	0.79
Sec-42	16 + 360	830	34,730	16.16	2,270	15.12	15.36	15.58	1.04	0.58
Sec-41	15 + 680	680	35,410	16.58	2,018	15.62	15.82	16.00	0.96	0.58
Sec-39	15 + 0	680	36,090	17.37	1,990	16.33	16.52	16.69	1.04	0.68
Sec-38	14 + 90	910	37,000	18.37	1,405	17.13	17.38	17.58	1.24	0.79
Sec-35	13 + 580	510	37,510	18.63	1,498	17.46	17.72	17.93	1.17	0.70
Sec-27	12 + 380	1,200	38,710	19.36	2,224	18.30	18.56	18.77	1.06	0.59
Min.					1,097				0.59	0.07
Max.					2,426				1.31	0.88
Avg.					1,841				0.98	0.48

Table 7.1.1 Flood Hydrograph for Çatalan Dam

Days	Time	2-Year (m3/s)	5-Year (m3/s)	10-Year (m3/s)	25-Year (m3/s)	50-Year (m3/s)	100-Year (m3/s)	200-Year (m3/s)	500-Year (m3/s)	Catast. (m3/s)
	0 : 00									
	24 : 00									
	48 : 00									
	96 : 00									
	120 : 00									
	144 : 00									
1st day	153 : 00	275	320	350	375	400	425	575	625	
1st day	165 : 00	285	330	375	400	425	450	600	650	
1st day	177 : 00	300	350	390	425	450	475	624	665	
2nd day	189 : 00	325	370	410	440	470	495	635	675	
2nd day	201 : 00	340	385	425	450	485	520	650	700	
3rd day	213 : 00	360	400	450	475	510	540	675	725	873
3rd day	225 : 00	375	420	470	500	550	585	690	740	883
4th day	237 : 00	400	435	495	535	580	615	720	775	1,077
4th day	249 : 00	425	470	530	610	650	700	775	825	1,189
5th day	261 : 00	450	515	600	660	725	790	860	915	1,250
5th day	273 : 00	475	575	690	760	825	925	1,000	1,065	1,260
6th day	285 : 00	525	640	800	890	985	1,085	1,210	1,280	1,689
6th day	297 : 00	600	780	900	1,065	1,190	1,300	1,475	1,550	4,338
7th day	309 : 00	740	975	1,160	1,365	1,525	1,735	1,850	1,950	9,226
7th day	321 : 00	1,175	1,740	2,130	2,650	3,045	3,455	3,850	4,375	9,376
8th day	333 : 00	760	1,000	1,185	1,380	1,535	1,725	1,850	1,950	4,730
8th day	345 : 00	610	790	900	1,075	1,200	1,300	1,410	1,525	3,234
9th day	357 : 00	530	675	800	935	1,010	1,100	1,130	1,250	2,619
9th day	369 : 00	465	575	675	775	860	930	935	1,020	2,214
10th day	381 : 00	400	500	575	655	735	800	810	865	1,931
10th day	393 : 00	380	450	500	575	600	700	725	780	1,731
11th day	405 : 00	355	410	460	520	575	625	690	745	1,523
11th day	417 : 00	350	380	430	475	530	590	675	725	1,374
12th day	429 : 00	335	370	425	455	520	575	660	710	1,106
12th day	441 : 00	325	355	400	445	500	555	645	695	975
13th day	453 : 00	310	345	390	430	480	540	630	675	883
13th day	465 : 00	300	330	375	420	475	525	625	665	
14th day	477 : 00	285	320	360	400	455	515	600	650	
14th day	489 : 00	275	300	350	385	435	500	590	640	
Peak Discharge		1,175	1,740	2,130	2,650	3,045	3,455	3,850	4,375	9,376
Flood Vol. (mil. m3)		538.1	656.4	762.5	870.3	963.7	1,063.3	1,191.5	1,286.4	2,310.4

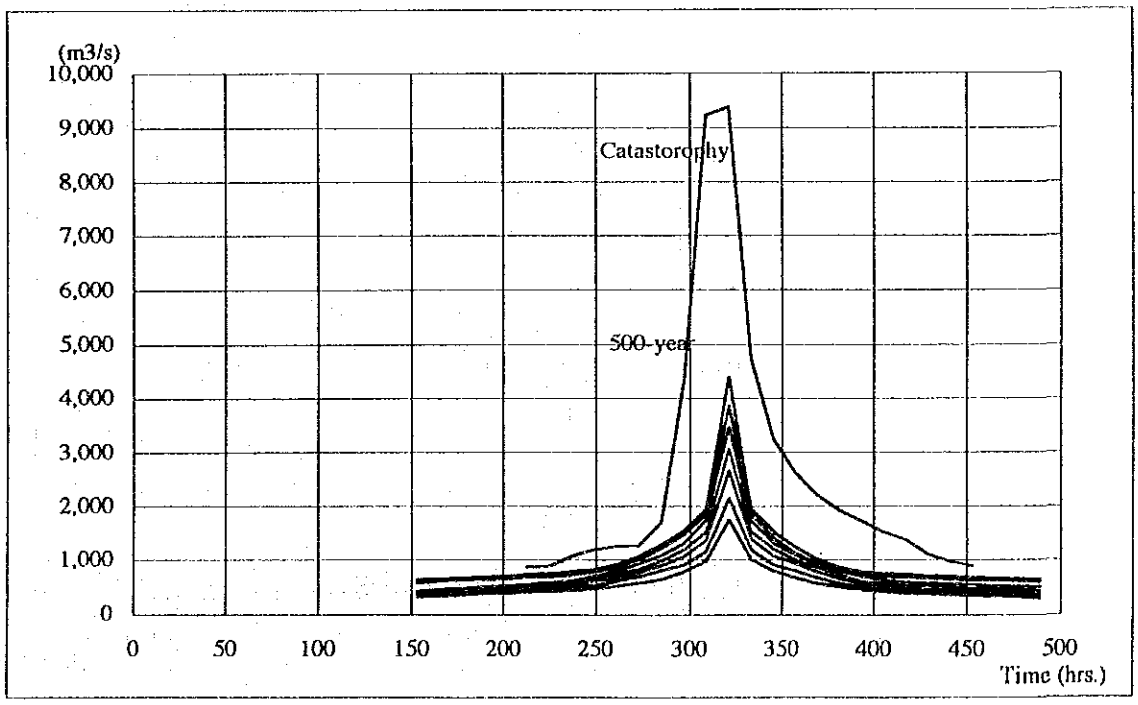

Table 7.1.2 Flood Hydrograph for Seyhan Dam

Days	Time	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	200-Year	500-Year	Catast.
1st day	0 : 00	20	32	40	46	60	69	80	110	
1st day	6 : 00	25	35	42	51	62	72	89	119	
1st day	12 : 00	27	37	45	55	65	75	100	129	
1st day	18 : 00	30	40	50	58	68	80	110	140	
1st day	24 : 00	35	45	54	64	77	86	122	158	
2nd day	30 : 00	40	50	61	74	89	102	140	170	
2nd day	36 : 00	46	60	75	84	108	129	158	190	
2nd day	42 : 00	55	73	93	110	133	160	182	214	
2nd day	48 : 00	63	88	115	140	165	197	215	255	
3rd day	54 : 00	73	106	141	175	203	235	260	305	
3rd day	60 : 00	83	128	167	210	246	280	320	368	
3rd day	66 : 00	97	155	198	253	295	335	390	440	560
3rd day	72 : 00	120	190	244	312	355	407	480	535	3,362
4th day	78 : 00	163	245	325	400	445	504	608	682	6,066
4th day	84 : 00	280	435	550	705	825	955	1,075	1,235	6,731
4th day	90 : 00	152	262	340	404	455	515	615	680	5,544
4th day	96 : 00	112	190	244	308	362	397	485	540	3,127
5th day	102 : 00	91	148	193	247	296	325	395	445	1,591
5th day	108 : 00	79	120	157	205	244	272	320	365	831
5th day	114 : 00	68	96	130	171	205	228	260	302	451
5th day	120 : 00	59	80	106	142	168	186	210	250	227
6th day	126 : 00	52	68	87	116	133	150	175	214	94
6th day	132 : 00	45	58	74	93	106	118	155	190	24
6th day	138 : 00	40	51	64	77	87	96	140	175	
6th day	144 : 00	35	47	57	71	79	86	125	162	
7th day	150 : 00	32	44	55	67	75	82	112	150	
7th day	156 : 00	30	42	52	64	72	80	100	135	
7th day	162 : 00	26	38	49	60	68	76	90	123	
7th day	168 : 00	24	35	45	56	63	73	80	115	
Peak Discharge		280	435	550	705	825	955	1,075	1,235	6,731
Flood Vol.(mil. m3)		14.1	53.4	68.7	86.0	100.8	114.0	138.0	154.9	617.9

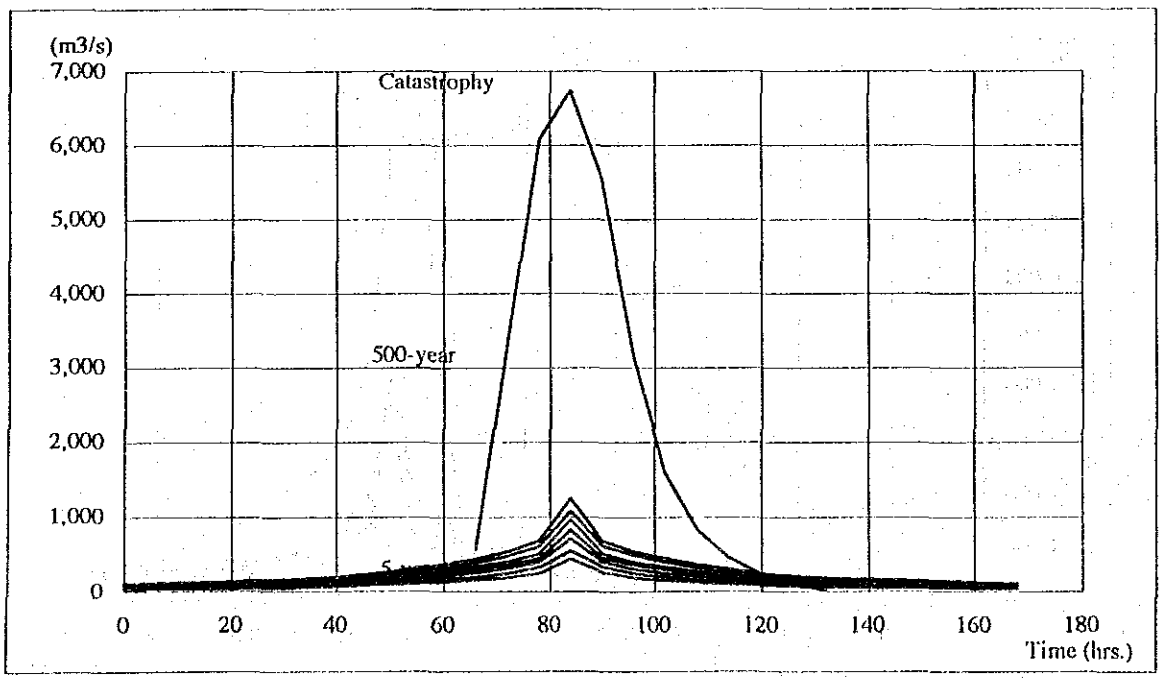

Table 7.1.3 Çatalan Dam Flood Routing for 500-year Flood (Constant Ratio Operation Qt=600m³/s)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	625				600			1,644.6	118.60
1st day	12 : 00	650	27.54	1.02	0.709	602	25.96	1.58	1,646.2	118.62
1st day	24 : 00	665	28.40	1.01	0.709	598	25.90	2.50	1,648.7	118.66
2nd day	36 : 00	675	28.94	1.01	0.709	599	25.85	3.09	1,651.8	118.70
2nd day	48 : 00	700	29.70	1.01	0.710	601	25.93	3.77	1,655.6	118.75
3rd day	60 : 00	725	30.78	1.01	0.710	604	26.02	4.76	1,660.3	118.82
3rd day	72 : 00	740	31.64	1.00	0.710	601	26.02	5.62	1,666.0	118.90
4th day	84 : 00	775	32.72	1.00	0.710	604	26.04	6.68	1,672.6	118.99
4th day	96 : 00	825	34.56	0.98	0.711	597	25.96	8.60	1,681.2	119.11
5th day	108 : 00	915	37.58	0.98	0.709	566	25.14	12.45	1,693.7	119.28
5th day	120 : 00	1,065	42.77	0.97	0.712	606	25.33	17.44	1,711.1	119.52
6th day	132 : 00	1,280	50.65	0.94	0.713	600	26.05	24.61	1,735.7	119.85
6th day	144 : 00	1,550	61.13	0.92	0.714	603	25.98	35.15	1,770.9	120.33
7th day	156 : 00	1,950	75.60	0.89	0.716	604	26.08	49.52	1,820.4	120.99
7th day	168 : 00	4,375	136.62	0.82	0.720	598	25.96	110.66	1,931.1	122.42
8th day	180 : 00	1,950	136.62	0.78	0.724	604	25.96	110.66	2,041.7	123.82
8th day	192 : 00	1,525	75.06	0.76	0.723	580	25.58	49.48	2,091.2	124.42
9th day	204 : 00	1,250	59.94	0.74	0.730	600	25.50	34.44	2,125.6	124.84
9th day	216 : 00	1,020	49.03	0.73	0.731	599	25.90	23.13	2,148.8	125.12
10th day	228 : 00	865	40.72	0.73	0.731	603	25.96	14.76	2,163.5	125.30
10th day	240 : 00	780	35.53	0.73	0.732	605	26.09	9.44	2,173.0	125.41
11th day	252 : 00	745	32.94	0.72	0.732	599	26.01	6.93	2,179.9	125.50
11th day	264 : 00	725	31.75	0.72	0.732	601	25.92	5.83	2,185.7	125.57
12th day	276 : 00	710	31.00	0.72	0.732	602	25.98	5.02	2,190.7	125.63
12th day	288 : 00	695	30.35	0.72	0.732	603	26.03	4.32	2,195.1	125.68
13th day	300 : 00	675	29.59	0.72	0.733	604	26.07	3.52	2,198.6	125.72
13th day	312 : 00	665	28.94	0.72	0.733	604	26.10	2.84	2,201.4	125.75
14th day	324 : 00	650								
14th day	336 : 00	640								
		4,375	1,230.1				673.3		2,201.4	125.75
							Stored Volume=		556.8	

Table 7.1.4 Çatalan Dam Flood Routing for 500-year Flood (Constant Ratio Operation Qt=800m³/s)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	625				625			1,644.6	118.60
1st day	12 : 00	650	27.54	1.06	0.708	623	26.97	0.57	1,645.2	118.61
1st day	24 : 00	665	28.40	1.07	0.708	630	27.07	1.33	1,646.5	118.63
2nd day	36 : 00	675	28.94	1.07	0.708	631	27.22	1.72	1,648.2	118.65
2nd day	48 : 00	700	29.70	1.07	0.708	632	27.27	2.43	1,650.7	118.68
3rd day	60 : 00	725	30.78	1.07	0.708	634	27.34	3.44	1,654.1	118.73
3rd day	72 : 00	740	31.64	1.06	0.709	631	27.31	4.33	1,658.5	118.79
4th day	84 : 00	775	32.72	1.06	0.709	634	27.31	5.41	1,663.9	118.87
4th day	96 : 00	825	34.56	1.06	0.709	638	27.47	7.09	1,671.0	118.97
5th day	108 : 00	915	37.58	1.05	0.710	638	27.55	10.03	1,681.0	119.11
5th day	120 : 00	1,065	42.77	1.05	0.710	645	27.71	15.05	1,696.0	119.31
6th day	132 : 00	1,280	50.65	1.05	0.711	657	28.14	22.51	1,718.6	119.62
6th day	144 : 00	1,550	61.13	1.04	0.712	668	28.62	32.51	1,751.1	120.06
7th day	156 : 00	1,950	75.60	1.04	0.713	690	29.33	46.27	1,797.3	120.68
7th day	168 : 00	4,375	136.62	1.14	0.713	805	32.28	104.34	1,901.7	122.05
8th day	180 : 00	1,950	136.62	1.07	0.716	801	34.68	101.94	2,003.6	123.34
8th day	192 : 00	1,525	75.06	1.05	0.717	803	34.61	40.42	2,044.0	123.84
9th day	204 : 00	1,250	59.94	1.04	0.718	805	34.73	25.21	2,069.2	124.16
9th day	216 : 00	1,020	49.03	1.03	0.718	803	34.74	14.29	2,083.5	124.33
10th day	228 : 00	865	40.72	1.02	0.718	798	34.59	6.13	2,089.7	124.41
10th day	240 : 00	780	35.53	1.02	0.718	798	34.49	1.04	2,090.7	124.42
11th day	252 : 00	745	32.94	1.02	0.718	798	34.48	-1.54	2,089.2	124.40
11th day	264 : 00	725	31.75	1.02	0.718	797	34.45	-2.70	2,086.5	124.37
12th day	276 : 00	710	31.00	1.03	0.718	803	34.56	-3.56	2,082.9	124.32
12th day	288 : 00	695	30.35	1.03	0.718	801	34.65	-4.30	2,078.6	124.27
13th day	300 : 00	675	29.59	1.03	0.718	800	34.58	-4.99	2,073.6	124.21
13th day	312 : 00	665	28.94	1.03	0.718	797	34.49	-5.55	2,068.1	124.14
14th day	324 : 00	650								
14th day	336 : 00	640								
		4,375	1,230.1				806.7		2,090.7	124.42
							Stored Volume=		446.1	

Table 7.1.5 Çatalan Dam Flood Routing for 500-year Flood
(Constant Ratio Operation Qt=1,000m³/s)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	625				625			1,644.6	118.60
1st day	12 : 00	650	27.54	1.07	0.708	629	27.09	0.45	1,645.1	118.61
1st day	24 : 00	665	28.40	1.07	0.708	629	27.18	1.22	1,646.3	118.62
2nd day	36 : 00	675	28.94	1.07	0.708	631	27.22	1.73	1,648.0	118.65
2nd day	48 : 00	700	29.70	1.08	0.708	637	27.39	2.31	1,650.3	118.68
3rd day	60 : 00	725	30.78	1.07	0.708	634	27.46	3.32	1,653.7	118.73
3rd day	72 : 00	740	31.64	1.07	0.709	636	27.43	4.22	1,657.9	118.78
4th day	84 : 00	775	32.72	1.07	0.709	639	27.54	5.18	1,663.1	118.86
4th day	96 : 00	825	34.56	1.07	0.709	643	27.69	6.87	1,669.9	118.95
5th day	108 : 00	915	37.58	1.08	0.709	654	28.01	9.58	1,679.5	119.08
5th day	120 : 00	1,065	42.77	1.09	0.709	667	28.54	14.23	1,693.7	119.28
6th day	132 : 00	1,280	50.65	1.11	0.709	691	29.33	21.32	1,715.1	119.57
6th day	144 : 00	1,550	61.13	1.13	0.710	719	30.46	30.67	1,745.7	119.99
7th day	156 : 00	1,950	75.60	1.15	0.711	755	31.85	43.75	1,789.5	120.58
7th day	168 : 00	4,375	136.62	1.45	0.709	1,002	37.95	98.67	1,888.2	121.87
8th day	180 : 00	1,950	136.62	1.37	0.711	1,001	43.27	93.35	1,981.5	123.06
8th day	192 : 00	1,525	75.06	1.35	0.712	1,004	43.32	31.74	2,013.3	123.46
9th day	204 : 00	1,250	59.94	1.33	0.713	998	43.25	16.69	2,029.9	123.67
9th day	216 : 00	1,020	49.03	1.33	0.713	1,001	43.19	5.84	2,035.8	123.74
10th day	228 : 00	865	40.72	1.33	0.713	1,000	43.23	-2.51	2,033.3	123.71
10th day	240 : 00	780	35.53	1.34	0.712	1,003	43.27	-7.74	2,025.5	123.61
11th day	252 : 00	745	32.94	1.34	0.712	998	43.23	-10.29	2,015.2	123.49
11th day	264 : 00	725	31.75	1.35	0.712	999	43.14	-11.39	2,003.9	123.34
12th day	276 : 00	710	31.00	1.36	0.712	1,000	43.18	-12.18	1,991.7	123.19
12th day	288 : 00	695	30.35	1.37	0.711	1,000	43.20	-12.85	1,978.8	123.03
13th day	300 : 00	675	29.59	1.38	0.711	1,000	43.19	-13.60	1,965.2	122.86
13th day	312 : 00	665	28.94	1.39	0.710	999	43.16	-14.22	1,951.0	122.68
14th day	324 : 00	650								
14th day	336 : 00	640								
		4,375	1,230.1				923.7		2,035.8	123.74
							Stored Volume=		391.2	

Table 7.1.6 Çatalan Dam Flood Routing for 500-year Flood
(Constant Ratio Operation Qt=1,200m³/s)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	625				625			1,644.6	118.60
1st day	12 : 00	650	27.54	1.07	0.708	629	27.09	0.45	1,645.1	118.61
1st day	24 : 00	665	28.40	1.07	0.708	629	27.18	1.22	1,646.3	118.62
1st day	36 : 00	675	28.94	1.07	0.708	631	27.22	1.73	1,648.0	118.65
1st day	48 : 00	700	29.70	1.08	0.708	637	27.39	2.31	1,650.3	118.68
2nd day	60 : 00	725	30.78	1.08	0.708	639	27.57	3.21	1,653.5	118.72
2nd day	72 : 00	740	31.64	1.08	0.708	641	27.66	3.99	1,657.5	118.78
2nd day	84 : 00	775	32.72	1.08	0.709	644	27.77	4.95	1,662.5	118.85
2nd day	96 : 00	825	34.56	1.09	0.709	654	28.04	6.52	1,669.0	118.94
2nd day	108 : 00	915	37.58	1.11	0.708	670	28.59	9.00	1,678.0	119.06
3rd day	120 : 00	1,065	42.77	1.13	0.709	689	29.36	13.41	1,691.4	119.25
3rd day	132 : 00	1,280	50.65	1.18	0.708	729	30.61	20.01	1,711.4	119.52
3rd day	144 : 00	1,550	61.13	1.22	0.708	770	32.38	28.74	1,740.2	119.91
4th day	156 : 00	1,950	75.60	1.28	0.708	831	34.57	41.03	1,781.2	120.47
4th day	168 : 00	4,375	136.62	1.78	0.704	1,202	43.91	92.71	1,873.9	121.69
5th day	180 : 00	1,950	136.62	1.69	0.707	1,205	52.00	84.62	1,958.5	122.77
5th day	192 : 00	1,525	75.06	1.66	0.708	1,201	51.97	23.09	1,981.6	123.07
6th day	204 : 00	1,250	59.94	1.65	0.708	1,199	51.83	8.11	1,989.7	123.17
6th day	216 : 00	1,020	49.03	1.65	0.708	1,197	51.75	-2.72	1,987.0	123.13
7th day	228 : 00	865	40.72	1.66	0.708	1,197	51.70	-10.98	1,976.0	123.00
7th day	240 : 00	780	35.53	1.68	0.707	1,200	51.76	-16.23	1,959.8	122.79
8th day	252 : 00	745	32.94	1.70	0.707	1,200	51.83	-18.89	1,940.9	122.55
9th day	264 : 00	725	31.75	1.72	0.706	1,199	51.82	-20.07	1,920.8	122.29
10th day	276 : 00	710	31.00	1.75	0.705	1,203	51.90	-20.90	1,899.9	122.02
11th day	288 : 00	695	30.35	1.77	0.704	1,199	51.90	-21.55	1,878.4	121.75
12th day	300 : 00	675	29.59	1.80	0.703	1,201	51.85	-22.26	1,856.1	121.46
13th day	312 : 00	665	28.94	1.83	0.702	1,202	51.90	-22.95	1,833.2	121.16
	324 : 00	650								
	336 : 00	640								
		4,375	1,230.1				1,011.6		1,989.7	123.17
							Stored Volume=		345.1	

Table 7.1.7 (1/5) Çatalan Dam Flood Routing
(Constant Ratio Operation, 2-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	275				275			1,644.6	118.60
1st day	12 : 00	285	12.10	0.47	0.725	285	12.09	0.00	1,644.6	118.60
1st day	24 : 00	300	12.64	0.49	0.723	299	12.62	0.02	1,644.6	118.60
2nd day	36 : 00	325	13.50	0.54	0.721	325	13.49	0.01	1,644.7	118.60
2nd day	48 : 00	340	14.36	0.56	0.720	340	14.37	0.00	1,644.6	118.60
3rd day	60 : 00	360	15.12	0.60	0.719	360	15.12	0.00	1,644.7	118.60
3rd day	72 : 00	375	15.88	0.62	0.718	376	15.90	-0.03	1,644.6	118.60
4th day	84 : 00	400	16.74	0.67	0.717	400	16.77	-0.03	1,644.6	118.60
4th day	96 : 00	425	17.82	0.71	0.716	426	17.85	-0.03	1,644.6	118.60
5th day	108 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.6	118.60
5th day	120 : 00	475	19.98	0.80	0.714	475	19.95	0.03	1,644.6	118.60
6th day	132 : 00	525	21.60	0.91	0.711	537	21.84	-0.24	1,644.3	118.60
6th day	144 : 00	600	24.30	0.91	0.711	541	23.29	1.01	1,645.4	118.61
7th day	156 : 00	740	28.94	0.93	0.711	551	23.59	5.35	1,650.7	118.68
7th day	168 : 00	1,175	41.36	0.96	0.711	581	24.45	16.91	1,667.6	118.92
8th day	180 : 00	760	41.80	0.95	0.711	581	25.12	16.68	1,684.3	119.15
8th day	192 : 00	610	29.59	0.95	0.712	581	25.10	4.49	1,688.8	119.21
9th day	204 : 00	530	24.62	0.95	0.712	581	25.10	-0.47	1,688.3	119.21
9th day	216 : 00	465	21.49	0.95	0.711	582	25.12	-3.63	1,684.7	119.16
10th day	228 : 00	400	18.68	0.96	0.711	582	25.13	-6.45	1,678.2	119.07
10th day	240 : 00	380	16.85	0.96	0.711	582	25.14	-8.29	1,669.9	118.95
11th day	252 : 00	355	15.88	0.97	0.710	580	25.11	-9.23	1,660.7	118.82
11th day	264 : 00	350	15.23	0.98	0.710	579	25.04	-9.81	1,650.9	118.69
12th day	276 : 00	335	14.80	0.55	0.721	334	19.73	-4.94	1,646.0	118.62
12th day	288 : 00	325	14.26	0.54	0.721	326	14.26	-0.01	1,646.0	118.62
13th day	300 : 00	310	13.72	0.51	0.722	311	13.76	-0.04	1,645.9	118.62
13th day	312 : 00	300	13.18	0.49	0.723	300	13.20	-0.02	1,645.9	118.62
14th day	324 : 00	285								
14th day	336 : 00	275								
		1,175	513.3				512.1		1,688.8	119.21
								Stored Volume=	44.2	

Table 7.1.7 (2/5) Çatalan Dam Flood Routing
(Constant Ratio Operation, 5-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	320				320			1,644.6	118.60
1st day	12 : 00	330	14.04	0.55	0.721	331	14.06	-0.02	1,644.6	118.60
1st day	24 : 00	350	14.69	0.58	0.719	351	14.74	-0.06	1,644.5	118.60
2nd day	36 : 00	370	15.55	0.61	0.718	369	15.55	0.00	1,644.5	118.60
2nd day	48 : 00	385	16.31	0.64	0.717	386	16.30	0.01	1,644.5	118.60
3rd day	60 : 00	400	16.96	0.67	0.717	401	17.00	-0.05	1,644.5	118.60
3rd day	72 : 00	420	17.71	0.70	0.716	420	17.75	-0.04	1,644.5	118.60
4th day	84 : 00	435	18.47	0.73	0.715	435	18.47	0.00	1,644.5	118.60
4th day	96 : 00	470	19.55	0.79	0.714	469	19.52	0.03	1,644.5	118.60
5th day	108 : 00	515	21.28	0.90	0.711	534	21.65	-0.38	1,644.1	118.59
5th day	120 : 00	575	23.54	0.91	0.711	539	23.16	0.38	1,644.5	118.60
6th day	132 : 00	640	26.24	0.92	0.711	544	23.38	2.86	1,647.4	118.64
6th day	144 : 00	780	30.67	0.93	0.711	553	23.68	6.99	1,654.3	118.74
7th day	156 : 00	975	37.91	0.94	0.711	568	24.21	13.70	1,668.0	118.93
7th day	168 : 00	1,740	58.64	1.00	0.711	619	25.64	33.01	1,701.0	119.38
8th day	180 : 00	1,000	59.18	0.98	0.712	620	26.75	32.43	1,733.5	119.82
8th day	192 : 00	790	38.66	0.97	0.713	620	26.77	11.90	1,745.4	119.99
9th day	204 : 00	675	31.64	0.97	0.713	622	26.81	4.84	1,750.2	120.05
9th day	216 : 00	575	27.00	0.96	0.713	620	26.82	0.18	1,750.4	120.05
10th day	228 : 00	500	23.22	0.97	0.713	620	26.79	-3.57	1,746.8	120.00
10th day	240 : 00	450	20.52	0.97	0.713	620	26.78	-6.26	1,740.6	119.92
11th day	252 : 00	410	18.58	0.98	0.712	619	26.77	-8.20	1,732.4	119.81
11th day	264 : 00	380	17.06	0.99	0.712	621	26.79	-9.72	1,722.6	119.68
12th day	276 : 00	370	16.20	0.99	0.711	618	26.77	-10.57	1,712.1	119.53
12th day	288 : 00	355	15.66	1.00	0.711	619	26.73	-11.07	1,701.0	119.38
13th day	300 : 00	345	15.12	1.01	0.710	619	26.73	-11.61	1,689.4	119.22
13th day	312 : 00	330	14.58	1.02	0.710	618	26.72	-12.14	1,677.2	119.05
14th day	324 : 00	320								
14th day	336 : 00	300								
		1,740	629.0				596.4		1,750.4	120.05
							Stored Volume=		105.8	

Table 7.1.7 (3/5) Çatalan Dam Flood Routing
(Constant Ratio Operation, 10-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	350				350			1,644.6	118.60
1st day	12 : 00	375	15.66	0.62	0.718	376	15.69	-0.03	1,644.6	118.60
1st day	24 : 00	390	16.52	0.65	0.717	389	16.53	0.00	1,644.6	118.60
2nd day	36 : 00	410	17.28	0.68	0.716	409	17.23	0.05	1,644.6	118.60
2nd day	48 : 00	425	18.04	0.71	0.716	426	18.04	0.00	1,644.6	118.60
3rd day	60 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.6	118.60
3rd day	72 : 00	470	19.87	0.79	0.714	469	19.83	0.05	1,644.7	118.60
4th day	84 : 00	495	20.84	0.83	0.713	494	20.81	0.04	1,644.7	118.60
4th day	96 : 00	530	22.14	0.90	0.711	536	22.26	-0.12	1,644.6	118.60
5th day	108 : 00	600	24.41	0.91	0.711	541	23.26	1.15	1,645.7	118.62
5th day	120 : 00	690	27.86	0.92	0.711	548	23.51	4.35	1,650.1	118.68
6th day	132 : 00	800	32.18	0.93	0.711	555	23.81	8.37	1,658.5	118.79
6th day	144 : 00	900	36.72	0.93	0.711	563	24.14	12.58	1,671.1	118.97
7th day	156 : 00	1,160	44.50	0.94	0.712	581	24.70	19.79	1,690.8	119.24
7th day	168 : 00	2,130	71.06	1.02	0.712	645	26.47	44.59	1,735.4	119.85
8th day	180 : 00	1,185	71.60	0.99	0.713	647	27.91	43.70	1,779.1	120.44
8th day	192 : 00	900	45.04	0.97	0.714	646	27.92	17.11	1,796.2	120.67
9th day	204 : 00	800	36.72	0.97	0.714	646	27.90	8.82	1,805.1	120.78
9th day	216 : 00	675	31.86	0.96	0.714	647	27.92	3.94	1,809.0	120.84
10th day	228 : 00	575	27.00	0.97	0.714	647	27.95	-0.95	1,808.1	120.82
10th day	240 : 00	500	23.22	0.97	0.714	647	27.96	-4.74	1,803.3	120.76
11th day	252 : 00	460	20.74	0.97	0.714	645	27.91	-7.17	1,796.1	120.67
11th day	264 : 00	430	19.22	0.98	0.713	646	27.88	-8.66	1,787.5	120.55
12th day	276 : 00	425	18.47	0.99	0.713	647	27.92	-9.45	1,778.0	120.42
12th day	288 : 00	400	17.82	0.99	0.713	647	27.94	-10.12	1,767.9	120.29
13th day	300 : 00	390	17.06	1.00	0.712	646	27.93	-10.87	1,757.1	120.14
13th day	312 : 00	375	16.52	1.01	0.712	647	27.93	-11.40	1,745.6	119.99
14th day	324 : 00	360								
14th day	336 : 00	350								
		2,130	731.3				630.2		1,809.0	120.84
							Stored Volume=		164.4	

Table 7.1.7 (4/5) Çatalan Dam Flood Routing
(Constant Ratio Operation, 50-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	400				400			1,644.6	118.60
1st day	12 : 00	425	17.82	0.71	0.716	426	17.85	-0.03	1,644.6	118.60
1st day	24 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.6	118.60
1st day	36 : 00	470	19.87	0.79	0.714	469	19.83	0.05	1,644.6	118.60
1st day	48 : 00	485	20.63	0.82	0.713	486	20.62	0.00	1,644.6	118.60
2nd day	60 : 00	510	21.49	0.90	0.711	535	22.04	-0.55	1,644.1	118.59
2nd day	72 : 00	550	22.90	0.91	0.711	539	23.19	-0.30	1,643.8	118.59
2nd day	84 : 00	580	24.41	0.91	0.711	539	23.30	1.11	1,644.9	118.60
2nd day	96 : 00	650	26.57	0.92	0.711	547	23.46	3.10	1,648.0	118.65
2nd day	108 : 00	725	29.70	0.92	0.711	550	23.68	6.02	1,654.0	118.73
3rd day	120 : 00	825	33.48	0.94	0.711	566	24.09	9.39	1,663.4	118.86
3rd day	132 : 00	985	39.10	0.93	0.712	567	24.46	14.64	1,678.1	119.06
3rd day	144 : 00	1,190	46.98	0.94	0.712	583	24.84	22.14	1,700.2	119.37
4th day	156 : 00	1,525	58.64	0.95	0.713	605	25.66	32.99	1,733.2	119.82
4th day	168 : 00	3,045	98.71	1.07	0.712	709	28.37	70.34	1,803.5	120.76
5th day	180 : 00	1,535	98.93	1.02	0.715	708	30.59	68.34	1,871.9	121.66
5th day	192 : 00	1,200	59.08	1.00	0.715	709	30.60	28.48	1,900.3	122.03
6th day	204 : 00	1,010	47.74	0.99	0.716	710	30.65	17.09	1,917.4	122.25
6th day	216 : 00	860	40.39	0.99	0.716	710	30.68	9.72	1,927.1	122.37
7th day	228 : 00	735	34.45	0.98	0.716	709	30.66	3.79	1,930.9	122.42
7th day	240 : 00	600	28.84	0.98	0.716	708	30.60	-1.77	1,929.2	122.40
8th day	252 : 00	575	25.38	0.99	0.716	715	30.72	-5.34	1,923.8	122.33
9th day	264 : 00	530	23.87	0.99	0.716	710	30.76	-6.89	1,916.9	122.24
10th day	276 : 00	520	22.68	1.05	0.713	709	30.65	-7.97	1,909.0	122.14
11th day	288 : 00	500	22.03	1.00	0.715	710	30.65	-8.62	1,900.3	122.03
12th day	300 : 00	480	21.17	1.00	0.715	708	30.62	-9.45	1,890.9	121.91
13th day	312 : 00	475	20.63	1.01	0.715	708	30.57	-9.94	1,880.9	121.78
	324 : 00	455								
	336 : 00	435								
		3,045	924.4				688.0		1,930.9	122.42
								Stored Volume=	286.3	

Table 7.1.7 (5/5) Çatalan Dam Flood Routing
(Constant Ratio Operation, 100-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	425				425			1,644.6	118.60
1st day	12 : 00	450	18.90	0.75	0.715	449	18.88	0.02	1,644.6	118.60
1st day	24 : 00	475	19.98	0.80	0.714	475	19.95	0.03	1,644.7	118.60
1st day	36 : 00	495	20.95	0.83	0.713	494	20.93	0.02	1,644.7	118.60
1st day	48 : 00	520	21.92	0.91	0.711	537	22.27	-0.35	1,644.4	118.60
2nd day	60 : 00	540	22.90	0.91	0.711	538	23.21	-0.32	1,644.0	118.59
2nd day	72 : 00	585	24.30	0.91	0.711	541	23.31	0.99	1,645.0	118.61
2nd day	84 : 00	615	25.92	0.91	0.711	541	23.37	2.55	1,647.6	118.64
2nd day	96 : 00	700	28.40	0.92	0.711	547	23.49	4.91	1,652.5	118.71
2nd day	108 : 00	790	32.18	0.92	0.711	555	23.79	8.39	1,660.9	118.83
3rd day	120 : 00	925	37.04	0.93	0.712	562	24.13	12.92	1,673.8	119.01
3rd day	132 : 00	1,085	43.42	0.93	0.712	574	24.53	18.88	1,692.7	119.27
3rd day	144 : 00	1,300	51.52	0.94	0.713	589	25.12	26.40	1,719.1	119.63
4th day	156 : 00	1,735	65.56	0.96	0.713	620	26.13	39.43	1,758.5	120.16
4th day	168 : 00	3,455	112.10	1.08	0.713	736	29.30	82.80	1,841.3	121.26
5th day	180 : 00	1,725	111.89	1.03	0.715	736	31.81	80.08	1,921.4	122.30
5th day	192 : 00	1,300	65.34	1.01	0.716	738	31.85	33.49	1,954.9	122.73
6th day	204 : 00	1,100	51.84	1.00	0.717	736	31.85	19.99	1,974.9	122.98
6th day	216 : 00	930	43.85	0.99	0.717	737	31.83	12.02	1,986.9	123.13
7th day	228 : 00	800	37.37	0.99	0.717	736	31.82	5.55	1,992.4	123.20
7th day	240 : 00	700	32.40	0.99	0.717	736	31.80	0.60	1,993.0	123.21
8th day	252 : 00	625	28.62	0.99	0.717	736	31.79	-3.17	1,989.9	123.17
9th day	264 : 00	590	26.24	0.99	0.717	736	31.80	-5.55	1,984.3	123.10
10th day	276 : 00	575	25.16	1.00	0.717	737	31.84	-6.67	1,977.6	123.02
11th day	288 : 00	555	24.41	1.00	0.717	738	31.87	-7.46	1,970.2	122.92
12th day	300 : 00	540	23.65	1.01	0.717	738	31.89	-8.23	1,961.9	122.82
13th day	312 : 00	525	23.00	1.01	0.716	738	31.89	-8.88	1,953.1	122.70
	324 : 00	515								
	336 : 00	500								
		3,455	1,018.9				710.4		1,993.0	123.21
							Stored Volume=		348.4	

Table 7.1.8 (1/5) Seyhan Dam Flood Routing
(Constant Ratio Operation, 2-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total Disch.	Outflow Vol.	In/Out Balance	Resvr. Volume	RWL
		Çatalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Vol. (mil.m3)	Open (m)	Coef.	Disch. (m3/s)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(mil.m3)	(m)
1st day	0 : 00	333	20	353					185	185			510.90	61.00
1st day	6 : 00	340	20	360	7.70	Full	2.20	6	185	191	4.07	3.63	514.53	61.17
1st day	12 : 00	350	20	370	7.88	Full	2.20	12	185	197	4.19	3.69	518.22	61.25
1st day	18 : 00	360	20	380	8.10	Full	2.19	17	185	202	4.31	3.79	522.01	61.33
1st day	24 : 00	368	20	388	8.29	Full	2.19	24	185	209	4.45	3.85	525.86	61.41
2nd day	30 : 00	376	20	396	8.47	Full	2.19	33	185	218	4.61	3.86	529.72	61.50
2nd day	36 : 00	388	20	408	8.68	Full	2.19	41	185	226	4.79	3.90	533.62	61.58
2nd day	42 : 00	400	25	425	9.00	Full	2.19	49	185	234	4.97	4.03	537.65	61.66
2nd day	48 : 00	413	27	440	9.34	Full	2.19	60	185	245	5.17	4.17	541.82	61.75
3rd day	54 : 00	426	30	456	9.68	Full	2.18	71	185	256	5.40	4.27	546.09	61.84
3rd day	60 : 00	438	35	473	10.03	Full	2.18	82	185	267	5.65	4.38	550.47	61.93
3rd day	66 : 00	449	40	489	10.38	Full	2.18	94	185	279	5.90	4.48	554.96	62.02
3rd day	72 : 00	462	46	508	10.77	Full	2.18	107	185	292	6.17	4.60	559.55	62.11
4th day	78 : 00	475	55	530	11.21	Full	2.18	122	185	307	6.46	4.75	564.30	62.21
4th day	84 : 00	506	63	569	11.87	Full	2.17	137	185	322	6.79	5.08	569.38	62.31
4th day	90 : 00	537	73	610	12.73	Full	2.17	154	185	339	7.14	5.59	574.97	62.42
4th day	96 : 00	539	83	622	13.31	Full	2.17	174	185	359	7.54	5.76	580.74	62.54
5th day	102 : 00	541	97	638	13.61	Full	2.17	193	185	378	7.96	5.65	586.38	62.65
5th day	108 : 00	546	120	666	14.08	Full	2.16	212	185	397	8.37	5.71	592.09	62.76
5th day	114 : 00	551	163	714	14.90	Full	2.16	234	185	419	8.82	6.08	598.17	62.88
6th day	126 : 00	581	280	861	34.02	Full	2.16	288	185	473	19.27	14.75	612.92	63.16
6th day	138 : 00	581	112	693	33.58	Full	2.15	335	185	520	21.45	12.13	625.06	63.40
7th day	150 : 00	581	79	660	29.23	Full	2.15	359	185	544	22.98	6.24	631.30	63.51
7th day	162 : 00	581	59	640	28.08	Full	2.15	376	185	561	23.87	4.21	635.51	63.59
8th day	174 : 00	582	45	627	27.37	Full	2.15	387	185	572	24.47	2.90	638.41	63.64
8th day	186 : 00	582	35	617	26.86	Full	2.15	396	185	581	24.89	1.97	640.37	63.68
9th day	198 : 00	582	30	612	26.55	Full	2.15	402	185	587	25.22	1.33	641.70	63.71
9th day	210 : 00	580	24	604	26.28	Full	2.15	404	185	589	25.41	0.87	642.57	63.72
10th day	222 : 00	579	20	599	25.99	Full	2.15	406	185	591	25.50	0.49	643.05	63.73
10th day	234 : 00	334	20	354	20.60	Full	2.15	389	185	574	25.17	-4.58	638.48	63.65
				861	479					591	351		643.05	63.73

Stored Volume= 132.2

Table 7.1.8 (2/5) Seyhan Dam Flood Routing
(Constant Ratio Operation, 5-year Flood)

Days	Time	Reservoir Inflow Çatalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Inflow Vol. (mil.m3)	Gated Spillway Open (m)	Coef.	Disch. (m3/s)	H.E.P (m3/s)	Total Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	378	32	410					185	185			510.90	61.00
1st day	6 : 00	386	32	418	8.94	Full	2.20	8	185	193	4.09	4.85	515.75	61.20
1st day	12 : 00	394	32	426	9.11	Full	2.19	15	185	200	4.25	4.86	520.61	61.30
1st day	18 : 00	401	32	433	9.27	Full	2.19	24	185	209	4.42	4.85	525.46	61.41
1st day	24 : 00	411	32	443	9.46	Full	2.19	33	185	218	4.62	4.84	530.30	61.51
2nd day	30 : 00	420	32	452	9.66	Full	2.19	44	185	229	4.83	4.83	535.13	61.61
2nd day	36 : 00	428	32	460	9.84	Full	2.19	55	185	240	5.06	4.78	539.91	61.71
2nd day	42 : 00	435	35	470	10.04	Full	2.18	67	185	252	5.31	4.73	544.64	61.81
2nd day	48 : 00	452	37	489	10.36	Full	2.18	80	185	265	5.58	4.78	549.42	61.91
3rd day	54 : 00	469	40	509	10.78	Full	2.18	93	185	278	5.86	4.92	554.34	62.01
3rd day	60 : 00	502	45	547	11.40	Full	2.18	107	185	292	6.15	5.24	559.58	62.11
3rd day	66 : 00	534	50	584	12.21	Full	2.18	125	185	310	6.50	5.71	565.29	62.23
3rd day	72 : 00	537	60	597	12.75	Full	2.17	143	185	328	6.89	5.86	571.16	62.35
4th day	78 : 00	539	73	612	13.05	Full	2.17	161	185	346	7.28	5.77	576.93	62.46
4th day	84 : 00	542	88	630	13.41	Full	2.17	181	185	366	7.69	5.72	582.65	62.58
4th day	90 : 00	544	106	650	13.82	Full	2.17	200	185	385	8.11	5.71	588.36	62.69
4th day	96 : 00	549	128	677	14.33	Full	2.16	219	185	404	8.53	5.80	594.16	62.80
5th day	102 : 00	553	155	708	14.95	Full	2.16	242	185	427	8.98	5.98	600.14	62.92
5th day	108 : 00	561	190	751	15.75	Full	2.16	264	185	449	9.46	6.29	606.43	63.04
5th day	114 : 00	568	245	813	16.89	Full	2.16	290	185	475	9.98	6.91	613.34	63.17
6th day	126 : 00	619	435	1,054	40.32	Full	2.15	361	185	546	22.05	18.28	631.62	63.52
6th day	138 : 00	620	190	810	40.25	Full	2.14	422	185	607	24.91	15.35	646.97	63.80
7th day	150 : 00	620	120	740	33.46	Full	2.14	450	185	635	26.82	6.64	653.61	63.93
7th day	162 : 00	622	80	702	31.13	Full	2.14	465	185	650	27.75	3.38	656.98	63.99
8th day	174 : 00	620	58	678	29.81	Full	2.14	472	185	657	28.22	1.59	658.57	64.02
8th day	186 : 00	620	47	667	29.06	Full	2.14	474	185	659	28.42	0.64	659.21	64.03
9th day	198 : 00	620	42	662	28.71	Full	2.14	474	185	659	28.47	0.24	659.45	64.03
9th day	210 : 00	619	35	654	28.44	Full	2.14	474	185	659	28.47	-0.03	659.42	64.03
10th day	222 : 00	621	30	651	28.19	Full	2.14	474	185	659	28.47	-0.27	659.15	64.03
10th day	234 : 00	618	27	645	28.00	Full	2.14	472	185	657	28.42	-0.42	658.73	64.02
				1,054	543					659	396		659.45	64.03

Stored Volume= 148.6

Table 7.1.8 (3/5) Seyhan Dam Flood Routing
(Constant Ratio Operation, 10-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan	Remn.	Total	Vol.	Open	Coef.	Disch.	Disch.	Disch.	Vol.	Balance	Volume	
		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(m)		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(mil.m3)	(m)
1st day	0 : 00	418	40	458					185	185			510.90	61.00
1st day	6 : 00	426	40	466	9.97	Full	2.20	10	185	195	4.10	5.88	516.77	61.22
1st day	12 : 00	438	40	478	10.19	Full	2.19	19	185	204	4.30	5.89	522.66	61.35
1st day	18 : 00	449	40	489	10.44	Full	2.19	30	185	215	4.52	5.92	528.57	61.47
1st day	24 : 00	459	40	499	10.67	Full	2.19	43	185	228	4.78	5.89	534.47	61.60
2nd day	30 : 00	469	40	509	10.89	Full	2.19	56	185	241	5.06	5.82	540.29	61.72
2nd day	36 : 00	482	40	522	11.13	Full	2.18	71	185	256	5.36	5.77	546.06	61.84
2nd day	42 : 00	494	42	536	11.42	Full	2.18	86	185	271	5.69	5.73	551.79	61.96
2nd day	48 : 00	515	45	560	11.84	Full	2.18	101	185	286	6.02	5.82	557.60	62.07
3rd day	54 : 00	536	50	586	12.38	Full	2.18	120	185	305	6.39	5.99	563.59	62.20
3rd day	60 : 00	539	54	593	12.73	Full	2.17	138	185	323	6.79	5.94	569.53	62.32
3rd day	66 : 00	541	61	602	12.90	Full	2.17	156	185	341	7.18	5.73	575.26	62.43
3rd day	72 : 00	545	75	620	13.19	Full	2.17	174	185	359	7.56	5.63	580.89	62.54
4th day	78 : 00	548	93	641	13.61	Full	2.17	193	185	378	7.96	5.65	586.54	62.65
4th day	84 : 00	552	115	667	14.12	Full	2.16	214	185	399	8.39	5.73	592.27	62.77
4th day	90 : 00	555	141	696	14.72	Full	2.16	234	185	419	8.84	5.88	598.15	62.88
4th day	96 : 00	559	167	726	15.36	Full	2.16	257	185	442	9.30	6.06	604.21	63.00
5th day	102 : 00	563	198	761	16.06	Full	2.16	280	185	465	9.79	6.27	610.48	63.12
5th day	108 : 00	572	244	816	17.03	Full	2.16	305	185	490	10.32	6.71	617.20	63.25
5th day	114 : 00	581	325	906	18.59	Full	2.15	330	185	515	10.86	7.74	624.93	63.39
6th day	126 : 00	645	550	1,195	45.37	Full	2.14	420	185	605	24.18	21.19	646.12	63.79
6th day	138 : 00	647	244	891	45.06	Full	2.14	492	185	677	27.69	17.36	663.49	64.11
7th day	150 : 00	646	157	803	36.58	Full	2.14	521	185	706	29.87	6.71	670.20	64.23
7th day	162 : 00	646	106	752	33.58	Full	2.13	533	185	718	30.74	2.84	673.04	64.28
8th day	174 : 00	647	74	721	31.81	Full	2.13	535	185	720	31.05	0.76	673.80	64.29
8th day	186 : 00	647	57	704	30.78	Full	2.13	535	185	720	31.10	-0.32	673.48	64.29
9th day	198 : 00	647	52	699	30.32	Full	2.13	530	185	715	31.00	-0.68	672.79	64.27
9th day	210 : 00	645	45	690	30.00	Full	2.13	528	185	713	30.84	-0.84	671.96	64.26
10th day	222 : 00	646	42	688	29.76	Full	2.14	523	185	708	30.69	-0.93	671.03	64.24
10th day	234 : 00	647	42	689	29.73	Full	2.14	521	185	706	30.53	-0.80	670.22	64.23
				1,195	590					720	431		673.80	64.29

Stored Volume= 162.9

Table 7.1.8 (4/5) Seyhan Dam Flood Routing
(Constant Ratio Operation, 50-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan	Remn.	Total	Vol.	Open	Coef.	Disch.		Disch.	Vol.	Balance	Volume	
		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(m)		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(mil.m3)	(m)
1st day	0 : 00	478	60	538					185	185			510.90	61.00
1st day	6 : 00	486	60	546	11.70	Full	2.19	12	185	197	4.13	7.57	518.47	61.26
1st day	12 : 00	511	60	571	12.06	Full	2.19	25	185	210	4.40	7.66	526.13	61.42
1st day	18 : 00	535	60	595	12.59	Full	2.19	42	185	227	4.72	7.87	534.00	61.59
1st day	24 : 00	537	60	597	12.87	Full	2.19	40	185	225	4.87	8.00	542.00	61.75
2nd day	30 : 00	539	60	599	12.92	Full	2.18	80	185	265	5.28	7.63	549.64	61.91
2nd day	36 : 00	539	60	599	12.94	Full	2.18	99	185	284	5.93	7.01	556.65	62.05
2nd day	42 : 00	539	62	601	12.96	Full	2.18	119	185	304	6.35	6.61	563.26	62.19
2nd day	48 : 00	543	65	608	13.06	Full	2.17	138	185	323	6.77	6.28	569.55	62.32
3rd day	54 : 00	547	68	615	13.21	Full	2.17	158	185	343	7.19	6.02	575.56	62.44
3rd day	60 : 00	549	77	626	13.40	Full	2.17	176	185	361	7.60	5.80	581.36	62.55
3rd day	66 : 00	550	89	639	13.66	Full	2.17	195	185	380	8.00	5.66	587.02	62.66
3rd day	72 : 00	558	108	666	14.09	Full	2.16	214	185	399	8.41	5.68	592.71	62.77
4th day	78 : 00	566	133	699	14.74	Full	2.16	236	185	421	8.86	5.89	598.59	62.89
4th day	84 : 00	567	165	732	15.45	Full	2.16	258	185	443	9.34	6.11	604.70	63.01
4th day	90 : 00	567	203	770	16.22	Full	2.16	282	185	467	9.83	6.39	611.09	63.13
4th day	96 : 00	575	246	821	17.18	Full	2.15	307	185	492	10.36	6.82	617.91	63.26
5th day	102 : 00	583	295	878	18.35	Full	2.15	336	185	521	10.95	7.40	625.32	63.40
5th day	108 : 00	594	355	949	19.73	Full	2.15	368	185	553	11.59	8.13	633.45	63.55
5th day	114 : 00	605	445	1,050	21.58	Full	2.15	404	185	589	12.33	9.25	642.70	63.72
6th day	126 : 00	709	825	1,534	55.80	Full	2.14	521	185	706	27.97	27.83	670.53	64.23
6th day	138 : 00	708	362	1,070	56.23	Full	2.13	623	185	808	32.69	23.54	694.07	64.65
7th day	150 : 00	709	244	953	43.69	Full	2.12	658	185	843	35.67	8.02	702.09	64.79
7th day	162 : 00	710	168	878	39.55	Full	2.12	671	185	856	36.70	2.84	704.94	64.84
8th day	174 : 00	710	106	816	36.59	Full	2.12	670	185	855	36.95	-0.36	704.58	64.84
8th day	186 : 00	709	79	788	34.65	Full	2.12	661	185	846	36.73	-2.08	702.50	64.80
9th day	198 : 00	708	72	780	33.87	Full	2.12	651	185	836	36.32	-2.45	700.05	64.76
9th day	210 : 00	715	63	778	33.64	Full	2.13	641	185	826	35.88	-2.24	697.80	64.72
10th day	222 : 00	710	62	772	33.46	Full	2.13	630	185	815	35.45	-1.99	695.82	64.68
10th day	234 : 00	709	60	769	33.29	Full	2.13	623	185	808	35.07	-1.78	694.04	64.65
				1,534	679					856	496		704.94	64.84

Stored Volume= 194.0

Table 7.1.8 (5/5) Seyhan Dam Flood Routing
(Constant Ratio Operation, 100-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway				Total	Outflow	In/Out	Resvr.	
		Catalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Vol. (mil.m3)	Open (m)	Coef.	Disch. (m3/s)	H.E.P (m3/s)	Disch. (m3/s)	Vol. (mil.m3)	Balance (mil.m3)	Volume (mil.m3)	RWL (m)
1st day	0 : 00	517	69	586					185	185			510.90	61.00
1st day	6 : 00	537	69	606	12.87	Full	2.19	14	185	199	4.14	8.73	519.63	61.28
1st day	12 : 00	538	69	607	13.10	Full	2.19	30	185	215	4.46	8.63	528.26	61.47
1st day	18 : 00	538	69	607	13.11	Full	2.19	47	185	232	4.82	8.28	536.54	61.64
1st day	24 : 00	540	69	609	13.13	Full	2.18	67	185	252	5.23	7.90	544.44	61.80
2nd day	30 : 00	541	69	610	13.16	Full	2.18	86	185	271	5.65	7.51	551.95	61.96
2nd day	36 : 00	541	69	610	13.18	Full	2.18	106	185	291	6.07	7.11	559.06	62.10
2nd day	42 : 00	541	72	613	13.21	Full	2.18	126	185	311	6.50	6.71	565.77	62.24
2nd day	48 : 00	544	75	619	13.31	Full	2.17	146	185	331	6.94	6.37	572.13	62.37
3rd day	54 : 00	547	80	627	13.46	Full	2.17	166	185	351	7.37	6.09	578.22	62.49
3rd day	60 : 00	551	86	637	13.65	Full	2.17	186	185	371	7.80	5.86	584.08	62.61
3rd day	66 : 00	555	102	657	13.98	Full	2.17	205	185	390	8.22	5.75	589.83	62.72
3rd day	72 : 00	559	129	688	14.52	Full	2.16	225	185	410	8.64	5.88	595.71	62.83
4th day	78 : 00	562	160	722	15.22	Full	2.16	247	185	432	9.09	6.13	601.84	62.95
4th day	84 : 00	568	197	765	16.06	Full	2.16	272	185	457	9.60	6.46	608.30	63.08
4th day	90 : 00	574	235	809	17.00	Full	2.16	297	185	482	10.15	6.85	615.15	63.21
4th day	96 : 00	582	280	862	18.04	Full	2.15	326	185	511	10.73	7.31	622.47	63.35
5th day	102 : 00	589	335	924	19.28	Full	2.15	357	185	542	11.37	7.91	630.38	63.50
5th day	108 : 00	605	407	1,012	20.91	Full	2.15	391	185	576	12.08	8.83	639.21	63.66
5th day	114 : 00	620	504	1,124	23.07	Full	2.14	433	185	618	12.90	10.17	649.38	63.85
6th day	126 : 00	736	955	1,691	60.82	Full	2.13	564	185	749	29.52	31.30	680.68	64.41
6th day	138 : 00	736	397	1,133	61.01	Full	2.12	679	185	864	34.85	26.16	706.84	64.87
7th day	150 : 00	738	272	1,010	46.30	Full	2.12	718	185	903	38.17	8.13	714.97	65.02
7th day	162 : 00	736	186	922	41.74	Full	2.12	728	185	913	39.22	2.53	717.50	65.06
8th day	174 : 00	737	118	855	38.40	Full	2.12	723	185	908	39.33	-0.93	716.56	65.04
8th day	186 : 00	736	86	822	36.23	Full	2.12	712	185	897	38.99	-2.76	713.80	65.00
9th day	198 : 00	736	80	816	35.38	Full	2.12	697	185	882	38.43	-3.04	710.76	64.94
9th day	210 : 00	736	73	809	35.10	Full	2.12	685	185	870	37.84	-2.74	708.02	64.90
10th day	222 : 00	736	69	805	34.87	Full	2.12	674	185	859	37.34	-2.47	705.54	64.85
10th day	234 : 00	737	69	806	34.82	Full	2.12	666	185	851	36.93	-2.11	703.43	64.82
				1,691	715					913	522		717.50	65.06

Stored Volume= 206.6

Table 7.1.9 (1/5) Çatalan Dam Flood Routing
(Constant Outflow Operation, Qt=1,200 m^3/s, 2-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	275				275			1,644.6	118.60
1st day	12 : 00	285	12.10	0.47	0.725	285	12.10	0.00	1,644.6	118.60
1st day	24 : 00	300	12.64	0.49	0.723	299	12.62	0.01	1,644.6	118.60
2nd day	36 : 00	325	13.50	0.54	0.721	325	13.49	0.01	1,644.6	118.60
2nd day	48 : 00	340	14.36	0.56	0.720	340	14.37	0.00	1,644.6	118.60
3rd day	60 : 00	360	15.12	0.60	0.719	360	15.12	0.00	1,644.6	118.60
3rd day	72 : 00	375	15.88	0.62	0.718	374	15.87	0.01	1,644.6	118.60
4th day	84 : 00	400	16.74	0.67	0.717	400	16.74	0.00	1,644.7	118.60
4th day	96 : 00	425	17.82	0.71	0.716	426	17.85	-0.03	1,644.6	118.60
5th day	108 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.6	118.60
5th day	120 : 00	475	19.98	0.80	0.714	475	19.95	0.03	1,644.6	118.60
6th day	132 : 00	525	21.60	0.89	0.712	525	21.60	0.00	1,644.6	118.60
6th day	144 : 00	600	24.30	1.02	0.709	601	24.33	-0.03	1,644.6	118.60
7th day	156 : 00	740	28.94	1.28	0.705	741	28.98	-0.03	1,644.6	118.60
7th day	168 : 00	1,175	41.36	2.09	0.694	1,174	41.36	0.00	1,644.6	118.60
8th day	180 : 00	760	41.80	1.29	0.705	759	41.75	0.04	1,644.6	118.60
8th day	192 : 00	610	29.59	1.02	0.709	609	29.54	0.05	1,644.7	118.60
9th day	204 : 00	530	24.62	0.88	0.712	529	24.58	0.05	1,644.7	118.60
9th day	216 : 00	465	21.49	0.77	0.715	466	21.50	-0.01	1,644.7	118.60
10th day	228 : 00	400	18.68	0.66	0.717	400	18.70	-0.02	1,644.7	118.60
10th day	240 : 00	380	16.85	0.62	0.719	379	16.82	0.03	1,644.7	118.60
11th day	252 : 00	355	15.88	0.58	0.720	356	15.88	0.00	1,644.7	118.60
11th day	264 : 00	350	15.23	0.57	0.720	350	15.25	-0.02	1,644.7	118.60
12th day	276 : 00	335	14.80	0.55	0.721	335	14.80	-0.01	1,644.7	118.60
12th day	288 : 00	325	14.26	0.53	0.722	325	14.27	-0.02	1,644.7	118.60
13th day	300 : 00	310	13.72	0.50	0.723	309	13.70	0.01	1,644.7	118.60
13th day	312 : 00	300	13.18	0.49	0.724	300	13.16	0.02	1,644.7	118.60
14th day	324 : 00	285								
14th day	336 : 00	275								
		1,175	513.3				513.2		1,644.7	118.60
		0.0								
							Stored Volume=		0.1	

Table 7.1.9 (2/5) Çatalan Dam Flood Routing
(Constant Outflow Operation, Qt=1,200 m^3/s, 5-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	320				320			1,644.6	118.60
1st day	12 : 00	330	14.04	0.54	0.721	328	14.00	0.04	1,644.7	118.60
1st day	24 : 00	350	14.69	0.58	0.720	349	14.63	0.06	1,644.7	118.60
2nd day	36 : 00	370	15.55	0.61	0.718	369	15.50	0.05	1,644.8	118.60
2nd day	48 : 00	385	16.31	0.64	0.717	386	16.30	0.01	1,644.8	118.60
3rd day	60 : 00	400	16.96	0.67	0.717	400	16.99	-0.03	1,644.7	118.60
3rd day	72 : 00	420	17.71	0.70	0.716	420	17.73	-0.02	1,644.7	118.60
4th day	84 : 00	435	18.47	0.73	0.715	435	18.48	-0.02	1,644.7	118.60
4th day	96 : 00	470	19.55	0.79	0.714	471	19.58	-0.03	1,644.7	118.60
5th day	108 : 00	515	21.28	0.87	0.712	516	21.33	-0.06	1,644.6	118.60
5th day	120 : 00	575	23.54	0.97	0.710	575	23.57	-0.02	1,644.6	118.60
6th day	132 : 00	640	26.24	1.09	0.708	640	26.23	0.01	1,644.6	118.60
6th day	144 : 00	780	30.67	1.35	0.703	780	30.67	0.00	1,644.6	118.60
7th day	156 : 00	975	37.91	1.72	0.699	976	37.94	-0.03	1,644.6	118.60
7th day	168 : 00	1,740	58.64	2.14	0.694	1,202	47.04	11.60	1,656.2	118.76
8th day	180 : 00	1,000	59.18	2.12	0.694	1,200	51.88	7.31	1,663.5	118.86
8th day	192 : 00	790	38.66	1.35	0.704	791	43.00	-4.33	1,659.2	118.80
9th day	204 : 00	675	31.64	1.14	0.707	676	31.68	-0.03	1,659.1	118.80
9th day	216 : 00	575	27.00	0.96	0.711	575	27.01	-0.01	1,659.1	118.80
10th day	228 : 00	500	23.22	0.83	0.713	501	23.24	-0.02	1,659.1	118.80
10th day	240 : 00	450	20.52	0.74	0.715	449	20.52	0.00	1,659.1	118.80
11th day	252 : 00	410	18.58	0.68	0.717	411	18.58	0.00	1,659.1	118.80
11th day	264 : 00	380	17.06	0.62	0.719	379	17.07	-0.01	1,659.1	118.80
12th day	276 : 00	370	16.20	0.61	0.719	370	16.19	0.01	1,659.1	118.80
12th day	288 : 00	355	15.66	0.58	0.720	356	15.69	-0.03	1,659.0	118.80
13th day	300 : 00	345	15.12	0.56	0.721	344	15.12	0.00	1,659.1	118.80
13th day	312 : 00	330	14.58	0.54	0.722	329	14.55	0.03	1,659.1	118.80
14th day	324 : 00	320								
14th day	336 : 00	300								
		1,740	629.0				614.5		1,663.5	118.86
		0.0								
							Stored Volume=		18.9	

Table 7.1.9 (3/5) Çatalan Dam Flood Routing
(Constant Outflow Operation, Qt=1,200 m^3/s, 10-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	350				350			1,644.6	118.60
1st day	12 : 00	375	15.66	0.62	0.718	374	15.65	0.01	1,644.6	118.60
1st day	24 : 00	390	16.52	0.65	0.717	390	16.51	0.01	1,644.6	118.60
2nd day	36 : 00	410	17.28	0.68	0.716	409	17.26	0.02	1,644.7	118.60
2nd day	48 : 00	425	18.04	0.71	0.716	426	18.04	0.00	1,644.7	118.60
3rd day	60 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.7	118.60
3rd day	72 : 00	470	19.87	0.79	0.714	469	19.83	0.05	1,644.7	118.60
4th day	84 : 00	495	20.84	0.83	0.713	494	20.81	0.04	1,644.7	118.60
4th day	96 : 00	530	22.14	0.89	0.711	528	22.09	0.05	1,644.8	118.60
5th day	108 : 00	600	24.41	1.02	0.709	600	24.36	0.04	1,644.8	118.60
5th day	120 : 00	690	27.86	1.18	0.706	688	27.83	0.04	1,644.9	118.60
6th day	132 : 00	800	32.18	1.39	0.703	801	32.18	0.00	1,644.9	118.60
6th day	144 : 00	900	36.72	1.57	0.700	898	36.70	0.02	1,644.9	118.60
7th day	156 : 00	1,160	44.50	2.09	0.694	1,161	44.47	0.03	1,644.9	118.60
7th day	168 : 00	2,130	71.06	2.12	0.694	1,202	51.04	20.03	1,665.0	118.88
8th day	180 : 00	1,185	71.60	2.07	0.696	1,198	51.84	19.76	1,684.7	119.16
8th day	192 : 00	900	45.04	2.09	0.695	1,201	51.83	-6.79	1,677.9	119.06
9th day	204 : 00	800	36.72	1.35	0.704	799	43.20	-6.48	1,671.4	118.97
9th day	216 : 00	675	31.86	1.13	0.708	675	31.84	0.02	1,671.5	118.97
10th day	228 : 00	575	27.00	0.95	0.711	575	26.99	0.01	1,671.5	118.97
10th day	240 : 00	500	23.22	0.82	0.714	500	23.23	-0.01	1,671.5	118.97
11th day	252 : 00	460	20.74	0.75	0.715	459	20.73	0.01	1,671.5	118.97
11th day	264 : 00	430	19.22	0.70	0.717	430	19.22	0.01	1,671.5	118.97
12th day	276 : 00	425	18.47	0.69	0.717	424	18.46	0.01	1,671.5	118.97
12th day	288 : 00	400	17.82	0.65	0.718	401	17.83	-0.01	1,671.5	118.97
13th day	300 : 00	390	17.06	0.63	0.719	389	17.06	0.00	1,671.5	118.97
13th day	312 : 00	375	16.52	0.61	0.719	375	16.50	0.02	1,671.5	118.97
14th day	324 : 00	360								
14th day	336 : 00	350								
		2,130	731.3				704.4		1,684.7	119.16
							Stored Volume=		40.1	

Table 7.1.9 (4/5) Çatalan Dam Flood Routing
(Constant Outflow Operation, Qt=1,200 m^3/s, 50-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	400				400			1,644.6	118.60
1st day	12 : 00	425	17.82	0.71	0.716	426	17.85	-0.03	1,644.6	118.60
1st day	24 : 00	450	18.90	0.75	0.715	449	18.90	0.00	1,644.6	118.60
2nd day	36 : 00	470	19.87	0.79	0.714	471	19.88	0.00	1,644.6	118.60
2nd day	48 : 00	485	20.63	0.82	0.713	486	20.67	-0.05	1,644.5	118.60
3rd day	60 : 00	510	21.49	0.86	0.712	511	21.54	-0.05	1,644.5	118.60
3rd day	72 : 00	550	22.90	0.93	0.711	551	22.94	-0.04	1,644.5	118.60
4th day	84 : 00	580	24.41	0.98	0.710	579	24.39	0.02	1,644.5	118.60
4th day	96 : 00	650	26.57	1.11	0.708	651	26.55	0.02	1,644.5	118.60
5th day	108 : 00	725	29.70	1.25	0.705	725	29.71	-0.01	1,644.5	118.60
5th day	120 : 00	825	33.48	1.44	0.702	826	33.50	-0.02	1,644.4	118.60
6th day	132 : 00	985	39.10	1.74	0.698	986	39.15	-0.05	1,644.4	118.60
6th day	144 : 00	1,190	46.98	2.15	0.693	1,191	47.03	-0.05	1,644.3	118.60
7th day	156 : 00	1,525	58.64	2.15	0.693	1,201	51.67	6.98	1,651.3	118.69
7th day	168 : 00	3,045	98.71	2.05	0.696	1,202	51.90	46.81	1,698.1	119.34
8th day	180 : 00	1,535	98.93	1.96	0.699	1,200	51.88	47.05	1,745.2	119.98
8th day	192 : 00	1,200	59.08	1.95	0.699	1,201	51.87	7.21	1,752.4	120.08
9th day	204 : 00	1,010	47.74	1.95	0.699	1,197	51.81	-4.07	1,748.3	120.02
9th day	216 : 00	860	40.39	1.97	0.699	1,199	51.75	-11.36	1,737.0	119.87
10th day	228 : 00	735	34.45	2.00	0.698	1,198	51.76	-17.31	1,719.6	119.64
10th day	240 : 00	600	28.84	2.05	0.696	1,200	51.80	-22.96	1,696.7	119.32
11th day	252 : 00	575	25.38	0.94	0.712	575	38.36	-12.98	1,683.7	119.14
11th day	264 : 00	530	23.87	0.86	0.713	529	23.85	0.02	1,683.7	119.14
12th day	276 : 00	520	22.68	0.85	0.714	520	22.65	0.03	1,683.7	119.14
12th day	288 : 00	500	22.03	0.81	0.714	500	22.02	0.01	1,683.8	119.14
13th day	300 : 00	480	21.17	0.78	0.715	481	21.19	-0.02	1,683.7	119.14
13th day	312 : 00	475	20.63	0.77	0.715	474	20.64	-0.01	1,683.7	119.14
14th day	324 : 00	455								
14th day	336 : 00	435								
		3,045	924.4				885.3		1,752.4	120.08
							Stored Volume=		107.8	

Table 7.1.9 (1/5) Çatalan Dam Flood Routing
(Constant Outflow Operation, Qt=1,200 m^3/s, 100-year Flood)

Days	Time	Resvr. Inflow (m3/s)	Inflow Vol. (mil.m3)	Spilling Outflow Open (m)	Coef.	Disch. (m3/s)	Outflow Vol. (mil.m3)	In/Out Balance (mil.m3)	Resvr. Volume (mil.m3)	RWL (m)
1st day	0 : 00	425				425			1,644.6	118.60
1st day	12 : 00	450	18.90	0.75	0.715	449	18.88	0.02	1,644.6	118.60
1st day	24 : 00	475	19.98	0.80	0.714	475	19.95	0.03	1,644.7	118.60
1st day	36 : 00	495	20.95	0.83	0.713	494	20.93	0.02	1,644.7	118.60
1st day	48 : 00	520	21.92	0.88	0.712	520	21.91	0.02	1,644.7	118.60
2nd day	60 : 00	540	22.90	0.91	0.711	539	22.88	0.02	1,644.7	118.60
2nd day	72 : 00	585	24.30	0.99	0.710	584	24.27	0.03	1,644.8	118.60
2nd day	84 : 00	615	25.92	1.05	0.709	615	25.90	0.02	1,644.8	118.60
2nd day	96 : 00	700	28.40	1.20	0.706	700	28.40	0.01	1,644.8	118.60
2nd day	108 : 00	790	32.18	1.37	0.703	791	32.21	-0.03	1,644.8	118.60
3rd day	120 : 00	925	37.04	1.62	0.700	924	37.05	0.00	1,644.8	118.60
3rd day	132 : 00	1,085	43.42	1.93	0.696	1,083	43.36	0.06	1,644.8	118.60
3rd day	144 : 00	1,300	51.52	2.16	0.693	1,201	49.34	2.18	1,647.0	118.63
4th day	156 : 00	1,735	65.56	2.12	0.694	1,197	51.79	13.77	1,660.8	118.83
4th day	168 : 00	3,455	112.10	2.01	0.698	1,204	51.85	60.25	1,721.0	119.65
5th day	180 : 00	1,725	111.89	1.90	0.700	1,199	51.89	60.00	1,781.0	120.46
5th day	192 : 00	1,300	65.34	1.88	0.701	1,199	51.79	13.55	1,794.6	120.65
6th day	204 : 00	1,100	51.84	1.88	0.701	1,199	51.80	0.04	1,794.6	120.65
6th day	216 : 00	930	43.85	1.89	0.701	1,198	51.78	-7.93	1,786.7	120.54
7th day	228 : 00	800	37.37	1.91	0.700	1,197	51.73	-14.36	1,772.3	120.35
7th day	240 : 00	700	32.40	1.94	0.699	1,196	51.70	-19.30	1,753.0	120.09
8th day	252 : 00	625	28.62	1.99	0.698	1,200	51.75	-23.13	1,729.9	119.78
9th day	264 : 00	590	26.24	2.03	0.697	1,198	51.79	-25.55	1,704.3	119.43
10th day	276 : 00	575	25.16	2.09	0.695	1,201	51.82	-26.66	1,677.7	119.06
11th day	288 : 00	555	24.41	0.93	0.711	560	38.04	-13.63	1,664.0	118.87
12th day	300 : 00	540	23.65	0.90	0.712	540	23.77	-0.12	1,663.9	118.87
13th day	312 : 00	525	23.00	0.87	0.712	526	23.03	-0.02	1,663.9	118.87
	324 : 00	515								
	336 : 00	500								
		3,455	1,018.9				999.6		1,794.6	120.65
							Stored Volume=		150.0	

Table 7.1.10 (1/5) Seyhan Dam Flood Routing
(Constant Outflow Operation, 2-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Vol. (mil.m3)	Open (m)	Coef.	Disch. (m3/s)	(m3/s)	Disch. (m3/s)	Vol. (mil.m3)	Balance (mil.m3)	Volume (mil.m3)	(m)
1st day	0 : 00	275	20	295					185	185			510.90	61.00
1st day	12 : 00	275	20	295	12.74	Full	2.20	8	185	193	8.16	4.59	515.48	61.19
1st day	24 : 00	275	20	295	12.74	Full	2.19	14	185	199	8.45	4.29	519.78	61.28
2nd day	36 : 00	275	20	295	12.74	Full	2.19	21	185	206	8.73	4.01	523.79	61.37
2nd day	48 : 00	275	20	295	12.74	Full	2.19	28	185	213	9.04	3.70	527.49	61.45
3rd day	60 : 00	275	20	295	12.74	Full	2.19	34	185	219	9.34	3.41	530.90	61.52
3rd day	72 : 00	275	20	295	12.74	Full	2.19	42	185	227	9.64	3.11	534.01	61.59
4th day	84 : 00	285	20	305	12.96	Full	2.19	48	185	233	9.93	3.03	537.03	61.65
4th day	96 : 00	300	20	320	13.50	Full	2.19	56	185	241	10.24	3.26	540.29	61.72
5th day	108 : 00	325	20	345	14.36	Full	2.18	66	185	251	10.62	3.74	544.03	61.80
5th day	120 : 00	340	20	360	15.23	Full	2.18	76	185	261	11.04	4.18	548.22	61.88
6th day	132 : 00	360	20	380	15.98	Full	2.18	87	185	272	11.52	4.47	552.69	61.97
6th day	144 : 00	375	20	395	16.74	Full	2.18	101	185	286	12.07	4.67	557.36	62.07
7th day	156 : 00	400	20	420	17.60	Full	2.18	116	185	301	12.68	4.93	562.28	62.17
7th day	168 : 00	425	27	452	18.84	Full	2.17	132	185	317	13.35	5.49	567.77	62.28
8th day	180 : 00	450	35	485	20.24	Full	2.17	151	185	336	14.11	6.13	573.90	62.40
8th day	192 : 00	475	46	521	21.73	Full	2.17	174	185	359	15.02	6.71	580.61	62.54
9th day	204 : 00	525	63	588	23.95	Full	2.17	200	185	385	16.07	7.88	588.49	62.69
9th day	216 : 00	600	83	683	27.45	Full	2.16	236	185	421	17.41	10.05	598.54	62.89
10th day	228 : 00	740	120	860	33.33	Full	2.16	288	185	473	19.30	14.03	612.57	63.16
10th day	240 : 00	1,175	280	1,455	50.00	Full	2.15	393	185	578	22.70	27.30	639.87	63.67
11th day	252 : 00	760	152	912	51.13	Full	2.14	492	185	677	27.12	24.00	663.88	64.11
11th day	264 : 00	610	91	701	34.84	Full	2.14	514	185	699	29.72	5.12	668.99	64.20
12th day	276 : 00	530	68	598	28.06	Full	2.14	506	185	691	30.02	-1.97	667.03	64.17
12th day	288 : 00	465	52	517	24.08	Full	2.14	483	185	668	29.37	-5.28	661.74	64.07
13th day	300 : 00	400	40	440	20.67	Full	2.14	453	185	638	28.22	-7.55	654.20	63.94
13th day	312 : 00	380	32	412	18.40	Full	2.14	417	185	602	26.80	-8.40	645.80	63.78
14th day	324 : 00	355	26	381	17.13	Full	2.15	385	185	570	25.32	-8.19	637.61	63.63
14th day	336 : 00	350	20	370	16.22	Full	2.15	355	185	540	23.97	-7.74	629.86	63.49
15th day	348 : 00	335	20	355	15.66	Full	2.15	326	185	511	22.69	-7.03	622.83	63.35
				1,455	605					699	493		668.99	64.20

Stored Volume= 158.1

Table 7.1.10 (2/5) Seyhan Dam Flood Routing
(Constant Outflow Operation, 5-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Çatalan	Remn.	Total	Vol.	Open	Coef.	Disch.	Disch.	Disch.	Vol.	Balance	Volume	
		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(m)		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(mil.m3)	(m)
1st day	0 : 00	320	32	352					185	185			510.90	61.00
1st day	12 : 00	320	32	352	15.21	Full	2.20	11	185	196	8.23	6.98	517.88	61.24
1st day	24 : 00	320	32	352	15.21	Full	2.19	22	185	207	8.69	6.51	524.39	61.38
2nd day	36 : 00	320	32	352	15.21	Full	2.19	33	185	218	9.18	6.02	530.42	61.51
2nd day	48 : 00	320	32	352	15.21	Full	2.19	46	185	231	9.71	5.50	535.92	61.63
3rd day	60 : 00	320	32	352	15.21	Full	2.19	57	185	242	10.22	4.99	540.90	61.73
3rd day	72 : 00	320	32	352	15.21	Full	2.18	68	185	253	10.71	4.50	545.40	61.82
4th day	84 : 00	328	32	360	15.38	Full	2.18	80	185	265	11.19	4.20	549.60	61.91
4th day	96 : 00	349	32	381	16.01	Full	2.18	92	185	277	11.70	4.32	553.91	62.00
5th day	108 : 00	369	32	401	16.89	Full	2.18	104	185	289	12.23	4.66	558.57	62.09
5th day	120 : 00	386	32	418	17.68	Full	2.18	119	185	304	12.80	4.88	563.45	62.19
6th day	132 : 00	400	32	432	18.37	Full	2.17	134	185	319	13.44	4.92	568.38	62.29
6th day	144 : 00	420	32	452	19.11	Full	2.17	150	185	335	14.11	5.00	573.38	62.39
7th day	156 : 00	435	32	467	19.87	Full	2.17	166	185	351	14.80	5.06	578.44	62.49
7th day	168 : 00	471	37	508	21.07	Full	2.17	184	185	369	15.55	5.52	583.96	62.60
8th day	180 : 00	516	45	561	23.10	Full	2.17	207	185	392	16.44	6.66	590.62	62.73
8th day	192 : 00	575	60	635	25.84	Full	2.16	236	185	421	17.56	8.28	598.90	62.89
9th day	204 : 00	640	88	728	29.43	Full	2.16	276	185	461	19.05	10.38	609.28	63.10
9th day	216 : 00	780	128	908	35.34	Full	2.15	330	185	515	21.07	14.26	623.54	63.37
10th day	228 : 00	976	190	1,166	44.81	Full	2.14	412	185	597	24.01	20.80	644.34	63.75
10th day	240 : 00	1,202	435	1,637	60.54	Full	2.13	544	185	729	28.64	31.90	676.24	64.33
11th day	252 : 00	1,200	262	1,462	66.93	Full	2.12	687	185	872	34.60	32.34	708.58	64.90
11th day	264 : 00	791	148	939	51.85	Full	2.12	746	185	931	38.96	12.90	721.47	65.13
12th day	276 : 00	676	96	772	36.95	Full	2.12	733	185	918	39.95	-3.01	718.47	65.08
12th day	288 : 00	575	68	643	30.55	Full	2.12	694	185	879	38.82	-8.27	710.20	64.93
13th day	300 : 00	501	51	552	25.81	Full	2.13	646	185	831	36.93	-11.12	699.08	64.74
13th day	312 : 00	449	44	493	22.58	Full	2.13	592	185	777	34.72	-12.15	686.93	64.53
14th day	324 : 00	411	38	449	20.35	Full	2.13	540	185	725	32.43	-12.08	674.85	64.31
14th day	336 : 00	379	35	414	18.65	Full	2.14	490	185	675	30.24	-11.59	663.26	64.10
15th day	348 : 00	370	32	402	17.64	Full	2.14	447	185	632	28.22	-10.58	652.68	63.91
				1,637	746					931	604		721.47	65.13

Stored Volume= 210.6

Table 7.1.10 (3/5) Seyhan Dam Flood Routing
(Constant Outflow Operation, 10-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Vol. (mil.m3)	Open (m)	Coef.	Disch. (m3/s)	(m3/s)	Disch. (m3/s)	Vol. (mil.m3)	Balance (mil.m3)	Volume (mil.m3)	(m)
1st day	0 : 00	350	40	390					185	185			510.90	61.00
1st day	12 : 00	350	40	390	16.85	Full	2.19	14	185	199	8.29	8.56	519.46	61.28
1st day	24 : 00	350	40	390	16.85	Full	2.19	28	185	213	8.89	7.96	527.42	61.45
2nd day	36 : 00	350	40	390	16.85	Full	2.19	43	185	228	9.51	7.33	534.75	61.60
2nd day	48 : 00	350	40	390	16.85	Full	2.19	58	185	243	10.18	6.67	541.43	61.74
3rd day	60 : 00	350	40	390	16.85	Full	2.18	74	185	259	10.86	5.99	547.41	61.87
3rd day	72 : 00	350	40	390	16.85	Full	2.18	89	185	274	11.52	5.33	552.74	61.98
4th day	84 : 00	374	40	414	17.38	Full	2.18	103	185	288	12.13	5.25	557.99	62.08
4th day	96 : 00	390	40	430	18.24	Full	2.18	119	185	304	12.77	5.47	563.46	62.19
5th day	108 : 00	409	40	449	18.99	Full	2.17	135	185	320	13.48	5.51	568.97	62.30
5th day	120 : 00	426	40	466	19.77	Full	2.17	154	185	339	14.23	5.54	574.50	62.42
6th day	132 : 00	449	40	489	20.63	Full	2.17	177	185	362	15.14	5.49	579.99	62.52
6th day	144 : 00	469	40	509	21.55	Full	2.17	190	185	375	15.94	5.62	585.61	62.64
7th day	156 : 00	494	40	534	22.54	Full	2.17	211	185	396	16.65	5.89	591.50	62.75
7th day	168 : 00	528	45	573	23.92	Full	2.16	232	185	417	17.56	6.37	597.87	62.87
8th day	180 : 00	600	54	654	26.50	Full	2.16	262	185	447	18.68	7.83	605.69	63.03
8th day	192 : 00	688	75	763	30.61	Full	2.16	301	185	486	20.17	10.44	616.14	63.23
9th day	204 : 00	801	115	916	36.28	Full	2.15	355	185	540	22.17	14.12	630.25	63.49
9th day	216 : 00	898	167	1,065	42.79	Full	2.14	427	185	612	24.89	17.90	648.15	63.83
10th day	228 : 00	1,161	244	1,405	53.35	Full	2.13	530	185	715	28.68	24.67	672.83	64.27
10th day	240 : 00	1,202	550	1,752	68.19	Full	2.12	680	185	865	34.13	34.06	706.88	64.88
11th day	252 : 00	1,198	340	1,538	71.07	Full	2.11	817	185	1,002	40.33	30.73	737.61	65.40
11th day	264 : 00	1,201	193	1,394	63.34	Full	2.11	904	185	1,089	45.17	18.16	755.78	65.71
12th day	276 : 00	799	130	929	50.18	Full	2.10	917	185	1,102	47.32	2.86	758.64	65.76
12th day	288 : 00	675	87	762	36.52	Full	2.11	871	185	1,056	46.60	-10.08	748.56	65.59
13th day	300 : 00	575	64	639	30.26	Full	2.11	805	185	990	44.19	-13.93	734.63	65.35
13th day	312 : 00	500	55	555	25.80	Full	2.12	736	185	921	41.28	-15.48	719.15	65.09
14th day	324 : 00	459	49	508	22.98	Full	2.12	666	185	851	38.27	-15.30	703.85	64.82
14th day	336 : 00	430	45	475	21.25	Full	2.13	603	185	788	35.40	-14.15	689.70	64.57
15th day	348 : 00	424	42	466	20.34	Full	2.13	549	185	734	32.88	-12.54	677.15	64.35
				1,752	864					1,102	697		758.64	65.76

Stored Volume= 247.7

Table 7.1.10 (4/5) Seyhan Dam Flood Routing
(Constant Outflow Operation, 50-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan	Remn.	Total	Vol.	Open	Coef.	Disch.	Disch.	Disch.	Vol.	Balance	Volume	
		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(m)		(m3/s)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(mil.m3)	(m)
1st day	0 : 00	400	60	460					185	185			510.90	61.00
1st day	12 : 00	400	60	460	19.87	Full	2.19	18	185	203	8.39	11.49	522.38	61.34
1st day	24 : 00	400	60	460	19.87	Full	2.19	40	185	225	9.24	10.63	533.01	61.57
2nd day	36 : 00	400	60	460	19.87	Full	2.18	62	185	247	10.19	9.69	542.70	61.77
2nd day	48 : 00	400	60	460	19.87	Full	2.18	85	185	270	11.16	8.71	551.41	61.95
3rd day	60 : 00	400	60	460	19.87	Full	2.18	107	185	292	12.13	7.74	559.15	62.11
3rd day	72 : 00	400	60	460	19.87	Full	2.18	126	185	311	13.03	6.84	565.99	62.24
4th day	84 : 00	400	60	460	19.87	Full	2.17	146	185	331	13.88	5.99	571.99	62.36
4th day	96 : 00	426	60	486	20.44	Full	2.17	164	185	349	14.70	5.74	577.73	62.48
5th day	108 : 00	449	60	509	21.50	Full	2.17	184	185	369	15.52	5.98	583.70	62.60
5th day	120 : 00	471	60	531	22.47	Full	2.17	205	185	390	16.40	6.06	589.77	62.72
6th day	132 : 00	486	60	546	23.27	Full	2.16	225	185	410	17.28	5.98	595.75	62.83
6th day	144 : 00	511	60	571	24.13	Full	2.16	247	185	432	18.19	5.94	601.69	62.95
7th day	156 : 00	551	60	611	25.53	Full	2.16	270	185	455	19.16	6.37	608.06	63.07
7th day	168 : 00	579	65	644	27.09	Full	2.16	295	185	480	20.21	6.89	614.95	63.20
8th day	180 : 00	651	77	728	29.62	Full	2.15	328	185	513	21.46	8.16	623.11	63.36
8th day	192 : 00	725	108	833	33.71	Full	2.15	370	185	555	23.06	10.65	633.76	63.56
9th day	204 : 00	826	165	991	39.40	Full	2.14	426	185	611	25.19	14.21	647.98	63.82
9th day	216 : 00	986	246	1,232	48.03	Full	2.14	509	185	694	28.19	19.83	667.81	64.18
10th day	228 : 00	1,191	355	1,546	60.01	Full	2.13	628	185	813	32.55	27.47	695.28	64.67
10th day	240 : 00	1,201	825	2,026	77.15	Full	2.11	800	185	985	38.83	38.32	733.60	65.33
11th day	252 : 00	1,202	455	1,657	79.55	Full	2.10	958	185	1,143	45.95	33.60	767.20	65.90
11th day	264 : 00	1,200	296	1,496	68.10	Full	2.10	1,038	185	1,223	51.10	17.00	784.20	66.18
12th day	276 : 00	1,201	205	1,406	62.69	Full	2.09	1,079	185	1,264	53.72	8.97	793.18	66.32
12th day	288 : 00	1,197	133	1,330	59.11	Full	2.09	1,100	185	1,285	55.05	4.06	797.24	66.39
13th day	300 : 00	1,199	87	1,286	56.51	Full	2.09	1,103	185	1,288	55.56	0.95	798.18	66.40
13th day	312 : 00	1,198	75	1,273	55.26	Full	2.09	1,103	185	1,288	55.62	-0.36	797.82	66.40
14th day	324 : 00	1,200	68	1,268	54.89	Full	2.09	1,101	185	1,286	55.58	-0.70	797.13	66.39
14th day	336 : 00	575	62	637	41.16	Full	2.10	1,037	185	1,222	54.16	-13.00	784.13	66.18
15th day	348 : 00	529	60	589	26.48	Full	2.10	924	185	1,109	50.33	-23.85	760.28	65.78
				2,026	1,095					1,288	846		798.18	66.40

Stored Volume= 287.3

Table 7.1.10 (5/5) Seyhan Dam Flood Routing
(Constant Outflow Operation, 100-year Flood)

Days	Time	Reservoir Inflow			Inflow	Gated Spillway			H.E.P	Total	Outflow	In/Out	Resvr.	RWL
		Catalan (m3/s)	Remn. (m3/s)	Total (m3/s)	Vol. (mil.m3)	Open (m)	Coef.	Disch. (m3/s)	(m3/s)	Disch. (m3/s)	Vol. (mil.m3)	Balance (mil.m3)	Volume (mil.m3)	(m)
1st day	0 : 00	425	69	494					185	185			510.90	61.00
1st day	12 : 00	425	69	494	21.34	Full	2.19	21	185	206	8.44	12.90	523.80	61.37
1st day	24 : 00	425	69	494	21.34	Full	2.19	45	185	230	9.41	11.93	535.73	61.62
2nd day	36 : 00	425	69	494	21.34	Full	2.18	72	185	257	10.51	10.83	546.56	61.85
2nd day	48 : 00	425	69	494	21.34	Full	2.18	98	185	283	11.67	9.67	556.23	62.05
3rd day	60 : 00	425	69	494	21.34	Full	2.18	123	185	308	12.78	8.56	564.79	62.22
3rd day	72 : 00	425	69	494	21.34	Full	2.17	146	185	331	13.81	7.53	572.32	62.37
4th day	84 : 00	425	69	494	21.34	Full	2.17	167	185	352	14.77	6.57	578.89	62.50
4th day	96 : 00	425	69	494	21.34	Full	2.17	187	185	372	15.64	5.70	584.59	62.62
5th day	108 : 00	449	69	518	21.86	Full	2.17	205	185	390	16.46	5.40	589.99	62.72
5th day	120 : 00	475	69	544	22.93	Full	2.16	225	185	410	17.28	5.65	595.63	62.83
6th day	132 : 00	494	69	563	23.91	Full	2.16	245	185	430	18.15	5.76	601.40	62.94
6th day	144 : 00	520	69	589	24.89	Full	2.16	268	185	453	19.08	5.81	607.20	63.06
7th day	156 : 00	539	69	608	25.86	Full	2.16	290	185	475	20.04	5.82	613.03	63.17
7th day	168 : 00	584	69	653	27.25	Full	2.15	314	185	499	21.02	6.23	619.26	63.29
8th day	180 : 00	615	75	690	29.01	Full	2.15	340	185	525	22.11	6.89	626.16	63.42
8th day	192 : 00	700	86	786	31.87	Full	2.15	372	185	557	23.38	8.49	634.65	63.57
9th day	204 : 00	791	129	920	36.85	Full	2.14	420	185	605	25.10	11.75	646.40	63.79
9th day	216 : 00	924	197	1,121	44.09	Full	2.14	488	185	673	27.59	16.50	662.89	64.09
10th day	228 : 00	1,083	280	1,363	53.66	Full	2.13	586	185	771	31.18	22.48	685.37	64.50
10th day	240 : 00	1,201	955	2,156	76.01	Full	2.12	746	185	931	36.77	39.25	724.62	65.18
11th day	252 : 00	1,197	515	1,712	83.54	Full	2.10	941	185	1,126	44.43	39.11	763.73	65.84
11th day	264 : 00	1,204	325	1,529	69.99	Full	2.10	1,032	185	1,217	50.61	19.39	783.12	66.16
12th day	276 : 00	1,199	228	1,427	63.84	Full	2.09	1,079	185	1,264	53.59	10.24	793.36	66.32
12th day	288 : 00	1,199	150	1,349	59.95	Full	2.09	1,103	185	1,288	55.11	4.84	798.20	66.40
13th day	300 : 00	1,199	96	1,295	57.12	Full	2.09	1,108	185	1,293	55.75	1.37	799.56	66.42
13th day	312 : 00	1,198	82	1,280	55.63	Full	2.09	1,108	185	1,293	55.88	-0.25	799.31	66.42
14th day	324 : 00	1,197	76	1,273	55.15	Full	2.09	1,106	185	1,291	55.81	-0.67	798.64	66.41
14th day	336 : 00	1,196	73	1,269	54.92	Full	2.09	1,103	185	1,288	55.69	-0.77	797.87	66.40
15th day	348 : 00	1,200	72	1,272	54.89	Full	2.09	1,100	185	1,285	55.56	-0.67	797.20	66.39
				2,156	1,144					1,293	858		799.56	66.42

Stored Volume= 288.7

Table 7.2.1 Alternative Reservoir Rule Curve for Çatalan Dam

			Case-1						Case-2						Case-3					
	HWL	CTLN Inflow	HPP Dis.	Vol	Rsv. Vol.	Cal. RWL	Adj. RWL	Adj.Res. Vol.	HPP Dis.	Vol	Rsv. Vol.	Cal. RWL	Adj. RWL	Adj.Res. Vol.	HPP Dis.	Vol	Rsv. Vol.	Cai. RWL	Adj. RWL	Adj.Res. Vol.
	(m)	(m3/s)	(m3/s)	(mil.m3)	(mil.m3)	(m)	(m)	(mil.m3)	(m3/s)	(mil.m3)	(mil.m3)	(m)	(m)	(mil.m3)	(m3/s)	(mil.m3)	(mil.m3)	(m)	(m)	(mil.m3)
Oct.	120.7	70.4	110.0	-106.1	1,737.3	119.9	119.9	1,737.3	111.1	-109.0	1,384.4	114.8	115.0	1,398.7	101.1	-82.2	1,505.2	116.6	116.6	1,505.2
Nov.	118.6	90.3	141.1	-131.7	1,605.6	118.1	118.1	1,605.6	111.1	-53.9	1,344.8	114.2	115.0	1,398.7	101.1	-28.0	1,477.2	116.2	116.2	1,477.2
Dec.	118.6	136.6	213.5	-205.8	1,399.7	115.0	115.0	1,399.7	111.1	68.3	1,467.0	116.0	116.0	1,467.0	101.1	95.1	1,572.3	117.6	117.6	1,572.3
Jan.	118.6	164.5	126.6	101.5	1,501.2	116.5	116.5	1,501.2	189.4	-66.8	1,400.2	115.0	115.0	1,400.2	199.4	-93.6	1,478.7	116.2	116.2	1,478.7
Feb.	118.6	195.6	150.6	109.0	1,610.3	118.1	118.1	1,610.3	189.4	15.1	1,415.3	115.3	115.3	1,415.3	199.4	-9.1	1,469.6	116.1	116.1	1,469.6
Mar.	120.7	285.2	219.5	176.0	1,786.3	120.5	120.5	1,786.3	189.4	256.5	1,671.8	119.0	119.0	1,671.8	199.4	229.8	1,699.4	119.4	119.4	1,699.4
Apr.	125.0	353.6	272.2	211.2	1,997.4	123.3	123.3	1,997.4	189.4	425.7	2,097.5	124.5	124.5	2,097.5	199.4	399.8	2,099.1	124.5	124.5	2,099.1
May	125.0	230.0	177.0	141.9	2,139.0	125.0	125.0	2,139.0	189.4	108.7	2,126.0	125.0	125.0	2,139.0	199.4	82.0	2,126.0	125.0	125.0	2,139.0
Jun.	125.0	105.4	164.6	-153.6	1,985.4	123.1	123.1	1,985.4	111.1	-14.9	2,124.1	124.8	124.8	2,124.1	101.1	11.0	2,150.0	125.1	125.0	2,138.6
Jul.	125.0	26.2	41.0	-39.5	1,945.8	122.6	122.6	1,945.8	111.1	-227.3	1,896.8	122.0	122.0	1,896.8	101.1	-200.5	1,938.1	122.5	122.5	1,938.1
Aug.	125.0	23.1	36.1	-34.8	1,911.0	122.2	122.2	1,911.0	111.1	-235.7	1,661.1	118.8	118.8	1,661.1	101.1	-208.9	1,729.2	119.8	119.8	1,729.2
Sep.	125.0	46.4	72.5	-67.6	1,843.4	121.3	121.3	1,843.4	111.1	-167.8	1,493.4	116.4	116.4	1,493.4	101.1	-141.9	1,587.3	117.8	117.8	1,587.3
Avg.		143.9	143.7						143.7						142.1					

Table 7.2.2 (1/4) Çatalan Dam Reservoir Operation (Case-1,Qt=80m³/s)

	Rule	RWL	RC		Inf 1	Recv	Inf 1+ Qtr	Qt	Qlmin	Qfirm	Qsec1	Qsec2	Qsec		FSHL	Qsp	Spill	Rsv Vol	RWL	Firm	Second	Total	
	At beg	Inflow		Evp		RC	RC		LWL		LWL			HP		FSHL			At end	Energy	Energy	Energy	Fatx
1960																		1,399.0	115.00				
Jan	115.0	139.2	0.00	0.7	138.5	-37.2	21.3	80.0	58.5	58.5	80.0	21.3	21.3	79.8	118.6	-33.1	0.0	1,556.2	117.34	19.4	7.0	26.3	0.678
Feb	116.5	134.9	0.84	1.1	133.8	-22.0	31.8	80.0	118.8	80.0	118.8	31.8	31.8	111.8	118.6	-14.7	0.0	1,609.4	118.10	22.3	8.8	31.1	0.795
Mar	118.1	264.4	0.00	1.6	262.8	-65.2	117.6	80.0	261.4	80.0	261.4	117.6	117.6	197.6	120.7	-5.6	0.0	1,784.0	120.50	29.3	43.0	72.3	0.923
Apr	120.5	333.2	0.00	2.4	330.8	-83.6	167.2	80.0	399.3	80.0	399.3	167.2	167.2	247.2	125.0	-53.4	0.0	2,000.7	123.31	29.2	61.0	90.2	0.906
May	123.3	220.3	0.01	3.6	216.7	-51.3	85.4	80.0	361.3	80.0	361.3	85.4	85.4	165.4	125.0	-0.3	0.0	2,138.1	124.99	31.6	33.7	65.3	0.913
Jun	125.0	90.8	-0.01	4.9	85.9	59.2	0.0	80.0	291.0	80.0	291.0	0.0	0.0	80.0	125.0	5.6	5.6	2,138.9	125.00	30.9	0.0	30.9	0.910
Jul	123.1	19.7	1.90	5.1	14.6	72.3	6.9	80.0	210.8	80.0	210.8	6.9	6.9	86.9	125.0	-72.3	0.0	1,945.3	122.61	31.6	2.7	34.3	0.918
Aug	122.6	20.1	0.01	4.6	15.5	12.0	-52.5	80.0	139.5	80.0	139.5	0.0	0.0	80.0	125.0	-136.8	0.0	1,772.5	120.35	29.8	0.0	29.8	0.899
Sep	122.2	44.7	-1.85	3.7	41.0	-27.7	0.0	80.0	105.1	80.0	105.1	0.0	0.0	80.0	125.0	-180.4	0.0	1,671.4	118.97	27.6	0.0	27.6	0.893
Oct	121.3	62.0	-2.33	2.4	59.6	-25.3	0.0	80.0	81.3	80.0	81.3	0.0	0.0	80.0	120.7	-68.0	0.0	1,616.8	118.21	27.9	0.0	27.9	0.889
Nov	119.9	68.3	-1.69	1.4	66.9	3.0	0.0	80.0	70.9	70.9	80.0	0.0	0.0	70.9	118.0	-14.9	0.0	1,606.4	118.06	23.0	0.0	23.0	0.859
Dec	118.1	69.1	0.04	0.8	68.3	77.5	0.0	80.0	65.7	65.7	80.0	0.0	0.0	65.7	118.0	-11.8	0.0	1,613.4	118.16	21.5	0.0	21.5	0.840
Total/Avg		122.2		2.7	119.5					76.3			35.9	112.1			0.5			324.0	156.2	480.2	0.885
1961																							
Jan	115.0	79.7	3.16	0.7	79.0	42.9	41.9	80.0	70.0	70.0	-522.3	41.9	0.0	120.9	118.6	-53.7	0.0	1,501.2	116.51	24.7	0.0	24.7	0.814
Feb	116.5	152.7	0.04	1.1	151.6	-44.7	26.9	80.0	113.8	80.0	113.8	26.9	26.9	106.9	118.6	-14.7	0.0	1,609.3	118.10	25.5	8.6	34.1	0.926
Mar	118.1	125.7	0.09	1.6	124.1	-65.2	-21.1	80.0	122.6	80.0	122.6	0.0	0.0	80.0	120.7	-26.7	0.0	1,727.4	119.74	28.1	0.0	28.1	0.890
Apr	120.5	178.5	-0.76	2.4	176.1	-105.3	0.0	80.0	222.8	80.0	222.8	0.0	0.0	80.0	125.0	-62.7	0.0	1,976.5	123.00	28.7	0.0	28.7	0.899
May	123.3	109.1	-0.30	3.6	105.5	-60.5	0.0	80.0	241.1	80.0	241.1	0.0	0.0	80.0	125.0	-35.2	0.0	2,044.8	123.85	31.0	0.0	31.0	0.905
Jun	125.0	49.6	-1.15	4.9	44.7	23.2	0.0	80.0	213.9	80.0	213.9	0.0	0.0	80.0	125.0	-71.6	0.0	1,953.3	122.71	29.9	0.0	29.9	0.905
Jul	123.1	1.2	-0.39	5.1	0.0	3.2	0.0	80.0	127.0	80.0	127.0	0.0	0.0	80.0	125.0	-149.3	0.0	1,739.0	119.90	29.6	0.0	29.6	0.899
Aug	122.6	5.4	-2.70	4.6	0.8	-65.1	0.0	80.0	47.7	47.7	80.0	0.0	0.0	47.7	125.0	-196.2	0.0	1,613.4	118.16	14.4	0.0	14.4	0.759
Sep	122.2	33.5	-4.04	3.7	29.8	-89.1	0.0	80.0	32.5	32.5	80.0	0.0	0.0	32.5	125.0	-205.5	0.0	1,606.4	118.06	8.1	0.0	8.1	0.658
Oct	121.3	53.5	-3.24	2.4	51.1	-49.6	0.0	80.0	48.5	48.5	80.0	0.0	0.0	48.5	120.7	-69.3	0.0	1,613.4	118.16	14.4	0.0	14.4	0.758
Nov	119.9	59.2	-1.74	1.4	57.8	1.6	0.0	80.0	60.5	60.5	80.0	0.0	0.0	60.5	118.0	-14.9	0.0	1,606.4	118.06	18.6	0.0	18.6	0.818
Dec	118.1	175.7	-0.04	0.8	174.9	77.5	0.0	80.0	172.3	80.0	172.3	0.0	0.0	80.0	118.0	80.5	80.5	1,645.0	118.61	27.8	0.0	27.8	0.888
Total/Avg.		85.3		2.7	83.0					69.0			2.2	74.8			6.7			280.8	8.6	289.4	0.844
1962																							
Jan.	115.0	101.7	3.61	0.7	101.0	54.9	75.9	80.0	112.8	80.0	-501.3	75.9	0.0	155.9	118.6	-54.9	0.0	1,498.0	116.49	27.1	0.0	27.1	0.879
Feb	116.5	235.6	-0.91	1.1	234.5	-46.1	0.0	80.0	195.4	80.0	195.4	0.0	0.0	80.0	118.6	93.7	93.7	1,645.1	118.61	24.6	0.0	24.6	0.885
Mar.	118.1	390.1	0.51	1.6	388.5	-51.7	256.8	80.0	400.4	80.0	400.4	256.8	256.8	336.8	120.7	-5.8	0.0	1,783.6	120.50	29.4	94.4	123.8	0.925
Apr.	120.5	256.2	0.00	2.4	253.8	-83.6	90.2	80.0	322.2	80.0	322.2	90.2	90.2	170.2	125.0	-53.5	0.0	2,000.3	123.30	29.3	31.1	60.4	0.911
May	123.3	290.2	0.00	3.6	286.6	-51.6	155.0	80.0	431.1	80.0	431.1	155.0	155.0	235.0	125.0	0.2	0.0	2,138.5	125.00	31.3	60.6	91.9	0.903
Jun.	125.0	91.5	0.00	4.9	86.6	59.5	66.1	80.0	291.9	80.0	291.9	66.1	66.1	146.1	125.0	-59.7	0.0	1,984.3	123.10	29.8	24.6	54.4	0.890
Jul.	123.1	21.9	0.00	5.1	16.8	14.8	-48.4	80.0	155.3	80.0	155.3	0.0	0.0	80.0	125.0	-121.0	0.0	1,815.0	120.92	30.1	0.0	30.1	0.901
Aug.	122.6	19.3	-1.68	4.6	14.7	-36.7	0.0	80.0	90.0	80.0	90.0	0.0	0.0	80.0	125.0	-186.3	0.0	1,640.1	118.51	28.6	0.0	28.6	0.893
Sep.	122.2	42.1	-3.66	3.7	38.4	-78.6	0.0	80.0	51.4	51.4	80.0	0.0	0.0	51.4	125.0	-205.5	0.0	1,606.4	118.06	15.1	0.0	15.1	0.775
Oct.	121.3	61.8	-3.24	2.4	59.4	-49.6	0.0	80.0	56.8	56.8	80.0	0.0	0.0	56.8	120.7	-69.3	0.0	1,613.4	118.16	17.8	0.0	17.8	0.801
Nov.	119.9	65.4	-1.74	1.4	64.0	1.6	0.0	80.0	66.7	66.7	80.0	0.0	0.0	66.7	118.0	-14.9	0.0	1,606.4	118.06	21.2	0.0	21.2	0.843
Dec.	118.1	232.8	-0.04	0.8	232.0	77.5	0.0	80.0	229.4	80.0	229.4	0.0	0.0	80.0	118.0	137.6	137.6	1,645.0	118.61	27.8	0.0	27.8	0.888
Total/Avg		150.7		2.7	148.0					74.6			47.3	128.2			19.3			312.1	212.7	524.8	0.875
1963																							
Jan.	115.0	281.4	3.61	0.7	280.7	54.9	255.6	80.0	292.5	80.0	-321.6	255.6	0.0	335.6	118.6	-54.9	0.0	1,498.0	116.49	28.4	0.0	28.4	0.927
Feb.	116.5	389.3	-0.01	1.1	388.2	-46.1	0.0	80.0	349.1	80.0	349.1	0.0	0.0	80.0	118.6	247.4	247.4	1,645.1	118.61	24.6	0.0	24.6	0.885
Mar.	118.1	325.7	0.51	1.6	324.1	-51.7	192.4	80.0	336.0	80.0	336.0	192.4	192.4	272.4	120.7	-5.8	0.0	1,783.6	120.50	29.2	70.2	99.4	0.914
Apr.	120.5	416.2	0.00	2.4	413.8	-83.6	250.2	80.0	482.2	80.0	482.2	250.2	250.2	330.2	125.0	-53.5	0.0	2,000.3	123.30	29.6	92.7	122.3	0.924
May	123.3	371.0	0.00	3.6	367.4	-51.6	235.8	80.0	511.9	80.0	511.9	235.8	235.8	315.8	125.0	-0.2	0.0	2,138.5	125.00	31.9	93.9	125.8	0.924
Jun.	125.0	242.5	0.00	4.9	237.6	59.5	217.1	80.0	442.9	80.0	442.9	217.1	217.1	297.1	125.0	-59.7	0.0	1,984.3	123.10	30.9	83.9	114.8	0.927
Jul	123.1	79.8	0.00	5.1	74.7	14.8	9.5	80.0	213.2	80.0	213.2	9.5	9.5	89.5	125.0	-72.6	0.0	1,944.7	122.60	31.1	3.7	34.8	0.920
Aug.	122.6	56.0	0.00	4.6	51.4	11.7	-16.9	80.0	175.1	80.0	175.1	0.0	0.0	80.0	125.0	-101.1	0.0	1,868.1	121.61	30.1	0.0	30.1	0.901
Sep	122.2	74.5	-0.59	3.7	70.8	9.2	0.0	80.0	171.8	80.0	171.8	0.0	0.0	80.0	125.0	-113.7	0.0	1,844.3	121.30	28.7	0.0	28.7	0.899
Oct.	121.3	88.0	0.09	2.4	85.6	39.2	44.8	80.0	171.9	80.0	171.9	44.8	44.8	124.8	120.7	-22.3	0.0	1,739.3	119.90	27.3	15.3	42.6	0.838
Nov.	119.9	87.1	0.00	1.4	85.7	50.2	55.9	80.0	137.0	80.0	137.0	55.9	55.9	135.9	118.0	-13.8	0.0	1,609.2	118.10	26.2	18.3	44.5	0.853
Dec.	118.1	82.8	0.00	0.8	82.0	78.6	80.6	80.0	80.5	80.0	80.5	80.6	80.5	160.6	118.0	-92.0	0.0	1,398.7	115.00	26.6	26.8	53.4	0.881
Total/Avg.		207.9		2.7	205.2					80.0			90.5	191.8			20.6			344.6	404.8	749.4	0.899
1964																							
Jan	115.0	70.5	0.00	0.7	69.8	-37.2	-47.4	80.0	-10.3	69.8	-522.3	0.0	0.0	69.8	118.6	-92.0	0.0	1,398.7	115.00	21.5	0.0	21.5	0.840
Feb.	116.5	86.6	-1.50	1.1	85.5	-87.0	0.0	80.0	5.4	5.4	80.0	0.0	0.0	5.4	118.6	-21.7	0.0	1,592.5	117.86	0.8	0.0	0.8	0.434
Mar	118.1	201.7	-0.24	1.6	200.1	-71.5	0.0	80.0	192.3	80.0	192.3	0.0	0.0	80.0	120.7	-43.0	43.0	1,799.0	120.70	28.3	0.0	28.3	0.891
Apr.	120.5	148.5	0.20	2.4	146.1	-77.8	-11.7	80.0	220.4	80.0	220.4	0.0	0.0	80.0	125.0	-65.1	0.0	1,970.3	122.92	28.9	0.0	28.9	0.900
May	123.3	121.9	-0.38	3.6	118.3	-62.9	0.0	80.0	251.6	80.0	251.6	0.0	0.0	80.0	125.0	-24.7	0.0	2,072.9	124.20	31.0	0.0	31.0	0.906
Jun.	125.0	68.9	-0.80	4.9	64.0	34.1	0.0	80.0	244.0	80.0	244.0	0.0	0.0	80.0	125.0	-41.5	0.0	2,031.4	123.69	30.2	0.0	30.2	0.907
Jul.	123.1	7.6	0.59	5.1	2.5	32.4	-45.1	80.0	158.6	80.0	158.6	0.0	0.0	80.0	125.0	-117.7	0.0	1,823.8	121.03	30.3	0.0	30.3	0.902
Aug.	122.6	12.5	-1.57	4.6	7.9	-33.6	0.0	80.0	86.5	80.0	86.5	0.0	0.0	80.0	125.0	-189.8	0.0	1,630.7	118.40	28.6	0.0	28.6	0.893
Sep.	122.2	39.2	-3.80	3.7	35.5	-82.5	0.0	80.0	44.9	44.9	80.0	0.0	0.0	44.9	125.0	-205.5	0.0	1,606.3	118.06	12.5	0.0	12.5	0.738
Oct.	121.3	58.2	-3.24	2.4	55.8	-49.6	0.0	80.0	53.2	53.2	80.0	0.0	0.0	53.2	120.7	-69.3	0.0	1,613.3	118.16	16.2	0.0	16.2	0.783
Nov.	119.9	76.3	-1.74	1.4	74.9	1.6	0.0	80.0	77.6	77.6	80.0	0.0	0.0	77.6	118.0	-14.9	0.0	1,606.3	118.06	25.7	0.0	25.7	0.880
Dec.	118.1	96.6	-0.04	0.8	95.8	77.5	0.0	80.0	93.2	80.0	93.2	0.0	0.0	80.0	118.0	1.4	1.4	1,644.9	118.60	27.8	0.0	27.8	0.888
Total/Avg		82.4		2.7	79.7					67.6			0.0	67.6			3.7			281.8	0.0	281.8	0.830
1965																							
Jan.	115.0	109.2	3.60	0.7	108.5	54.6	83.1	80.0	120.3	80.0	-473.8	83.1	0.0	163.1	118.6	-54.6	0.0	1,498.7	116.51	27.4	0.0	27.4	0.889
Feb.	116.5	162.7	0.01	1.1	161.6	-45.5	36.1	80.0	122.8	80.0	122.8	36.1	36.1	116.1	118.6	-15.0	0.0	1,608.8	118.10	22.3	10.1	32.4	0.803
Mar.	118.1	349.2	0.00	1.6	347.6	-65.2	202.4	80.0	345.9	80.0	345.9	202.4	202.4	282.4	120.7	-5.8	0.0	1,783.4	120.50	29.1	73.7	102.8	0.918
Apr.	120.5	419.2	0.00	2.4	416.8	-83.6	253.2	80.0	485.1	80.0	485.1	253.2	253.2	333.2	125.0	-53.6	0.0	2,000.1	123.30	29.6	93.7	123.3	0.923
May	123.3	240.7	0.00	3.6	237.1	-51.6	105.5	80.0	381.5	80.0	381.5	105.5	105.5	185.5	125.0	-0.3	0.0	2,138.3	125.00	32.0	42.1	74.1	0.925
Jun.	125.0	129.6	0.00	4.9	124.7	59.5	104.2	80.0	329.9	80.0	329.9	104.2	104.2	184.2	125.0	-59.8	0.0	1,984.1	123.10	30.8	40.2	71.0	0.924
Jul.	123.1	43.1	0.00	5.1	38.0	14.8	-27.2	80.0	176.5	80.0	176.5	0.0	0.0	80.0	125.0	-99.8	0.0	1,871.6	121.66	30.3	0.0	30.3	0.902
Aug.	122.6	37.8	-0.94	4.6	33.2	-15.6	0.0	80.0	129.6	80.0	129.6	0.0	0.0	80.0	125.0	-146.6	0.0	1,746.3	120.00	29.3	0.0	29.3	0.897
Sep	122.2	58.1	-2.20	3.7	54.4	-37.7	0.0	80.0	108.4	80.0	108.4	0.0	0.0	80.0	125.0	-177.1	0.0	1,679.9	119.09	27.6	0.0	27.6	0.892
Oct.	121.3	67.9	-2.21	2.4	65.5	-22.1	0.0	80.0	90.4	80.0	90.4	0.0	0.0	80.0	120.7	-59.0	0.0	1,641.1	118.55	28.0	0.0	28.0	0.890
Nov.	119.9	75.9	-1.35	1.4	74.5	12.3	0.0	80.0	87.9	80.0	87.9	0.0	0.0	80.0	118.0	-7.0	0.0	1,626.8	118.35	26.9	0.0	26.9	0.888
Dec.	118.1	126.7	0.25	0.8	125.9	85.2	131.1	80.0	131.0	80.0	131.0	131.1	131.0	211.1	118.0	-92.0	0.0	1,398.6	115.00	27.9	45.7	73.6	0.924
Total/Avg.		151.7		2.7	149.0					80.0			69.4	156.3			0.0			341.2	305.5	646.7	0.898

Table 7.2.2 (2/4) Çatalan Dam Reservoir Operation (Case-1,Qt=80m^3/s)

	Rule	RWL	RC		Inf.t	Recv.	Inf.t+ Qt+	Qt	Qfmin	Qfirm	Qsec1	Qsec2	Qsec		FSHL	Qsp	Spill	Rsv.Vol	RWL	Firm	Second	Total	
	At beg	Inflow		Evp		RC	RC		LWL		LWL			HP		FSHL			At end	Energy	Energy	Energy	Eata
1966																							
Jan.	115.0	539.9	0.00	0.7	539.2	-37.2	422.0	80.0	459.1	80.0	63.1	280.0	0.0	360.0	118.6	87.2	87.2	1,615.0	118.61	27.9	0.0	27.9	0.925
Feb.	116.5	272.7	2.11	1.1	271.6	15.0	206.6	80.0	293.3	80.0	293.3	206.6	206.6	286.6	118.6	-15.0	0.0	1,608.7	118.09	25.9	66.8	92.7	0.918
Mar.	118.1	289.5	0.01	1.6	287.9	-65.5	0.0	80.0	286.2	80.0	286.2	0.0	0.0	80.0	120.7	136.9	136.9	1,798.9	120.70	28.4	0.0	28.4	0.892
Apr.	120.5	332.9	0.20	2.4	330.5	-77.8	172.7	80.0	404.8	80.0	404.8	172.7	172.7	252.7	125.0	-53.4	0.0	2,000.6	123.30	29.4	63.4	92.8	0.910
May	123.3	211.0	0.00	3.6	207.4	-51.6	75.8	80.0	352.0	80.0	352.0	75.8	75.8	155.8	125.0	-0.1	0.0	2,138.8	125.00	31.2	29.6	60.8	0.903
Jun.	125.0	110.3	0.00	4.9	105.4	59.5	84.9	80.0	310.8	80.0	310.8	84.9	84.9	164.9	125.0	-59.6	0.0	1,984.6	123.10	30.5	32.4	62.9	0.912
Jul.	123.1	41.2	0.00	5.1	36.1	14.8	-29.1	80.0	174.7	80.0	174.7	0.0	0.0	80.0	125.0	-101.5	0.0	1,867.0	121.60	30.3	0.0	30.3	0.902
Aug.	122.6	35.8	-1.00	4.6	31.2	-17.3	0.0	80.0	125.9	80.0	125.9	0.0	0.0	80.0	125.0	-150.4	0.0	1,736.3	119.86	29.2	0.0	29.2	0.897
Sep.	122.2	59.4	-2.34	3.7	55.7	-41.7	0.0	80.0	105.8	80.0	105.8	0.0	0.0	80.0	125.0	-179.7	0.0	1,673.3	119.00	27.5	0.0	27.5	0.892
Oct.	121.3	73.7	-2.30	2.4	71.3	-24.5	0.0	80.0	93.7	80.0	93.7	0.0	0.0	80.0	120.7	-55.6	0.0	1,650.0	118.68	28.0	0.0	28.0	0.890
Nov.	119.9	92.0	-1.22	1.4	90.6	15.9	0.0	80.0	107.4	80.0	107.4	0.0	0.0	80.0	118.0	12.5	12.5	1,645.1	118.61	27.1	0.0	27.1	0.889
Dec.	118.1	241.6	0.51	0.8	240.8	92.1	252.9	80.0	252.7	80.0	252.7	252.9	252.7	332.9	118.0	-92.1	0.0	1,398.4	115.00	28.0	88.5	116.5	0.927
Total/Avg		191.7		2.7	189.0					80.0			66.1	169.4			19.7			343.4	280.7	624.1	0.905
1967																							
Jan.	115.0	211.6	0.00	0.7	210.9	-37.2	93.7	80.0	130.7	80.0	391.4	93.7	0.0	173.7	118.6	-54.9	0.0	1,498.0	116.49	26.6	0.0	26.6	0.894
Feb.	116.5	147.4	-0.01	1.1	146.3	-46.1	0.0	80.0	107.2	80.0	107.2	0.0	0.0	80.0	118.6	5.5	5.5	1,645.1	118.61	24.6	0.0	24.6	0.885
Mar.	118.1	295.6	0.51	1.6	294.0	-51.7	162.3	80.0	305.9	80.0	305.9	162.3	162.3	242.3	120.7	-5.8	0.0	1,783.6	120.50	28.6	58.0	86.6	0.894
Apr.	120.5	383.9	0.00	2.4	383.5	-83.6	219.9	80.0	451.9	80.0	451.9	219.9	219.9	299.9	125.0	-53.5	0.0	2,000.3	123.30	29.8	81.8	111.6	0.926
May	123.3	323.6	0.00	3.6	320.0	-51.6	188.4	80.0	464.5	80.0	464.5	188.4	188.4	268.4	125.0	-0.2	0.0	2,138.5	125.00	31.9	75.0	106.9	0.922
Jun.	125.0	133.4	0.00	4.9	128.5	59.5	108.0	80.0	333.8	80.0	333.8	108.0	108.0	188.0	125.0	-59.7	0.0	1,984.3	123.10	30.9	41.7	72.6	0.925
Jul.	123.1	50.5	0.00	5.1	45.4	14.8	-19.8	80.0	183.9	80.0	183.9	0.0	0.0	80.0	125.0	-92.4	0.0	1,891.6	121.92	30.4	0.0	30.4	0.902
Aug.	122.6	43.5	-0.68	4.6	38.9	-8.1	0.0	80.0	142.8	80.0	142.8	0.0	0.0	80.0	125.0	-133.5	0.0	1,781.5	120.47	29.5	0.0	29.5	0.898
Sep.	122.2	63.9	-1.73	3.7	60.2	-24.2	0.0	80.0	127.8	80.0	127.8	0.0	0.0	80.0	125.0	-157.7	0.0	1,730.2	119.78	27.9	0.0	27.9	0.894
Oct.	121.3	80.9	-1.52	2.4	78.5	-3.3	0.0	80.0	122.2	80.0	122.2	0.0	0.0	80.0	120.7	-27.2	0.0	1,726.2	119.73	28.6	0.0	28.6	0.893
Nov.	119.9	126.0	-0.17	1.4	124.6	45.3	0.0	80.0	170.8	80.0	170.8	0.0	0.0	80.0	118.0	75.9	75.9	1,645.1	118.61	27.4	0.0	27.4	0.891
Dec.	118.1	158.2	0.51	0.8	157.4	92.1	169.5	80.0	169.3	80.0	169.3	169.5	169.3	249.5	118.0	-92.1	0.0	1,398.4	115.00	27.0	57.2	84.2	0.870
Total/Avg		168.4		2.7	165.7					80.0			70.7	158.5			6.8			343.2	313.7	656.9	0.901
1968																							
Jan.	115.0	258.0	0.00	0.7	257.3	-37.2	140.1	80.0	177.1	80.0	-345.0	140.1	0.0	220.1	118.6	-54.9	0.0	1,498.0	116.49	27.4	0.0	27.4	0.926
Feb.	116.5	256.0	-0.01	1.1	254.9	-46.1	0.0	80.0	255.8	80.0	255.8	0.0	0.0	80.0	118.6	154.1	154.1	1,645.1	118.61	24.6	0.0	24.6	0.885
Mar.	118.1	566.8	0.51	1.6	565.2	-51.7	433.5	80.0	577.1	80.0	577.1	280.0	280.0	360.0	120.7	147.7	147.7	1,799.1	120.71	29.2	102.3	131.5	0.919
Apr.	120.5	458.2	0.21	2.4	455.8	-77.5	298.3	80.0	530.2	80.0	530.2	280.0	280.0	360.0	125.0	-35.3	0.0	2,047.4	123.89	29.4	102.8	132.2	0.911
May	123.3	244.0	0.59	3.6	240.4	-33.9	126.5	80.0	402.5	80.0	402.5	126.5	126.5	206.5	125.0	-0.3	0.0	2,138.2	125.00	30.6	48.4	79.0	0.879
Jun.	125.0	134.8	0.00	4.9	129.9	59.5	109.4	80.0	335.1	80.0	335.1	109.4	109.4	189.4	125.0	-59.8	0.0	1,984.0	123.10	30.9	42.3	73.2	0.926
Jul.	123.1	46.4	0.00	5.1	41.3	14.8	-23.9	80.0	179.7	80.0	179.7	0.0	0.0	80.0	125.0	-96.6	0.0	1,880.3	121.77	30.4	0.0	30.4	0.902
Aug.	122.6	47.0	-0.83	4.6	42.4	-12.4	0.0	80.0	142.1	80.0	142.1	0.0	0.0	80.0	125.0	-134.2	0.0	1,779.6	120.45	29.5	0.0	29.5	0.898
Sep.	122.2	70.3	-1.75	3.7	66.6	-24.8	0.0	80.0	133.4	80.0	133.4	0.0	0.0	80.0	125.0	-152.1	0.0	1,744.9	119.98	28.0	0.0	28.0	0.895
Oct.	121.3	85.1	-1.32	2.4	82.7	2.2	0.0	80.0	131.8	80.0	131.8	0.0	0.0	80.0	120.7	-17.5	0.0	1,752.1	120.08	28.8	0.0	28.8	0.894
Nov.	119.9	162.7	0.18	1.4	161.3	55.3	136.6	80.0	217.5	80.0	217.5	136.6	136.6	216.6	118.0	-14.0	0.0	1,608.8	118.10	26.6	45.5	72.1	0.868
Dec.	118.1	316.3	0.00	0.8	315.5	78.6	314.1	80.0	313.8	80.0	313.8	280.0	280.0	360.0	118.0	-58.0	0.0	1,489.6	116.37	28.1	98.4	126.5	0.924
Total/Avg		223.8		2.7	221.1					80.0			101.0	192.7			25.2			343.5	439.7	783.2	0.902
1969																							
Jan.	115.0	287.3	1.37	0.7	286.6	-3.3	203.3	80.0	240.4	80.0	315.7	203.3	0.0	283.3	118.6	-54.7	0.0	1,498.4	116.50	27.4	0.0	27.4	0.911
Feb.	116.5	204.7	0.00	1.1	203.6	-45.8	77.8	80.0	164.7	80.0	164.7	77.8	77.8	157.8	118.6	-14.8	0.0	1,609.2	118.10	24.4	23.7	48.1	0.880
Mar.	118.1	509.3	0.00	1.6	507.7	-65.2	362.5	80.0	506.2	80.0	506.2	280.0	280.0	360.0	120.7	76.8	76.8	1,799.1	120.71	29.1	102.0	131.1	0.920
Apr.	120.5	426.8	0.21	2.4	424.4	-77.5	266.9	80.0	498.8	80.0	498.8	266.9	266.9	346.9	125.0	-53.6	0.0	2,000.0	123.30	29.5	98.3	127.8	0.918
May	123.3	387.3	0.00	3.6	383.7	-51.6	252.1	80.0	528.1	80.0	528.1	252.1	252.1	332.1	125.0	-0.3	0.0	2,138.2	125.00	31.7	99.7	131.4	0.919
Jun.	125.0	171.5	0.00	4.9	166.6	59.5	146.1	80.0	371.8	80.0	371.8	146.1	146.1	226.1	125.0	-59.8	0.0	1,984.0	123.10	30.0	54.8	84.8	0.896
Jul.	123.1	73.7	0.00	5.1	68.6	14.8	3.4	80.0	207.0	80.0	207.0	3.4	3.4	83.4	125.0	-72.7	0.0	1,944.4	122.59	30.8	1.3	32.1	0.910
Aug.	122.6	62.9	-0.01	4.6	58.3	11.4	0.0	80.0	181.9	80.0	181.9	0.0	0.0	80.0	125.0	-94.4	0.0	1,886.3	121.85	30.2	0.0	30.2	0.901
Sep.	122.2	78.6	-0.35	3.7	74.9	16.3	0.0	80.0	182.9	80.0	182.9	0.0	0.0	80.0	125.0	-102.6	0.0	1,873.1	121.68	28.9	0.0	28.9	0.900
Oct.	121.3	91.0	0.38	2.4	88.6	50.1	58.7	80.0	185.6	80.0	185.6	58.7	58.7	138.7	120.7	-22.4	0.0	1,738.9	119.90	28.3	20.8	49.1	0.865
Nov.	119.9	92.7	0.00	1.4	91.3	50.2	61.5	80.0	142.4	80.0	142.4	61.5	61.5	141.5	118.0	-14.0	0.0	1,608.8	118.10	26.5	20.3	46.8	0.863
Dec.	118.1	222.4	0.00	0.8	221.6	78.6	220.2	80.0	219.9	80.0	219.9	220.2	219.9	300.2	118.0	-92.1	0.0	1,398.3	114.99	27.7	76.1	103.8	0.919
Total/Avg		217.4		2.7	214.7					80.0			113.9	210.8			6.4			344.5	497.0	841.5	0.900
1970																							
Jan.	115.0	167.5	-0.01	0.7	166.8	-37.5	0.0	80.0	86.5	80.0	435.5	0.0	0.0	80.0	118.6	-5.3	0.0	1,630.8	118.41	26.7	0.0	26.7	0.881
Feb.	116.5	272.8	1.91	1.1	271.7	9.1	200.8	80.0	287.5	80.0	287.5	200.8	200.8	280.8	118.6	-15.0	0.0	1,608.8	118.10	25.8	64.6	90.4	0.915
Mar.	118.1	326.8	0.00	1.6	325.2	-65.2	180.0	80.0	323.5	80.0	323.5	180.0	180.0	260.0	120.7	-5.8	0.0	1,783.4	120.50	28.8	64.8	93.6	0.906
Apr.	120.5	247.1	0.00	2.4	244.7	-83.6	81.1	80.0	313.0	80.0	313.0	81.1	81.1	161.1	125.0	-53.6	0.0	2,000.1	123.30	29.1	29.5	58.6	0.902
May	123.3	153.9	0.00	3.6	150.3	-51.6	18.7	80.0	294.7	80.0	294.7	18.7	18.7	98.7	125.0	-0.3	0.0	2,138.3	125.00	27.5	6.4	33.9	0.792
Jun.	125.0	87.4	0.00	4.9	82.5	59.5	62.0	80.0	287.7	80.0	287.7	62.0	62.0	142.0	125.0	-59.8	0.0	1,984.1	123.10	29.6	22.9	52.5	0.884
Jul.	123.1	29.8	0.00	5.1	24.7	14.8	-40.5	80.0	163.2	80.0	163.2	0.0	0.0	80.0	125.0	-113.1	0.0	1,836.0	121.19	30.1	0.0	30.1	0.901
Aug.	122.6	25.9	-1.41	4.6	21.3	-29.0	0.0	80.0	104.5	80.0	104.5	0.0	0.0	80.0	125.0	-171.8	0.0	1,678.8	119.08	28.9	0.0	28.9	0.894
Sep.	122.2	48.8	-3.12	3.7	45.1	-63.7	0.0	80.0	73.0	73.0	80.0	0.0	0.0	73.0	125.0	-205.4	0.0	1,606.5	118.06	24.0	0.0	24.0	0.868
Oct.	121.3	81.4	-3.24	2.4	79.0	-49.6	0.0	80.0	76.5	76.5	80.0	0.0	0.0	76.5	120.7	-69.4	0.0	1,613.2	118.16	26.1	0.0	26.1	0.877
Nov.	119.9	113.5	-1.74	1.4	112.1	1.6	0.0	80.0	114.7	80.0	114.7	0.0	0.0	80.0	118.0	19.8	19.8	1,645.1	118.61	26.9	0.0	26.9	0.888
Dec.	118.1	113.1	0.51	0.8	112.3	92.1	124.4	80.0	124.2	80.0	124.2	124.4	124.2	204.4	118.0	-92.1	0.0	1,398.4	115.00	27.9	43.4	71.3	0.922
Total/Avg		139.0		2.7	136.3					79.1			55.6	134.7			1.7			331.4	231.6	563.0	0.886
1971																							
Jan.	115.0	94.3	0.00	0.7	93.6	-37.2	-23.6	80.0	13.4	13.4	-442.1	0.0	0.0	13.4	118.6	-11.9	0.0	1,613.2	118.16	2.5	0.0	2.5	0.501
Feb.	116.5	106.7	1.66	1.1	105.6	1.8	27.4	80.0	114.1	80.0	114.1	27.4	27.4	107.4	118.6	-14.9	0.0	1,608.8	118.10	22.2	7.6	29.8	0.786
Mar.	118.1	185.4	0.00	1.6	183.8	-65.2	38.6	80.0	182.1	80.0	182.1	38.6	38.6	118.6	120.7	-5.8	0.0	1,783.4	120.50	26.1	12.6	38.7	0.819
Apr.	120.5	357.0	0.00	2.4	354.6	-83.6	191.0	80.0	422.9	80.0	422.9	191.0	191.0	271.0	125.0	-53.6	0.0	2,000.1	123.30	29.6	70.6	100.2	0.919
May	123.3	174.7	0.00	3.6	171.1	-51.6	39.5	80.0	315.5	80.0	315.5	39.5	39.5	119.5	125.0	-0.3	0.0	2,138.3	125.00	29.2	14.4	43.6	0.843
Jun.	125.0	90.4	0.00	4.9	85.5	59.5	65.0	80.0	290.7	80.0	290.7	65.0	65.0	145.0	125.0	-59.8	0.0	1,984.1	123.10	29.7	24.1	53.8	0.888
Jul.	123.1	20.6	0.00	5.1	15.5	14.8	-49.7	80.0	154.0	80.0	154.0	0.0	0.0	80.0	125.0	-122.3	0.0	1,811.3	120.87	30.1	0.0	30.1	0.901
Aug.	122.6	31.2	-1.73	4.6	26.6	-38.1	0.0	80.0	100.5	80.0	100.5	0.0	0.0	80.0	125.0	-175.7	0.0	1,668.3	118.93	28.7	0.0	28.7	0.893
Sep.	122.2	47.0	-3.27	3.7	43.3	-67.8	0.0	80.0	67.2	67.2	80.0	0.0	0.0	67.2	125.0	-205.5	0.0	1,606.4	118.06	21.6	0.0	21.6	0.847
Oct.	121.3	64.6	-3.24	2.4	62.2	-49.6	0.0	80.0	59.6	59.6	80.0	0.0	0.0	59.6	120.7	-69.3	0.0	1,613.4	118.16	18.9	0.0	18.9	0.814
Nov.	119.9	76.1	-1.74	1.4	74.7	1.6	0.0	80.0	77.4	77.4	80.0	0.0	0.0	77.4	118.0	-14.9	0.0	1,606.4	118.06	25.6	0.0	25.6	0.880
Dec.	118.1	82.1	-0.04	0.8	81.3	77.5	0.0	80.0	78.7	78.7	80.0	0.0	0.0	78.7	118.0	-11.8	0.0	1,613.4	118.16	27.1	0.0	27.1	0.884
Total/Avg		110.8		2.7	108.2					71.4			30.1	101.5			0.0			291.3	129.3	420.6	0.832

Table 7.2.2 (3/4) Çatalan Dam Reservoir Operation (Case-1,Qt=80m³/s)

	Rule	RWL-RC			Inf.1	Recv.	Inf.1+ Qt-	Qt	Qfmin	Qfirm	Qsec1	Qsec2	Qsec		FSHL	Qsp	Spill	Rsv.Vol	RWL	Firm	Second	Total	
	At beg	Inflow		Evp		RC	RC		LWL		LWL			HP		FSHL			At end	Energy	Energy	Energy	Eata
1972																							
Jan	115.0	68.4	3.16	0.7	67.7	42.9	30.6	80.0	67.7	67.7	-522.3	30.6	0.0	98.3	118.6	-42.4	0.0	1,531.4	116.98	23.9	0.0	23.9	0.920
Feb	116.5	92.2	0.48	1.1	91.1	-32.2	-21.1	80.0	65.8	65.8	80.0	0.0	0.0	65.8	118.6	-21.7	0.0	1,592.6	117.87	19.1	0.0	19.1	0.836
Mar.	118.1	149.8	-0.23	1.6	148.2	-71.2	0.0	80.0	140.5	80.0	140.5	0.0	0.0	80.0	120.7	-8.9	0.0	1,775.3	120.39	28.3	0.0	28.3	0.891
Apr.	120.5	216.3	-0.11	2.4	213.9	-86.7	0.0	80.0	279.1	80.0	279.1	0.0	0.0	80.0	125.0	-6.4	0.0	2,122.4	124.80	29.4	0.0	29.4	0.903
May	123.3	232.3	1.50	3.6	228.7	-6.2	142.5	80.0	418.8	80.0	418.8	142.5	142.5	222.5	125.0	0.0	0.0	2,139.0	125.01	31.4	56.0	87.4	0.896
Jun.	125.0	117.8	0.01	4.9	112.9	59.8	92.7	80.0	318.4	80.0	318.4	92.7	92.7	172.7	125.0	-59.8	0.0	1,984.0	124.10	30.7	35.6	66.3	0.918
Jul.	123.1	33.8	0.00	5.1	28.7	14.8	-36.5	80.0	167.1	80.0	167.1	0.0	0.0	80.0	125.0	-109.2	0.0	1,846.6	121.33	30.2	0.0	30.2	0.901
Aug.	122.6	29.3	-1.27	4.6	24.7	-25.1	0.0	80.0	111.8	80.0	111.8	0.0	0.0	80.0	125.0	-164.5	0.0	1,698.5	119.35	29.0	0.0	29.0	0.895
Sep.	122.2	55.0	-2.85	3.7	51.3	-56.1	0.0	80.0	86.8	80.0	86.8	0.0	0.0	80.0	125.0	-198.6	0.0	1,624.1	118.31	27.1	0.0	27.1	0.890
Oct.	121.3	72.3	-2.99	2.4	69.9	-43.0	0.0	80.0	73.9	73.9	80.0	0.0	0.0	73.9	120.7	-69.3	0.0	1,613.4	118.16	25.1	0.0	25.1	0.870
Nov.	119.9	73.8	-1.74	1.4	72.4	1.6	0.0	80.0	75.1	75.1	80.0	0.0	0.0	75.1	118.0	-14.9	0.0	1,606.4	118.06	24.7	0.0	24.7	0.873
Dec.	118.1	67.1	-0.04	0.8	66.3	77.5	0.0	80.0	63.7	63.7	80.0	0.0	0.0	63.7	118.0	-11.8	0.0	1,613.4	118.16	20.7	0.0	20.7	0.832
Total/Avg.		100.7		2.7	98.0					75.5			19.6	97.7			0.0			319.6	91.6	411.2	0.885
1973																							
Jan	115.0	63.2	3.16	0.7	62.5	42.9	25.4	80.0	62.5	62.5	-522.3	25.4	0.0	87.9	118.6	-37.2	0.0	1,545.4	117.19	21.7	0.0	21.7	0.903
Feb	116.5	91.7	0.69	1.1	90.6	26.3	-15.7	80.0	71.1	71.1	80.0	0.0	0.0	71.1	118.6	-21.7	0.0	1,592.6	117.87	21.2	0.0	21.2	0.857
Mar.	118.1	146.4	-0.23	1.6	144.8	-71.2	0.0	80.0	137.1	80.0	137.1	0.0	0.0	80.0	120.7	-12.3	0.0	1,766.2	120.27	28.2	0.0	28.2	0.891
Apr.	120.5	191.2	-0.23	2.4	188.8	-90.2	0.0	80.0	250.5	80.0	250.5	0.0	0.0	80.0	125.0	-35.0	0.0	2,048.2	123.00	29.2	0.0	29.2	0.901
May	123.3	144.9	0.60	3.6	141.3	-33.6	27.7	80.0	303.7	80.0	303.7	27.7	27.7	107.7	125.0	-0.3	0.0	2,138.2	125.00	28.5	9.9	38.4	0.817
Jun.	125.0	70.8	0.00	4.9	65.9	59.5	45.4	80.0	271.1	80.0	271.1	45.4	45.4	125.4	125.0	-59.8	0.0	1,984.0	123.10	28.7	16.3	45.0	0.855
Jul.	123.1	-0.2	0.00	5.1	0.0	14.8	-65.2	80.0	138.4	80.0	138.4	0.0	0.0	80.0	125.0	-137.9	0.0	1,769.7	120.31	29.9	0.0	29.9	0.900
Aug.	122.6	4.7	-2.29	4.6	0.1	-53.8	0.0	80.0	58.5	58.5	80.0	0.0	0.0	58.5	125.0	-196.3	0.0	1,613.3	118.16	19.0	0.0	19.0	0.814
Sep.	122.2	34.9	-4.04	3.7	31.2	-89.1	0.0	80.0	33.9	33.9	80.0	0.0	0.0	33.9	125.0	-205.5	0.0	1,606.3	118.06	8.6	0.0	8.6	0.668
Oct.	121.3	51.6	-3.24	2.4	49.2	-49.6	0.0	80.0	46.6	46.6	80.0	0.0	0.0	46.6	120.7	-69.3	0.0	1,613.3	118.16	13.6	0.0	13.6	0.748
Nov.	119.9	56.3	-1.74	1.4	54.9	1.6	0.0	80.0	57.6	57.6	80.0	0.0	0.0	57.6	118.0	-14.9	0.0	1,606.3	118.06	17.5	0.0	17.5	0.805
Dec.	118.1	72.6	-0.04	0.8	71.8	77.5	0.0	80.0	69.2	69.2	80.0	0.0	0.0	69.2	118.0	-11.8	0.0	1,613.3	118.16	23.0	0.0	23.0	0.853
Total/Avg.		77.3		2.7	75.1					66.6			6.1	74.8			0.0			269.1	26.2	295.3	0.834
1974																							
Jan.	115.0	61.6	3.16	0.7	60.9	42.9	23.8	80.0	60.9	60.9	-522.3	23.8	0.0	84.7	118.6	-35.6	0.0	1,549.6	117.25	21.1	0.0	21.1	0.897
Feb.	116.5	77.7	0.75	1.1	76.6	-24.5	-27.9	80.0	58.9	58.9	80.0	0.0	0.0	58.9	118.6	-21.7	0.0	1,592.4	117.86	16.6	0.0	16.6	0.808
Mar.	118.1	213.1	-0.24	1.6	211.5	-71.5	0.0	80.0	203.7	80.0	203.7	0.0	0.0	80.0	120.7	54.4	54.4	1,798.9	120.70	28.3	0.0	28.3	0.891
Apr.	120.5	162.7	0.20	2.4	160.3	-77.8	2.5	80.0	234.6	80.0	234.6	2.5	2.5	82.5	125.0	-53.4	0.0	2,000.6	123.40	29.3	0.9	30.2	0.906
May	123.3	119.0	0.00	3.6	115.4	-51.6	-16.2	80.0	260.0	80.0	260.0	0.0	0.0	80.0	125.0	-16.3	0.0	2,095.4	124.48	31.2	0.0	31.2	0.906
Jun.	125.0	49.8	-0.52	4.9	44.9	43.0	0.0	80.0	233.6	80.0	233.6	0.0	0.0	80.0	125.0	-51.9	0.0	2,004.4	123.35	30.2	0.0	30.2	0.906
Jul.	123.1	-4.5	0.25	5.1	0.0	22.2	-57.8	80.0	146.0	80.0	146.0	0.0	0.0	80.0	125.0	-130.3	0.0	1,790.1	120.59	30.1	0.0	30.1	0.901
Aug.	122.6	6.5	-2.01	4.6	1.9	-46.0	0.0	80.0	67.9	67.9	80.0	0.0	0.0	67.9	125.0	-196.3	0.0	1,613.3	118.16	23.1	0.0	23.1	0.854
Sep.	122.2	35.8	-4.04	3.7	32.1	-89.1	0.0	80.0	34.8	34.8	80.0	0.0	0.0	34.8	125.0	-205.5	0.0	1,606.3	118.06	8.9	0.0	8.9	0.674
Oct.	121.3	61.2	-3.24	2.4	58.8	-49.6	0.0	80.0	56.2	56.2	80.0	0.0	0.0	56.2	120.7	-69.3	0.0	1,613.3	118.16	17.5	0.0	17.5	0.798
Nov.	119.9	65.8	-1.74	1.4	64.4	1.6	0.0	80.0	67.1	67.1	80.0	0.0	0.0	67.1	118.0	-14.9	0.0	1,606.3	118.06	21.4	0.0	21.4	0.845
Dec.	118.1	196.4	-0.04	0.8	195.6	77.5	0.0	80.0	193.0	80.0	193.0	0.0	0.0	80.0	118.0	101.2	101.2	1,644.9	118.60	27.8	0.0	27.8	0.888
Total/Avg.		87.1		2.7	85.2					68.8			0.2	71.0			13.0			285.5	0.9	286.4	0.856
1975																							
Jan.	115.0	160.6	3.69	0.7	159.9	54.6	134.5	80.0	171.7	80.0	-442.4	134.5	0.0	214.5	118.6	-54.6	0.0	1,498.7	116.51	28.4	0.0	28.4	0.926
Feb.	116.5	133.7	0.01	1.1	132.6	-45.5	7.1	80.0	93.8	80.0	93.8	7.1	7.1	87.1	118.6	-15.0	0.0	1,608.8	118.10	24.9	2.2	27.1	0.901
Mar.	118.1	272.0	0.00	1.6	270.4	-65.2	125.2	80.0	268.7	80.0	268.7	125.2	125.2	205.2	120.7	-5.8	0.0	1,783.4	120.50	29.4	45.9	75.3	0.926
Apr.	120.5	527.2	0.00	2.4	524.8	-83.6	361.2	80.0	593.1	80.0	593.1	280.0	280.0	360.0	125.0	27.6	27.6	2,139.0	125.01	29.5	101.4	132.9	0.969
May	123.3	438.0	1.71	3.6	434.4	0.3	354.7	80.0	630.7	80.0	630.7	280.0	280.0	360.0	125.0	74.4	74.4	2,139.0	125.01	31.3	109.7	141.0	0.899
Jun.	125.0	159.0	0.01	4.9	154.1	59.8	133.9	80.0	359.6	80.0	359.6	133.9	133.9	213.9	125.0	-59.8	0.0	1,984.0	123.10	29.6	49.6	79.2	0.885
Jul.	123.1	48.0	0.00	5.1	42.9	14.8	-22.3	80.0	181.3	80.0	181.3	0.0	0.0	80.0	125.0	-95.0	0.0	1,884.6	121.83	30.4	0.0	30.4	0.902
Aug.	122.6	38.4	-0.77	4.6	33.8	-10.7	0.0	80.0	135.1	80.0	135.1	0.0	0.0	80.0	125.0	-141.2	0.0	1,760.9	120.19	29.5	0.0	29.5	0.898
Sep.	122.2	53.4	-2.01	3.7	49.7	-32.3	0.0	80.0	109.3	80.0	109.3	0.0	0.0	80.0	125.0	-176.2	0.0	1,682.4	119.12	27.6	0.0	27.6	0.893
Oct.	121.3	72.8	-2.18	2.4	70.4	-21.3	0.0	80.0	96.2	80.0	96.2	0.0	0.0	80.0	120.7	-53.1	0.0	1,656.7	118.77	28.1	0.0	28.1	0.890
Nov.	119.9	78.5	-1.13	1.4	77.1	18.4	0.0	80.0	96.5	80.0	96.5	0.0	0.0	80.0	118.0	1.6	1.6	1,645.0	118.61	27.1	0.0	27.1	0.889
Dec.	118.1	81.1	0.51	0.8	80.3	92.1	92.4	80.0	92.1	80.0	92.1	92.4	92.1	172.4	118.0	-92.1	0.0	1,398.3	114.99	27.2	31.3	58.5	0.897
Total/Avg.		171.9		2.7	169.2					80.0			76.5	167.8			8.6			343.0	342.1	685.1	0.901
1976																							
Jan	115.0	155.0	-0.01	0.7	154.3	-37.5	0.0	80.0	74.0	74.0	-442.0	0.0	0.0	74.0	118.6	-11.8	0.0	1,613.4	118.16	24.1	0.0	24.1	0.862
Feb	116.5	150.2	1.66	1.1	149.1	1.8	70.9	80.0	157.7	80.0	157.7	70.9	70.9	150.9	118.6	-14.9	0.0	1,609.0	118.10	24.6	21.8	46.4	0.874
Mar.	118.1	190.9	0.00	1.6	189.3	-65.2	44.1	80.0	187.7	80.0	187.7	44.1	44.1	124.1	120.7	-5.7	0.0	1,783.6	120.50	26.5	14.6	41.1	0.831
Apr.	120.5	393.1	0.00	2.4	390.7	-83.6	227.1	80.0	459.1	80.0	459.1	227.1	227.1	307.1	125.0	-53.5	0.0	2,000.3	123.30	29.8	84.6	114.4	0.927
May	123.3	261.0	0.00	3.6	257.4	-51.6	125.8	80.0	401.9	80.0	401.9	125.8	125.8	205.8	125.0	-0.2	0.0	2,138.5	125.00	30.4	47.8	78.2	0.876
Jun	125.0	134.1	0.00	4.9	129.2	59.5	108.7	80.0	334.5	80.0	334.5	108.7	108.7	188.7	125.0	-59.7	0.0	1,984.3	123.10	30.9	42.0	72.9	0.926
Jul	123.1	38.2	0.00	5.1	33.1	14.8	-32.1	80.0	171.6	80.0	171.6	0.0	0.0	80.0	125.0	-104.7	0.0	1,858.7	121.49	30.3	0.0	30.3	0.902
Aug.	122.6	34.7	-1.11	4.6	30.1	-20.5	0.0	80.0	121.7	80.0	121.7	0.0	0.0	80.0	125.0	-154.6	0.0	1,725.0	119.71	29.2	0.0	29.2	0.895
Sep	122.2	58.8	-2.49	3.7	55.1	-45.9	0.0	80.0	100.9	80.0	100.9	0.0	0.0	80.0	125.0	-184.6	0.0	1,660.5	118.82	27.4	0.0	27.4	0.891
Oct.	121.3	88.9	-2.48	2.4	86.5	-29.4	0.0	80.0	104.1	80.0	104.1	0.0	0.0	80.0	120.7	-45.2	0.0	1,677.9	119.06	28.1	0.0	28.1	0.890
Nov.	119.9	116.8	-0.84	1.4	115.4	26.5	9.0	80.0	143.0	80.0	143.0	0.0	0.0	80.0	118.0	48.1	48.1	1,645.0	118.61	27.1	0.0	27.1	0.890
Dec.	118.1	220.7	0.51	0.8	219.9	92.1	232.0	80.0	231.7	80.0	231.7	232.0	231.7	312.0	118.0	-92.1	0.0	1,398.3	114.99	27.9	80.9	108.8	0.923
Total/Avg.		153.5		2.7	150.8					79.5			67.4	146.9			4.0			336.3	291.7	628.0	0.891
1977																							
Jan.	115.0	140.5	0.01	0.7	139.8	-37.5	0.0	80.0	59.5	59.5	-442.0	0.0	0.0	59.5	118.6	-11.8	0.0	1,613.4	118.16	18.2	0.0	18.2	0.806
Feb	116.5	280.6	1.66	1.1	279.5	1.8	201.3	80.0	288.1	80.0	288.1	201.3	201.3	281.3	118.6	-14.9	0.0	1,609.0	118.10	25.7	64.6	90.3	0.915
Mar.	118.1	327.9	0.00	1.6	326.3	-65.2	181.1	80.0	324.7	80.0	324.7	181.1	181.1	261.1	120.7	-5.7	0.0	1,783.6	120.50	28.8	65.2	94.0	0.907
Apr.	120.5	413.6	0.00	2.4	411.2	-83.6	247.6	80.0	479.6	80.0	479.6	247.6	247.6	327.6	125.0	-53.5	0.0	2,000.3	123.30	29.7	91.9	121.6	0.925
May	123.3	302.5	0.00	3.6	298.9	-51.6	167.3	80.0	443.4	80.0	443.4	167.3	167.3	247.3	125.0	-0.2	0.0	2,138.5	125.00	31.6	66.0	97.6	0.912
Jun	125.0	126.7	0.00	4.9	121.8	59.5	101.3	80.0	327.1	80.0	327.1	101.3	101.3	181.3	125.0	-59.7	0.0	1,984.3	123.10	30.8	39.0	69.8	0.923
Jul	123.1	45.0	0.00	5.1	39.9	14.8	-25.3	80.0	178.4	80.0	178.4	0.0	0.0	80.0	125.0	-97.9	0.0	1,876.9	121.73	30.3	0.0	30.3	0.902
Aug.	122.6	32.6	-0.87	4.6	28.0	-13.6	0.0	80.0	126.4	80.0	126.4	0.0	0.0	80.0	125.0	-149.9	0.0	1,737.6	119.88	29.3	0.0	29.3	0.897
Sep	122.2	59.2	-2.32	3.7	55.5	-41.1	0.0	80.0	106.1	80.0	106.1	0.0	0.0	80.0	125.0	-179.4	0.0	1,674.1	119.01	27.5	0.0	27.5	0.892
Oct	121.3	76.0	-2.29	2.4	73.6	-24.3	0.0	80.0	96.3	80.0	96.3	0.0	0.0	80.0	120.7	-53.0	0.0	1,657.0	118.77	28.1	0.0	28.1	0.890
Nov.	119.9	78.6	-1.13	1.4	77.2	18.4	0.0	80.0	96.7	80.0	96.7	0.0	0.0	80.0	118.0	1.8	1.8	1,645.1	118.61	27.1	0.0	27.1	0.889
Dec.	118.1	83.2	0.51	0.8	81.4	92.1	96.5	80.0	96.3	80.0	96.3	96.5	96.3	176.5	118.0	-92.1	0.0	1,398.4	115.00	27.3	32.9	60.2	0.901
Total/Avg.		164.0		2.7	161.3					78.3			82.9	161.2			0.2			334.4	350.6	694.0	0.897

Table 7.2.2 (4/4) Çatalan Dam Reservoir Operation (Case-1,Qt=80m^3/s)

	Rule	RWL-RC			Inf.1	Recv.	Inf.1+ Qt-	Qt	Qfmin	Qfirm	Qsec1	Qsec2	Qsec		FSHL	Qsp	Spill	Rsv.Vol	RWL	Firm	Second	Total	
	At beg	Inflow		Evp		RC	RC		LWL		LWL			HP		FSHL			At end	Energy	Energy	Energy	Eata
1978																							
Jan	115.0	230.6	0.00	0.7	229.9	-37.2	112.7	80.0	149.7	80.0	-372.4	112.7	0.0	192.7	118.6	-54.9	0.0	1,498.0	116.49	27.1	0.0	27.1	0.913
Feb	116.5	344.1	-0.01	1.1	343.0	-46.1	0.0	80.0	303.9	80.0	303.9	0.0	0.0	80.0	118.6	202.2	202.2	1,645.1	118.61	24.6	0.0	24.6	0.895
Mar.	118.1	307.9	0.51	1.6	306.3	-51.7	174.6	80.0	318.2	80.0	318.2	174.6	174.6	254.6	120.7	-5.8	0.0	1,783.6	120.50	28.9	63.0	91.9	0.904
Apr.	120.5	390.9	0.00	2.4	388.5	-83.6	224.9	80.0	456.9	80.0	456.9	224.9	224.9	304.9	125.0	-53.5	0.0	2,000.3	123.30	29.8	83.8	113.6	0.927
May	123.3	250.1	0.00	3.6	246.5	-51.6	114.9	80.0	391.0	80.0	391.0	114.9	114.9	194.9	125.0	-0.2	0.0	2,138.5	125.00	30.0	43.0	73.0	0.864
Jun.	125.0	109.5	0.00	4.9	104.6	-59.5	84.1	80.0	309.9	80.0	309.9	84.1	84.1	164.1	125.0	-59.7	0.0	1,984.3	123.10	30.5	32.0	62.5	0.911
Jul.	123.1	28.8	0.00	5.1	23.7	-14.8	-41.5	80.0	162.2	80.0	162.2	0.0	0.0	80.0	125.0	-114.1	0.0	1,833.5	121.16	30.1	0.0	30.1	0.901
Aug.	122.6	24.7	-1.44	4.6	20.1	-29.9	0.0	80.0	102.3	80.0	102.3	0.0	0.0	80.0	125.0	-174.0	0.0	1,673.1	119.00	28.9	0.0	28.9	0.894
Sep.	122.2	49.3	-3.20	3.7	45.6	-65.9	0.0	80.0	71.3	71.3	80.0	0.0	0.0	71.3	125.0	-205.4	0.0	1,606.5	118.06	23.3	0.0	23.3	0.862
Oct.	121.3	96.3	-3.23	2.4	93.9	-49.6	0.0	80.0	91.4	80.0	91.4	0.0	0.0	80.0	120.7	-58.0	0.0	1,643.7	118.59	27.8	0.0	27.8	0.888
Nov.	119.9	94.0	-1.31	1.4	92.6	13.4	0.0	80.0	107.0	80.0	107.0	0.0	0.0	80.0	118.0	12.1	12.1	1,645.0	118.61	27.0	0.0	27.0	0.889
Dec.	118.1	166.6	0.51	0.8	165.8	92.1	177.9	80.0	177.6	80.0	177.6	177.9	177.6	257.9	118.0	-92.1	0.0	1,398.3	114.99	27.2	60.4	87.6	0.896
Total	Avg	174.4		2.7	171.7					79.3			64.7	153.4			17.9			335.2	282.2	617.4	0.895
1979																							
Jan	115.0	353.6	-0.01	0.7	352.9	-37.5	0.0	80.0	272.6	80.0	249.4	0.0	0.0	80.0	118.6	180.8	180.8	1,645.0	118.61	26.8	0.0	26.8	0.881
Feb	116.5	251.7	2.11	1.1	250.6	15.0	185.6	80.0	272.3	80.0	272.3	185.6	185.6	265.6	118.6	-15.0	0.0	1,608.7	118.09	25.6	59.4	85.0	0.907
Mar.	118.1	192.8	-0.01	1.6	191.2	-65.5	0.0	80.0	189.5	80.0	189.5	0.0	0.0	80.0	120.7	40.2	40.2	1,798.9	120.70	28.4	0.0	28.4	0.892
Apr.	120.5	214.8	0.20	2.4	212.4	-77.8	54.6	80.0	286.7	80.0	286.7	54.6	54.6	134.6	125.0	-53.4	0.0	2,000.6	123.30	27.9	19.0	46.9	0.863
May	123.3	168.2	0.00	3.6	164.6	-51.6	33.0	80.0	309.2	80.0	309.2	33.0	33.0	113.0	125.0	-0.1	0.0	2,138.8	125.00	28.8	11.9	40.7	0.828
Jun.	125.0	117.7	0.00	4.9	112.8	59.5	92.3	80.0	318.2	80.0	318.2	92.3	92.3	172.3	125.0	-59.6	0.0	1,984.6	123.10	30.7	35.4	66.1	0.918
Jul.	123.1	40.9	0.00	5.1	35.8	14.8	-29.4	80.0	174.4	80.0	174.4	0.0	0.0	80.0	125.0	-101.8	0.0	1,866.2	121.59	30.3	0.0	30.3	0.902
Aug.	122.6	27.6	-1.01	4.6	23.0	-17.6	0.0	80.0	117.4	80.0	117.4	0.0	0.0	80.0	125.0	-158.9	0.0	1,711.5	119.55	29.2	0.0	29.2	0.896
Sep.	122.2	47.1	-2.65	3.7	43.4	-50.5	0.0	80.0	84.7	80.0	84.7	0.0	0.0	80.0	125.0	-200.8	0.0	1,618.6	118.23	27.2	0.0	27.2	0.890
Oct.	121.3	88.0	-3.07	2.4	85.6	-45.1	0.0	80.0	87.6	80.0	87.6	0.0	0.0	80.0	120.7	-61.8	0.0	1,634.6	118.45	27.8	0.0	27.8	0.888
Nov.	119.9	92.3	-1.45	1.4	90.9	9.6	0.0	80.0	101.4	80.0	101.4	0.0	0.0	80.0	118.0	6.5	6.5	1,645.0	118.61	27.0	0.0	27.0	0.889
Dec.	118.1	134.2	0.51	0.8	133.4	92.1	145.5	80.0	145.2	80.0	145.2	145.5	145.2	225.5	118.0	-92.1	0.0	1,398.3	114.99	26.3	47.8	74.1	0.867
Total	Avg	144.1		2.7	141.4					80.0			42.6	122.6			19.0			336.0	173.5	509.5	0.885

115.0

Calculation Summary

	Rule	RWL-RC			Inf.1	Recv.	Inf.1+ Qt-	Qt	Qfmin	Qfirm	Qsec1	Qsec2	Qsec		FSHL	Qsp	Spill	Rsv.Vol	RWL	Firm	Second	Total	
	At beg	Inflow		Evp		RC	RC		LWL		LWL			HP		FSHL			At end	Energy	Energy	Energy	Eata
1960		122.2		2.7	119.5					76.3			35.9				0.5			324.0	156.2	480.2	0.885
1961		85.3		2.7	83.0					69.0			2.2				6.7			280.8	8.6	289.4	0.843
1962		150.7		2.7	148.0					74.6			47.3				19.3			312.1	212.7	524.8	0.875
1963		207.9		2.7	205.2					80.0			90.5				20.6			344.6	404.8	749.4	0.899
1964		82.4		2.7	79.7					67.6			0.0				3.7			281.8	0.0	281.8	0.830
1965		151.7		2.7	149.0					80.0			60.4				0.0			341.2	305.5	646.7	0.898
1966		191.7		2.7	189.0					80.0			66.1				19.7			343.4	280.7	624.1	0.905
1967		168.4		2.7	165.7					80.0			70.7				6.8			343.2	313.7	656.9	0.901
1968		223.8		2.7	221.1					80.0			101.0				25.2			343.5	439.7	783.2	0.902
1969		217.4		2.7	214.7					80.0			113.9				6.4			344.5	497.0	841.5	0.900
1970		139.0		2.7	136.3					79.1			55.6				1.7			331.4	231.6	563.0	0.886
1971		110.8		2.7	108.2					71.4			30.1				0.0			291.3	129.3	420.6	0.832
1972		100.7		2.7	98.0					75.5			19.6				0.0			319.6	91.6	411.2	0.885
1973		77.3		2.7	75.1					66.6			6.1				0.0			269.1	26.2	295.3	0.834
1974		87.1		2.7	85.2					68.8			0.2				13.0			285.5	0.9	286.4	0.856
1975		171.9		2.7	169.2					80.0			76.5				8.6			343.0	342.1	685.1	0.901
1976		153.5		2.7	150.8					79.5			67.4				4.0			336.3	291.7	628.0	0.891
1977		164.0		2.7	161.3					78.3			82.9				0.2			334.4	359.6	694.0	0.897
1978		174.4		2.7	171.7					79.3			64.7				17.9			335.2	282.2	617.4	0.895
1979		144.1		2.7	141.4					80.0			42.6				19.0			336.0	173.5	509.5	0.885
		146.2		2.7	143.6					76.3			52.1				8.7			322.0	227.4	549.4	0.880

Table 7.2.3 Summary Sheet for Power Simulation at Çatalan Dam (Same as Flood Control Curve)

			Target Discharge=60 m3/s							Target Discharge=70 m3/s							Target Discharge=80 m3/s						
Year	Inflow (m3/s)	Evap. (m3/s)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)
1960	122.2	2.8	60.0	45.2	6.3	111.5	249.5	199.1	448.6	69.9	35.6	6.0	111.5	295.7	159.5	455.2	76.7	32.3	3.4	112.4	327.1	144.5	471.6
1961	85.3	2.8	60.0	17.8	3.3	81.1	245.6	71.6	317.2	67.8	6.8	8.0	82.6	279.2	25.5	304.7	70.0	0.0	11.6	81.6	289.4	0.0	289.4
1962	150.7	2.8	60.0	77.9	9.9	147.8	252.7	337.0	589.7	70.0	72.8	2.4	145.2	301.1	316.5	617.6	79.4	42.2	24.3	145.9	343.5	193.6	537.1
1963	207.9	2.8	60.0	116.4	10.1	186.5	262.2	513.2	775.4	70.0	104.1	30.8	204.9	307.2	455.9	763.1	80.0	97.9	10.3	188.2	354.8	428.8	783.6
1964	82.4	2.8	60.0	12.4	6.4	78.8	248.1	51.5	299.6	70.0	8.2	1.3	79.5	293.1	34.6	327.7	74.5	0.0	4.9	79.4	312.3	0.0	312.3
1965	151.7	2.8	60.0	59.4	25.2	144.6	251.5	256.8	508.3	70.0	72.4	3.1	145.5	298.9	317.4	616.3	80.0	62.1	4.3	146.4	345.0	274.8	619.8
1966	191.7	2.8	60.0	82.1	21.6	163.7	254.6	344.8	599.4	70.0	76.3	18.3	164.6	300.2	320.2	620.4	80.0	60.5	48.2	188.7	345.6	253.3	598.9
1967	168.4	2.8	60.0	83.7	9.1	152.8	257.2	368.8	626.0	70.0	77.9	5.8	153.7	303.3	343.8	647.1	80.0	57.7	27.7	165.4	349.5	254.4	603.9
1968	223.8	2.8	60.0	122.2	22.2	204.4	259.7	530.6	790.3	70.0	116.3	18.9	205.2	306.4	505.3	811.7	80.0	110.5	15.6	206.1	352.3	479.9	832.2
1969	217.4	2.8	60.0	117.5	18.0	195.5	262.1	520.8	782.9	70.0	105.5	20.8	196.3	309.0	465.1	774.1	80.0	99.7	17.5	197.2	355.2	439.6	794.8
1970	139.0	2.8	60.0	58.0	9.2	127.2	254.6	243.8	498.4	70.0	53.0	13.0	136.0	300.0	222.7	522.7	80.0	40.4	15.6	136.0	346.0	169.4	515.4
1971	110.8	2.8	60.0	42.3	2.8	105.1	252.9	181.2	434.1	70.0	31.1	4.8	105.9	298.4	135.4	433.8	80.0	14.2	13.6	107.8	343.0	62.0	405.0
1972	100.7	2.8	60.0	32.0	5.1	97.1	253.2	141.0	394.2	70.0	24.7	3.3	98.0	298.1	110.6	408.7	79.8	3.0	15.8	98.6	344.7	12.9	357.6
1973	77.3	2.8	60.0	6.4	8.4	74.8	247.3	26.3	273.6	69.2	1.4	5.6	76.2	288.4	6.3	294.7	71.1	0.0	3.7	74.8	296.9	0.0	296.9
1974	87.1	2.8	60.0	20.5	4.4	84.9	245.2	87.5	332.7	68.6	0.0	14.6	83.2	281.4	0.0	281.4	70.7	0.0	13.4	84.1	292.7	0.0	292.7
1975	171.9	2.8	60.0	59.8	49.2	169.0	252.1	261.2	513.3	70.0	78.9	12.6	161.5	301.0	347.3	648.3	80.0	49.7	32.6	162.3	346.3	219.0	565.3
1976	153.5	2.8	60.0	75.2	7.6	142.8	255.6	327.0	582.6	70.0	53.5	27.0	150.5	299.6	230.9	530.5	80.0	48.6	22.1	150.7	346.6	209.8	556.4
1977	164.0	2.8	60.0	69.2	31.9	161.1	254.2	300.6	554.8	70.0	81.7	3.6	155.3	303.1	358.3	661.4	80.0	59.2	21.9	161.1	349.1	257.8	606.9
1978	174.4	2.8	60.0	91.5	5.8	157.3	255.3	392.8	648.1	70.0	85.7	2.5	158.2	300.8	368.1	668.9	80.0	59.1	32.4	171.5	346.2	252.0	598.2
1979	144.1	2.8	60.0	58.2	6.2	124.4	254.5	239.4	493.9	70.0	52.4	2.9	125.3	299.9	215.0	514.9	80.0	40.7	5.4	126.1	344.8	166.3	511.1
Avg.	146.2	2.8	60.0	62.4	13.1	135.5	253.4	269.8	523.2	69.8	56.9	10.3	137.0	298.2	246.9	545.2	78.1	43.9	17.2	139.2	336.6	190.9	527.5

Table 7.2.4 Summary Sheet for Power Simulation at Çatalan Dam (Case-1)

			Target Discharge=70 m3/s							Target Discharge=80 m3/s							Target Discharge=90 m3/s						
Year	Inflow (m3/s)	Evap. (m3/s)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)	Firm Disch. (m3/s)	Second Disch. (m3/s)	Spill out (m3/s)	Total Disch. (m3/s)	Firm Energy (GWh)	Second Energy (GWh)	Total Energy (GWh)
1960	122.2	2.7	69.9	46.5	2.7	119.1	297.4	202.8	500.2	76.3	35.9	0.5	112.7	324.0	156.2	480.2	74.4	43.0	0.0	117.4	307.9	184.5	492.4
1961	85.3	2.7	62.4	6.0	6.7	75.1	253.7	21.8	275.5	69.0	2.2	6.7	77.9	280.8	8.6	289.4	64.5	20.5	0.0	85.0	263.8	82.0	345.8
1962	150.7	2.7	69.6	50.7	20.1	140.4	289.5	227.8	517.3	74.6	47.3	19.3	141.2	312.1	212.7	524.8	73.0	75.1	0.0	148.1	305.5	322.1	627.6
1963	207.9	2.7	70.0	120.4	0.0	190.4	302.1	522.8	824.9	80.0	90.5	20.6	191.1	344.6	404.8	749.4	88.4	82.3	19.8	190.5	383.2	368.9	752.1
1964	82.4	2.7	64.1	15.4	0.0	79.5	267.3	62.8	330.1	67.6	0.0	3.7	71.3	281.8	0.0	281.8	69.2	12.2	0.0	81.4	286.9	49.8	336.7
1965	151.7	2.7	67.4	70.5	3.5	141.4	283.0	308.8	591.8	80.0	69.4	0.0	149.4	341.2	305.5	646.7	79.7	69.4	0.0	149.1	341.1	304.4	645.5
1966	191.7	2.7	70.0	87.8	14.9	172.7	298.7	370.0	668.7	80.0	66.1	19.7	165.8	343.4	280.7	624.1	87.0	72.3	7.3	166.6	372.3	305.5	677.8
1967	168.4	2.7	70.0	78.1	17.9	166.0	297.9	341.5	639.4	80.0	70.7	6.8	157.5	343.2	313.7	656.9	89.4	66.1	2.7	158.2	384.5	293.4	677.9
1968	223.8	2.7	70.0	122.5	13.0	205.5	299.2	523.8	823.0	80.0	101.0	25.2	206.2	343.5	439.7	783.2	90.0	98.8	17.2	206.0	388.5	425.2	813.7
1969	217.4	2.7	70.0	103.9	17.9	191.8	300.3	457.9	758.2	80.0	113.9	6.4	200.3	344.5	497.0	841.5	90.0	104.8	6.4	201.2	391.7	458.7	850.4
1970	139.0	2.7	70.0	56.0	5.0	131.0	290.2	231.9	522.1	79.1	55.6	1.7	136.4	331.4	231.6	563.0	83.8	47.2	1.7	132.7	347.4	195.4	542.8
1971	110.8	2.7	66.1	41.9	0.0	108.0	271.6	179.6	451.2	71.4	30.1	0.0	101.5	291.3	129.3	420.6	73.8	33.4	0.0	107.2	303.0	141.9	444.9
1972	100.7	2.7	64.0	31.9	2.1	98.0	269.8	140.4	410.2	75.5	19.6	0.0	95.1	319.6	91.6	411.2	73.4	23.3	0.0	96.7	315.3	102.3	417.6
1973	77.3	2.7	58.2	10.9	0.0	69.1	236.0	45.8	281.8	66.6	6.1	0.0	72.7	269.1	26.2	295.3	65.4	10.2	0.0	75.6	270.6	41.0	311.6
1974	87.1	2.7	67.1	1.0	13.1	81.2	275.7	4.6	280.3	68.8	0.2	13.0	82.0	285.5	0.9	286.4	66.0	21.0	0.0	87.0	276.5	87.2	363.7
1975	171.9	2.7	70.0	86.0	8.5	164.5	297.3	380.2	677.5	80.0	76.5	8.6	165.1	343.0	342.1	685.1	83.6	73.0	8.5	165.1	353.5	324.9	678.4
1976	153.5	2.7	70.0	76.7	0.0	146.7	293.8	332.9	626.7	79.5	67.4	4.0	150.9	336.3	291.7	628.0	86.7	59.6	2.0	148.3	363.2	259.5	622.7
1977	164.0	2.7	70.0	91.4	0.0	161.4	295.9	393.8	689.7	78.3	82.9	0.2	161.4	334.4	359.6	694.0	85.3	71.5	2.6	159.4	366.7	307.5	674.2
1978	174.4	2.7	70.0	77.9	24.0	171.9	293.1	329.4	622.5	79.3	64.7	17.9	161.9	335.2	282.2	617.4	85.9	76.7	0.1	162.7	364.5	324.0	688.5
1979	144.1	2.7	70.0	51.6	20.1	141.7	291.3	212.7	504.0	80.0	42.6	19.0	141.6	336.0	173.5	509.5	86.4	38.3	16.8	141.5	364.2	155.7	519.9
Avg.	146.2	2.7	67.9	61.4	8.5	137.8	285.2	264.6	549.8	76.3	52.1	8.7	137.1	322.0	227.4	549.4	79.8	54.9	4.3	139.0	337.5	236.7	574.2