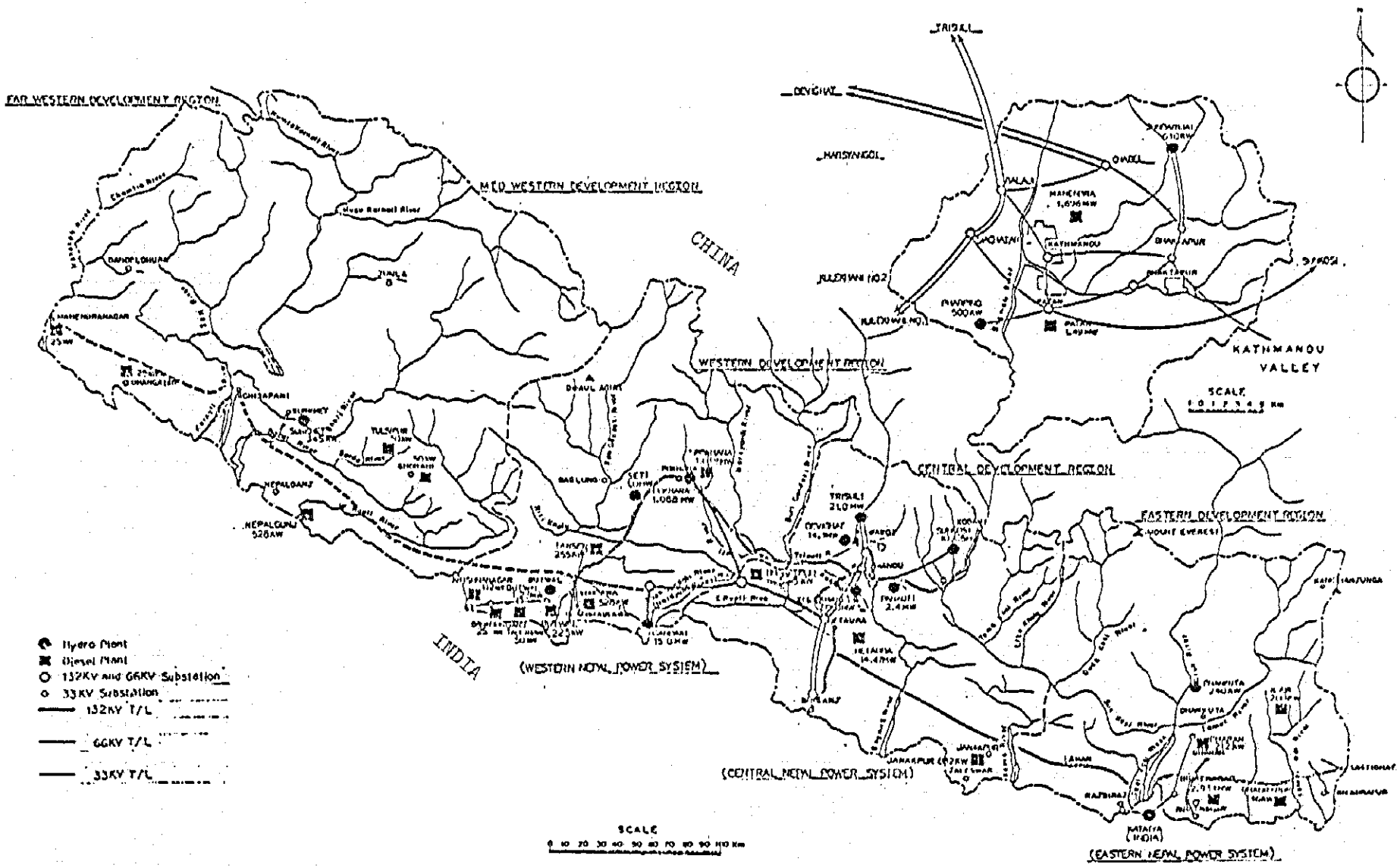


FIG. 3-2-1 EXISTING POWER SUPPLY SYSTEM IN NEPAL

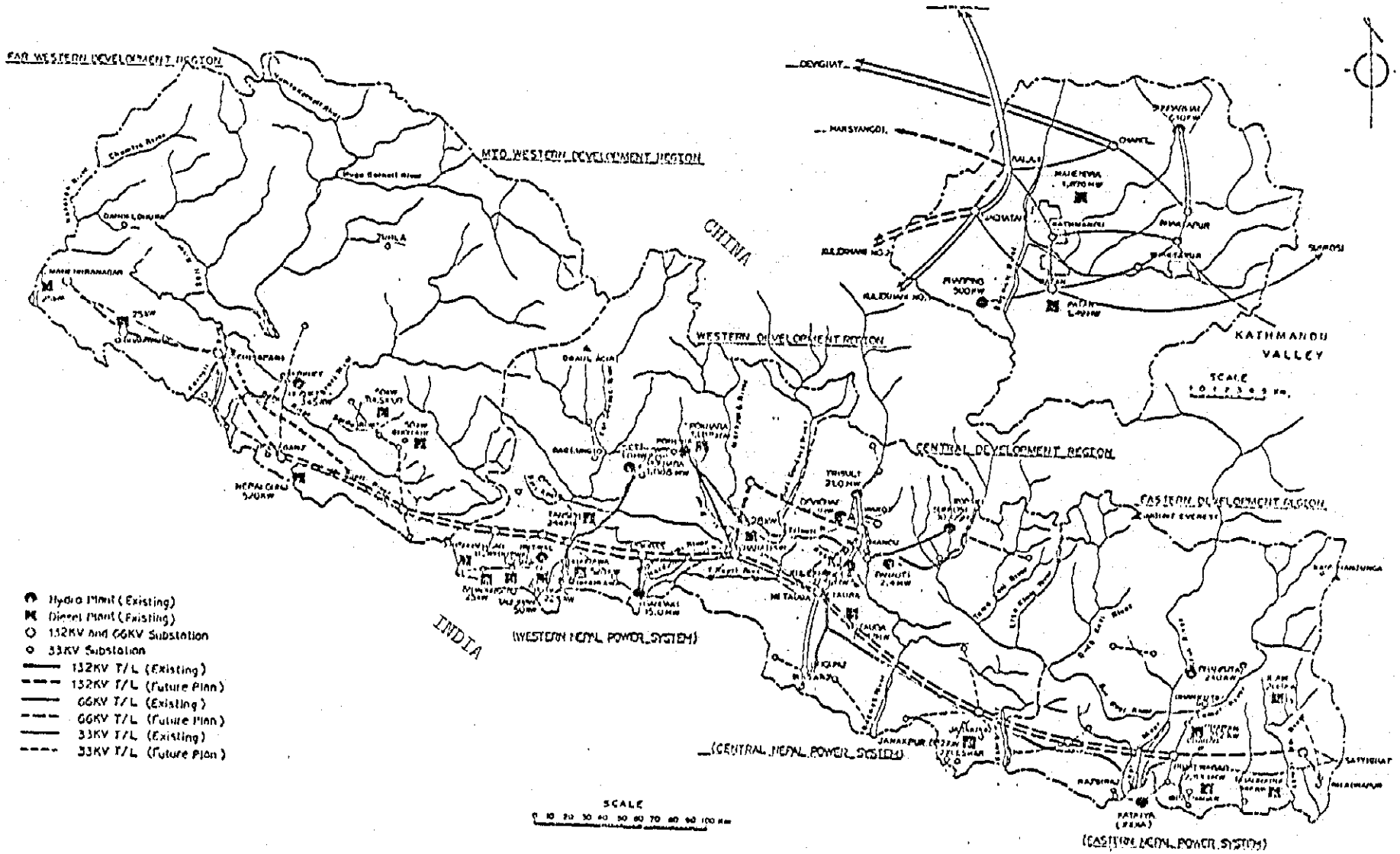


FIG. 3-2-2 ROUTE MAP OF TRANSMISSION LINES

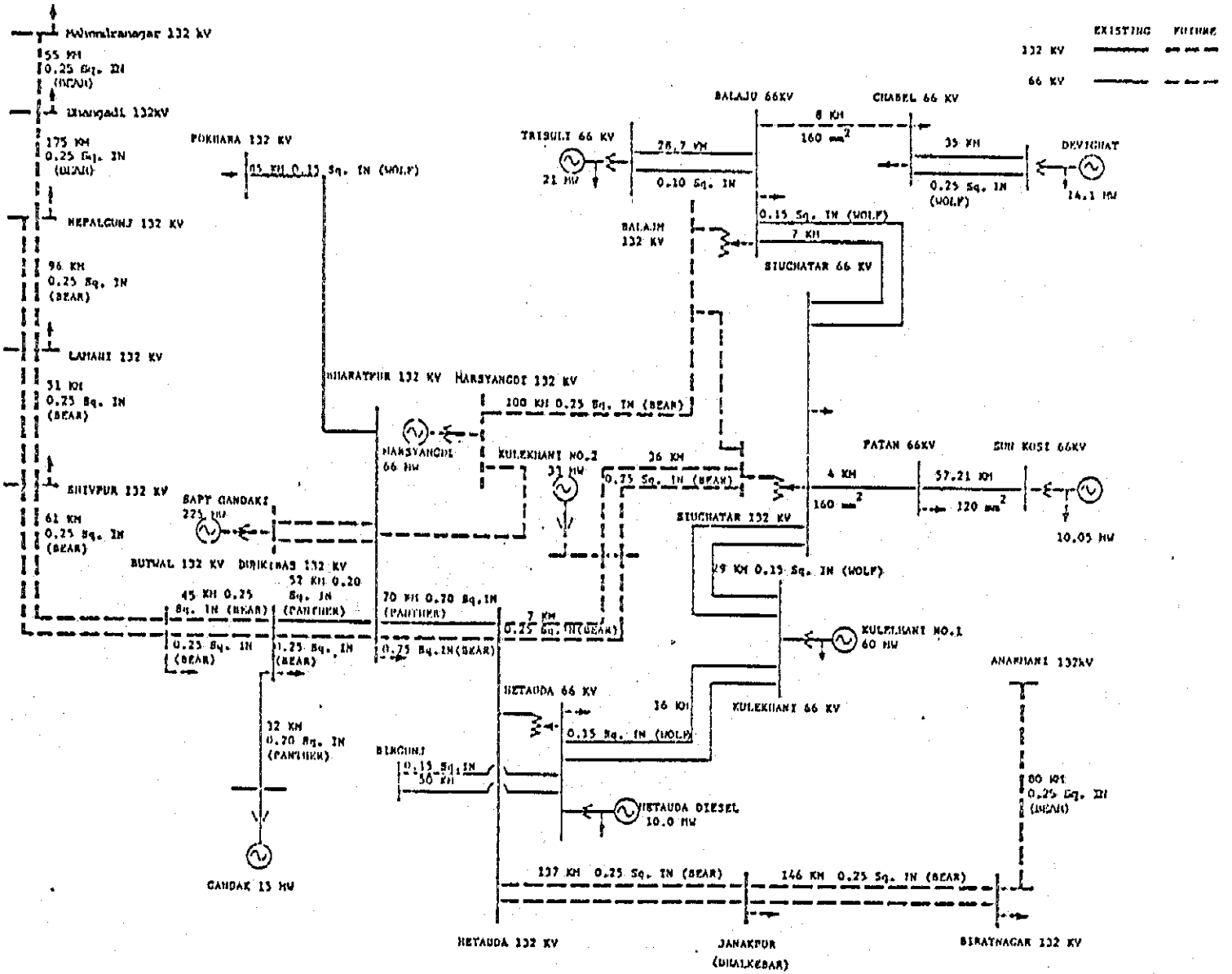


FIG. 3-2-3 NEPAL POWER SYSTEM DIAGRAM

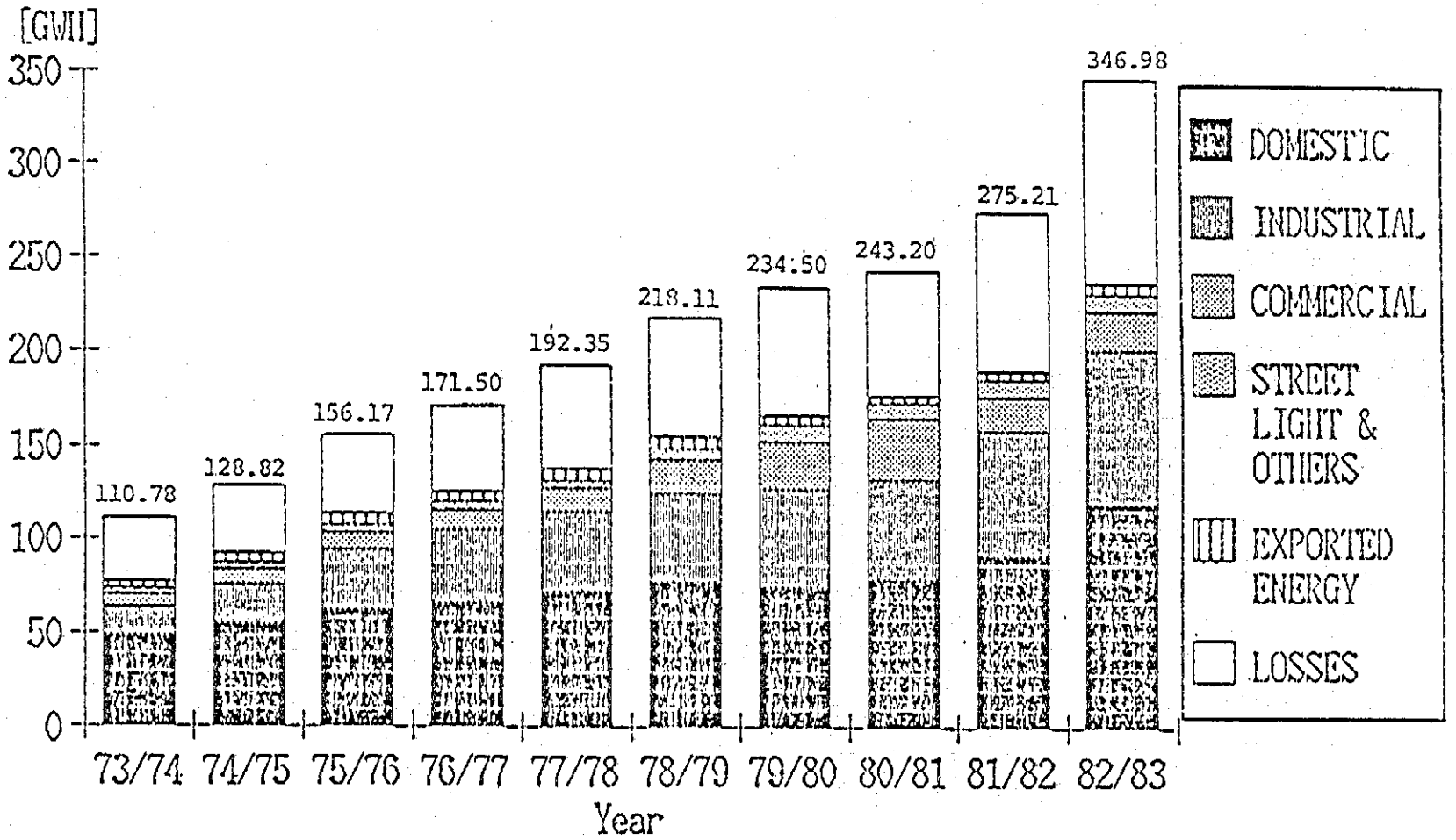


FIG. 3-2-4 HISTORICAL POWER CONSUMPTION BY TARIFF CATEGORIES
(1973/74 - 1982/83)

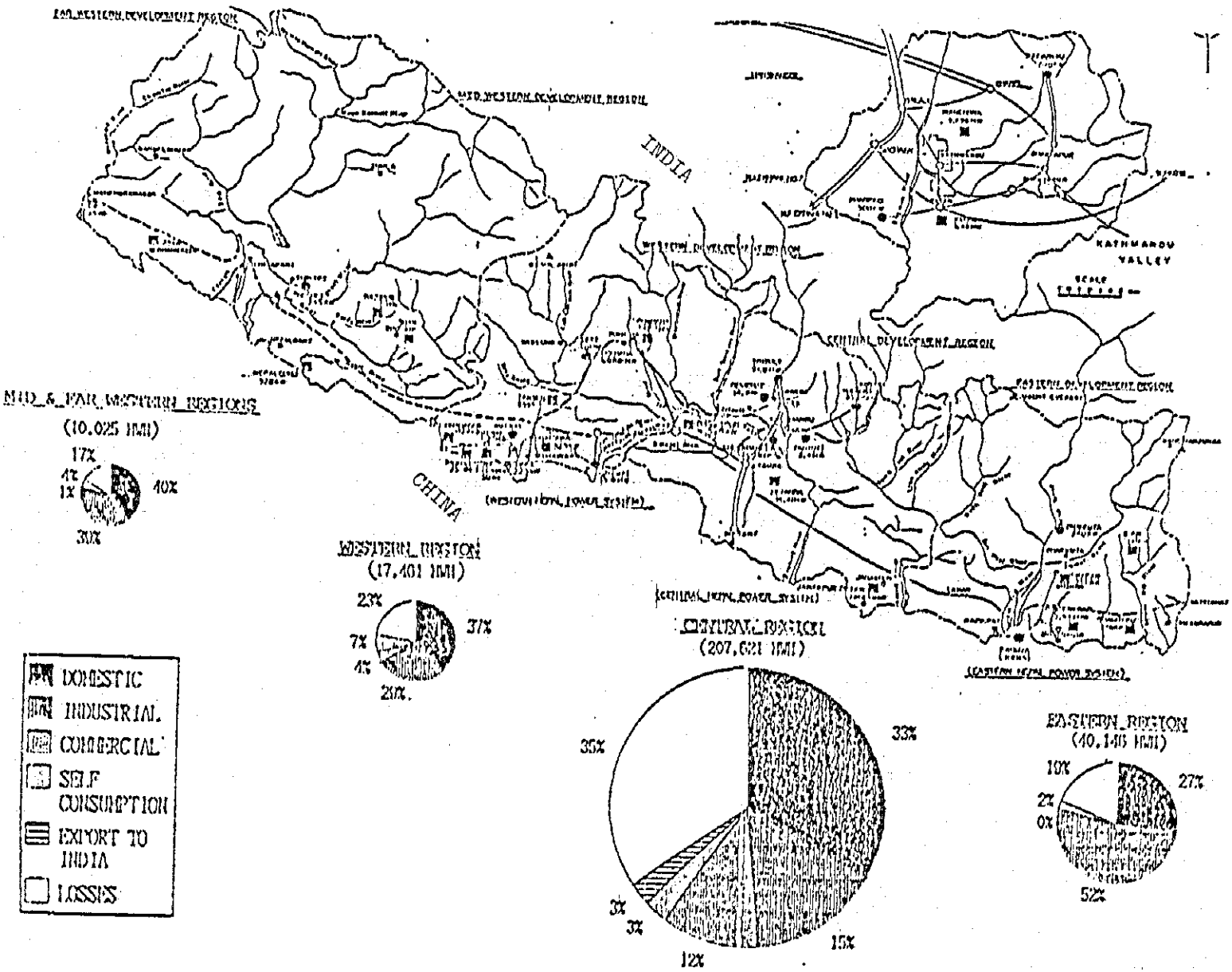


FIG. 3-2-5 POWER CONSUMPTION PATTERN BY VARIOUS REGIONS IN 1981/82

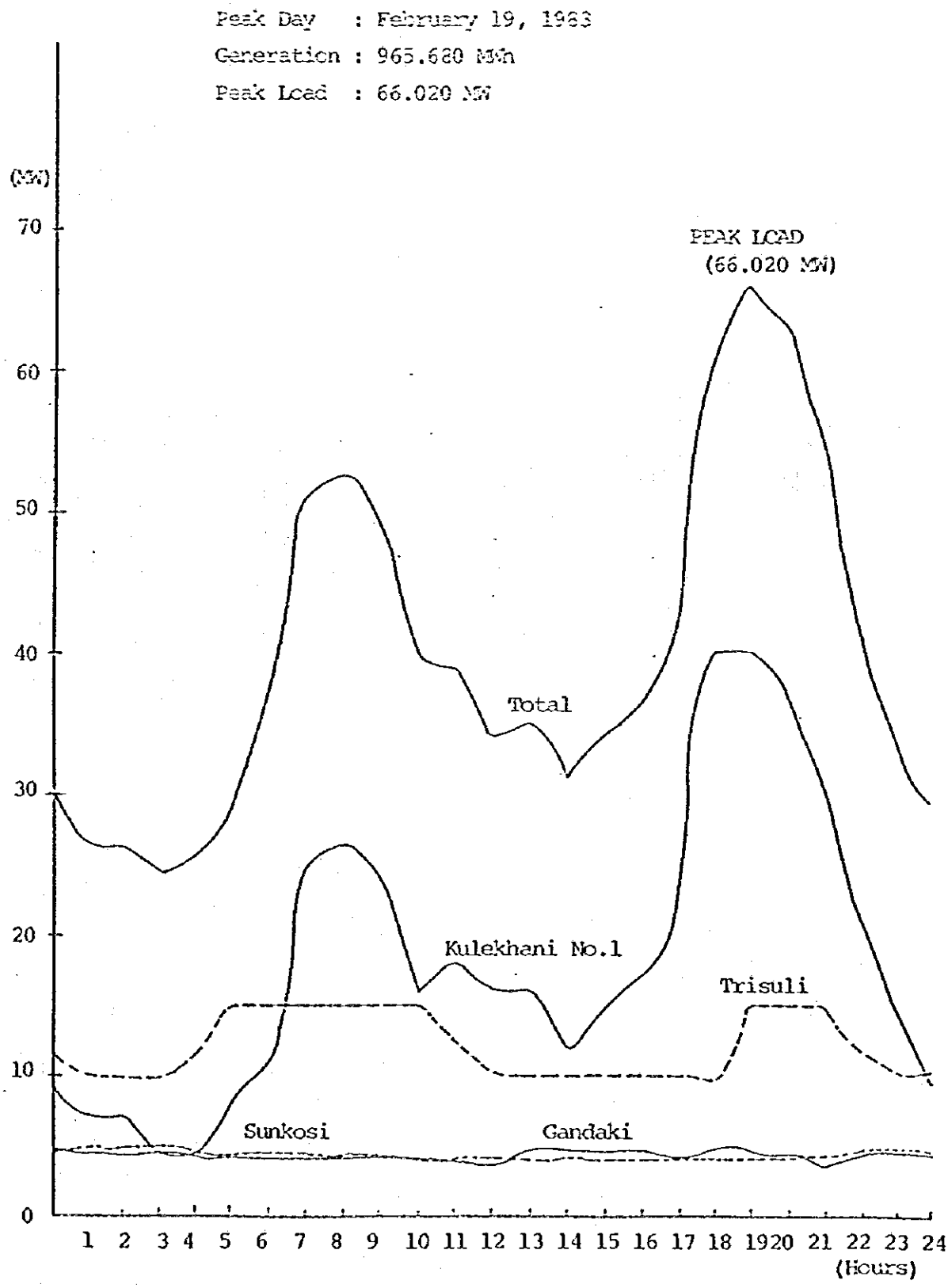


FIG. 3-2-6 **DAILY LOAD CURVE OF CENTRAL NEPAL POWER SYSTEM**

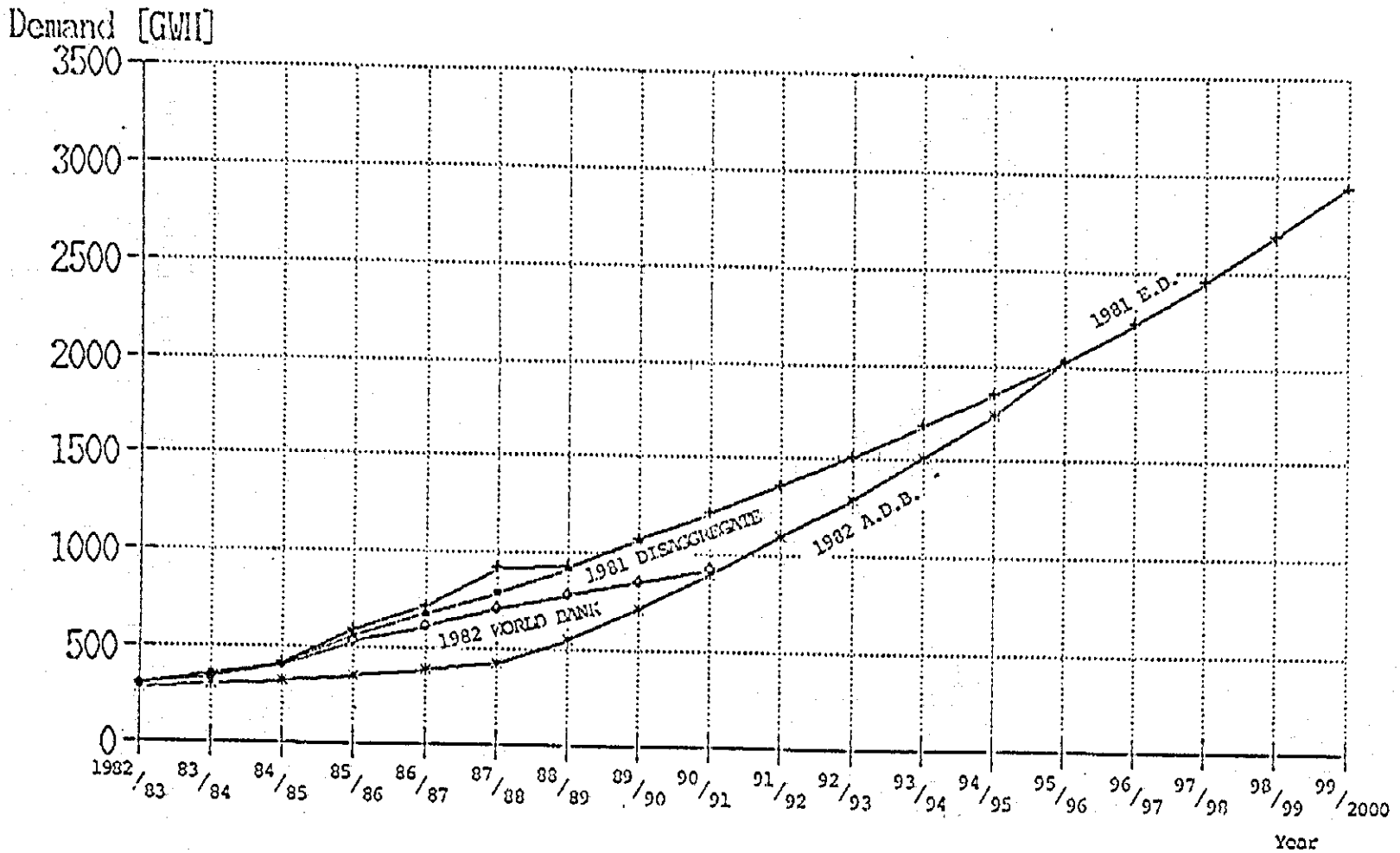


FIG. 3-3-1 SUMMARY OF PREVIOUS LOAD FORECASTS FOR INTEGRATED NEPAL POWER SYSTEM (POWER DEMAND)

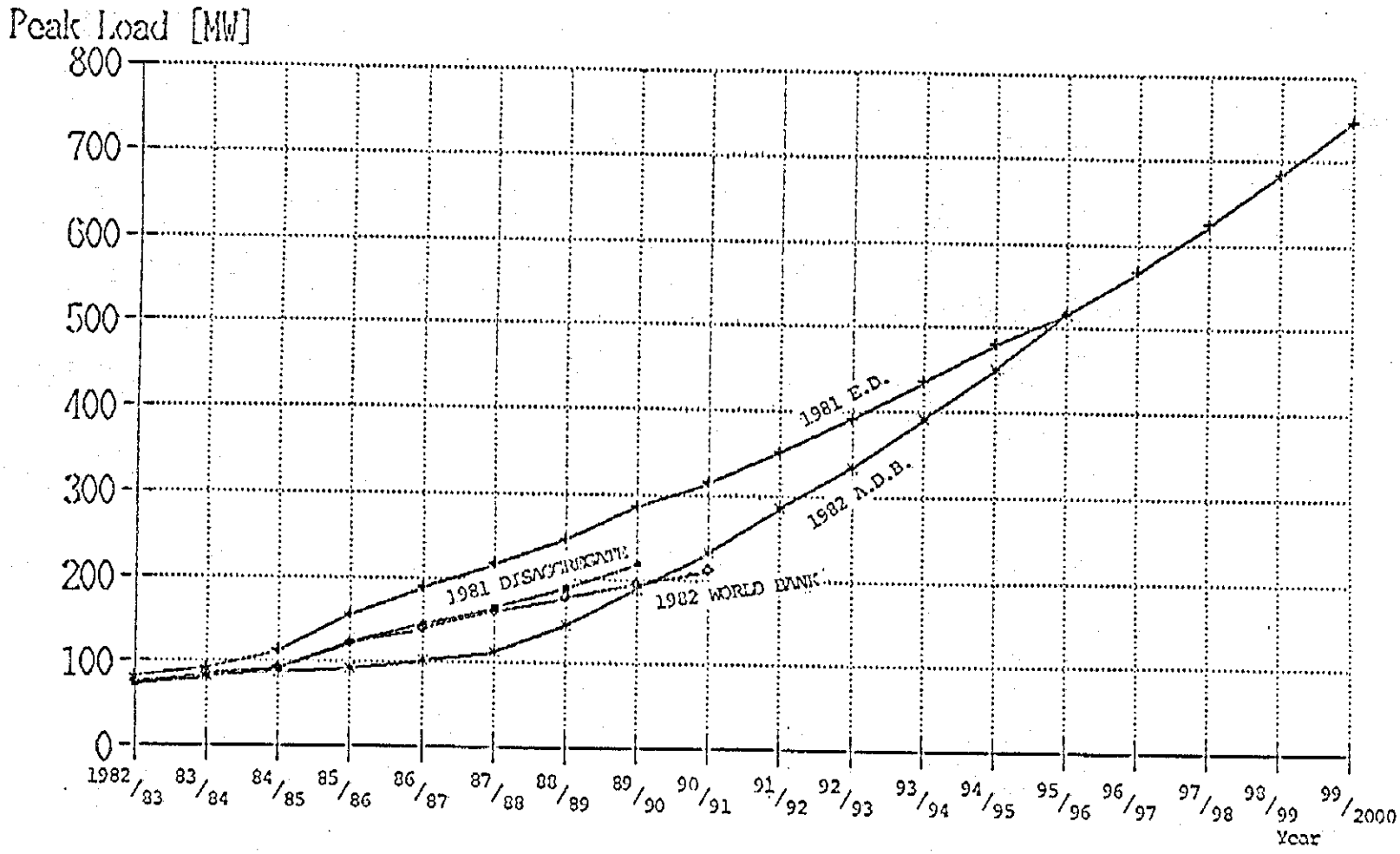


FIG. 3-3-2 SUMMARY OF PREVIOUS LOAD FORECASTS FOR INTEGRATED NEPAL POWER SYSTEM (PEAK LOAD)

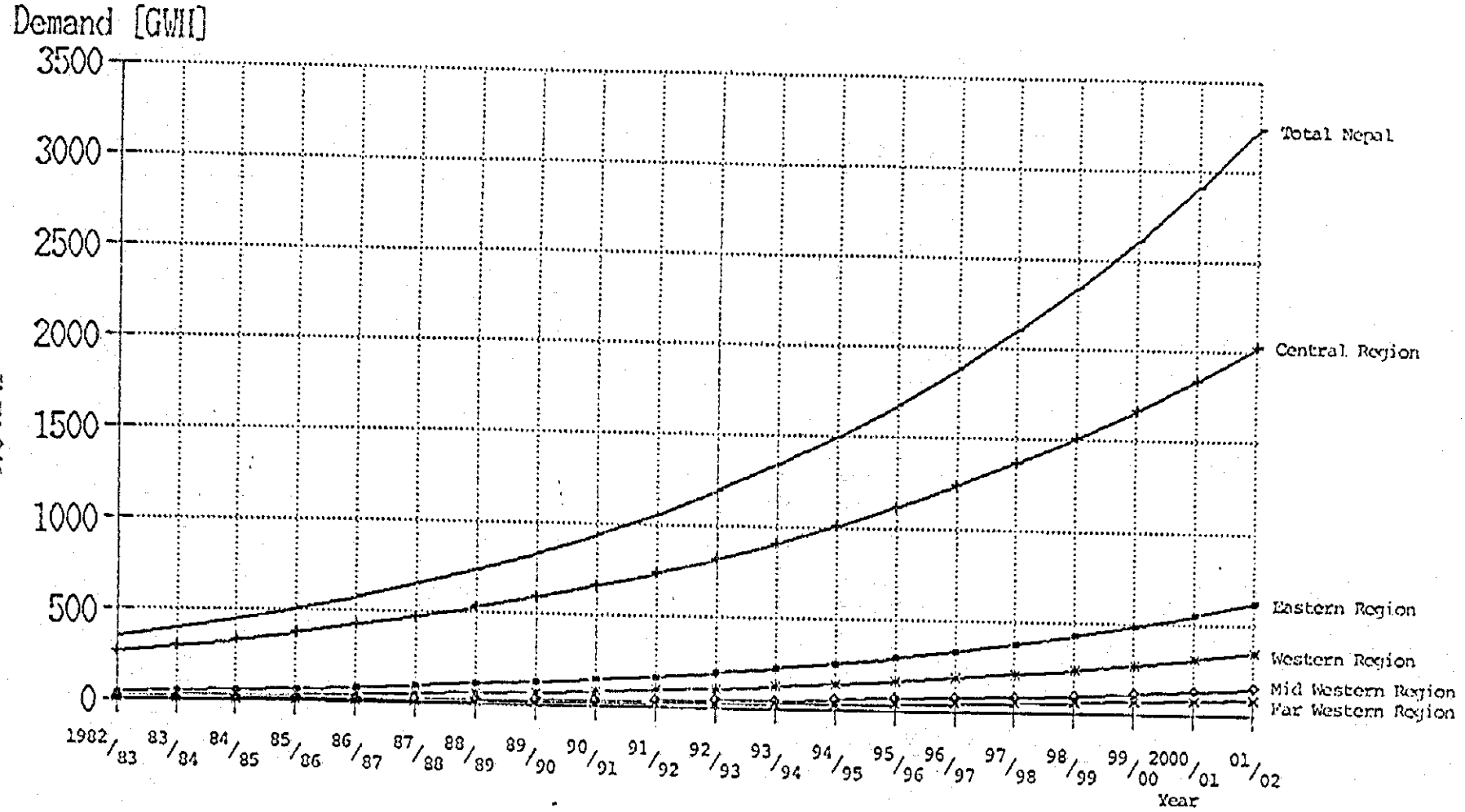


FIG. 3-3-3 FORECASTED REGIONAL POWER DEMANDS (GWH) BASED ON THE 1983 TREND (BASIC) FORECAST

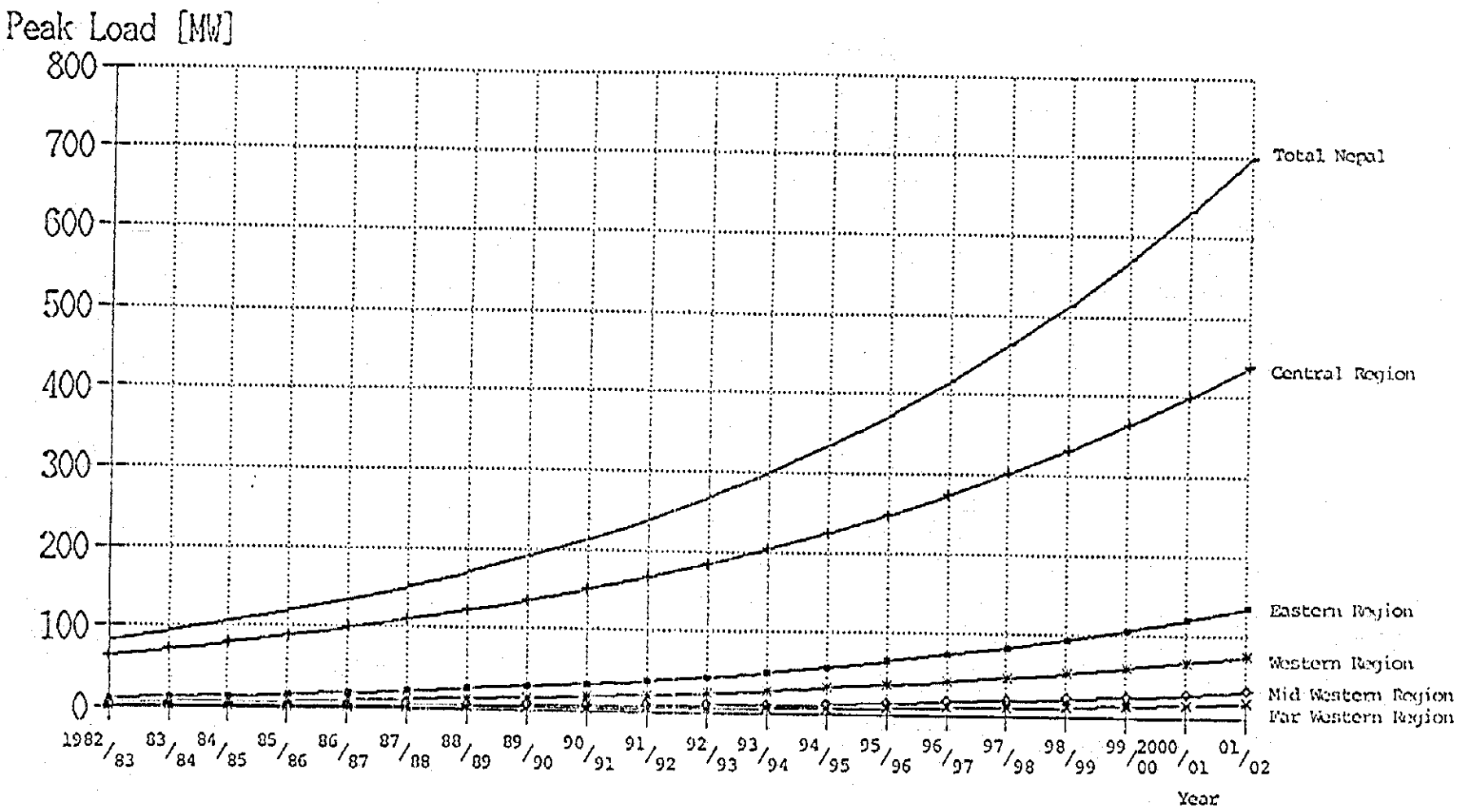


FIG. 3-3-4 FORECASTED REGIONAL LOADS (MW) BASED ON THE 1983 TREND (BASIC) FORECAST

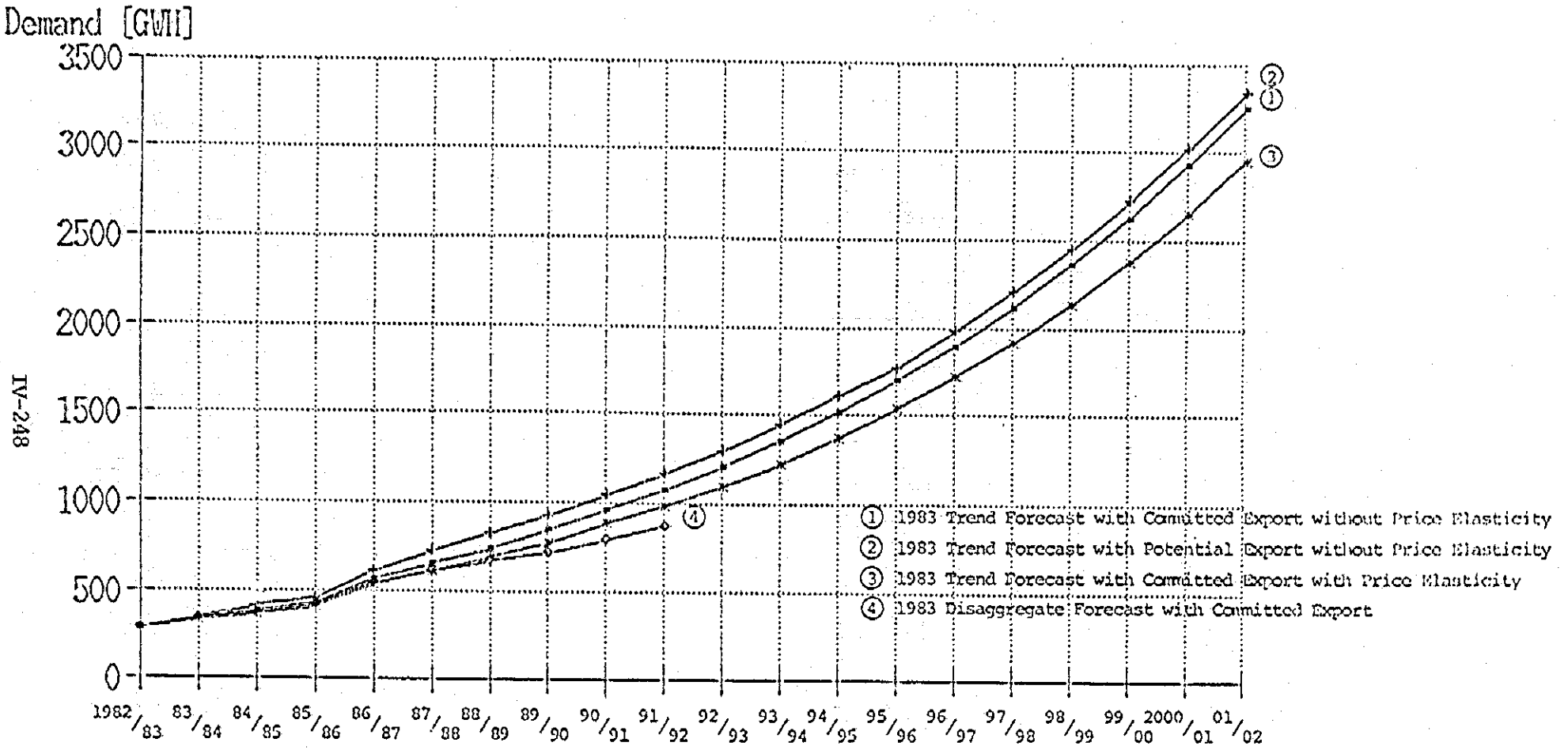


FIG. 3-3-5 COMPARISON OF 1983 TREND FORECASTS TO 1983 DISAGGREGATE FORECAST (POWER DEMAND, GWH)

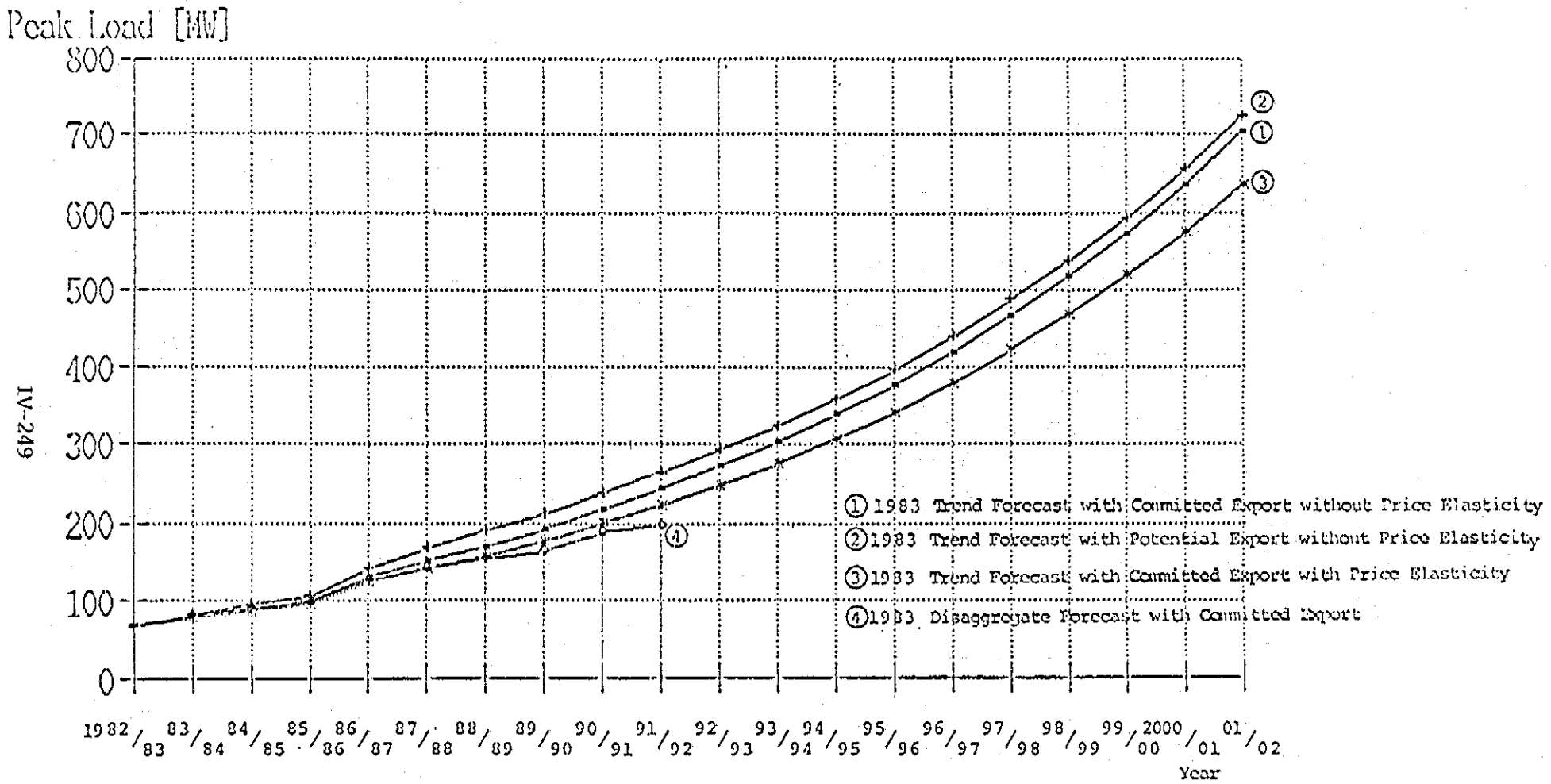


FIG. 3-3-6 COMPARISON OF 1983 TREND FORECASTS TO 1983 DISAGGREGATE FORECAST (PEAK LOAD, MW)

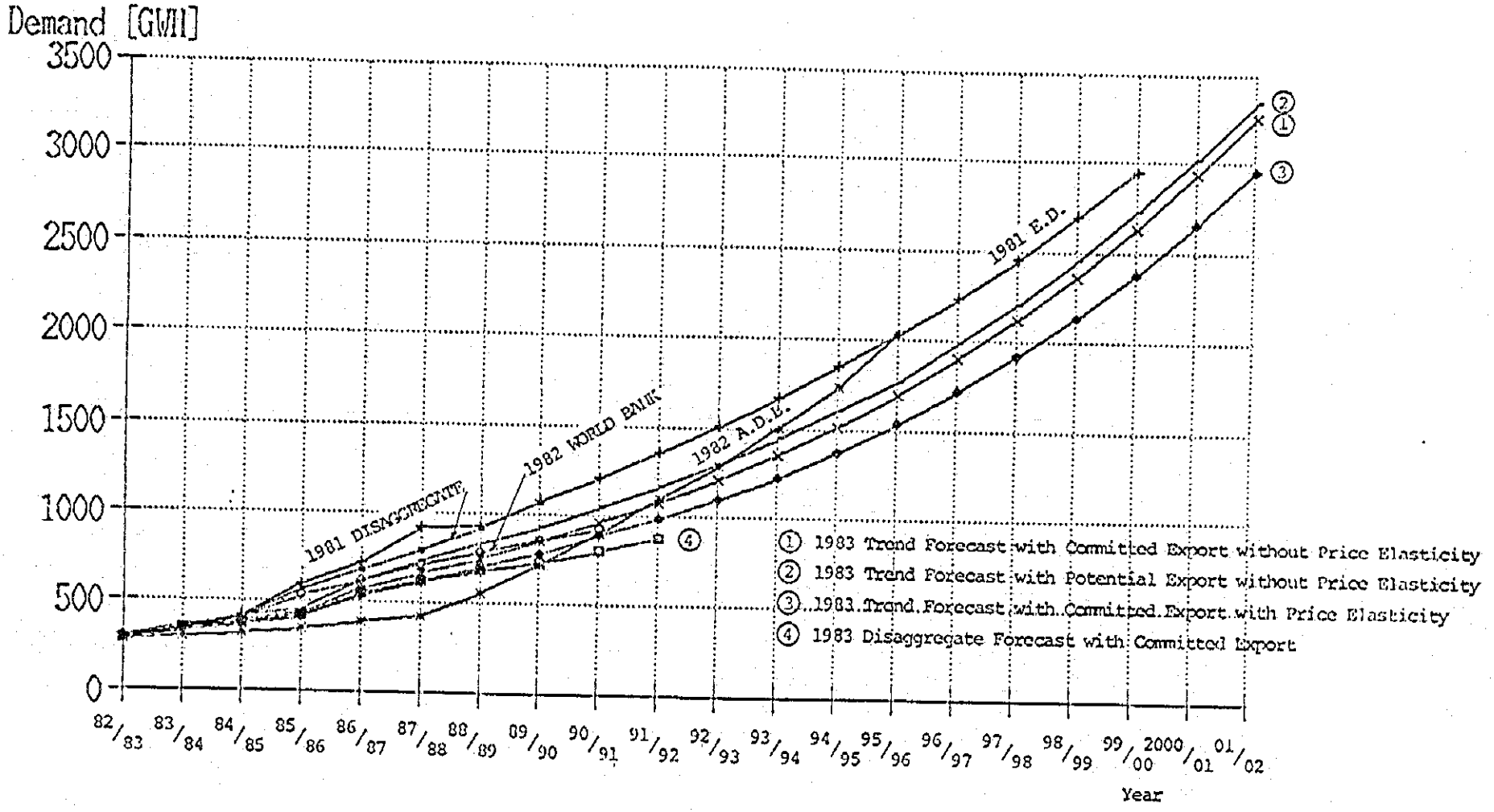


FIG. 3-3-7 COMPARISON OF 1983 LOAD FORECASTS TO THE PREVIOUS LOAD FORECASTS (POWER DEMAND, GWH)

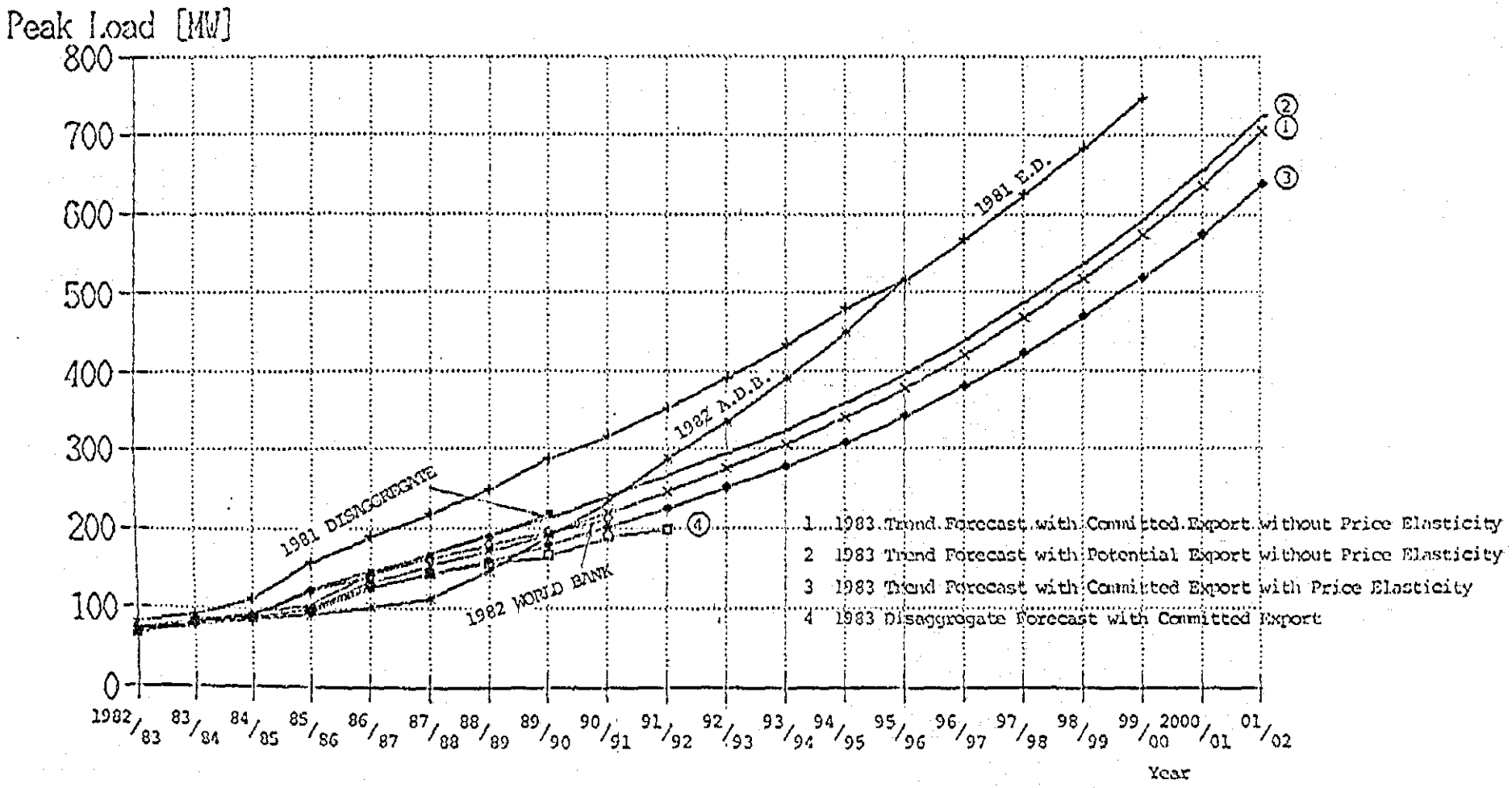


FIG. 3-3-8 COMPARISON OF 1983 LOAD FORECASTS TO THE PREVIOUS LOAD FORECASTS (PEAK LOAD, MW)

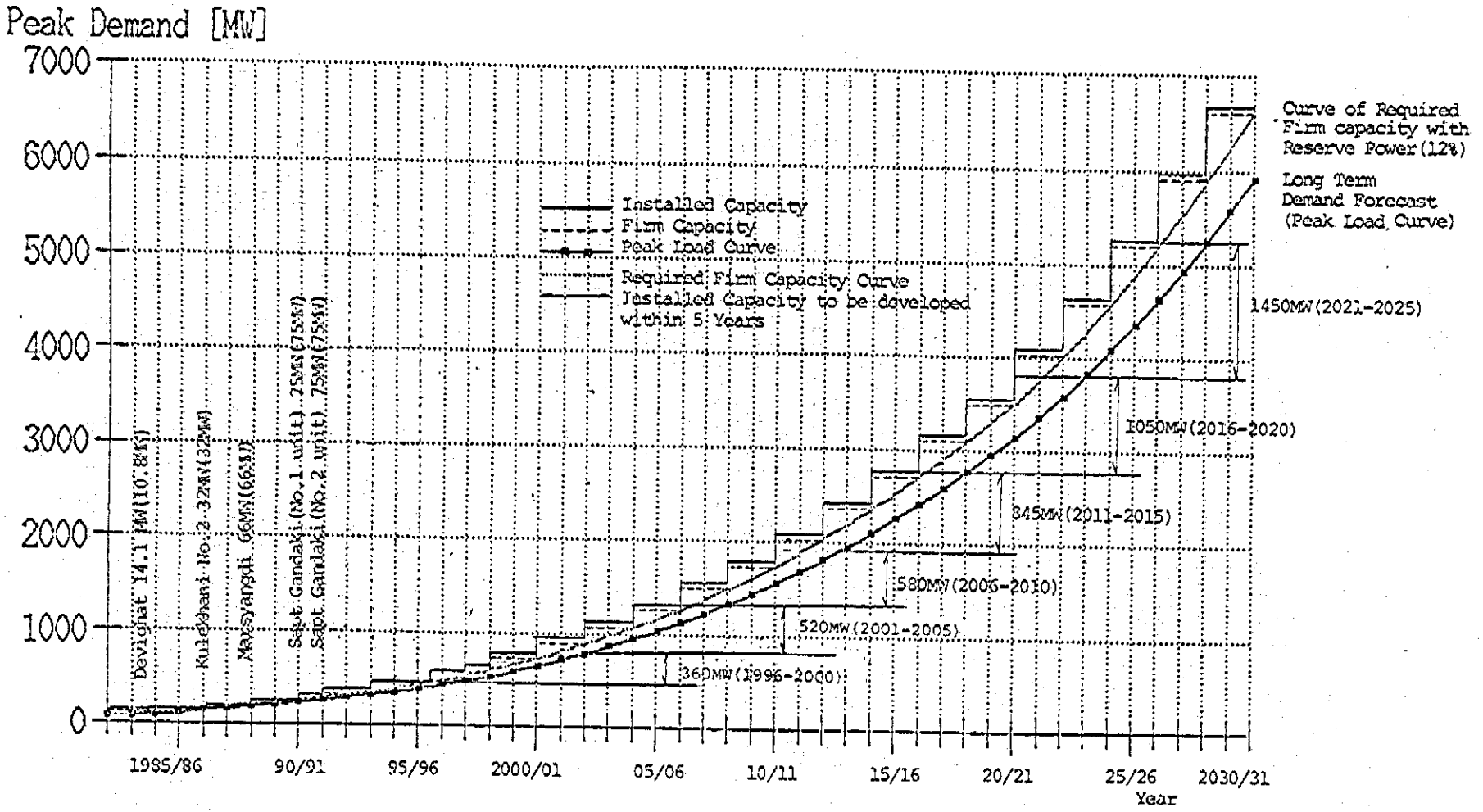


FIG. 3.3.9 RESULT OF LONG-TERM PEAK LOAD FORECAST AND GENERATION EXPANSION PROGRAM

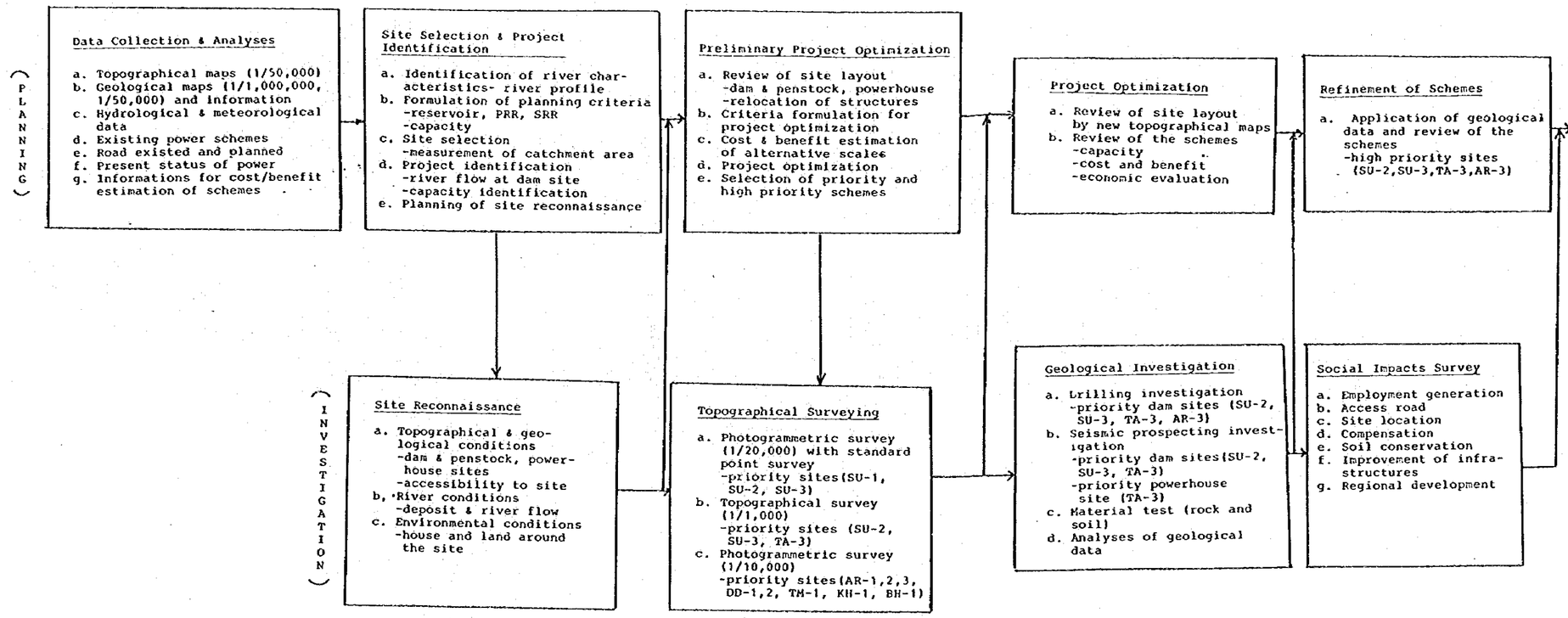


FIG. 3-5-1 METHODOLOGY OF HYDROPOWER PLANNING

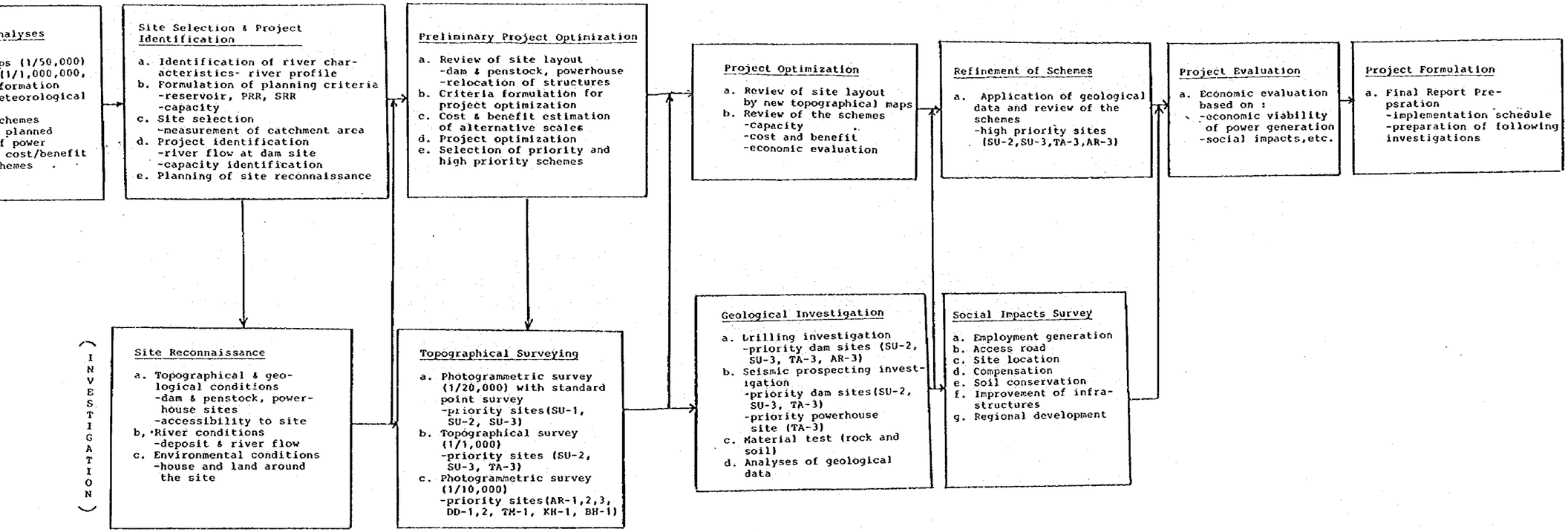


FIG. 3-5-1 METHODOLOGY OF HYDROPOWER PLANNING

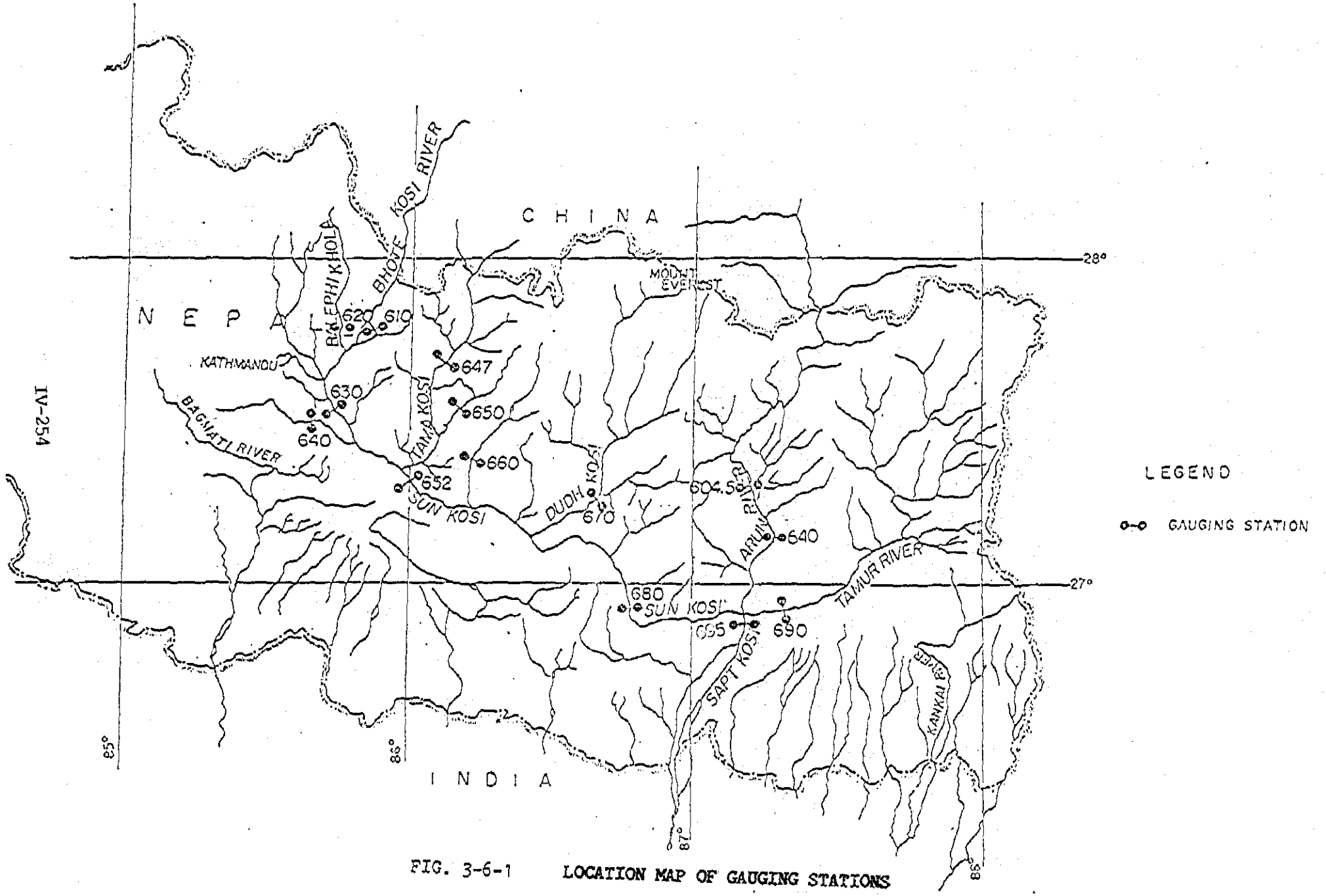


FIG. 3-6-1 LOCATION MAP OF GAUGING STATIONS

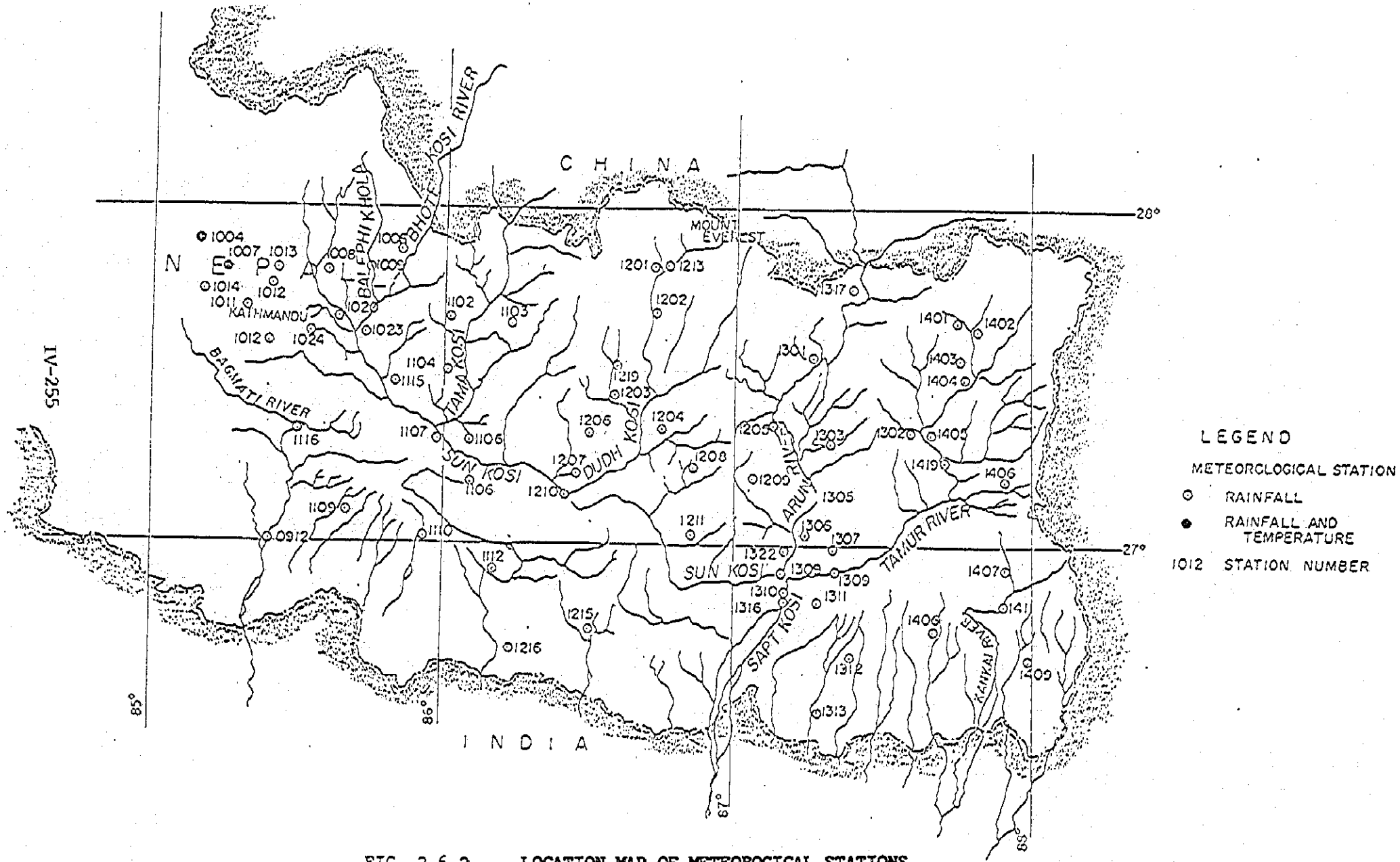


FIG. 3-6-2 LOCATION MAP OF METEOROGICAL STATIONS

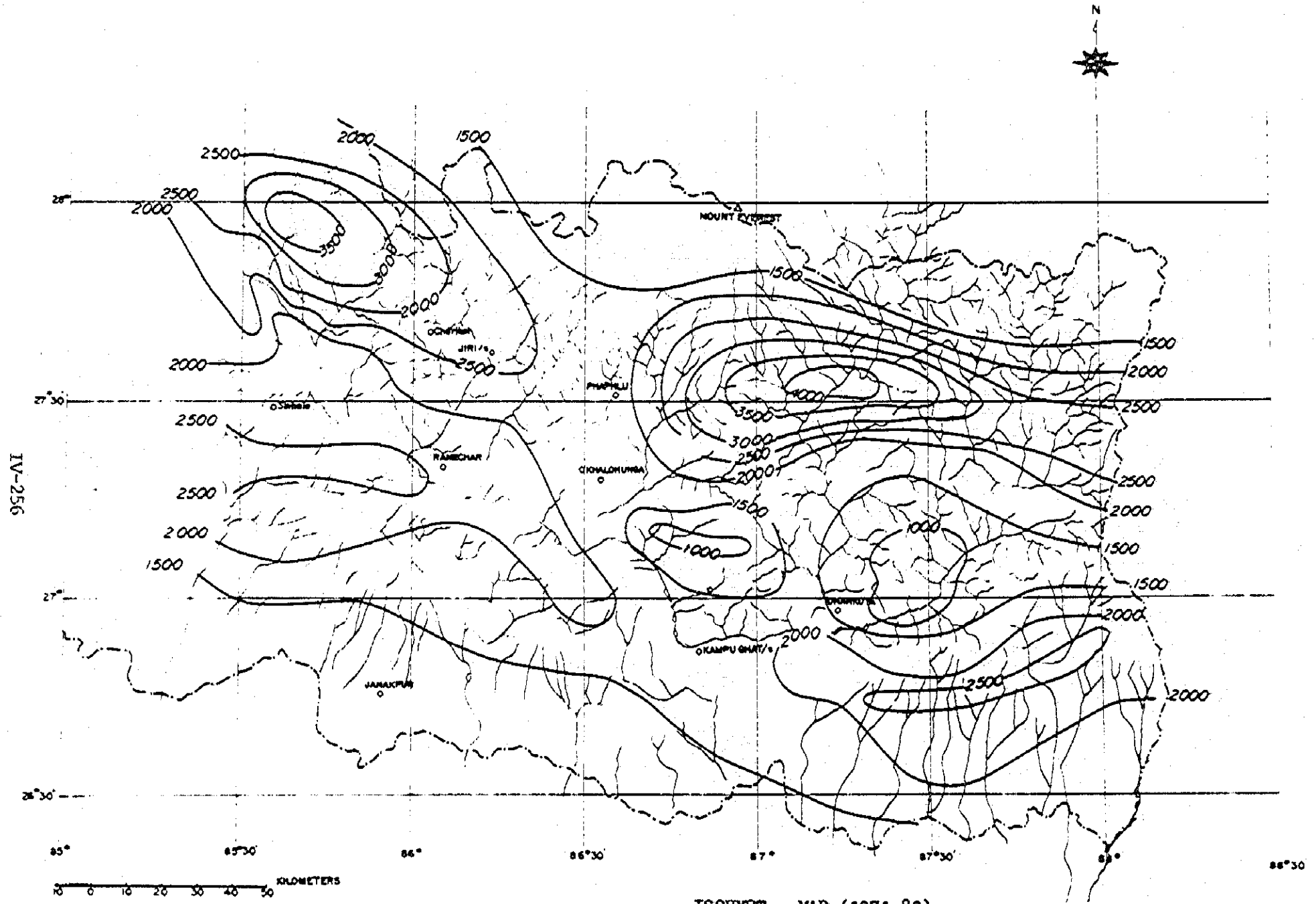


FIG. 3-6-3 ISOHYET MAP (1971-80)

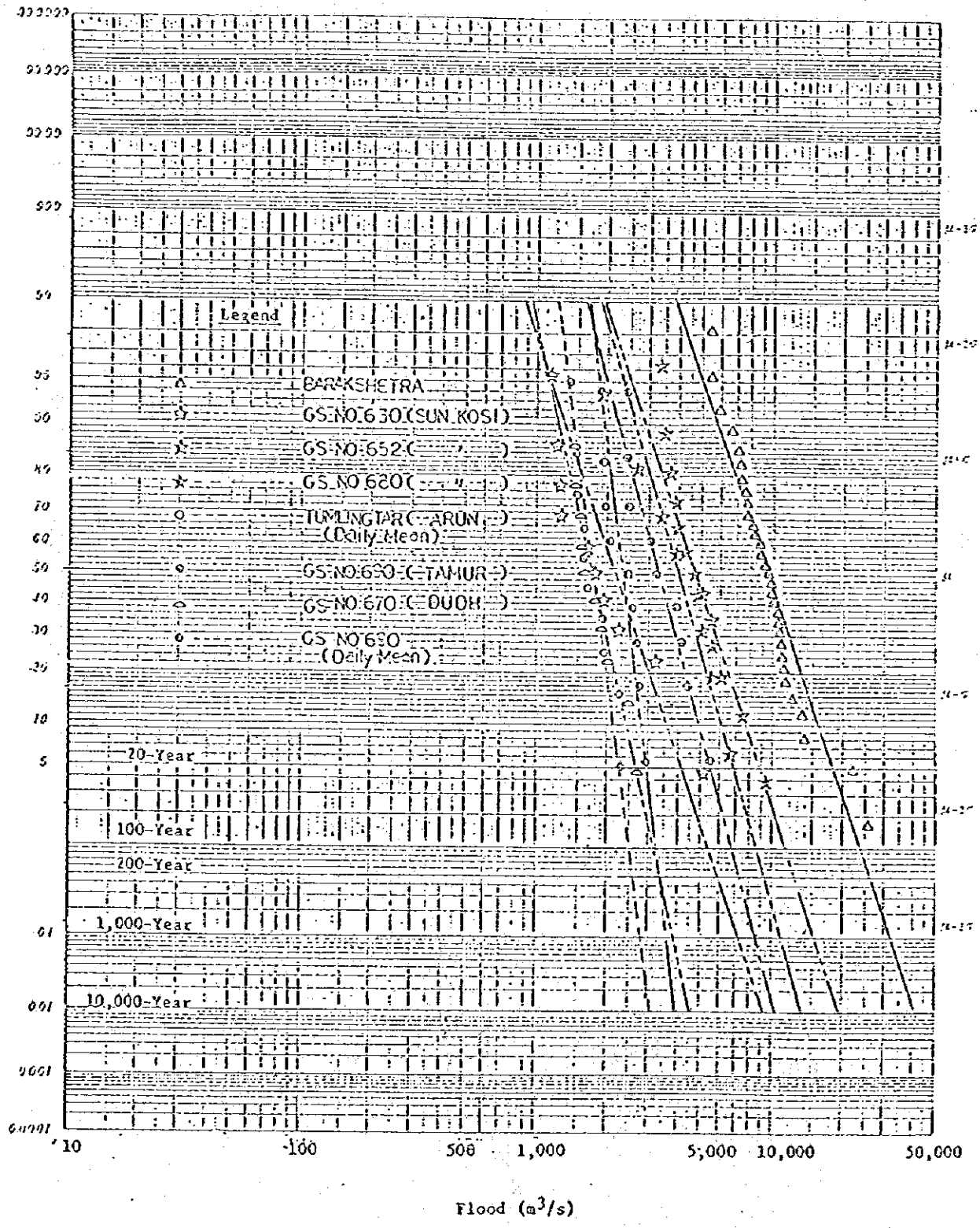


FIG. 3-6-4 **FLOOD PROBABILITY CURVE**

FIG. 3-6-5 DESIGN FLOOD DISCHARGES FOR DAMS IN NEPAL

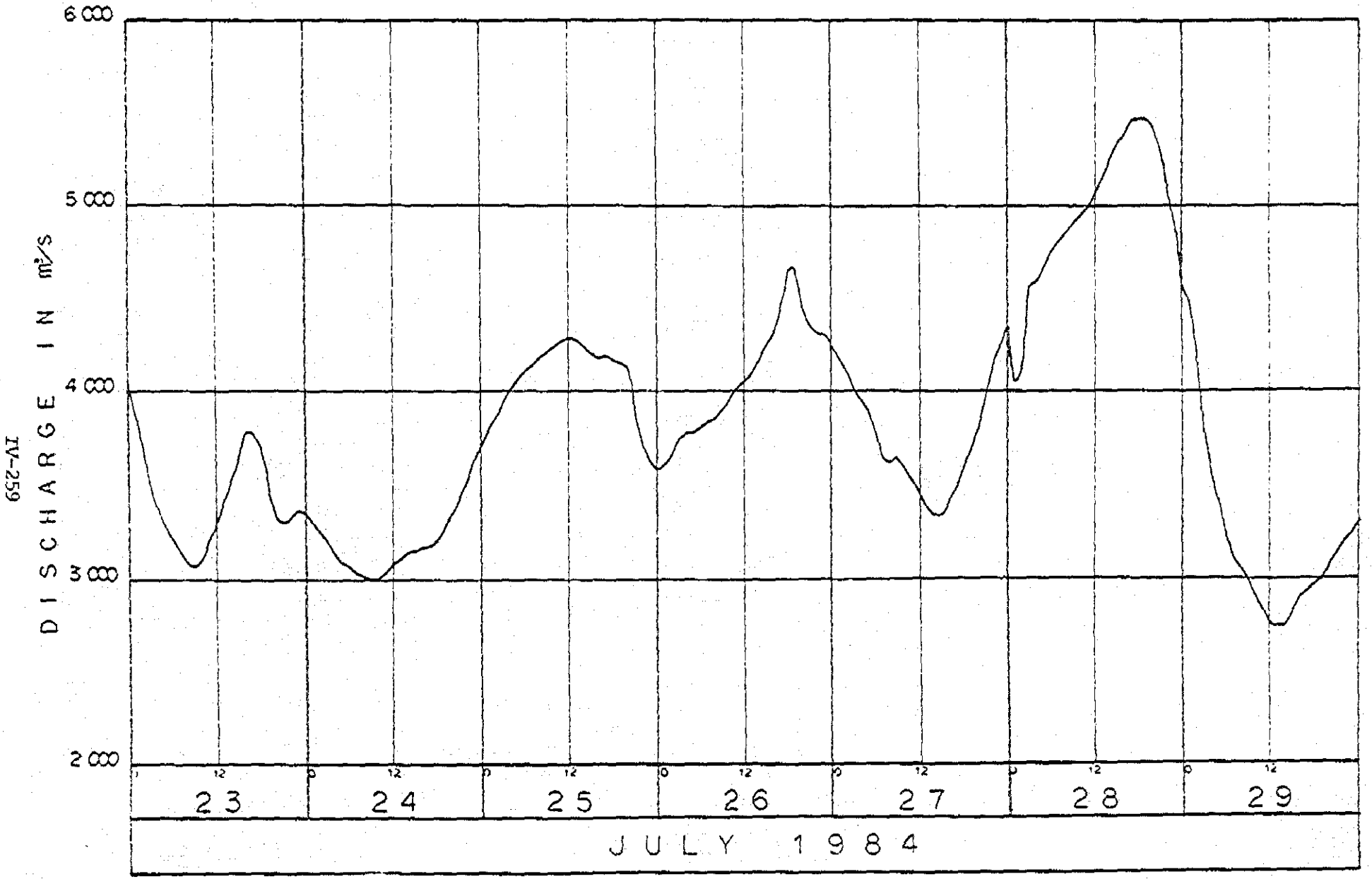


FIG. 3-6-6 FLOOD HYDROGRAPH (23th - 29th JULY 1984 G.S. NO.680 SUNKOSI RIVER AT KAMPUGHAT)
(1 of 2)

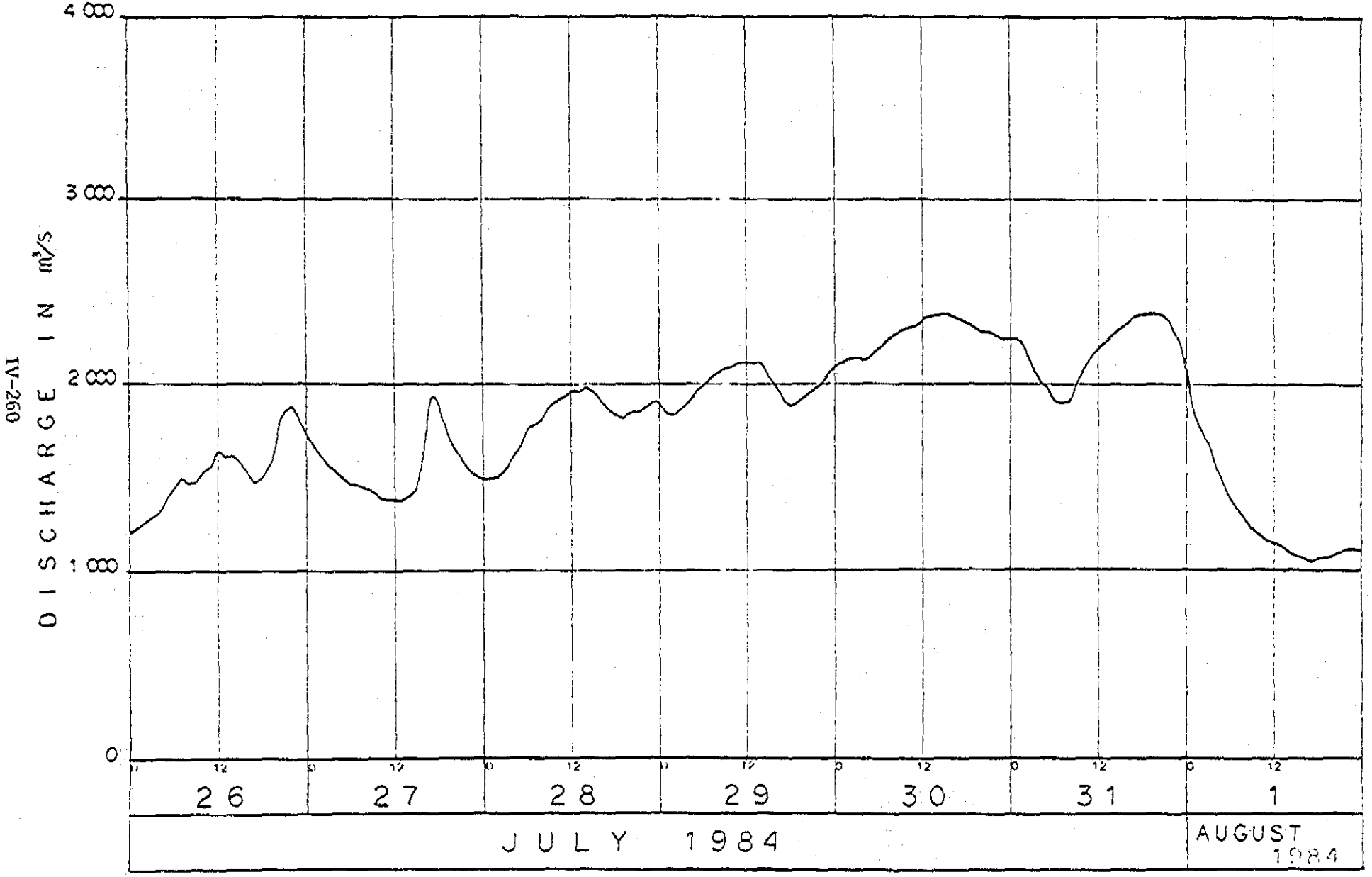


FIG. 3-6-6 (2 of 2) FLOOD HYDROGRAPH (26th JULY - 1st AUGUST 1984 G.S. NO.604.5 ARUN RIVER AT TURIK GHAT)

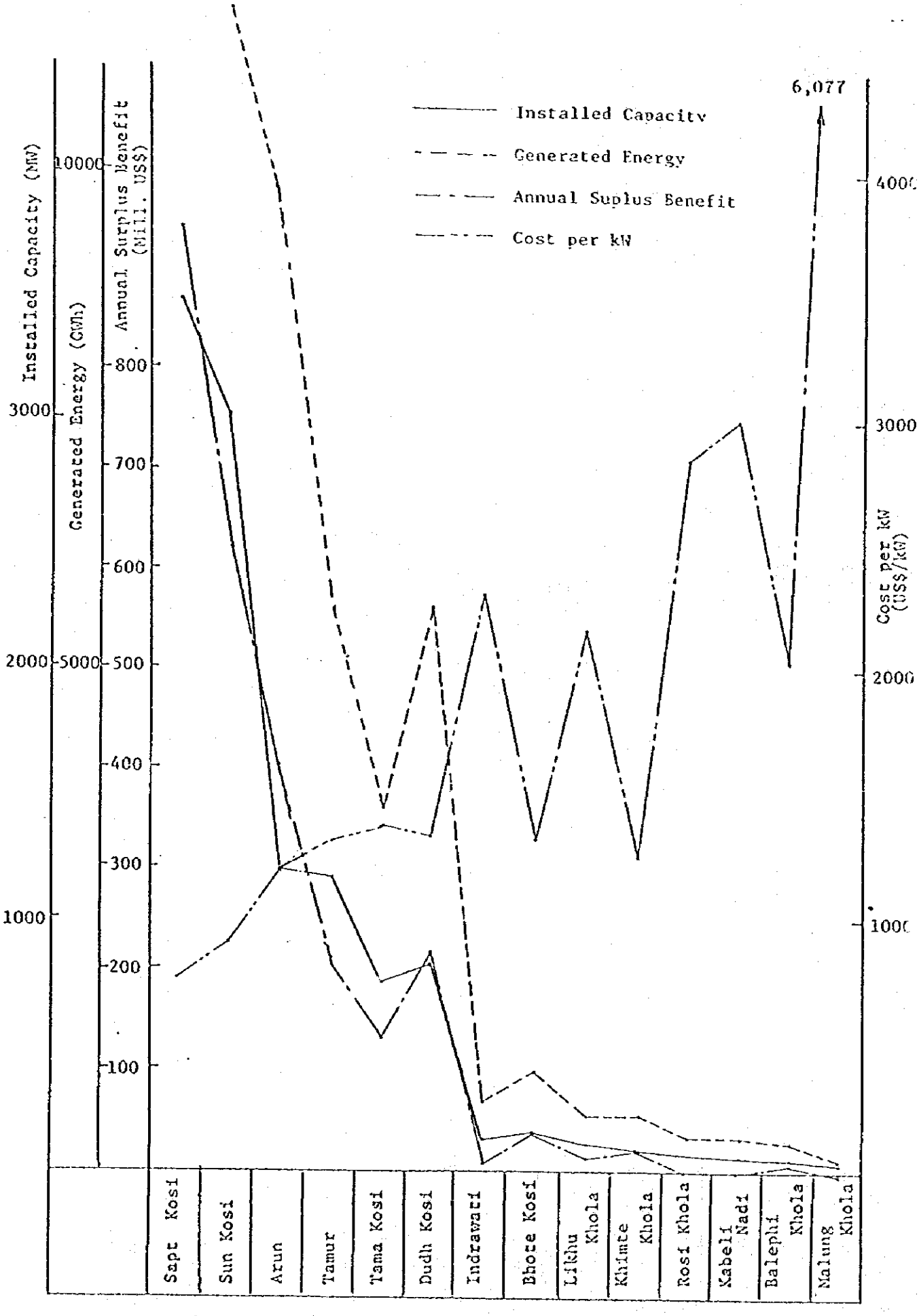
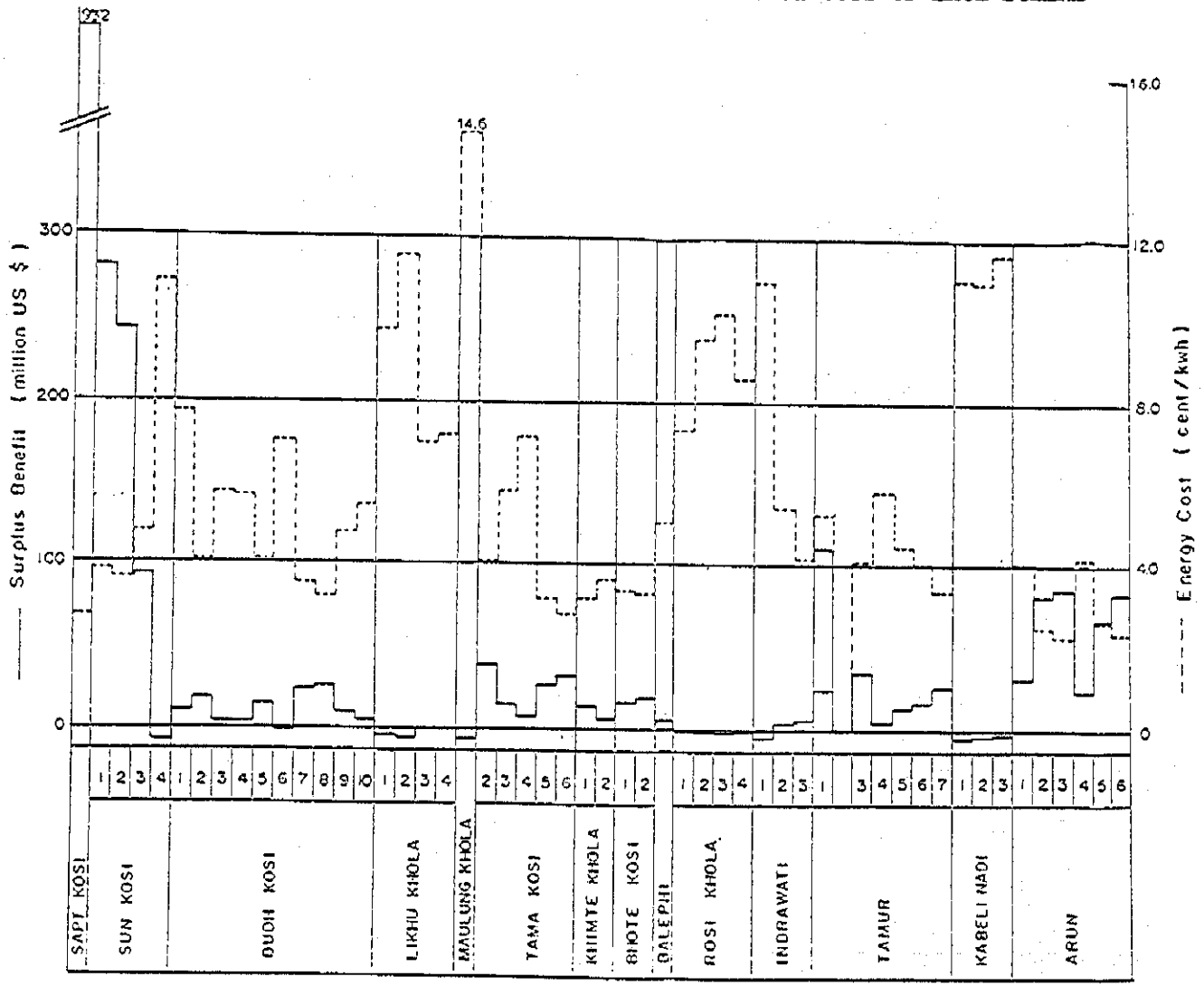


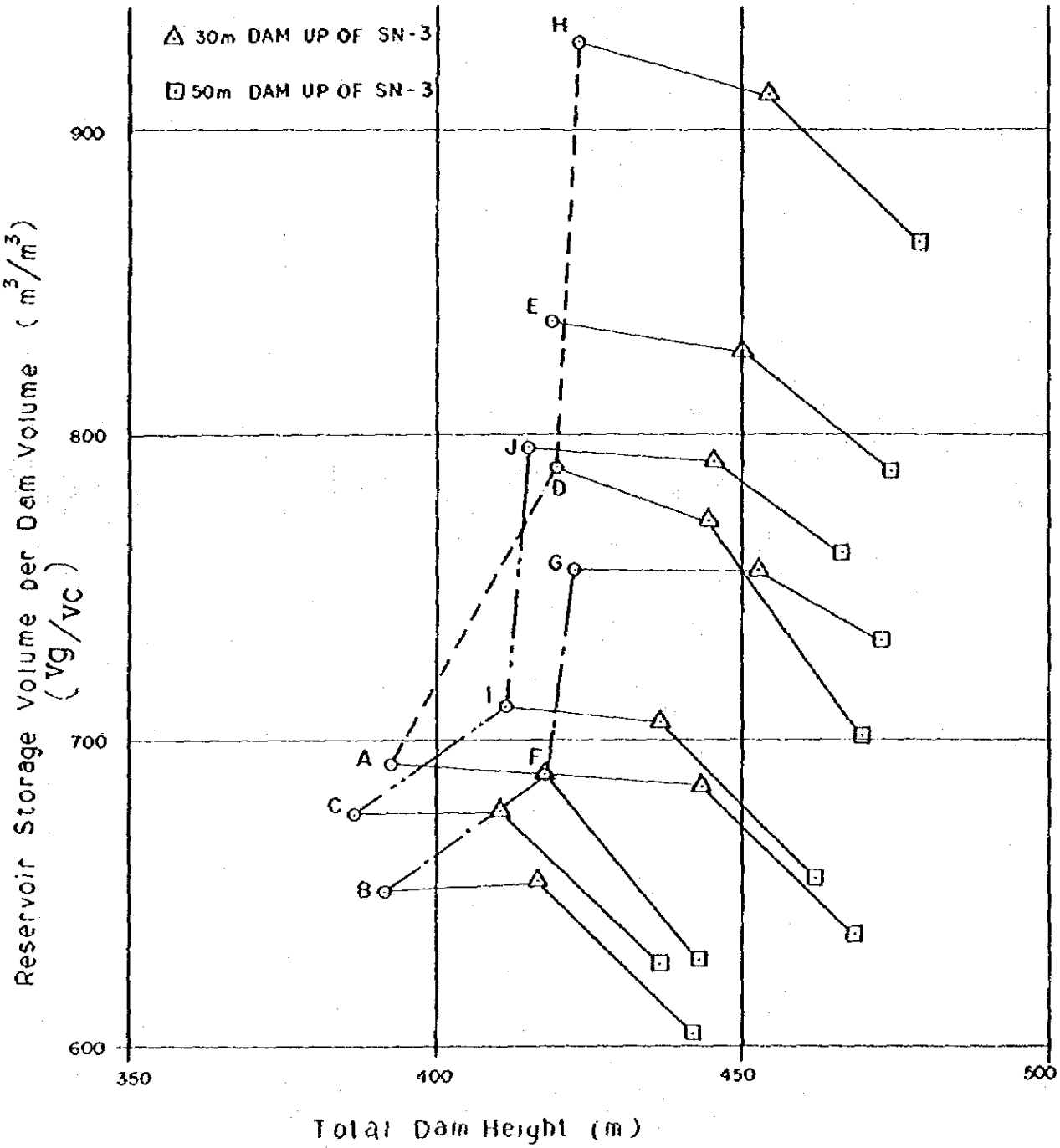
FIG. 3-6-7 HYDROPOWER POTENTIAL OF THE KOSI BASIN

FIG. 3-6-8 ANNUAL SUPPLUS BENEFIT AND ENERGY COST OF EACH SCHEME



* Construction cost includes the access road, cost assuming the independent development of each scheme but excluded/transmission/substation costs.

FIG. 3-6-9 RELATION OF Vg/Vc AND DAM HEIGHT



Legend

SN-1 Dam up (0, +25, +50m)
SN-2 " 0, +25 +50m)
SN-1 (+25m), SN-2 Dam up (0, +25, +50, +70m)
SN-1 (+50m), SN-2 " (0, +25, +50, +100m)

B/C : Total generated energy is evaluated by the same unit value

B/C^1: After completin of SU-3 scheme

B/C^2: Primary and secondary energies are evaluated by different unit values

KWh-Value: Independent development

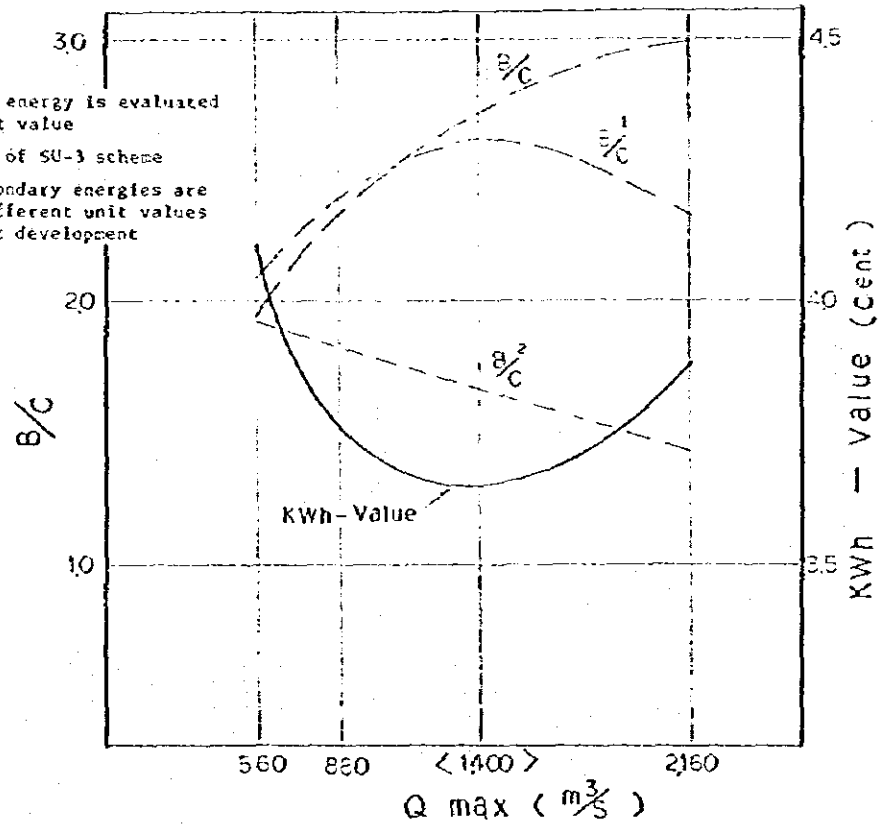


FIG.3.6.10 OPTIMIZATION STUDY
(1 of 29)
SUN KOSI NO.1 SCHEME (Case 1-1)

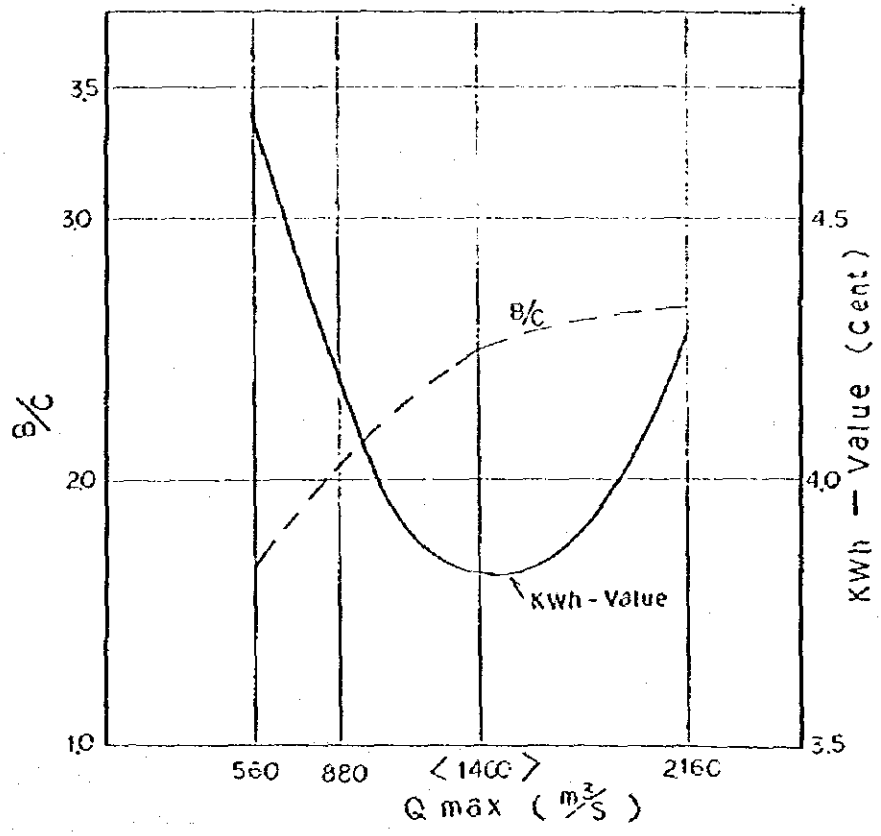


FIG.3.6.10 OPTIMIZATION STUDY
(2 of 29)
SUN KOSI NO.1 SCHEME (Case 1-2)

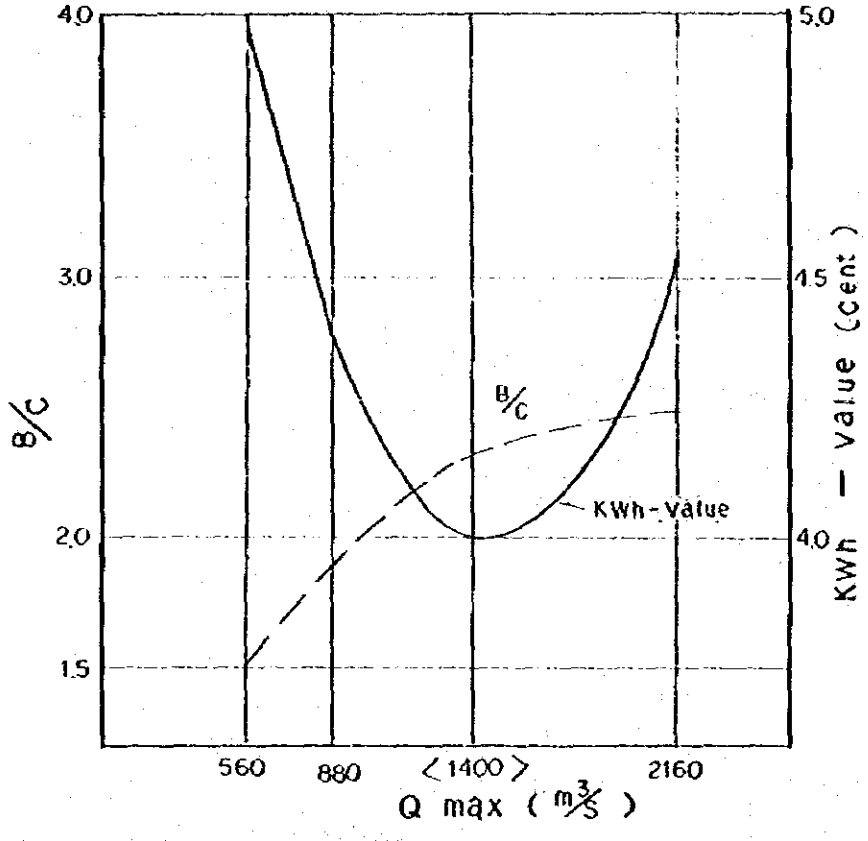


FIG.3.6.10 OPTIMIZATION STUDY
(3 of 29) SUN KOSI NO.1 SCHEME (Case1-3)

B/C : Total generated energy is evaluated by the same unit value
B/C^1: After completin of SU-3 scheme
B/C^2: Primary and secondary energies are evaluated by different unit values
KWh-Value: Independent development

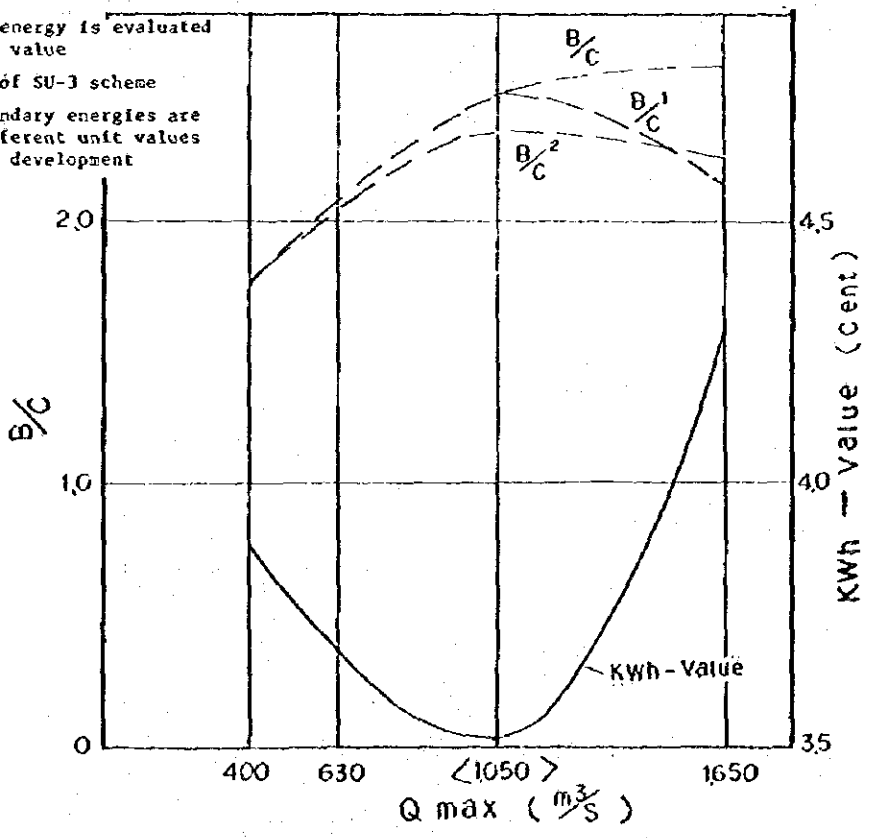


FIG.3.6.10 OPTIMIZATION STUDY
(4 of 29) SUN KOSI NO.2 SCHEME (Case 2-3)

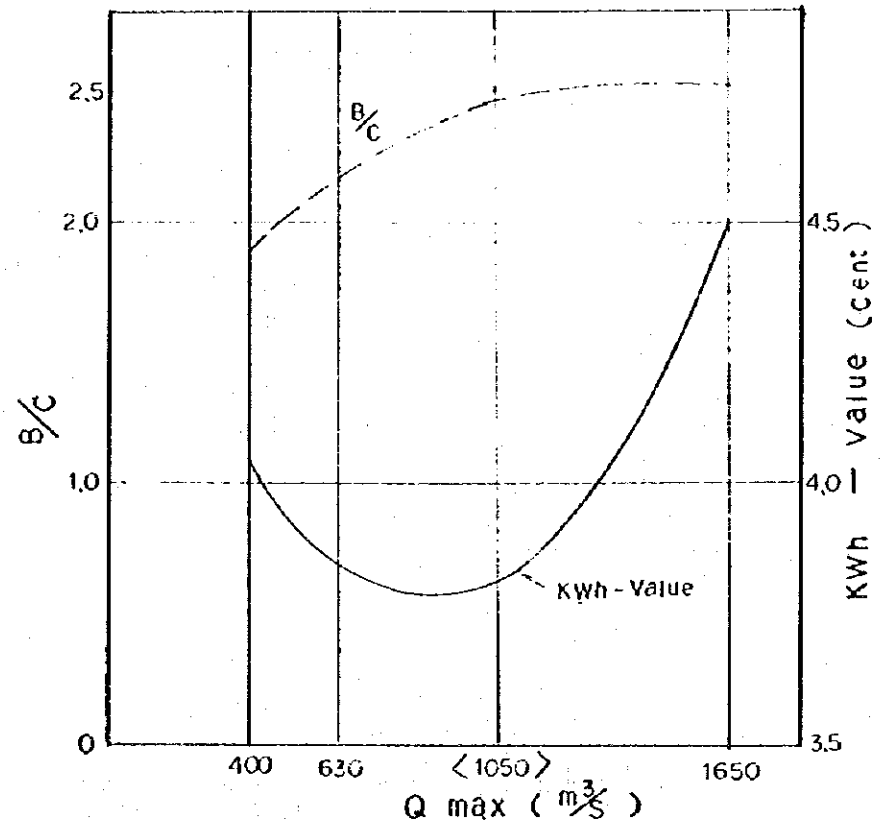


FIG.3.6.10 OPTIMIZATION STUDY
(5 of 29)
SUN KOSI NO.2 SCHEME (Case 2-10)

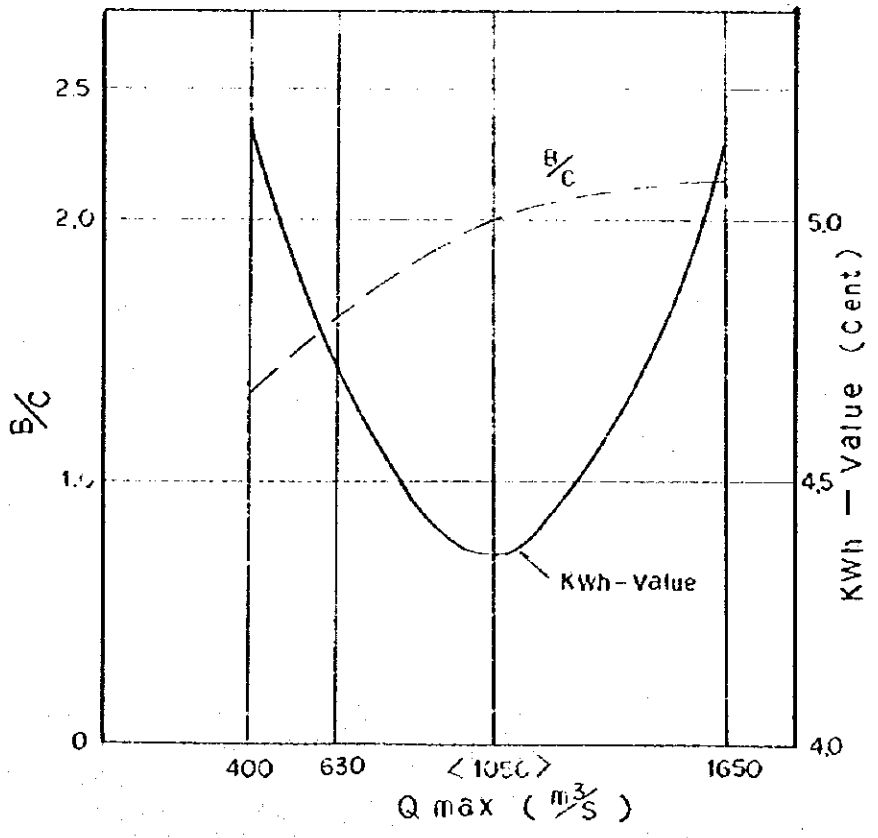


FIG.3.6.10 OPTIMIZATION STUDY
(6 of 29)
SUN KOSI NO.2 SCHEME (Case 2-7)

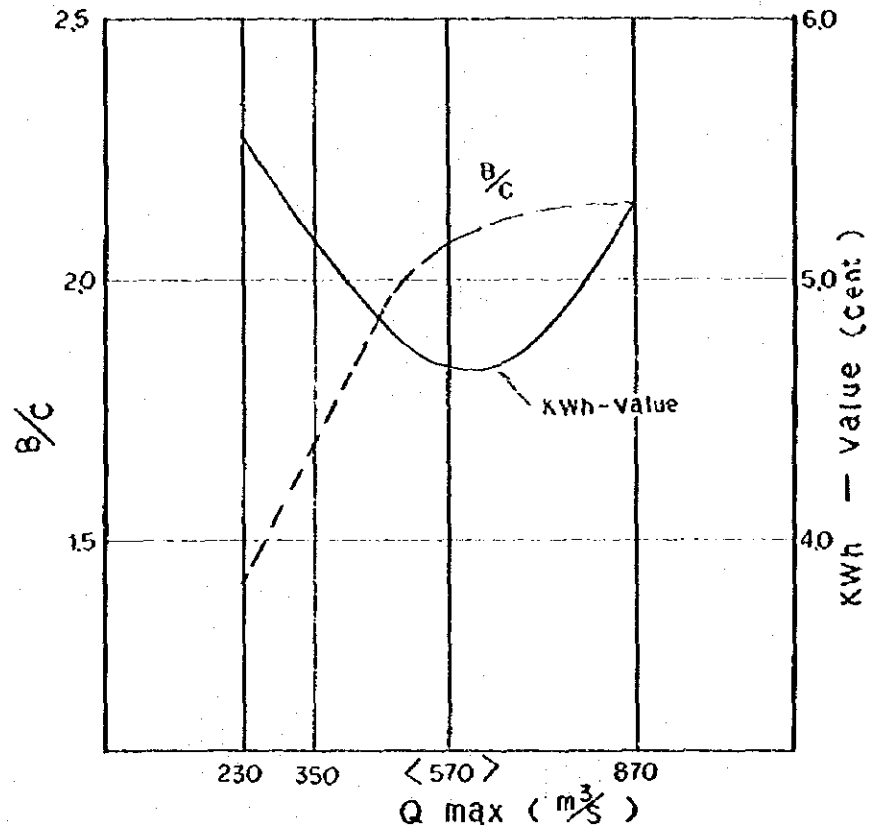


FIG.3.6.10 OPTIMIZATION STUDY
(7 of 29)
SUN KOSI NO.3 SCHEME (Case 3-4)

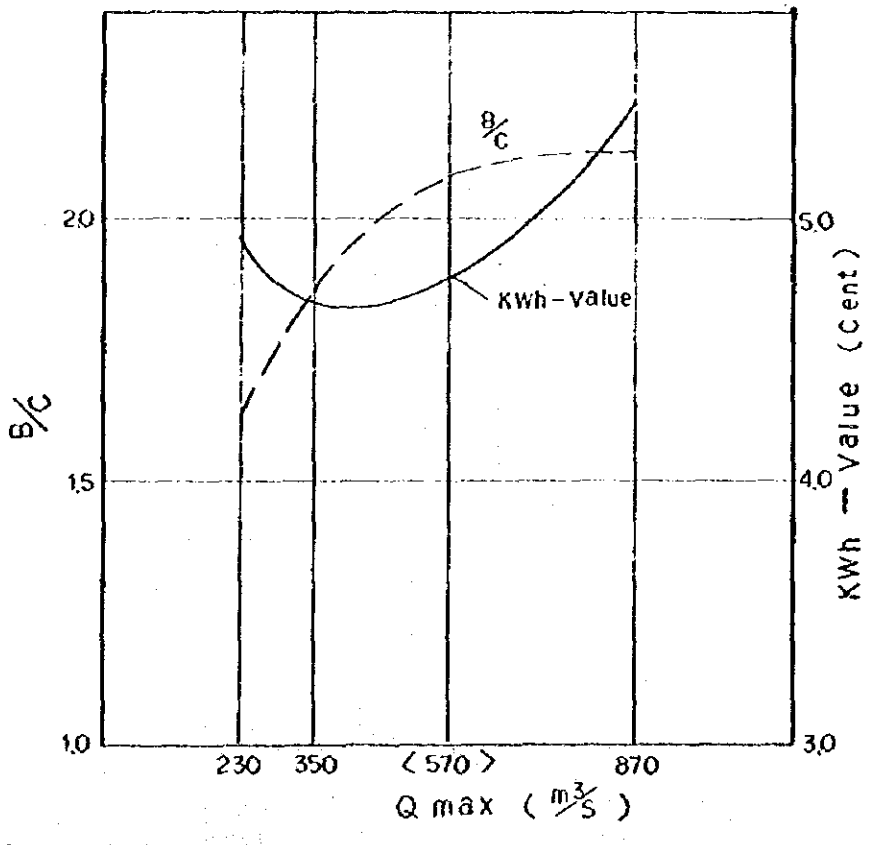


FIG.3.6.10 OPTIMIZATION STUDY
(8 of 29)
SUN KOSI NO,3 SCHEME (Case 3-7)

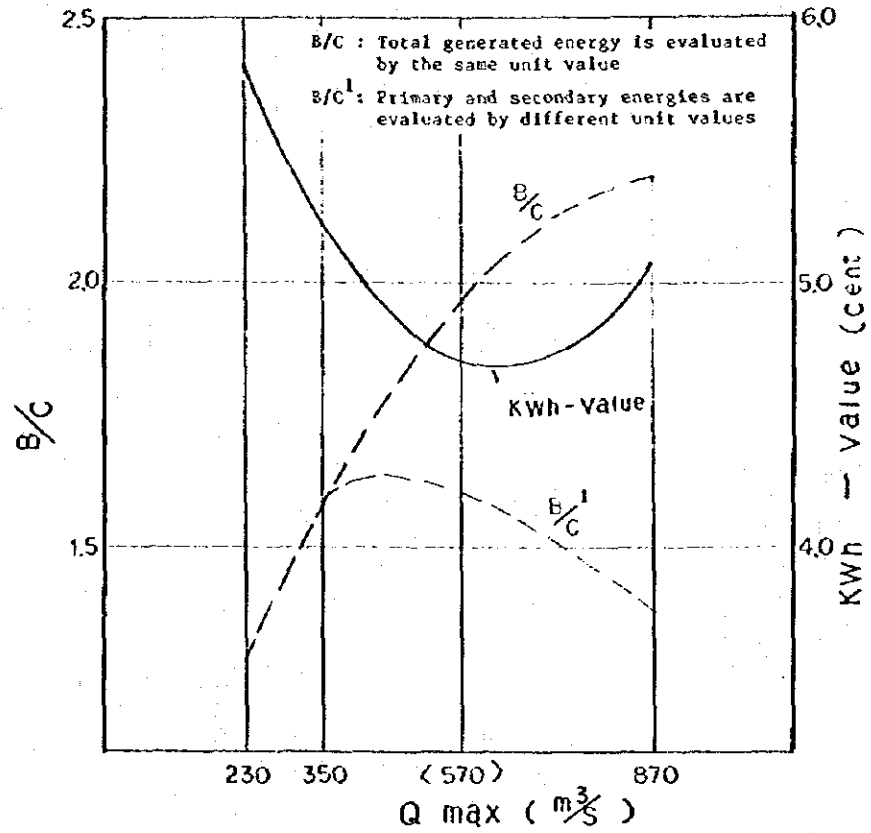


FIG. 3.6.10 OPTIMIZATION STUDY
(9 of 29) SUN KOSI NO.3 SCHEME (Case 3-5)

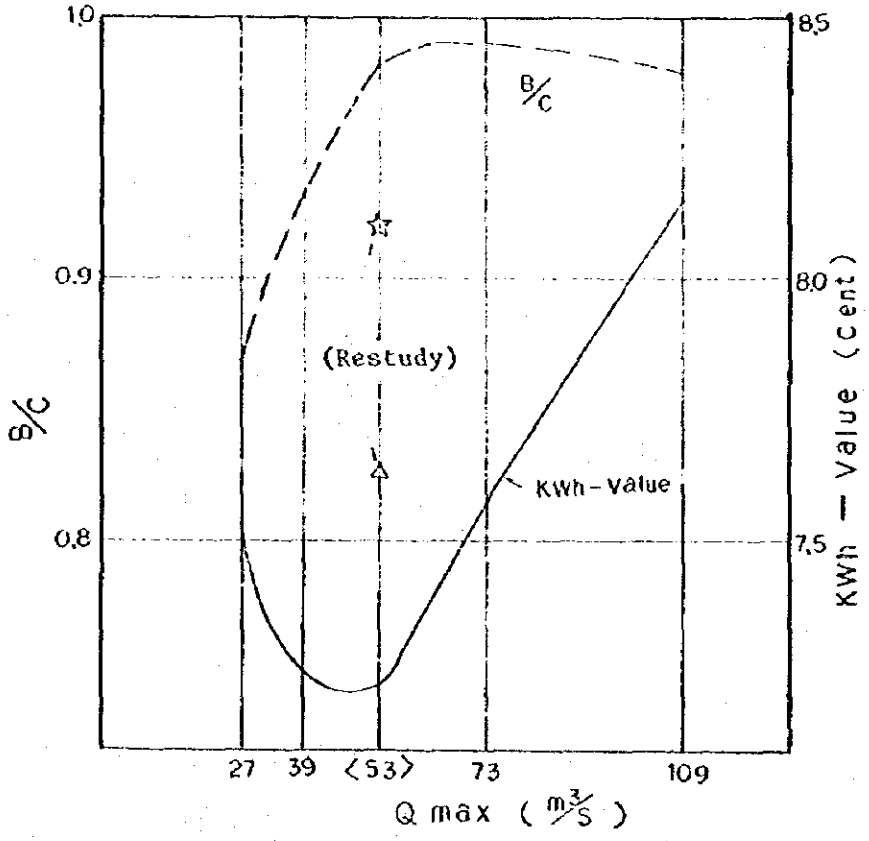


FIG. 3.6.10 OPTIMIZATION STUDY
(10 of 29) SUN KOSI NO.4 SCHEME (Case 4)

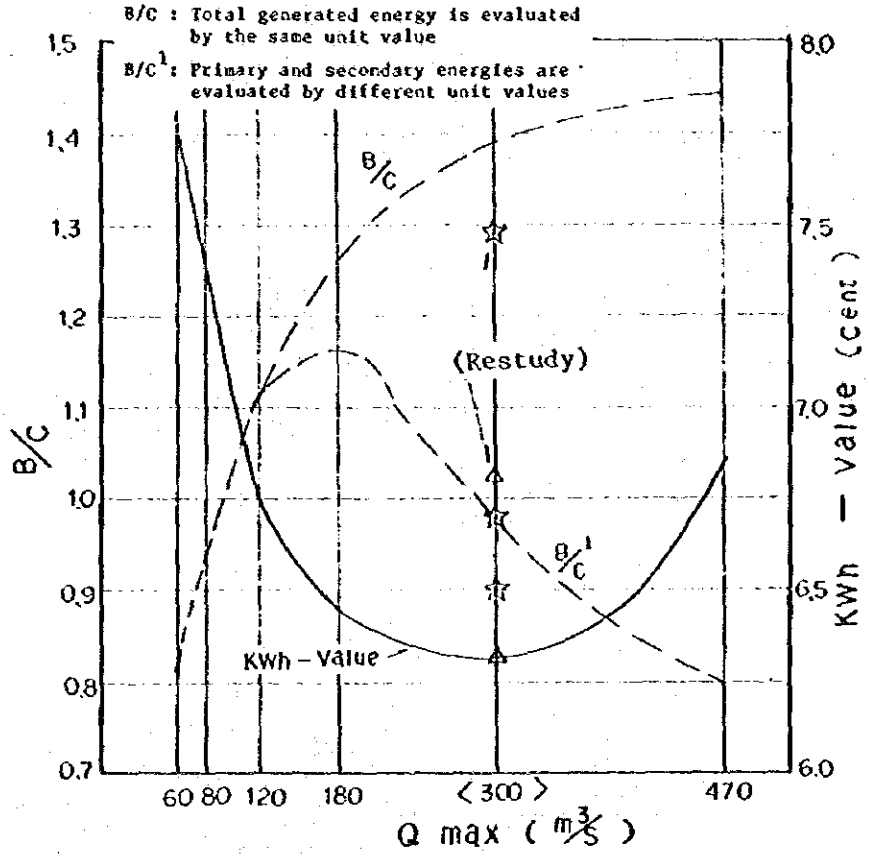


FIG. 3.6.10 OPTIMIZATION STUDY
(11 of 29)

DUDH KOSI NO. 1 SCHEME

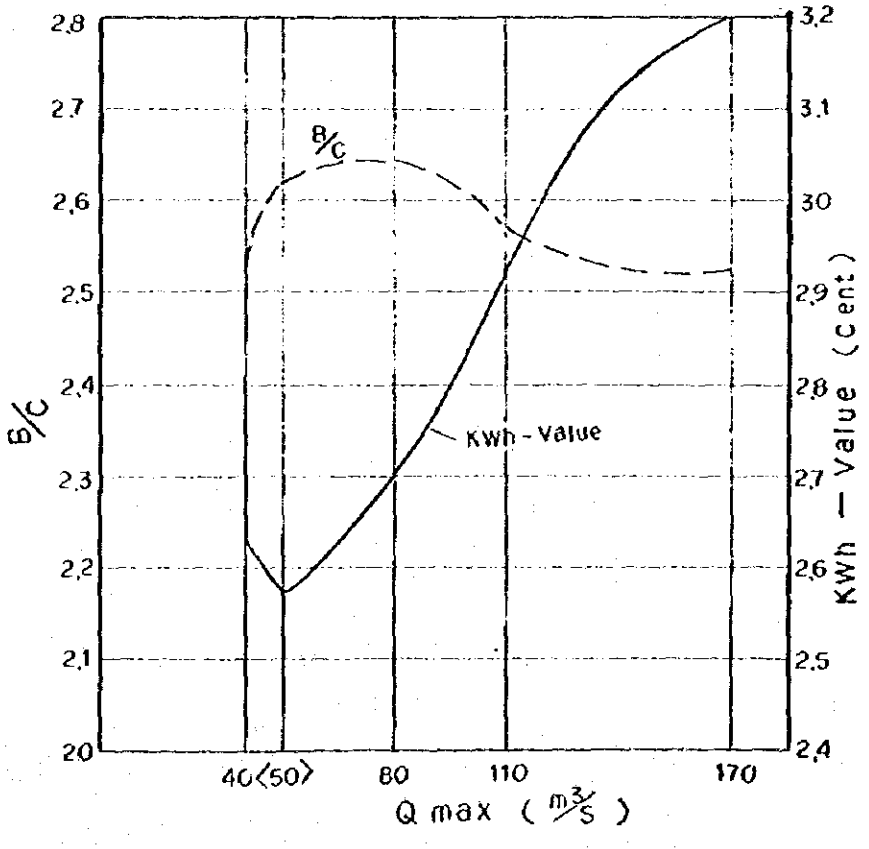


FIG. 3.6.10 OPTIMIZATION STUDY
(12 of 29)

DUDH KOSI NO. 2 SCHEME

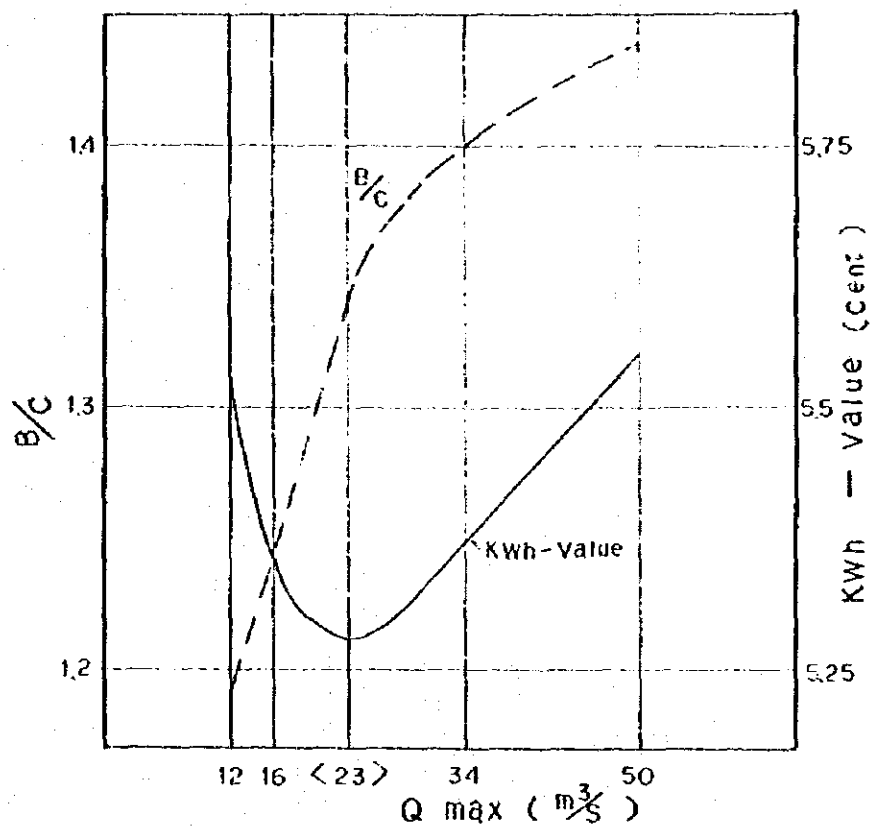


FIG.3.6.10 OPTIMIZATION STUDY
(13 of 29)

LIKHU KHOLA NO.1 SCHEME

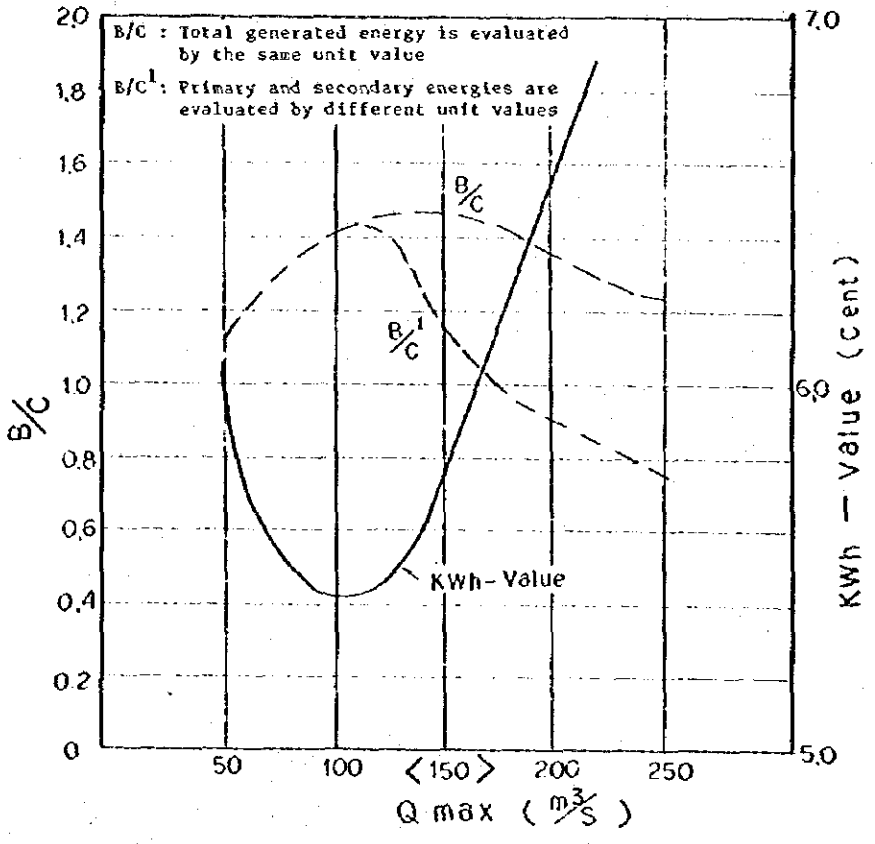


FIG.3.6.10 OPTIMIZATION STUDY
(14 of 29)

TAMA KOSI NO.3 SCHEME

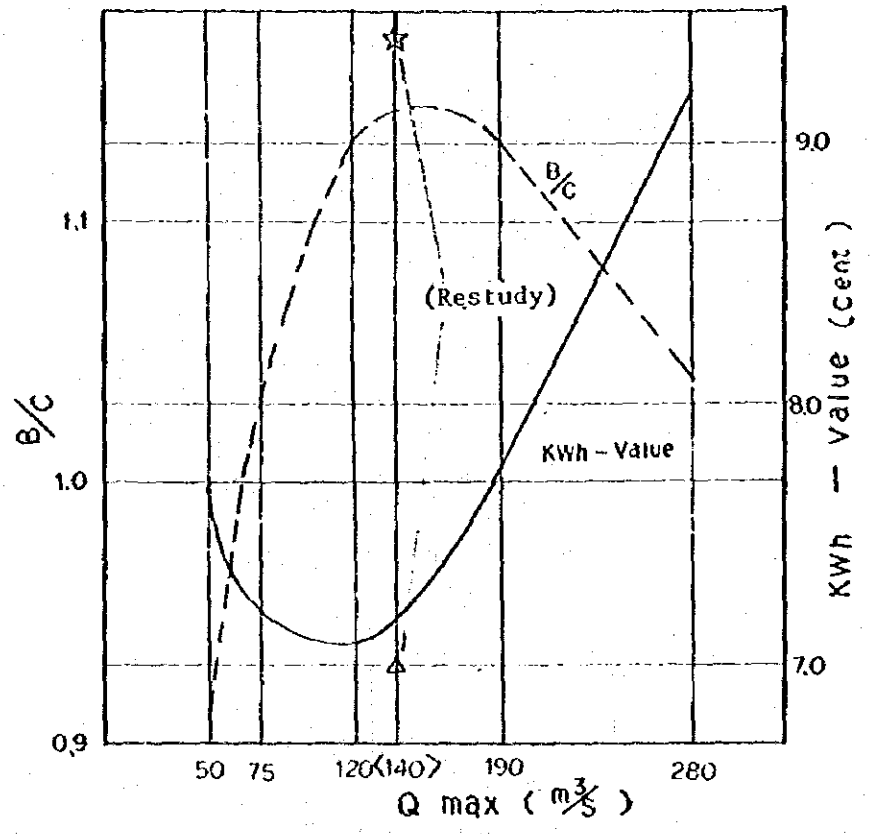


FIG.3.6.10 OPTIMIZATION STUDY
(15 of 29)
TAMA KOSI NO.4 SCHEME

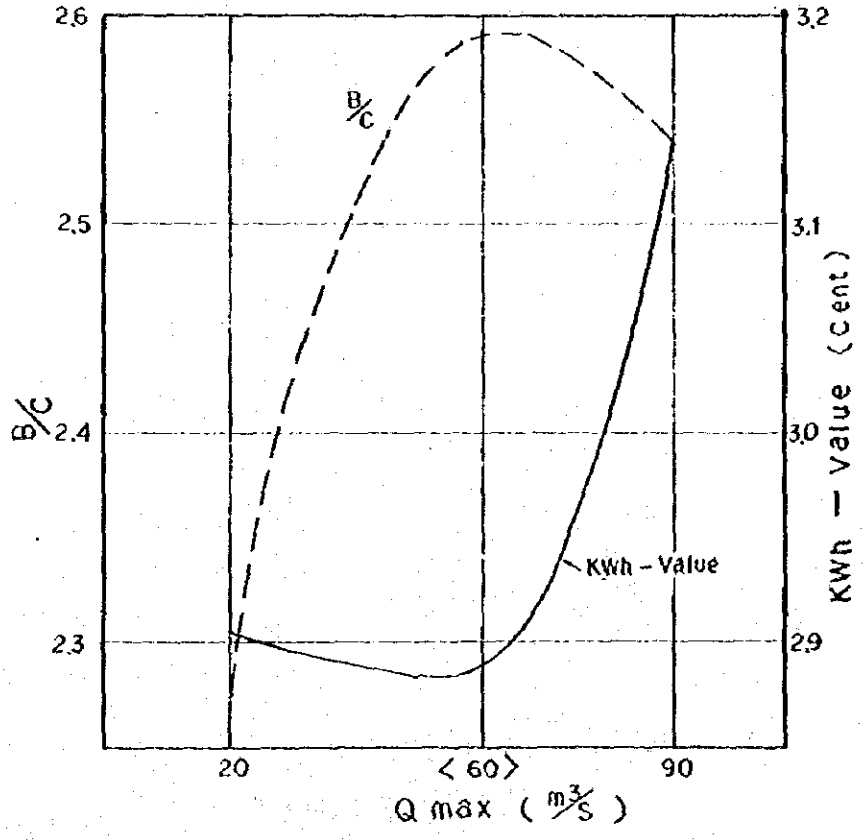


FIG.3.6.10 OPTIMIZATION STUDY
(16 of 29)
TAMA KOSI NO.5 SCHEME

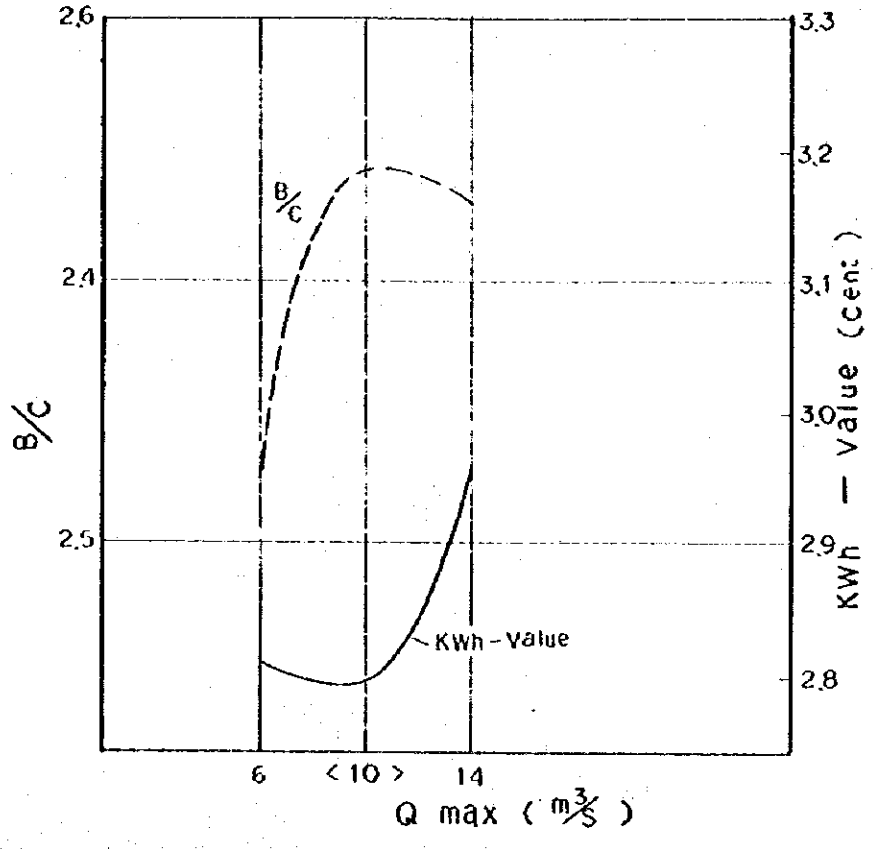


FIG.3.6.10 OPTIMIZATION STUDY
(17 of 29)
KHIMTE KHOLA NO.1 SCHEME

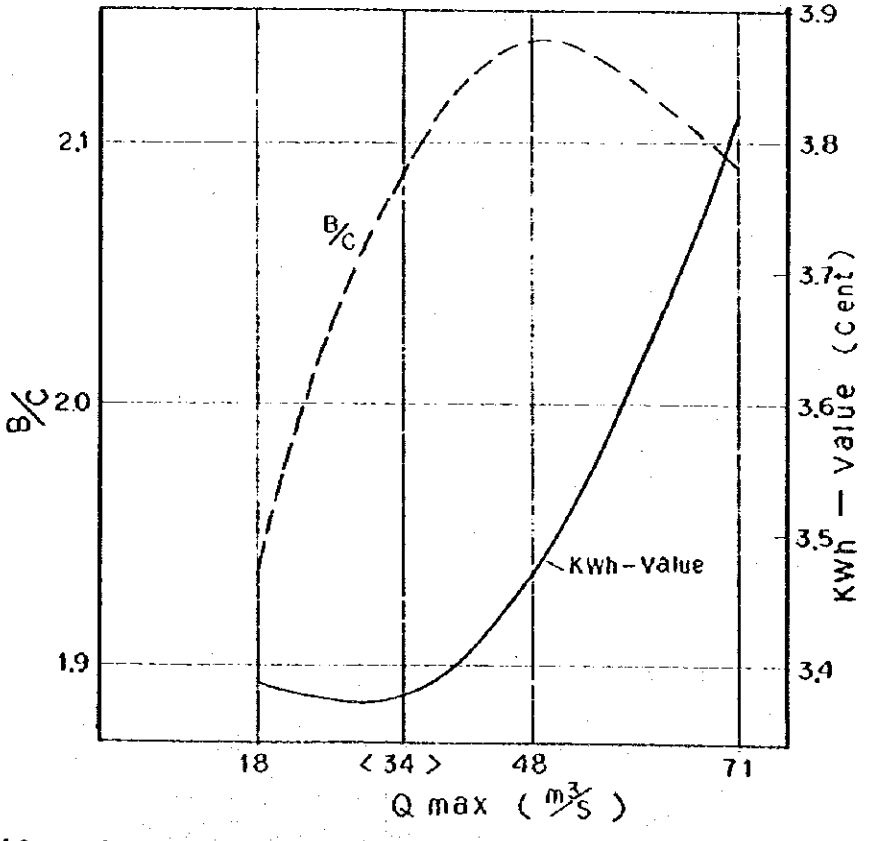


FIG.3.6.10 OPTIMIZATION STUDY
(18 of 29)
BHOTE KOSI NO.1 SCHEME

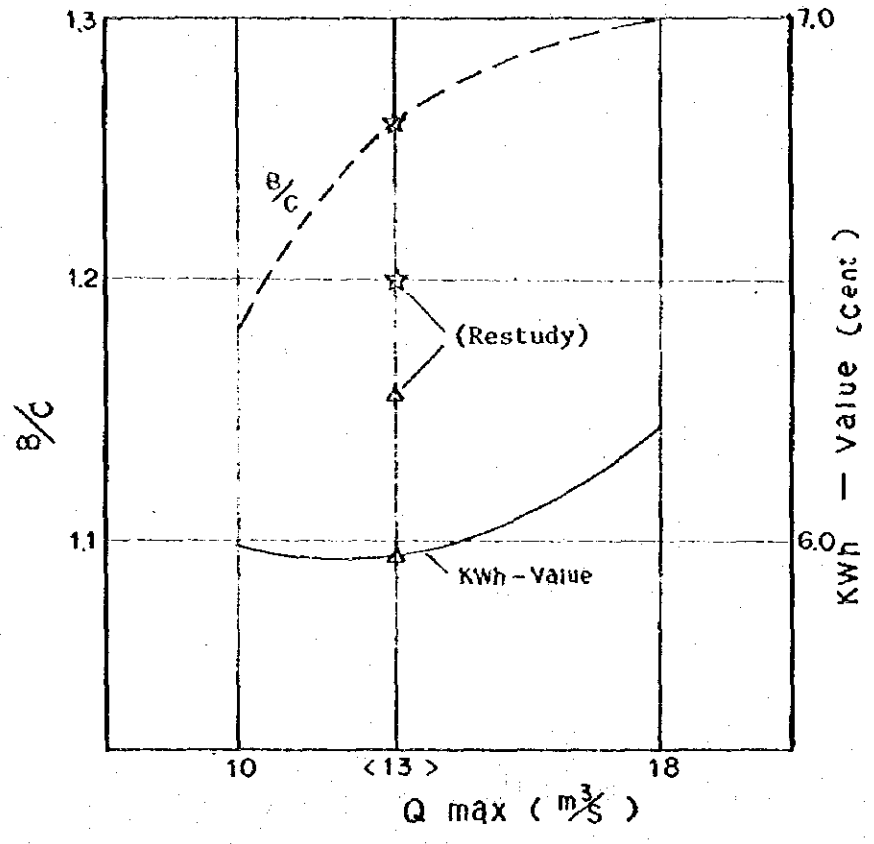


FIG.3.6.10 OPTIMIZATION STUDY
(19 of 29)
ROSI KHOLA NO.1 SCHEME

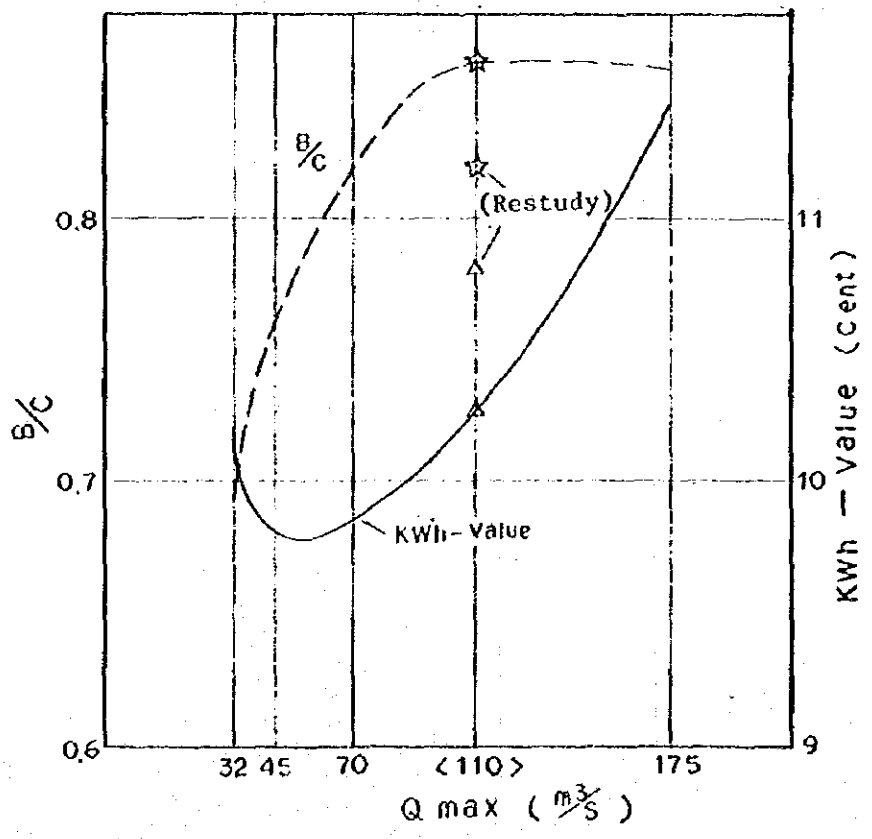


FIG.3.6.10 OPTIMIZATION STUDY
(20 of 29)
INDRAWATI NO.1 SCHEME

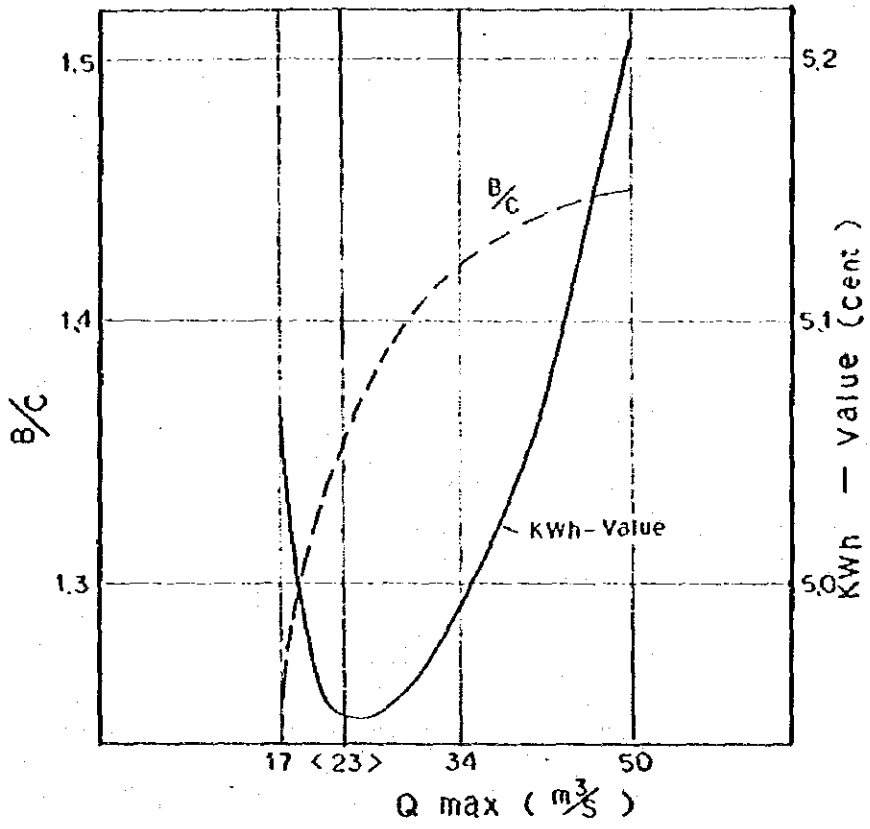


FIG.3.6.10 OPTIMIZATION STUDY
(21 of 29)

INDRAWATI NO.2 SCHEME

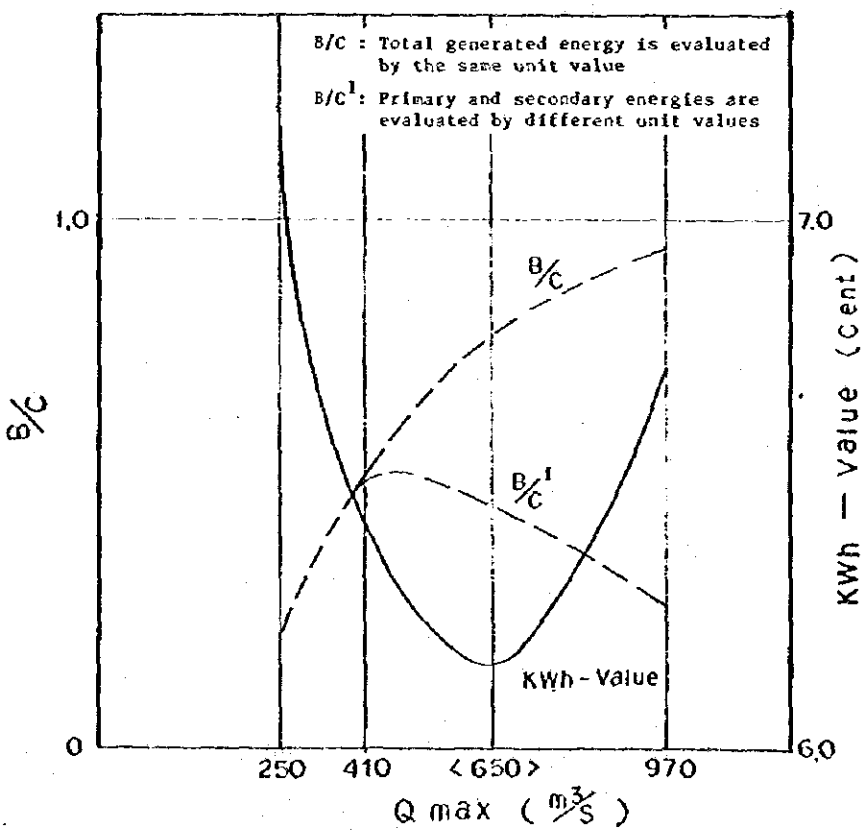


FIG.3.6.10 OPTIMIZATION STUDY
(22 of 29)

TAMUR NO.1 SCHEME (Case I)

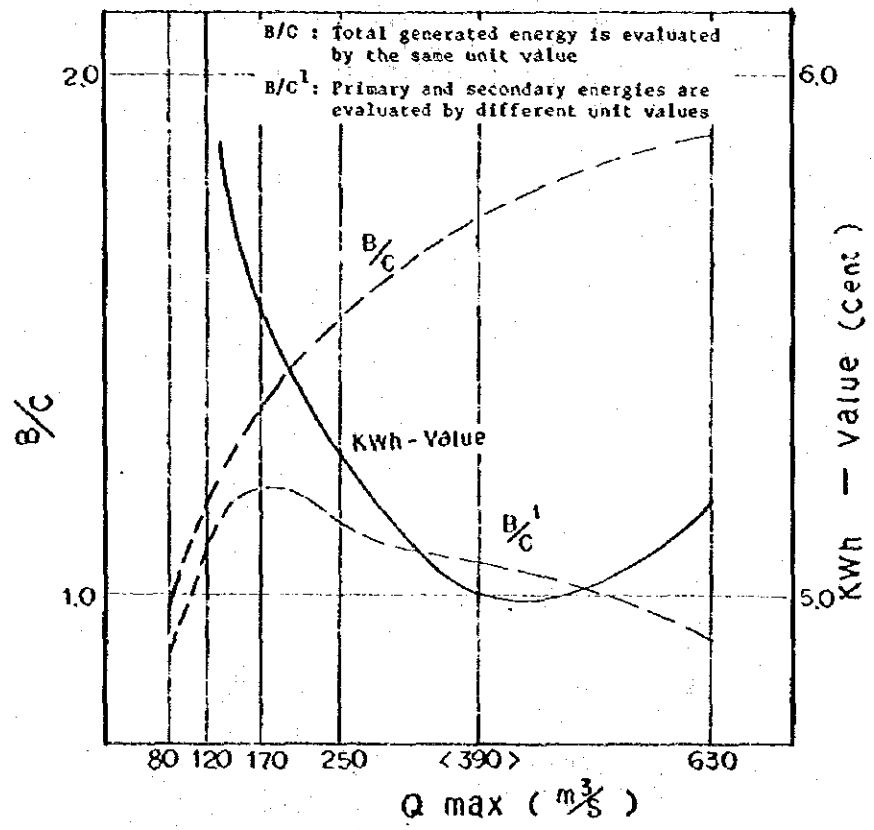


FIG. 3.6.10 OPTIMIZATION STUDY
(23 of 29)
TAMUR NO.1 SCHEME (Case II)

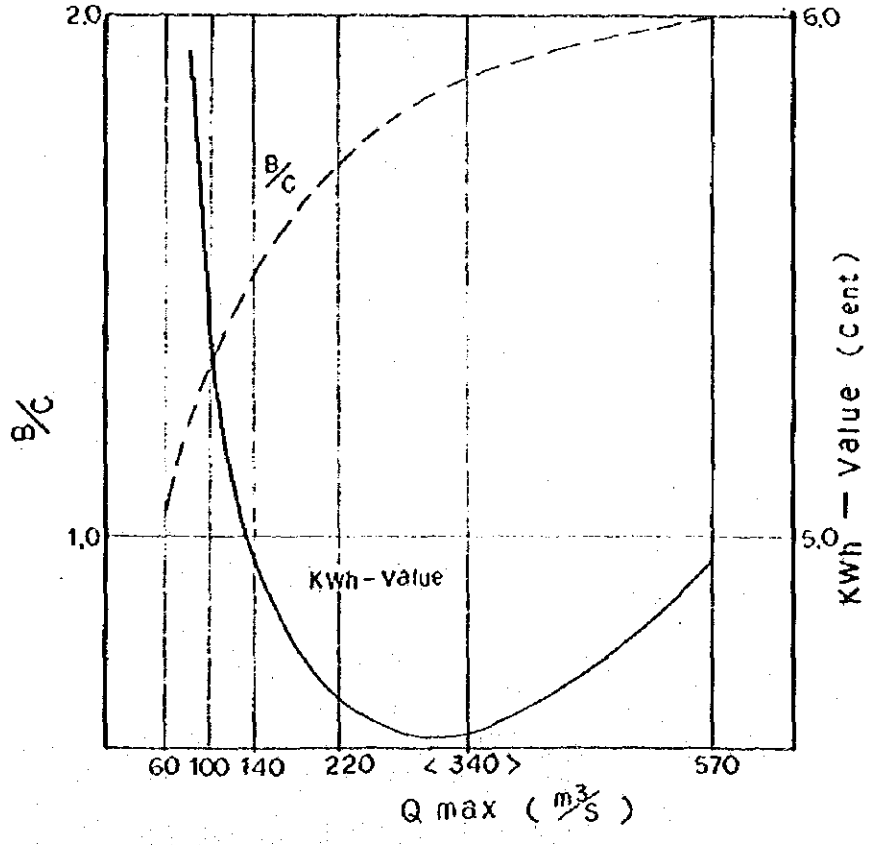


FIG. 3.6.10 OPTIMIZATION STUDY
(24 of 29)
TAMUR NO.2 SCHEME (Case II)

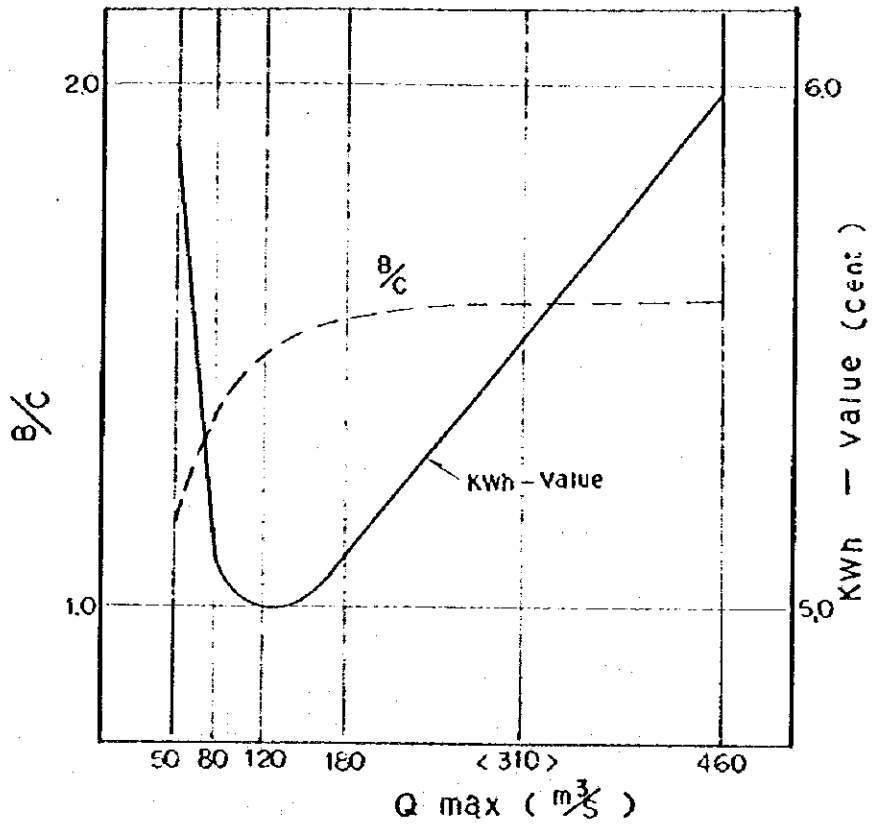


FIG.3.6.10 OPTIMIZATION STUDY
(25 of 29)
TAMUR NO.3 SCHEME (CaseII)

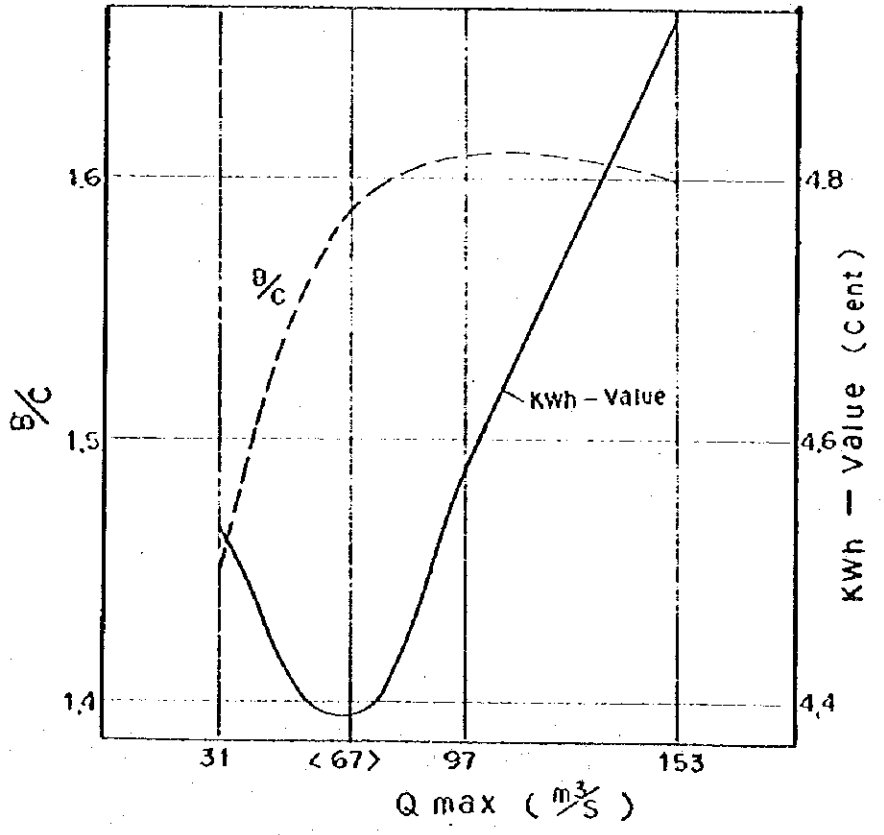


FIG.3.6.10 OPTIMIZATION STUDY
(26 of 29)
TAMUR NO.4 SCHEME

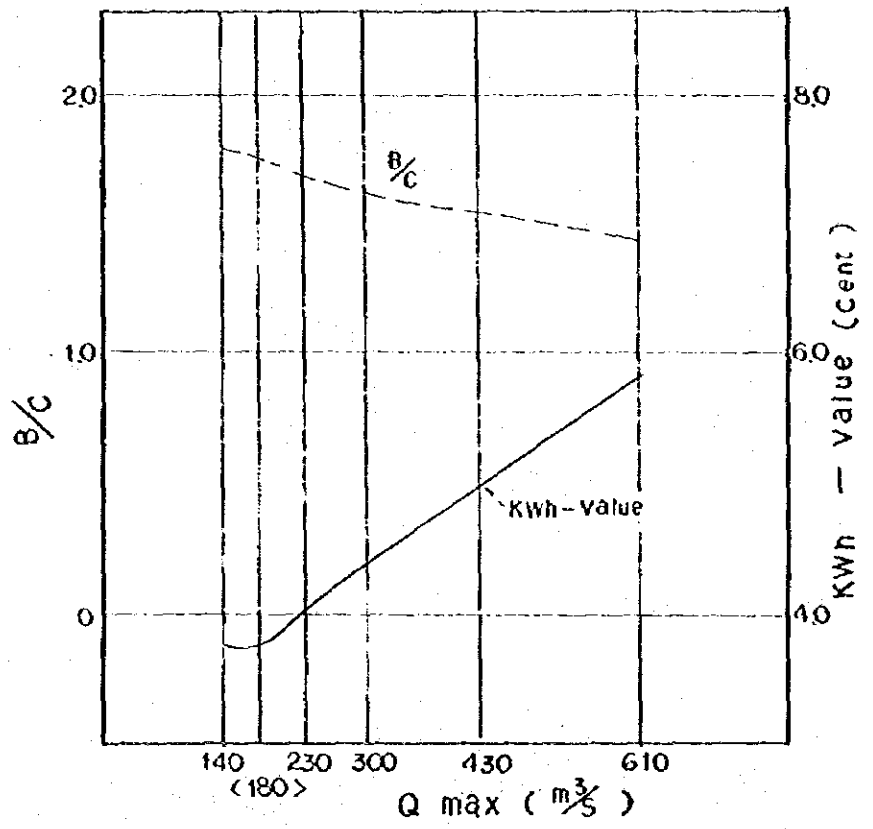


FIG.3.6.10 OPTIMIZATION STUDY
(27 of 29)
ARUN NO.1 SCHEME (Case I)

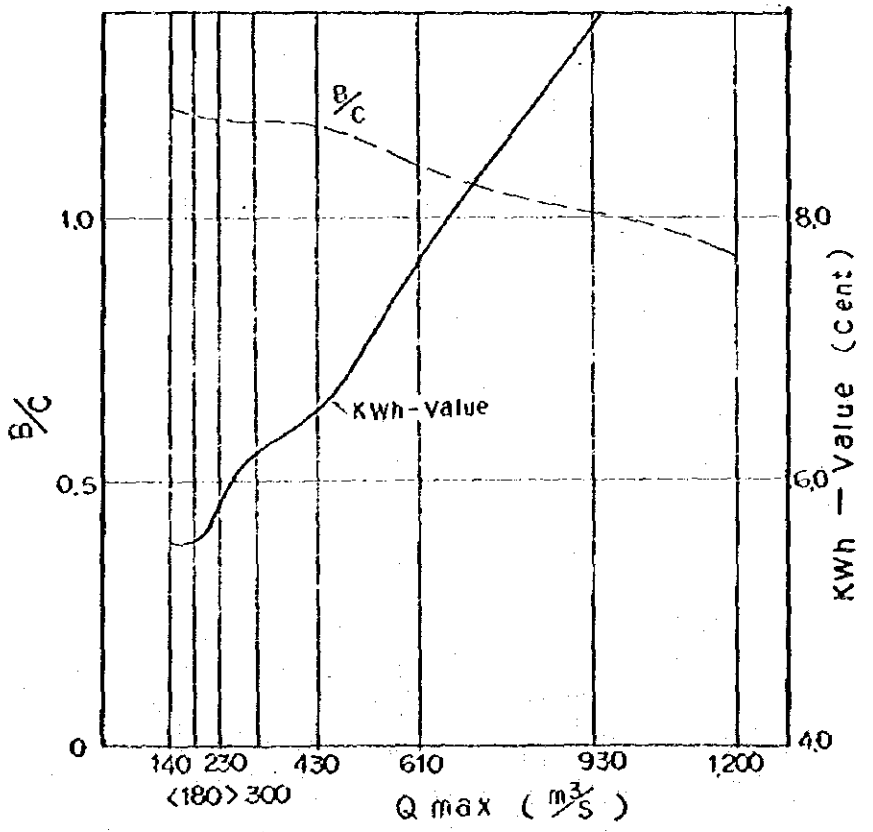


FIG.3.6.10 OPTIMIZATION STUDY
(28 of 29)
ARUN NO.1 SCHEME (Case II)

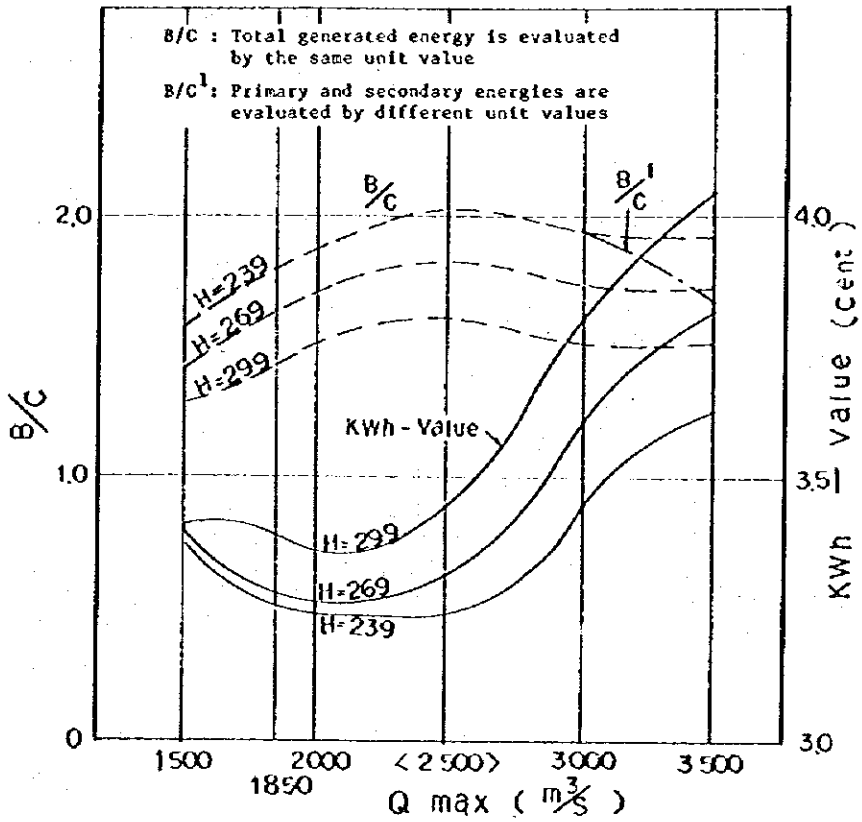


FIG.3.6.10 OPTIMIZATION STUDY
(29 of 29)

SAPT KOSI HIGH DAM

FIG.3.6.11(1)

MASS CURVE SUN KO

Q AVERAGE=673.166 (m^3/s) (1968-1975

C.A = 16,200 (km^2)

$V_E = 40 \times 10^6$ (m^3)

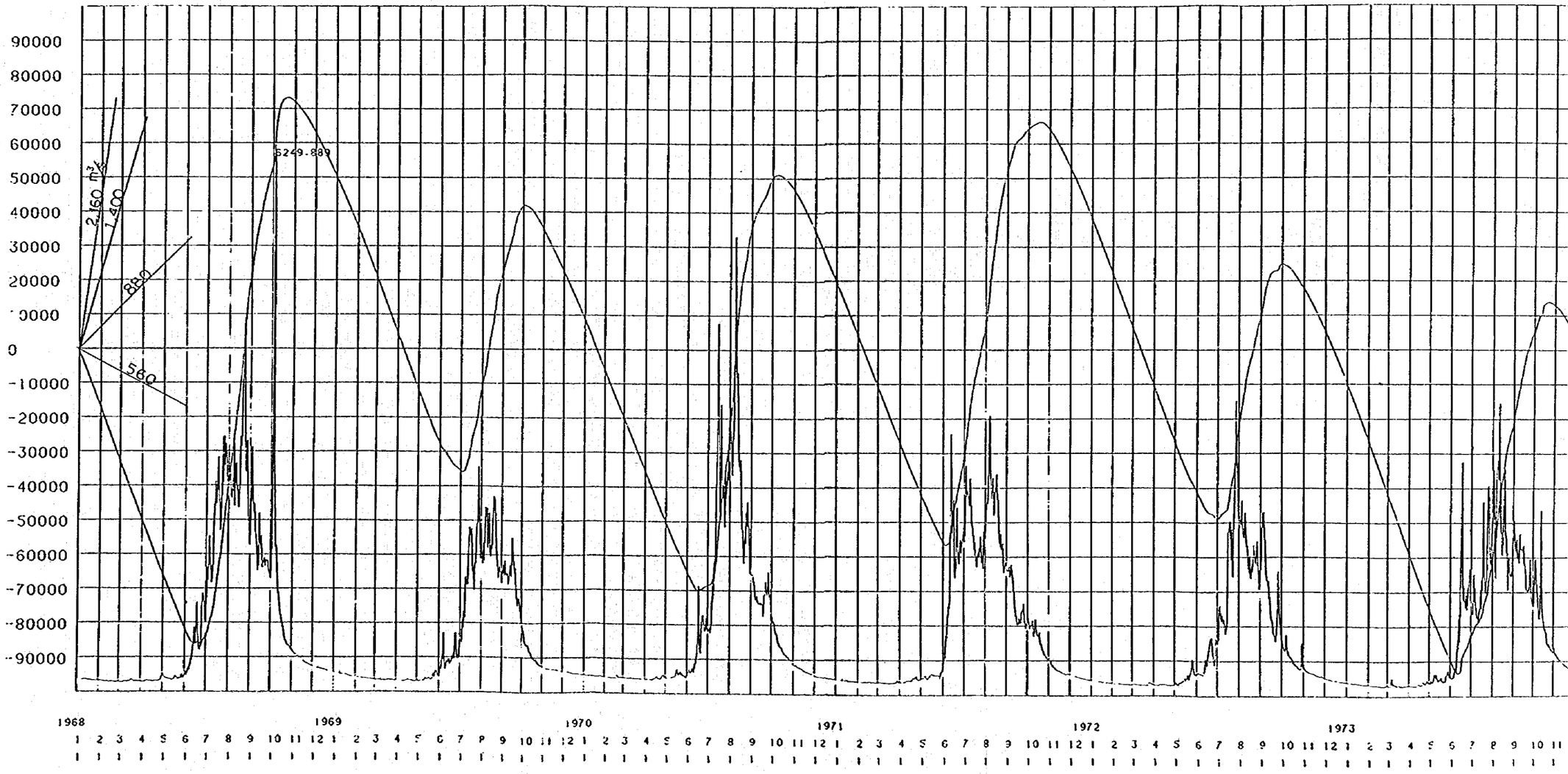


FIG.3.6.11(1) # MASS CURVE SUN KOSI NO. 1 CASE 1-1

Q AVERAGE=673.166 (m^3/s) (1968-1975)

C.A = 16,200 (km^2)

$V\varepsilon = 40 \times 10^6$ (m^3)

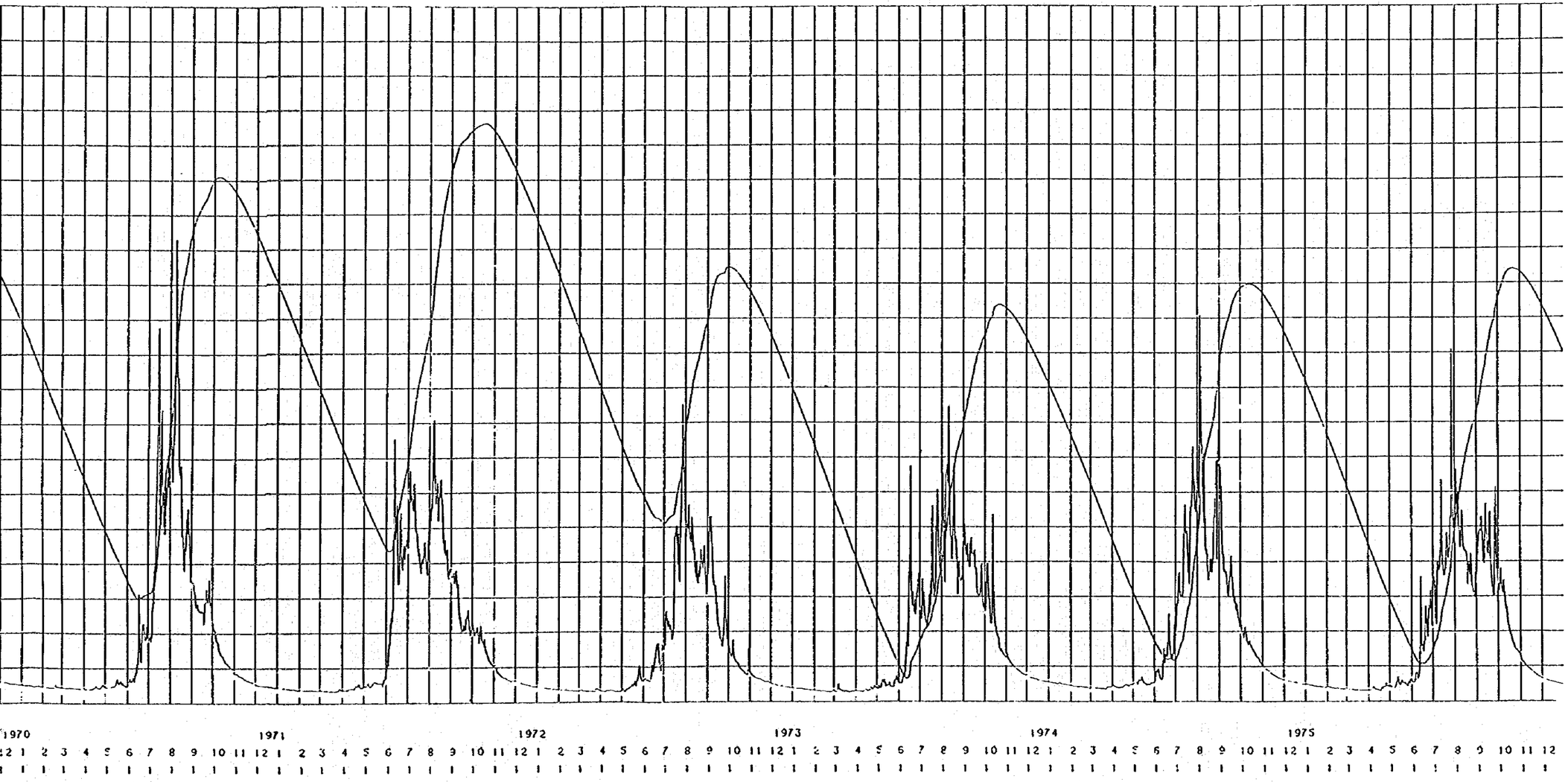


FIG.3.6.11(2)

MASS CURVE SUN KO

Q AVERAGE=530.734 (m^3/s) (1968-1975)

C.A.=10,396 (km^2)

$V_E = 3,040 \times 10^6 (m^3) = 35,185 (m^3/s \cdot day)$

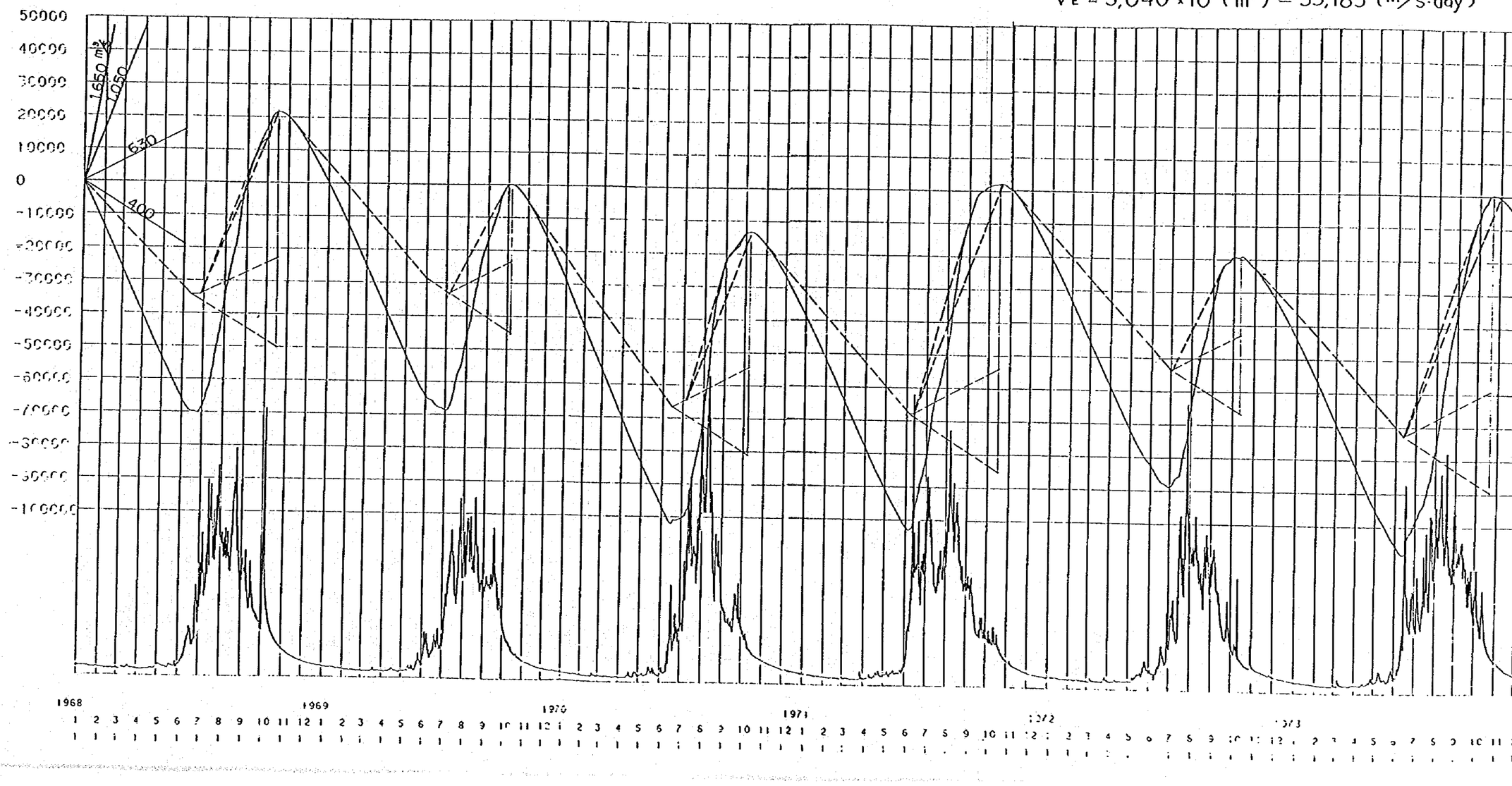


FIG.3.6.11(2) MASS CURVE SUN KOSI NO.2 CASE 2-3

G AVERAGE=530.734 (m^3/s) (1968-1975)

C.A.=10,396 (km^2)

V_E = 3,040 $\times 10^6$ (m^3) = 35,185 ($m^3/s \cdot day$)

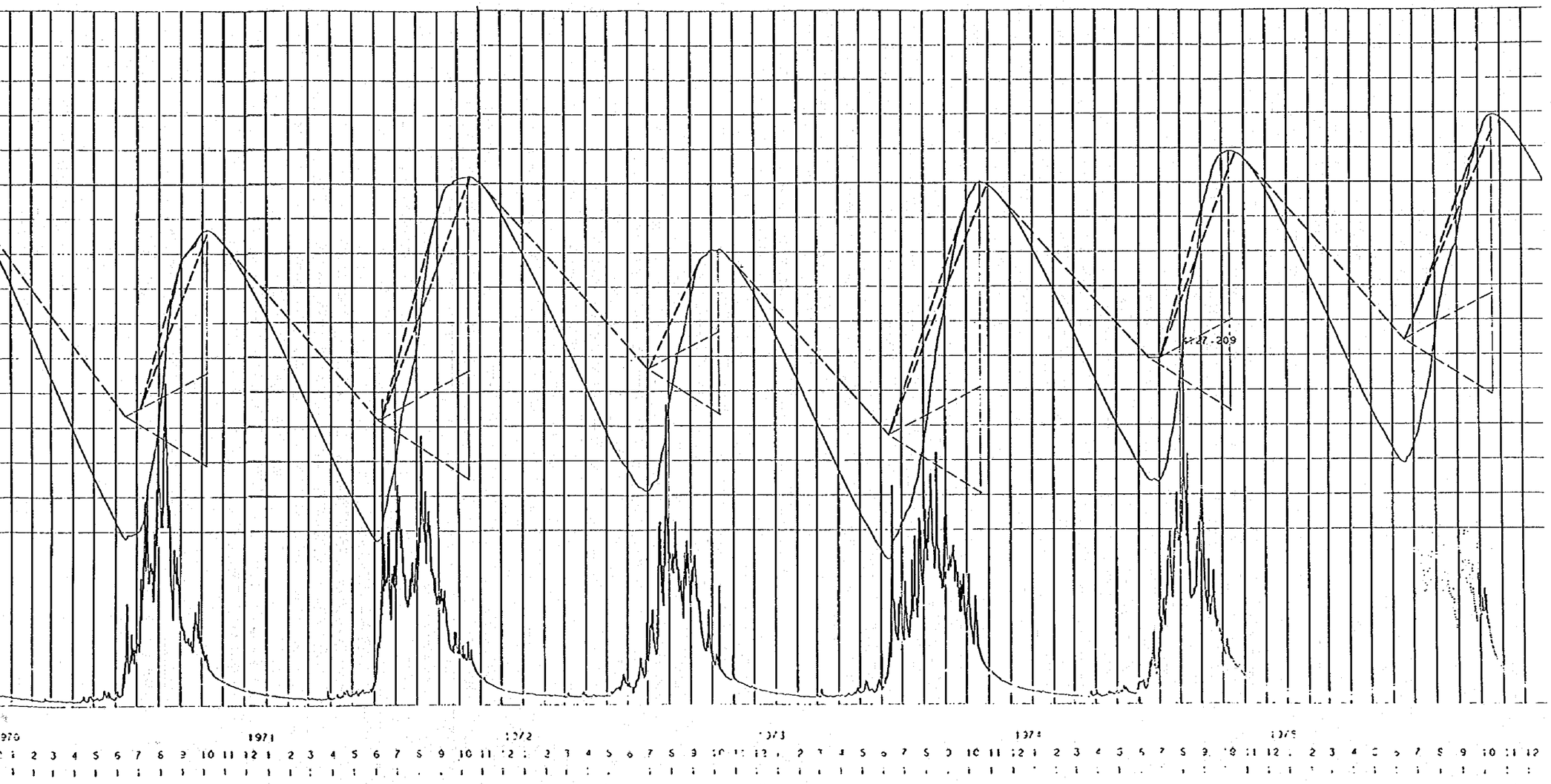


FIG. 3.6.11(3)

MASS CURVE SUN KOS

Q AVERAGE = 279.770 (m^3/s) (1968-1975)

C.A. = 5,520 (km^2)

V_E = 550×10^6 (m^3) = 6,356 ($m^3/s \cdot day$)

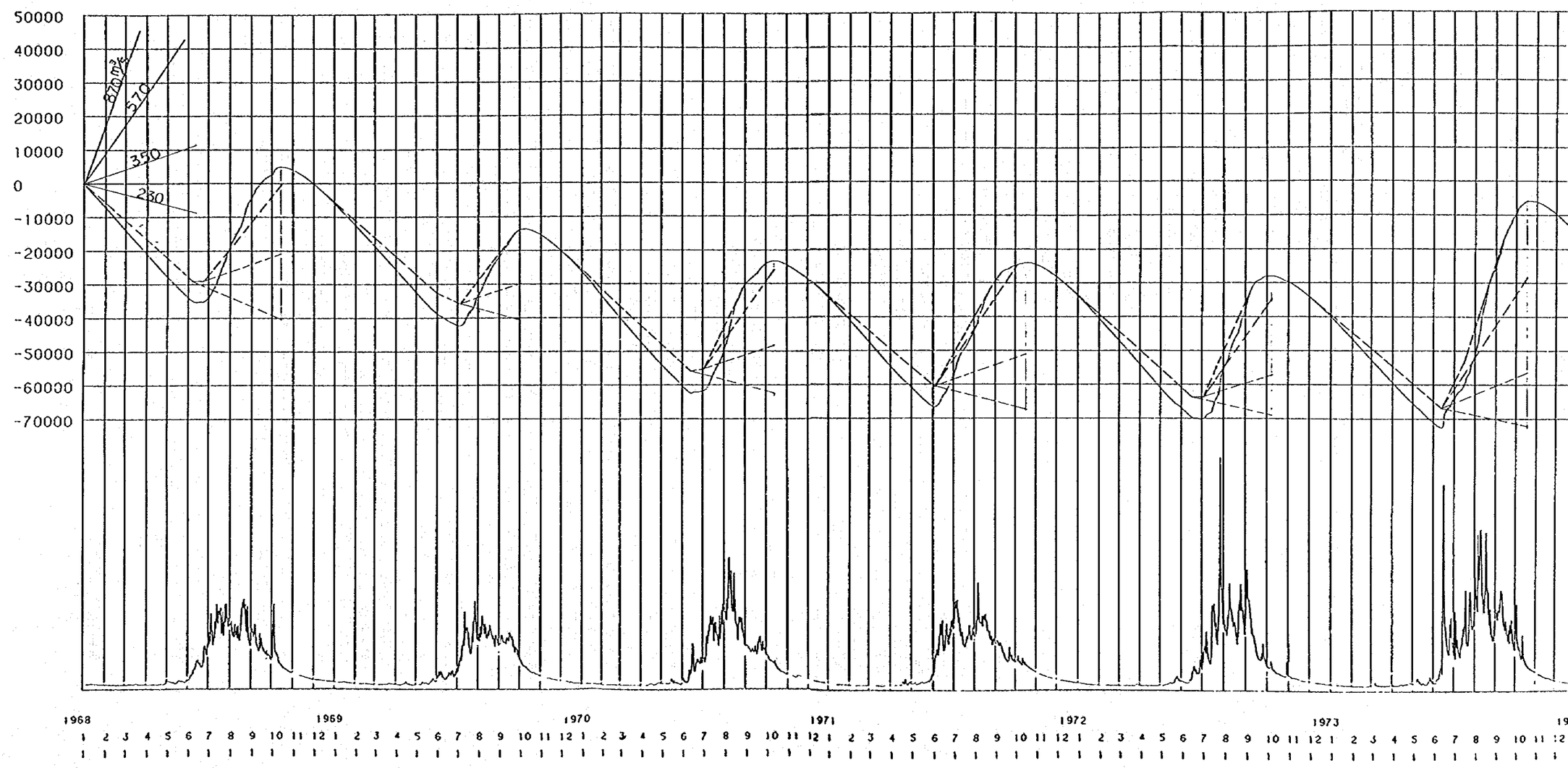


FIG. 3.6.11(3)

MASS CURVE SUN KOSI NO. 3 CASE 3-5

Q AVERAGE = 279.770 (m^3/s) (1968~1975)

C.A. = 5,520 (km^2)

V_E = 550×10^6 (m^3) = 6,356 ($m^3/s \cdot day$)

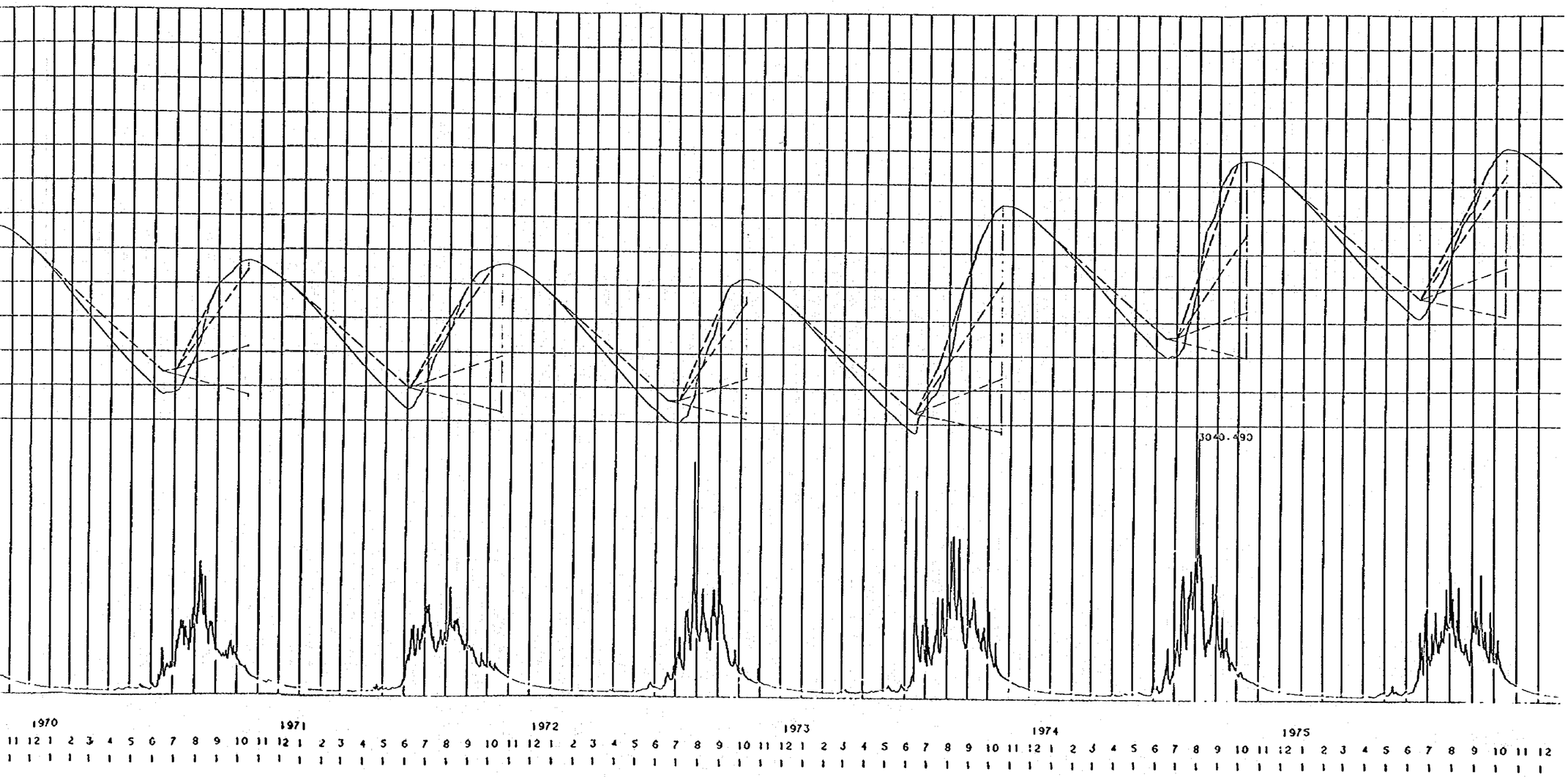


FIG.3.6.11(4) MASS CUR

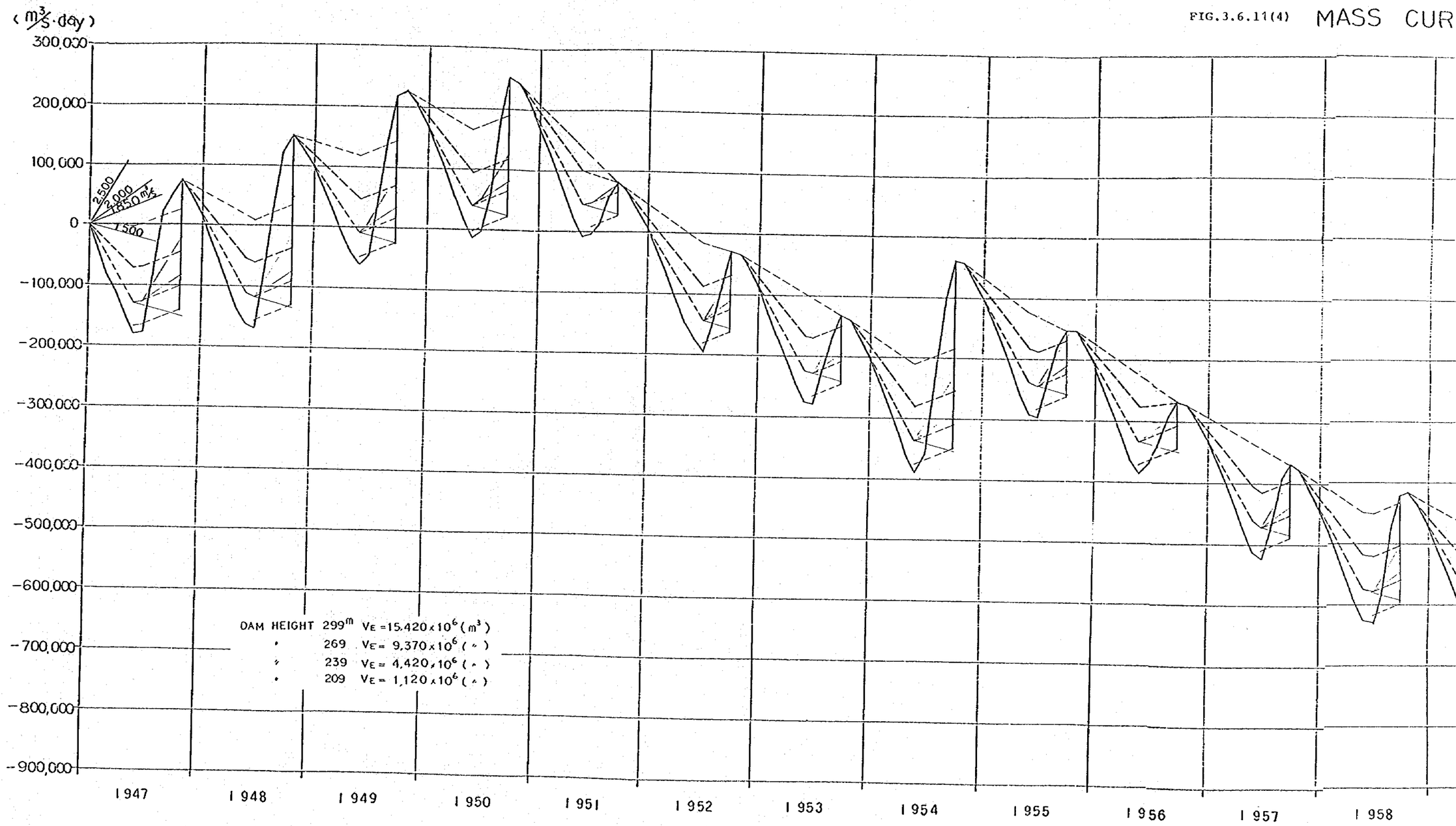
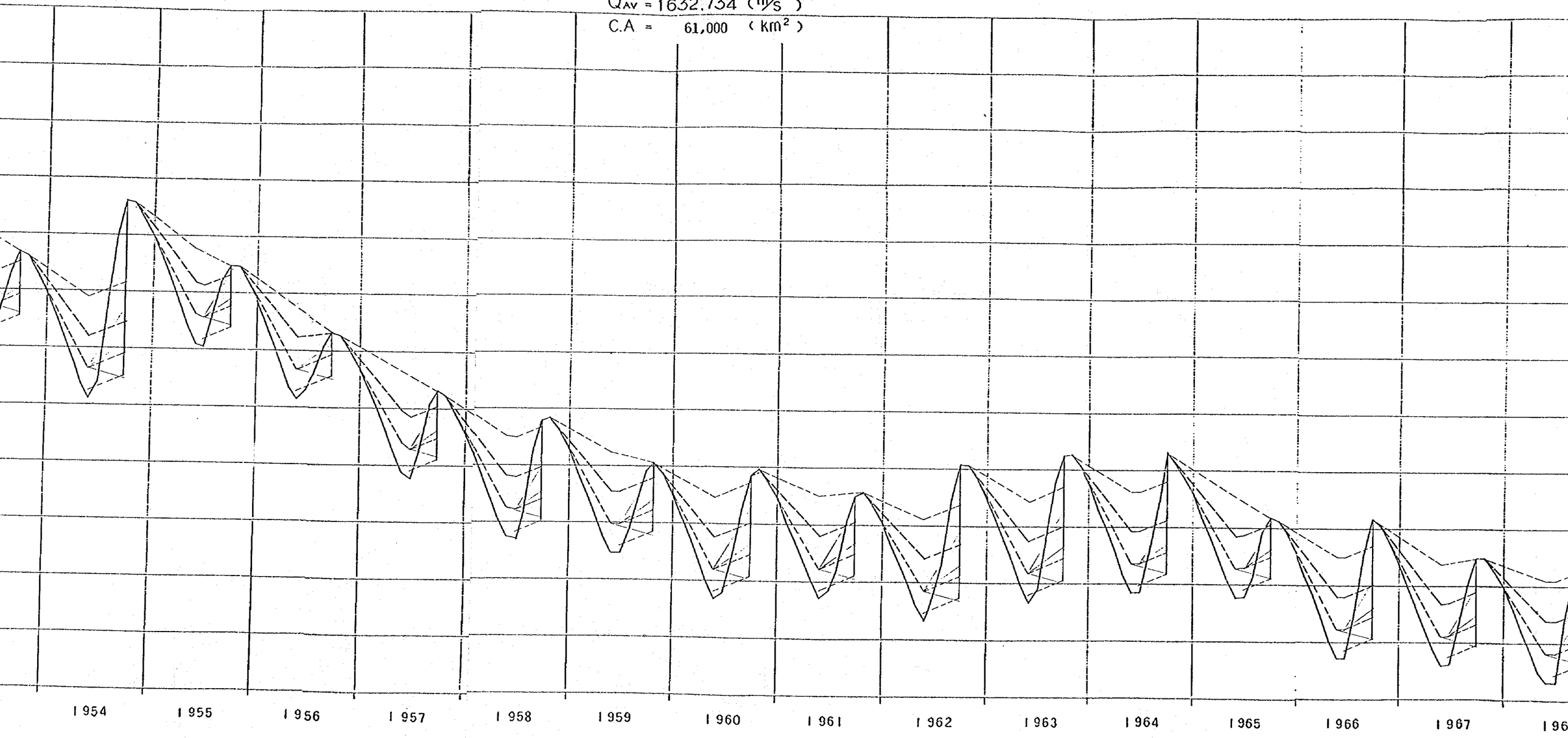


FIG.3.6.11(4) MASS CURVE SAPT KOSI

Q_{AV} = 1632.734 (m^3/s)

C.A = 61,000 (km^2)



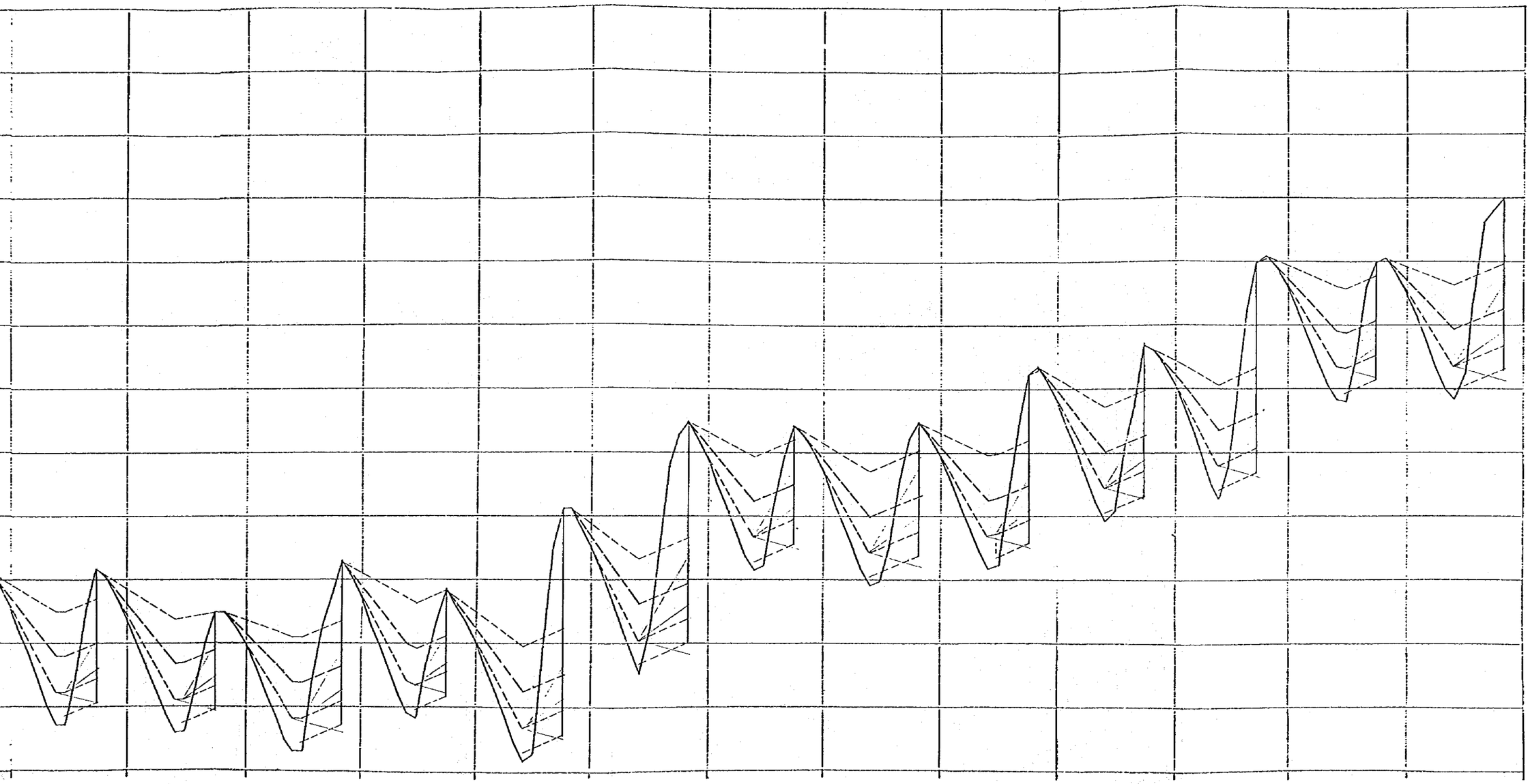

1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978

FIG.3.6.11(5) MASS CURVE TAML

Q AVERAGE=308.632 (1971-1

C.A.=5 085 (km²)

V_E = 760×10⁶ (m³) = 8 796 (m³/s

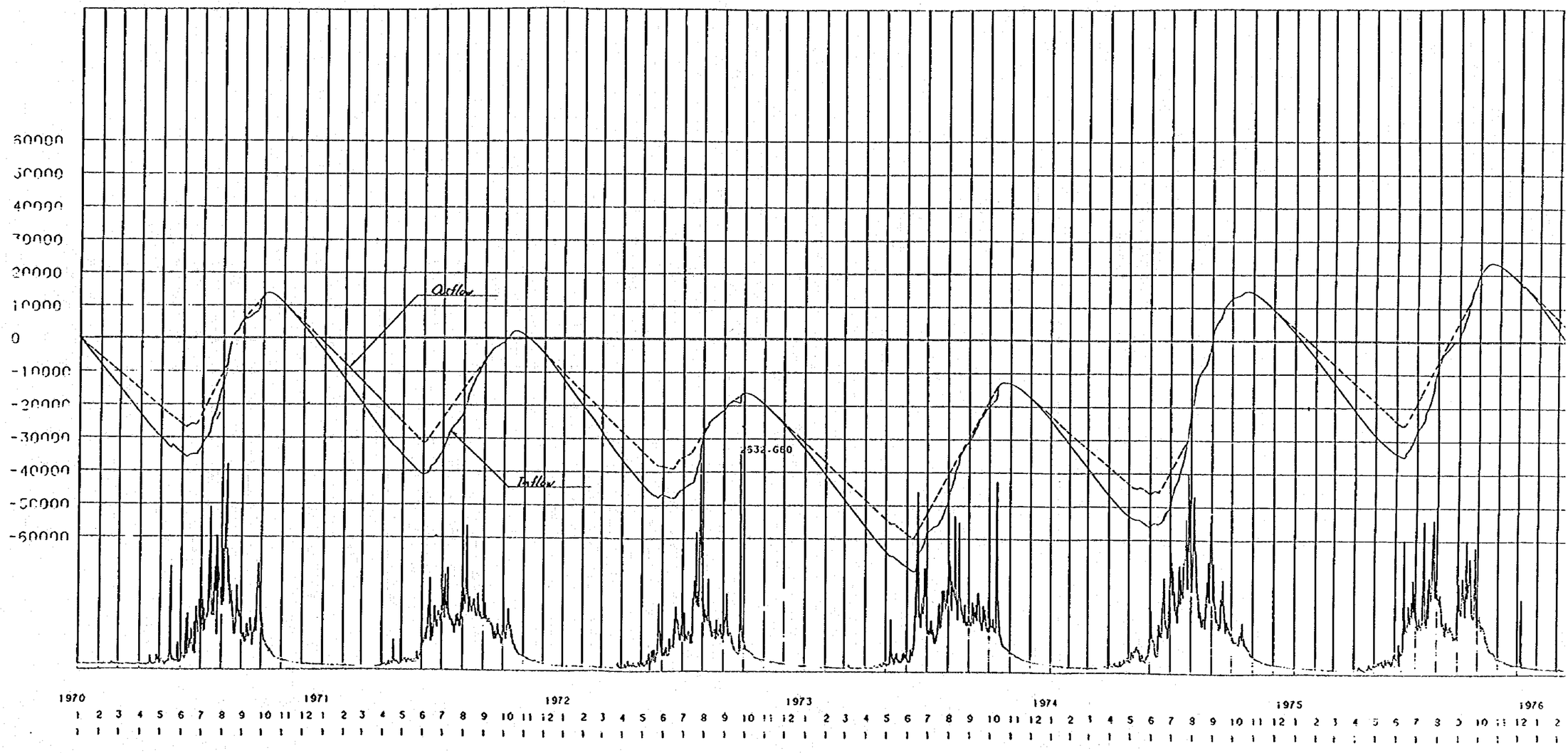


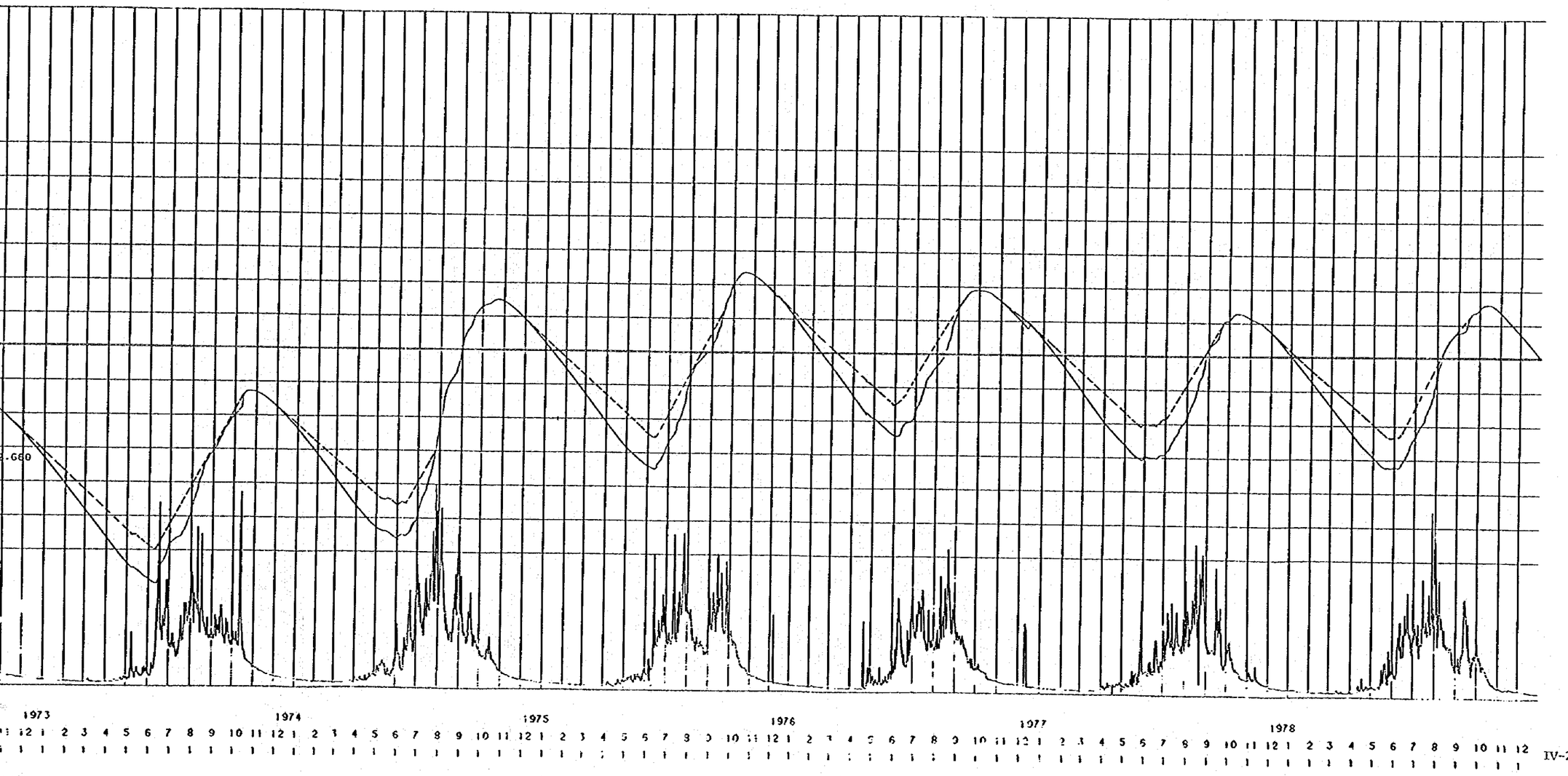
FIG.3.6.11(5)

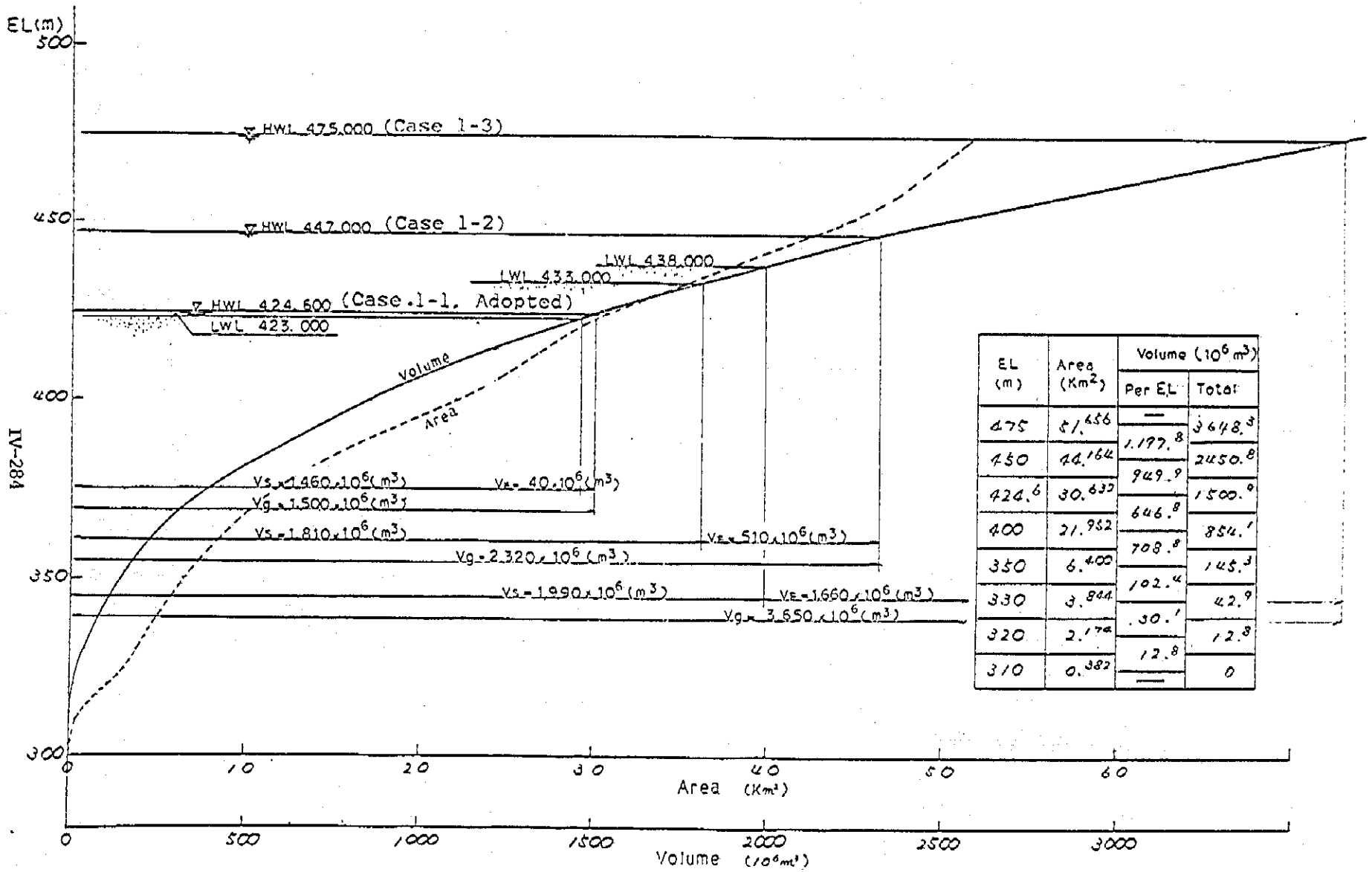
MASS CURVE TAMUR NO.1

Q AVERAGE=308.632 (1971-1979)

C.A.=5 085 (km²)

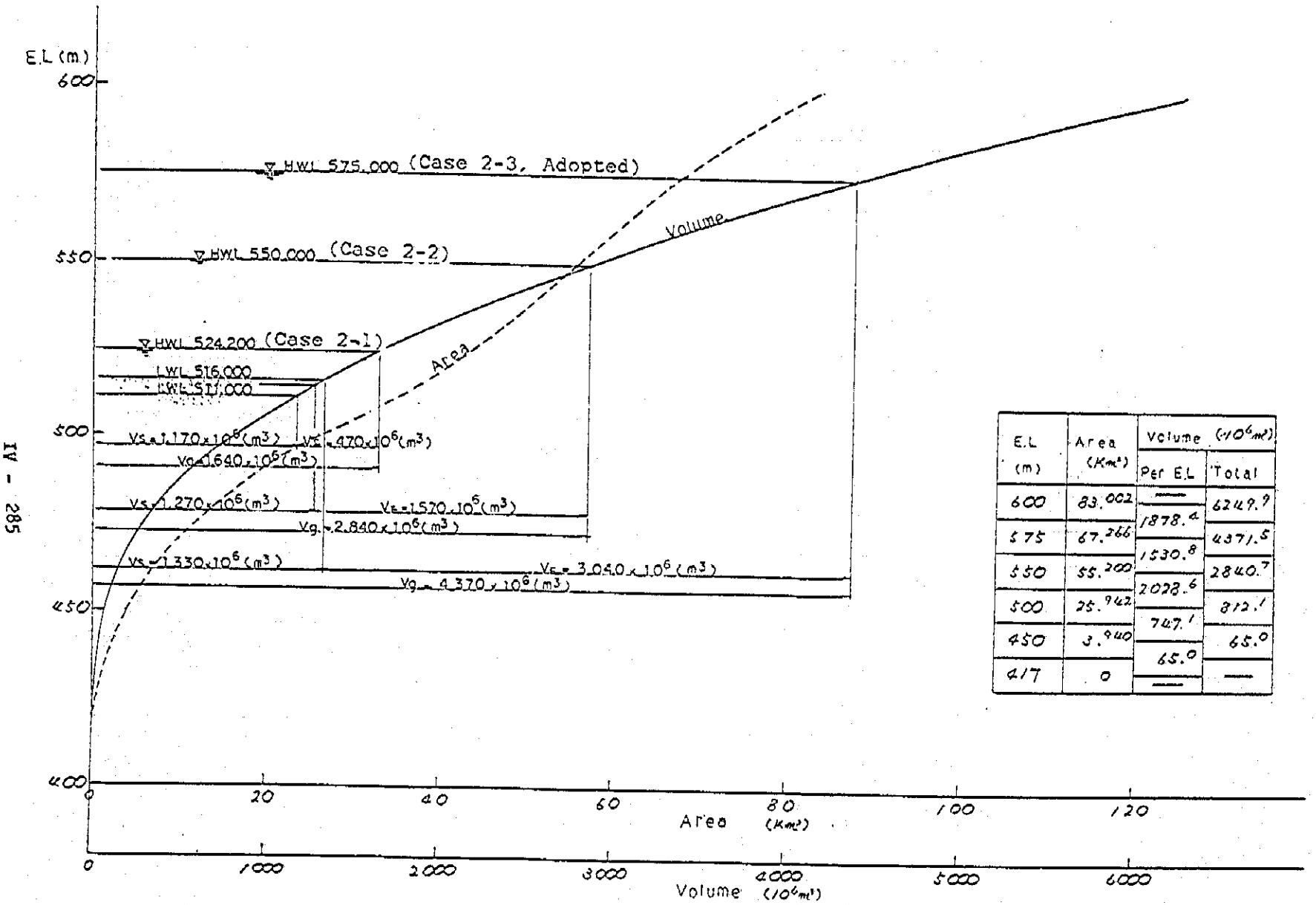
V_E = 760×10⁶ (m³) = 8 796 (m³/s·day)





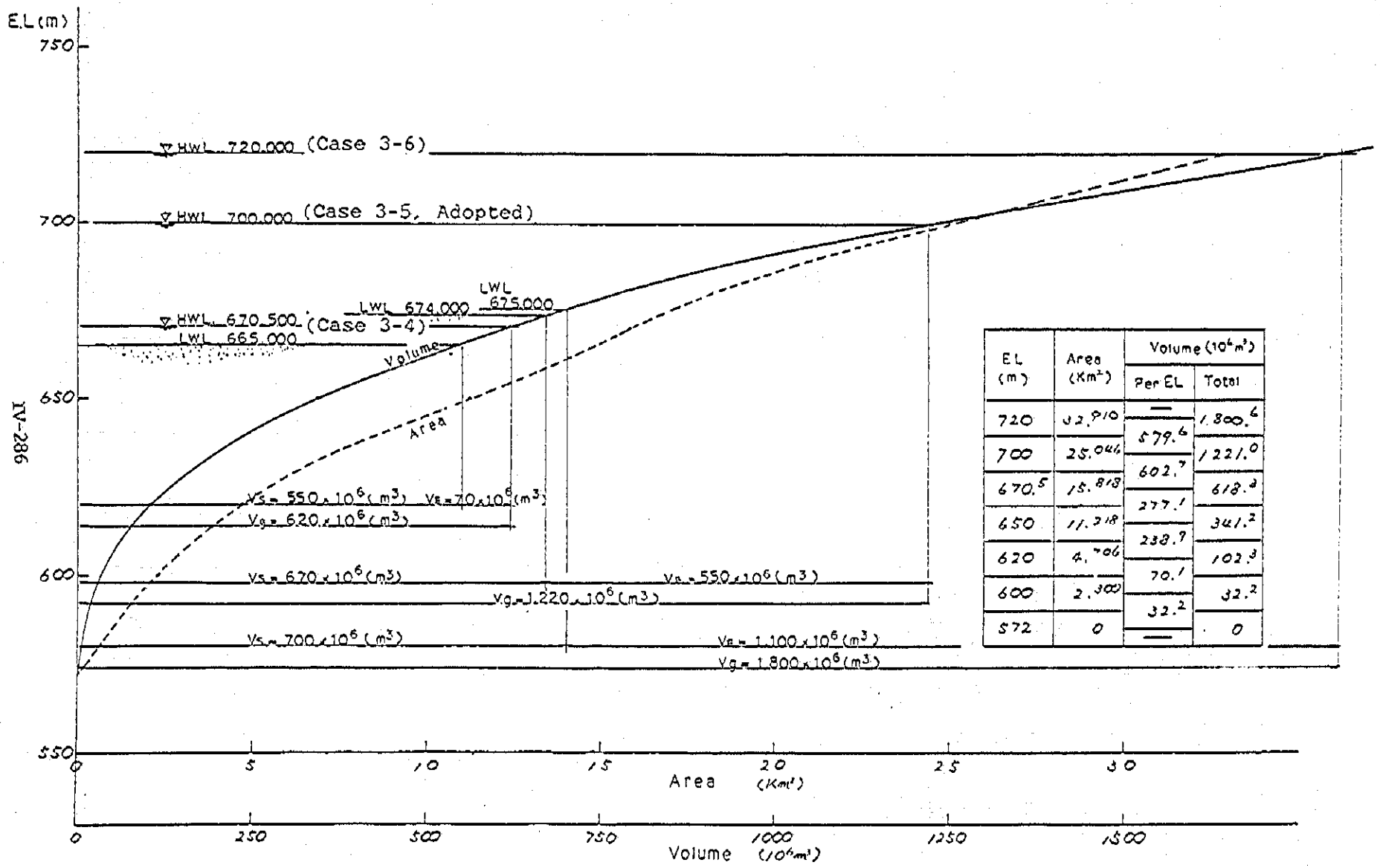
EL (m)	Area (Km²)	Volume (10^6 m³) Per EL	Total
475	51.456	—	3648.3
450	44.164	1,197.8	2450.5
424.6	30.633	949.9	1500.6
400	21.952	646.8	854.1
350	6.400	708.8	145.3
330	3.844	102.4	42.9
320	2.174	30.1	12.8
310	0.382	12.8	0
		—	

FIG. 3-6-12 (1) **STORAGE CAPACITY CURVE OF SUN KOSI NO.1 DAM (Site I)**



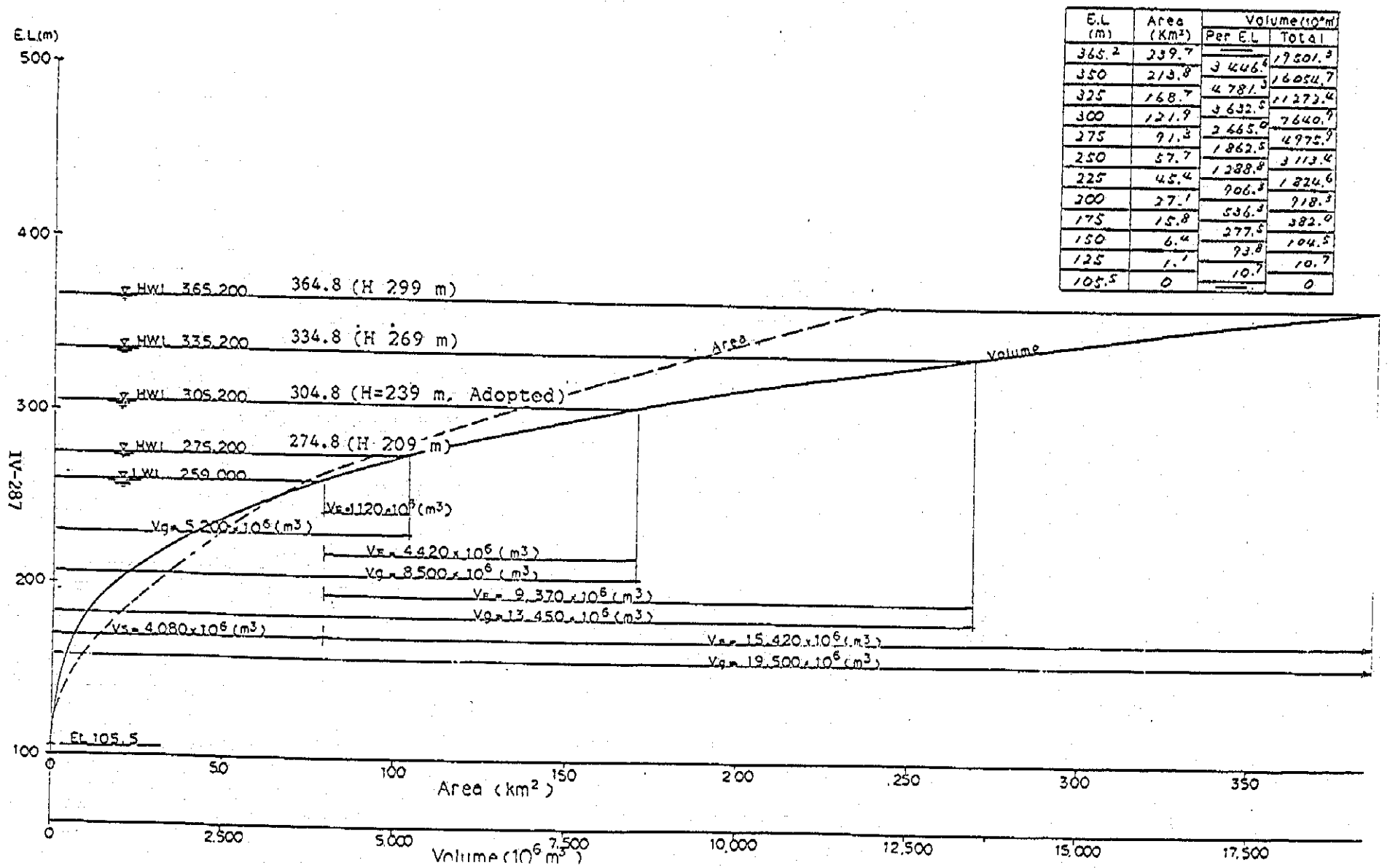
E.L (m)	Area (Km²)	Volume (×10⁶m³) Per E.L	Total
600	83.002	—	6249.9
		1878.4	
575	67.266		4371.5
		1530.8	
550	55.200		2840.7
		2028.6	
500	25.942		812.1
		747.1	
450	3.940		65.0
		65.0	
417	0	—	—

FIG. 3-6-12 (2) STORAGE CAPACITY CURVE OF SUN KOSI NO.2 DAM (Site II)



EL (m)	Area (Km²)	Volume (10⁶m³) Per EL	Volume (10⁶m³) Total
720	32.910	—	1,800.6
700	25.046	579.6	1,221.0
670.5	15.818	602.7	618.3
650	11.318	277.1	341.2
620	4.706	238.9	102.3
600	2.300	70.1	32.2
572	0	32.2	0

FIG. 3-6-12 (3) STORAGE CAPACITY CURVE OF SUN KOSI NO.3 DAM (Site VI)



E.L (m)	Area (Km²)	Volume (10⁶m³) Per E.L	Volume (10⁶m³) Total
365.2	239.7		19501.3
350	213.8	3 446.6	16054.7
325	168.7	4 781.3	11273.4
300	121.9	3 632.5	7640.9
275	91.3	2 665.0	4975.9
250	57.7	1 862.5	3 113.4
225	45.4	1 288.8	1 824.6
200	27.1	906.3	918.3
175	15.8	536.3	382.0
150	6.4	277.5	104.5
125	1.1	93.8	10.7
105.5	0	10.7	0

FIG. 3-6-12 (4) STORAGE CAPACITY CURVE OF SAPT KOSI HIGH DAM

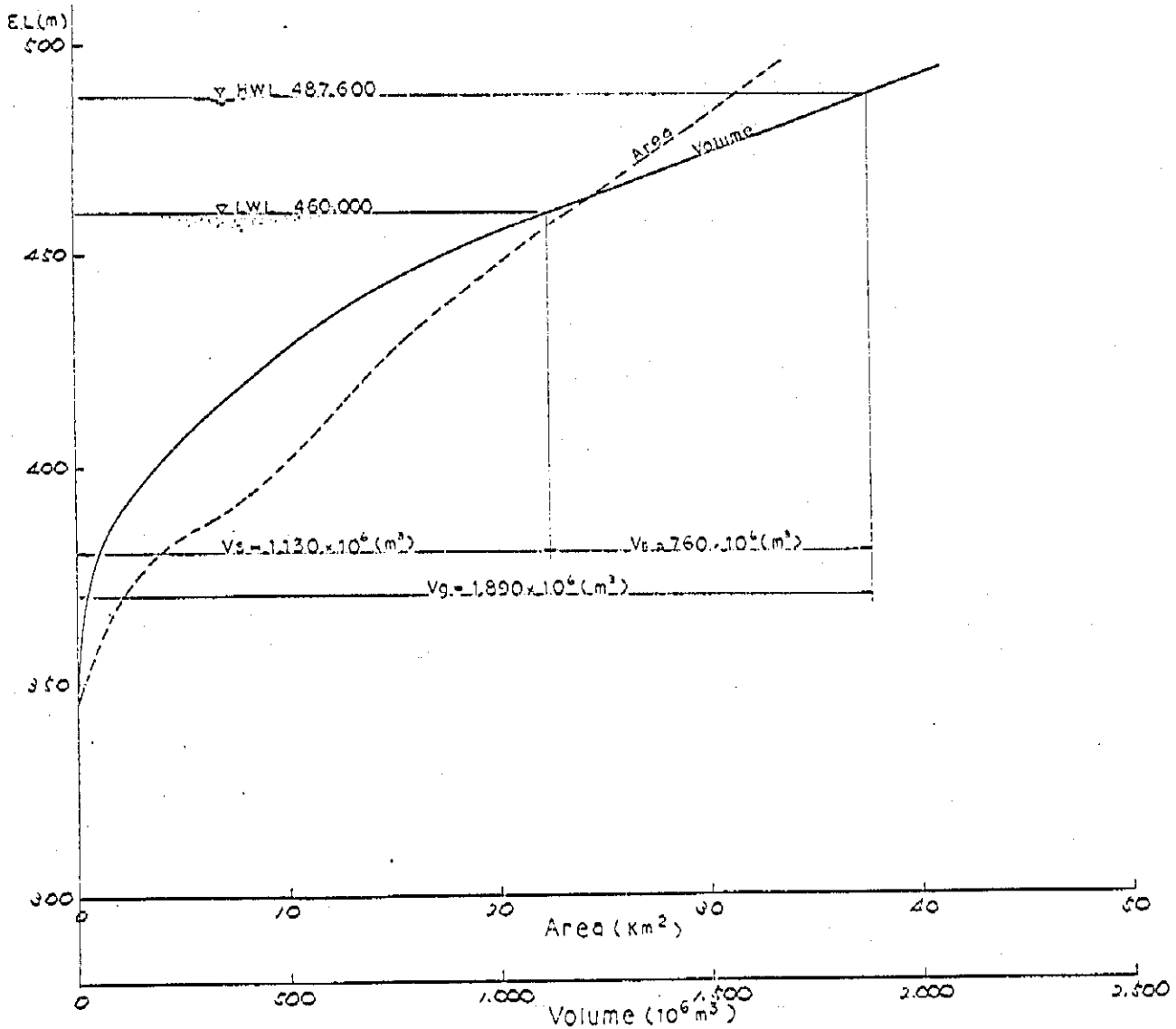


FIG. 3-6-12 (5) STORAGE CAPACITY CURVE OF TAMUR NO.1 DAM

FIG. 3-6-12 (6) STORAGE CAPACITY CURVE OF DUDH KOSI NO.1 DAM

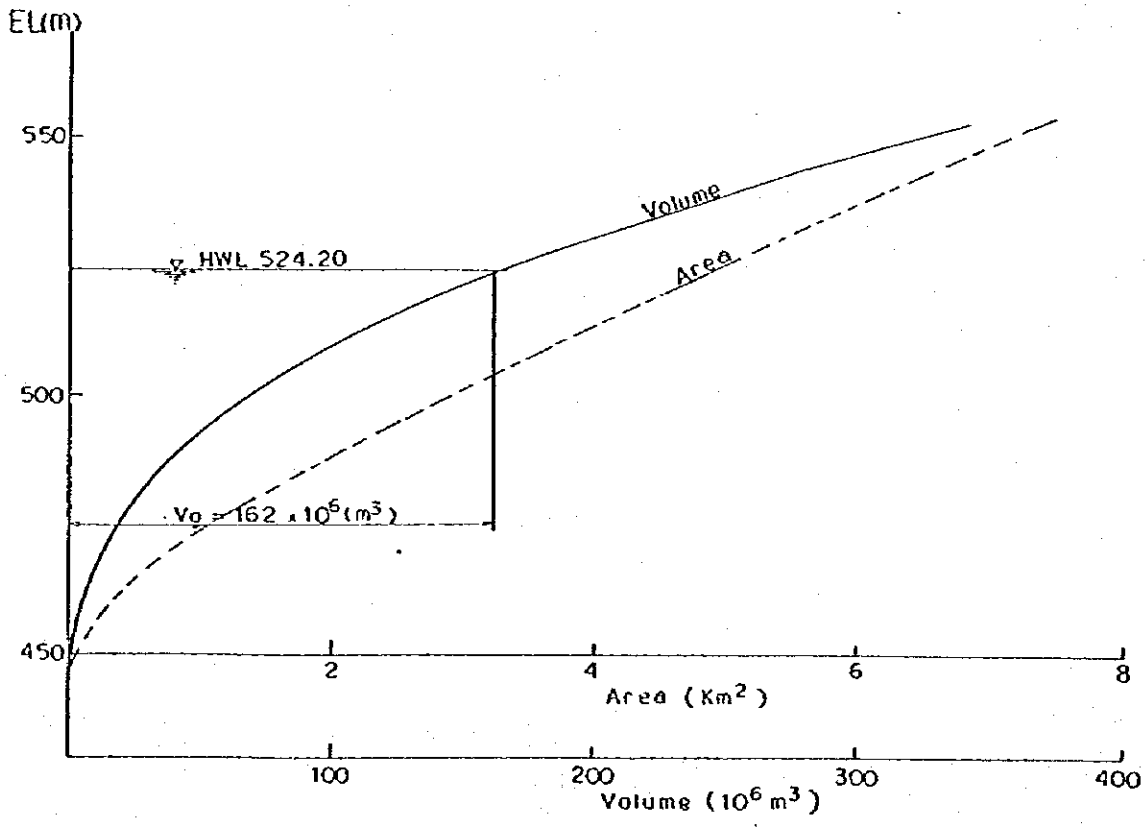


FIG. 3-6-12 (7) STORAGE CAPACITY CURVE OF TAMA KOSI NO.3 DAM

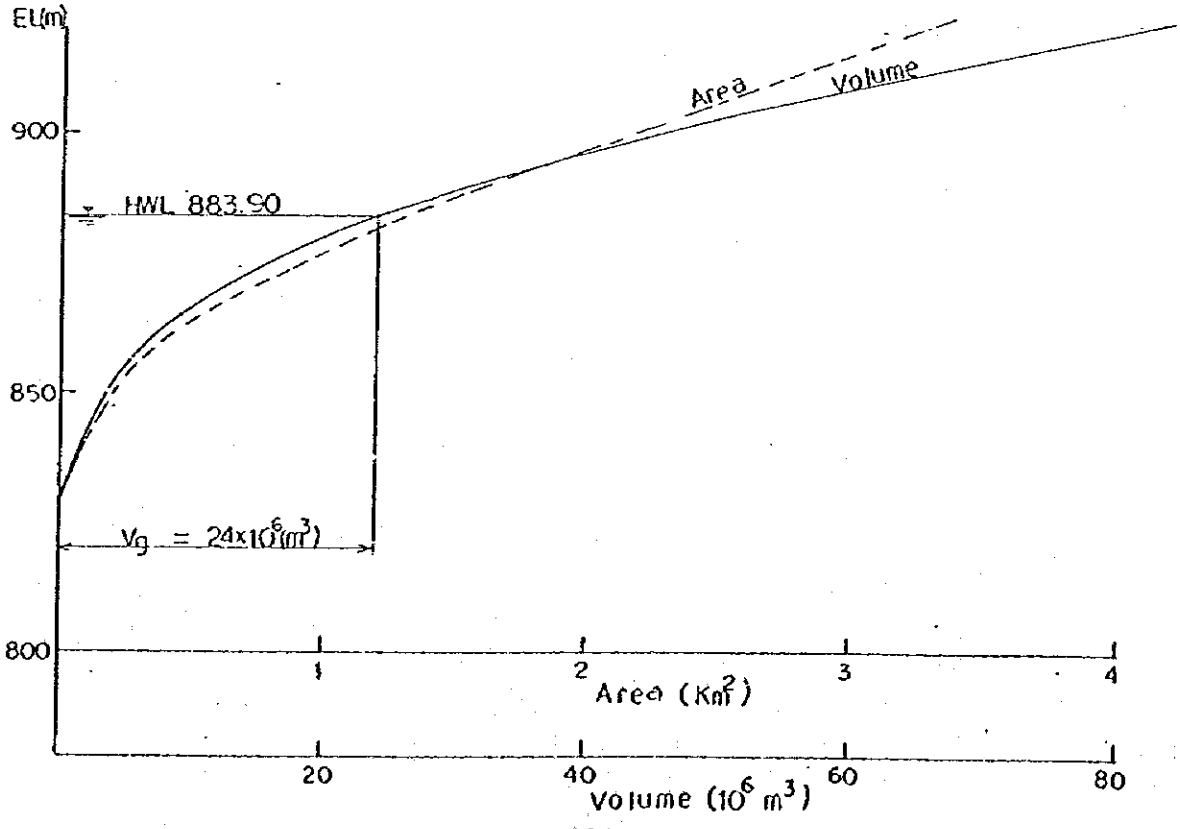


FIG. 3-6-12 (8) STORAGE CAPACITY CURVE OF TAMA KOSI NO.4 DAM

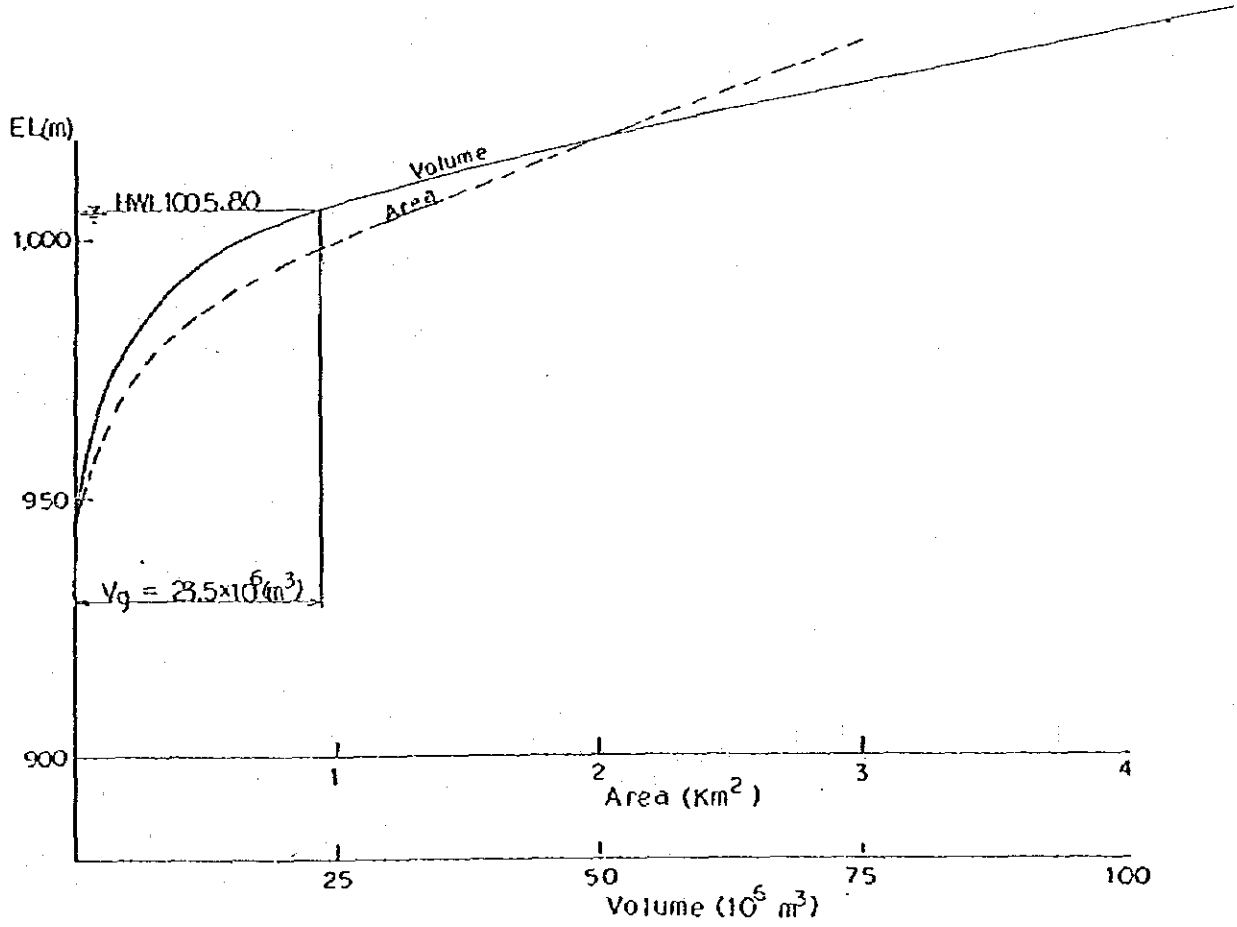


FIG. 3-6-12 (9) STORAGE CAPACITY CURVE OF INDRAWATI NO.2 DAM

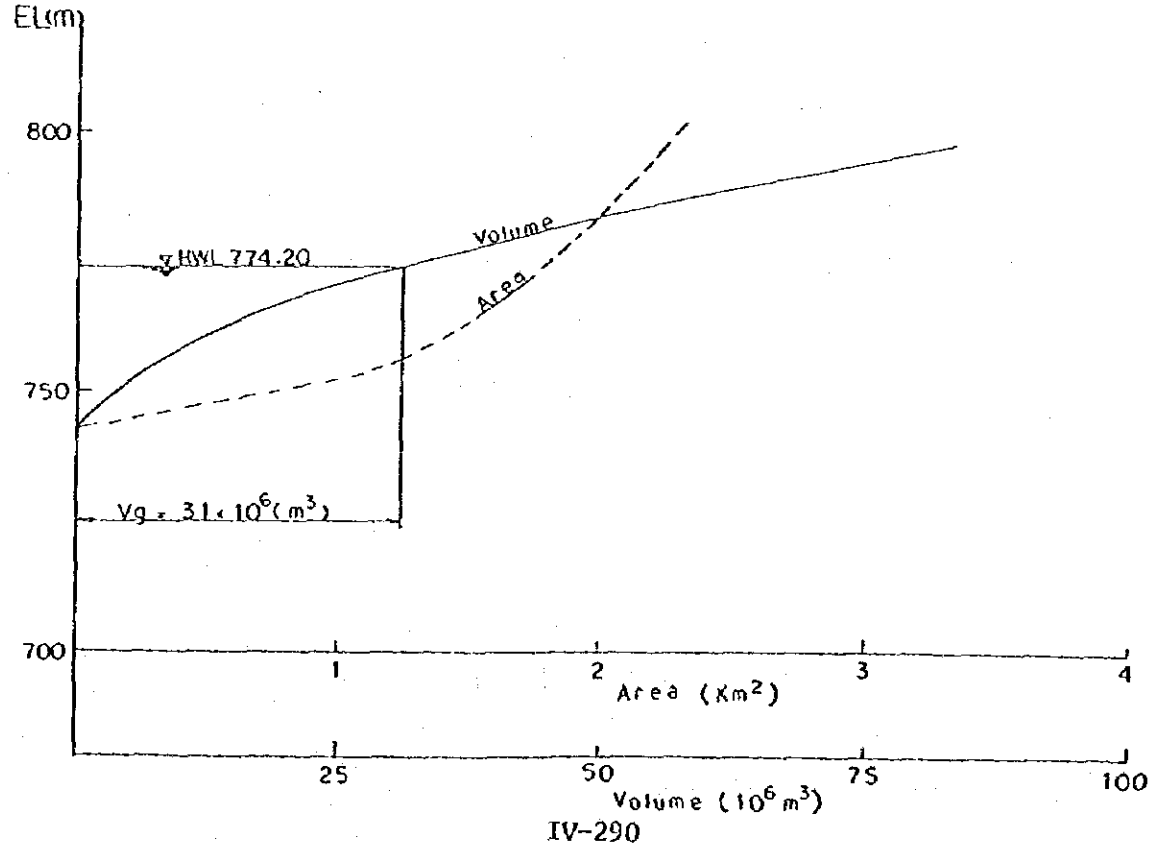


FIG. 3-6-12 (10) STORAGE CAPACITY CURVE OF TAMUR NO.2 DAM

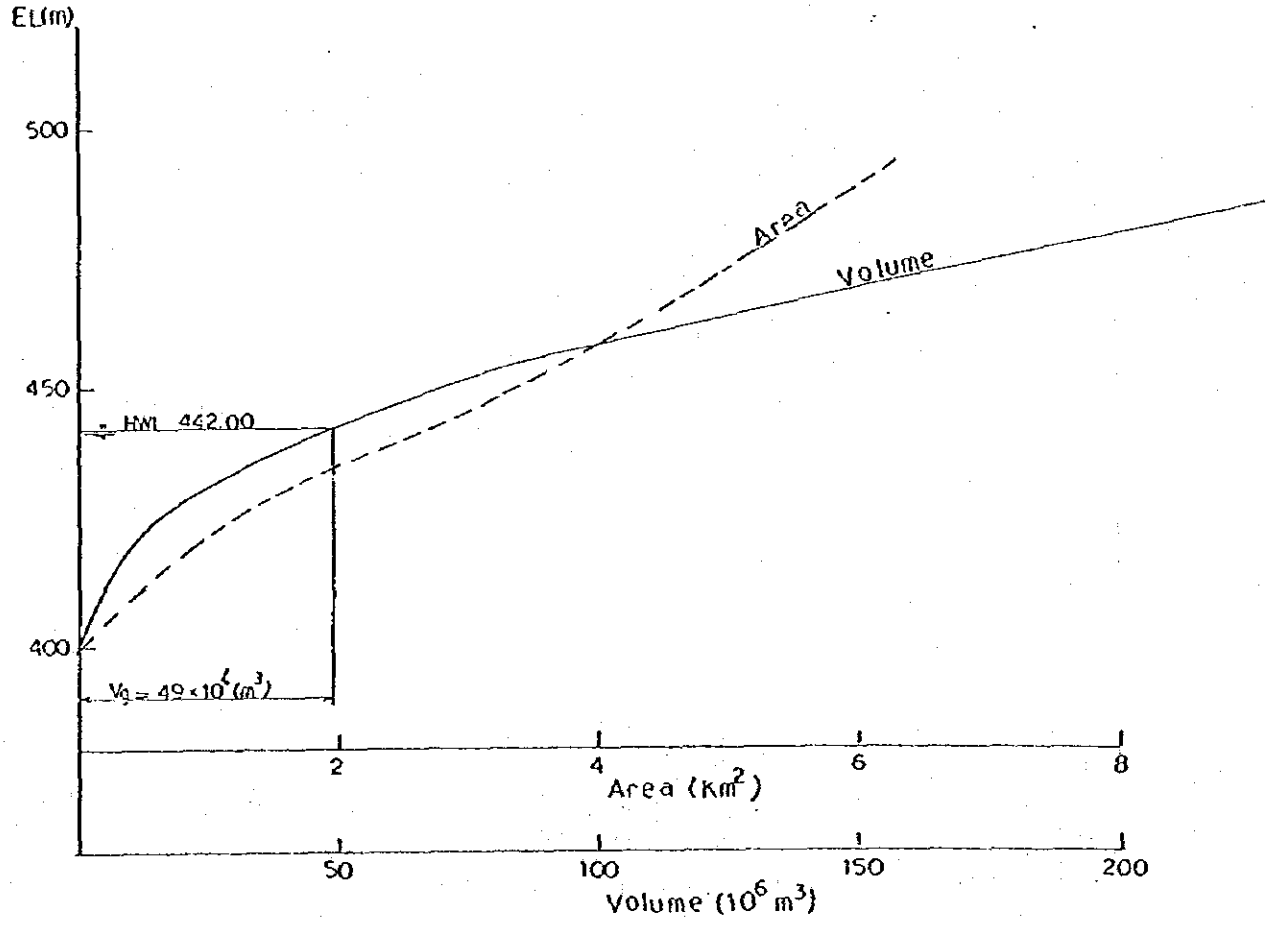
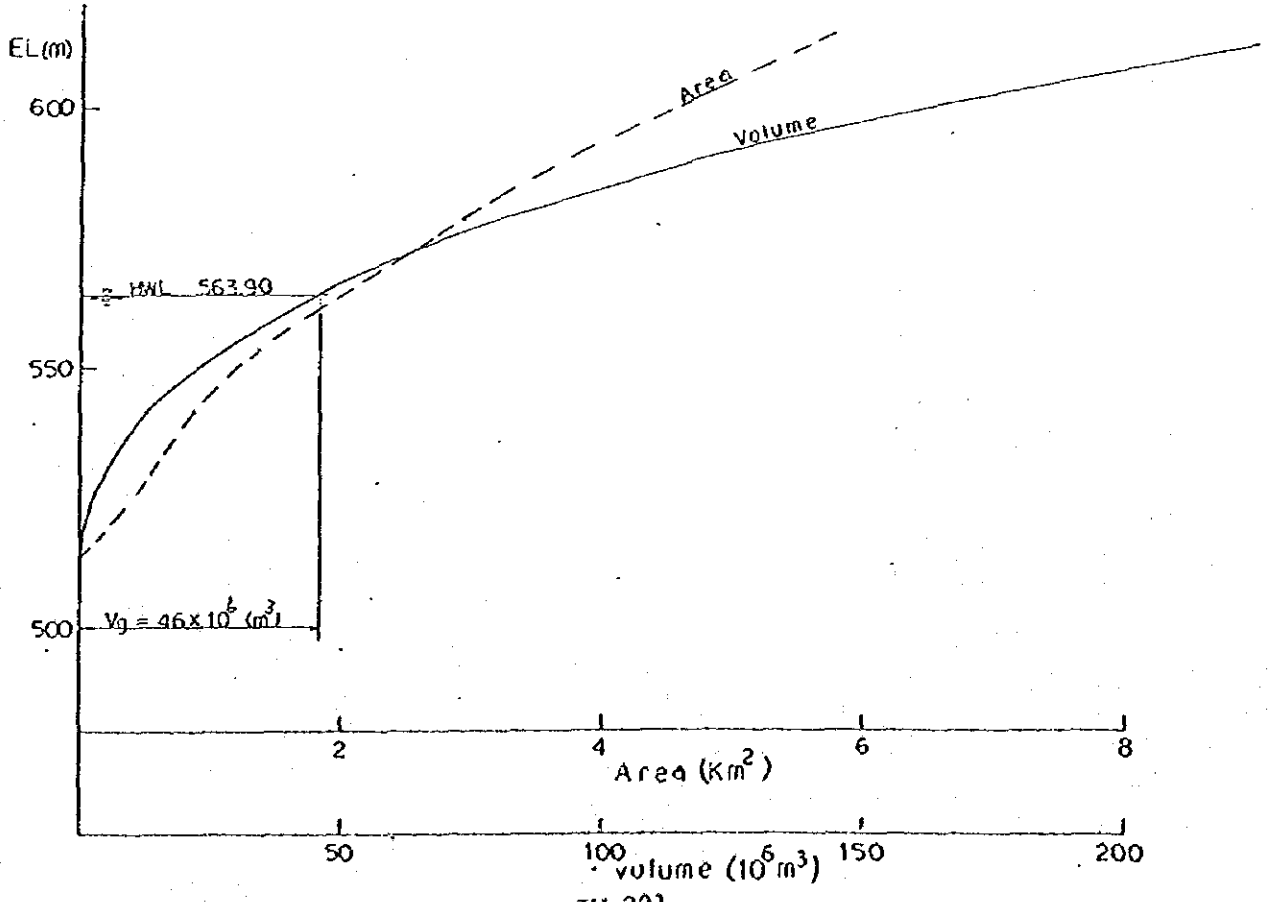


FIG. 3-6-12 (11) STORAGE CAPACITY CURVE OF TAMUR NO.3 DAM



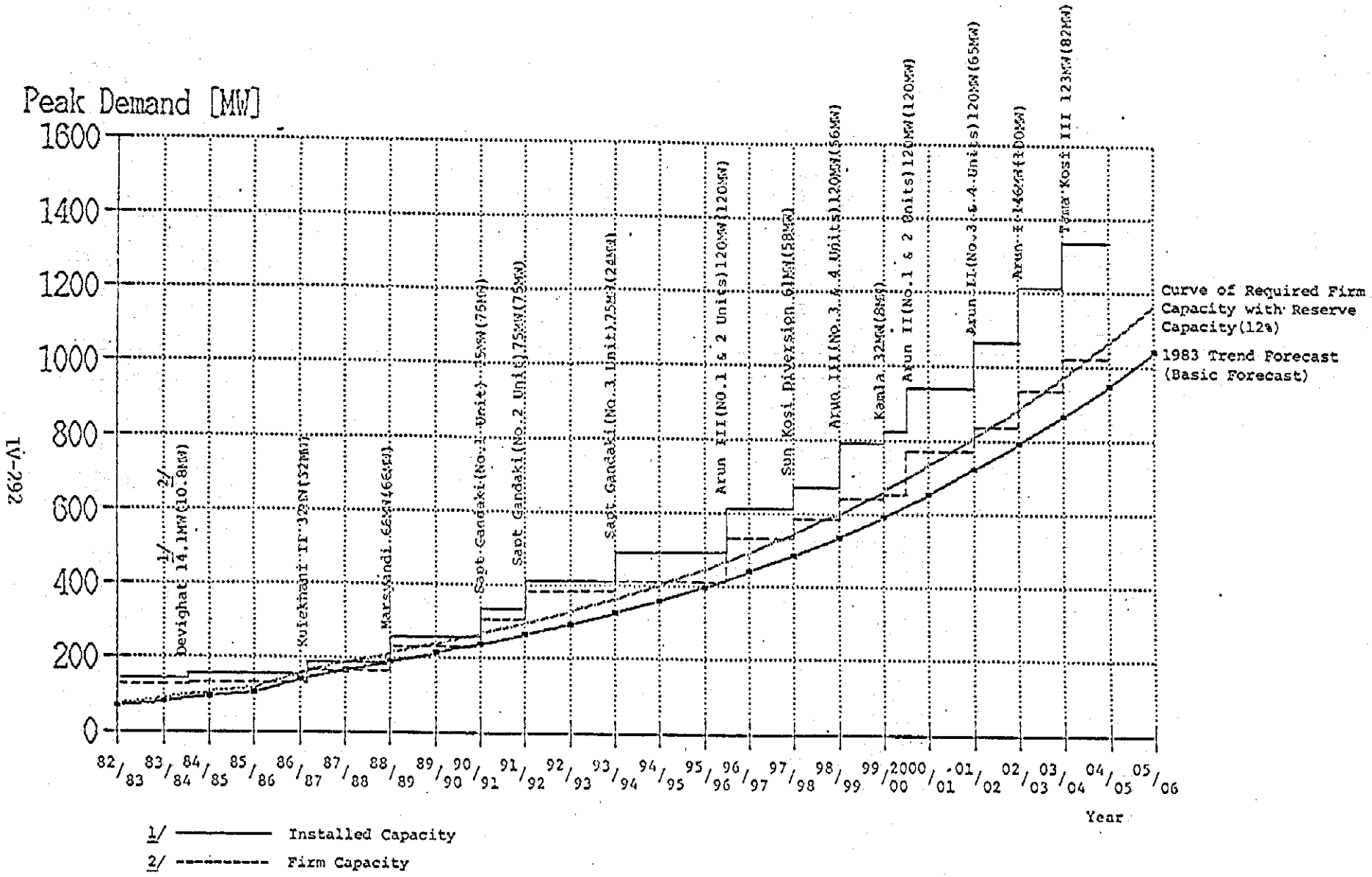


FIG. 3.6.14 HYDRO-ELECTRIC POWER DEVELOPMENT PROGRAM UP TO 2005 (ALTERNATIVE - 1 - 4)

(Alternative - 1)

(1 of 4)

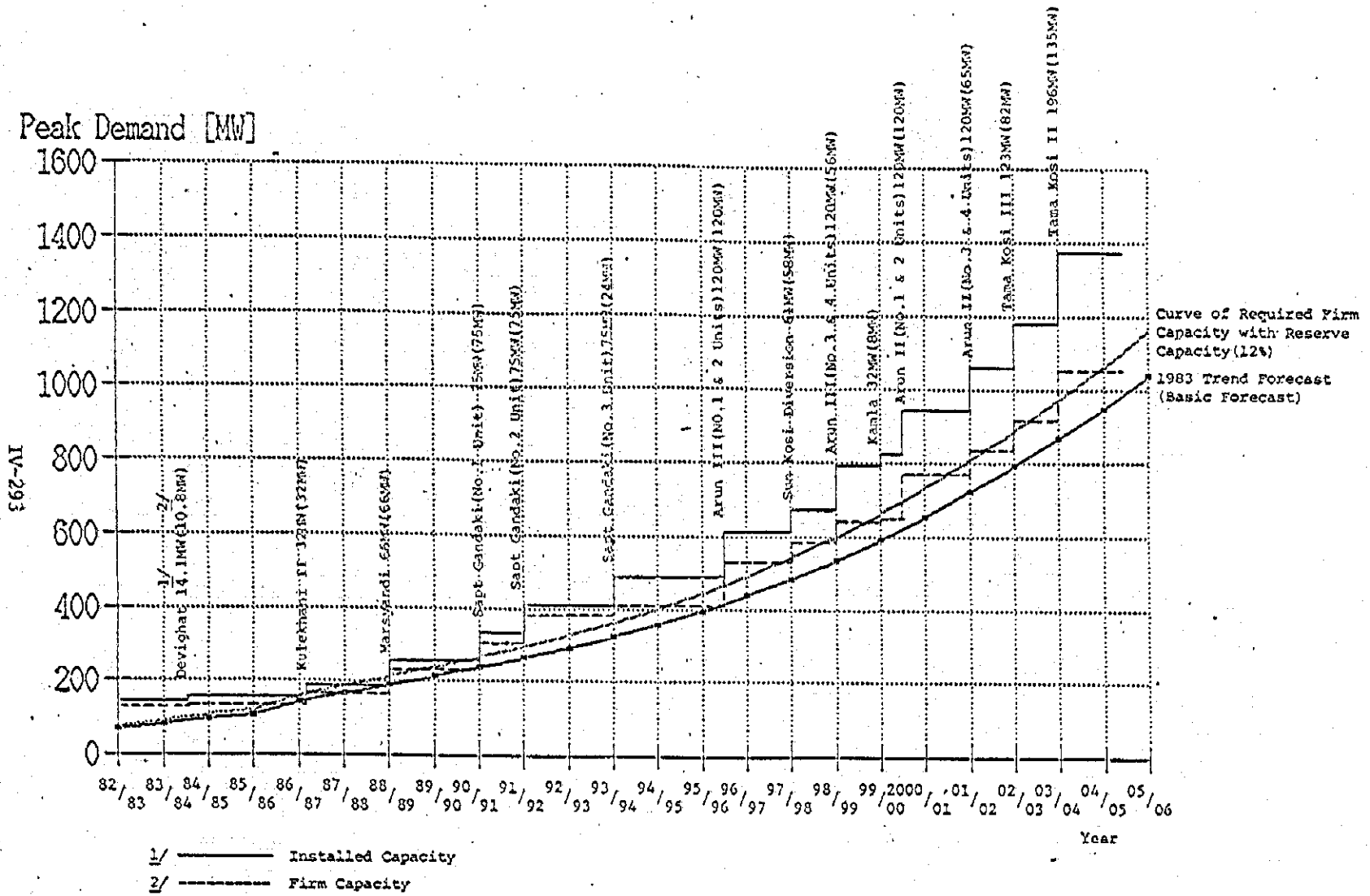


FIG. 3-6-14 HYDRO-ELECTRIC POWER DEVELOPMENT PROGRAM UP TO 2005 (ALTERNATIVE - 1 - 4)

(2 of 4) (Alternative - 2)

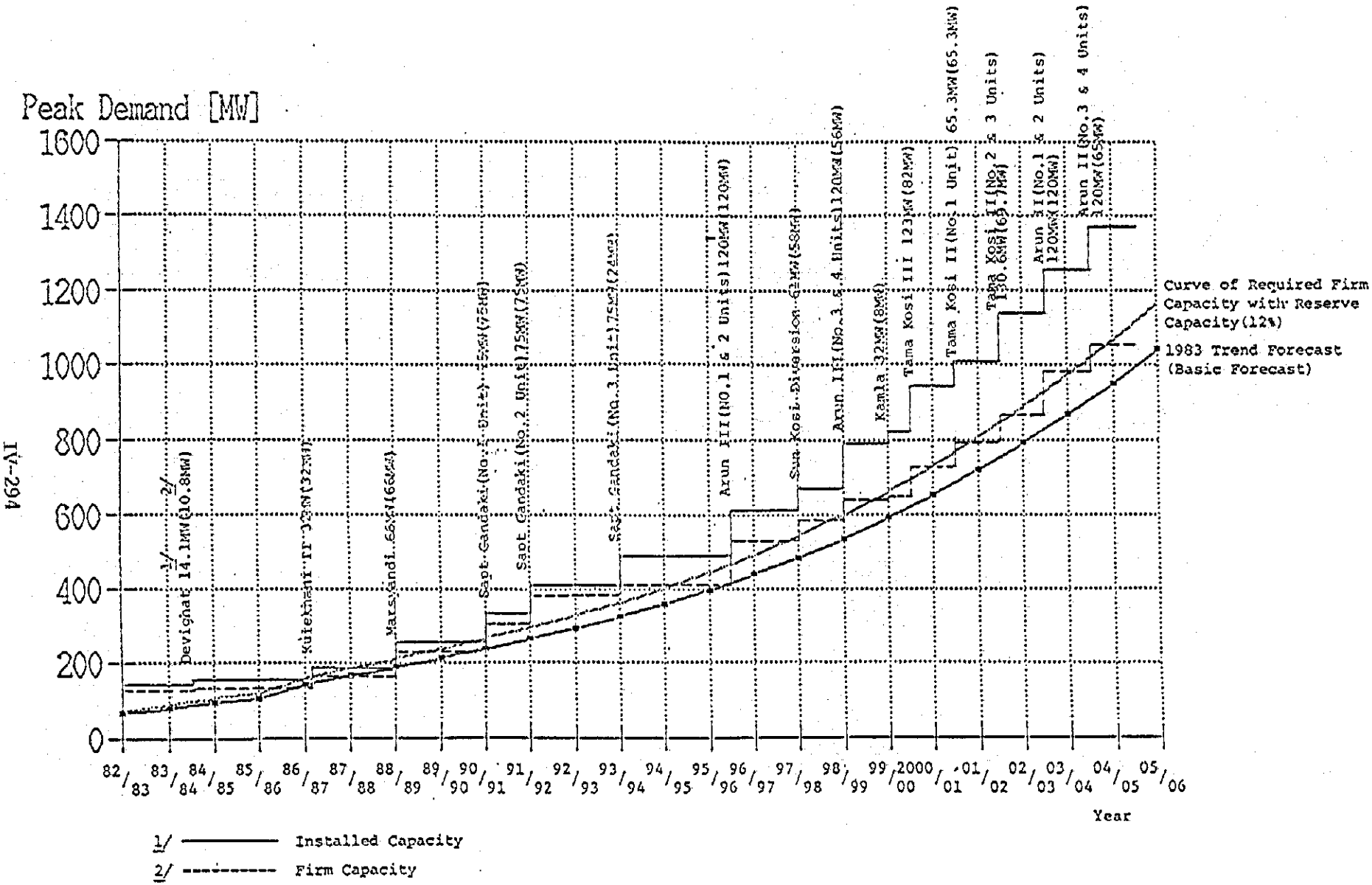


FIG. 3-6-14 HYDRO-ELECTRIC POWER DEVELOPMENT PROGRAM UP TO 2005 (ALTERNATIVE - 1 - 4)

(3 of 4) (Alternative - 3)

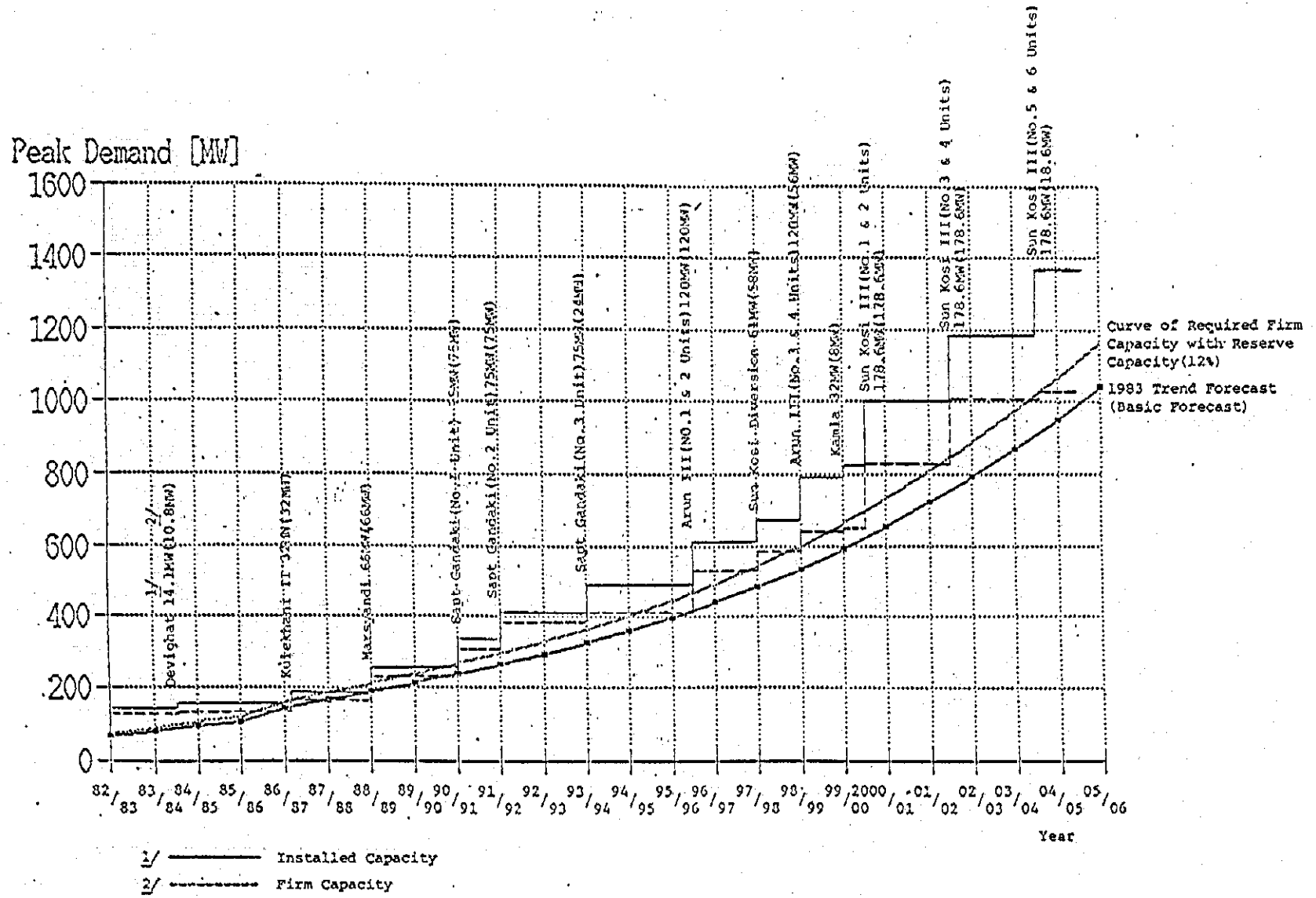
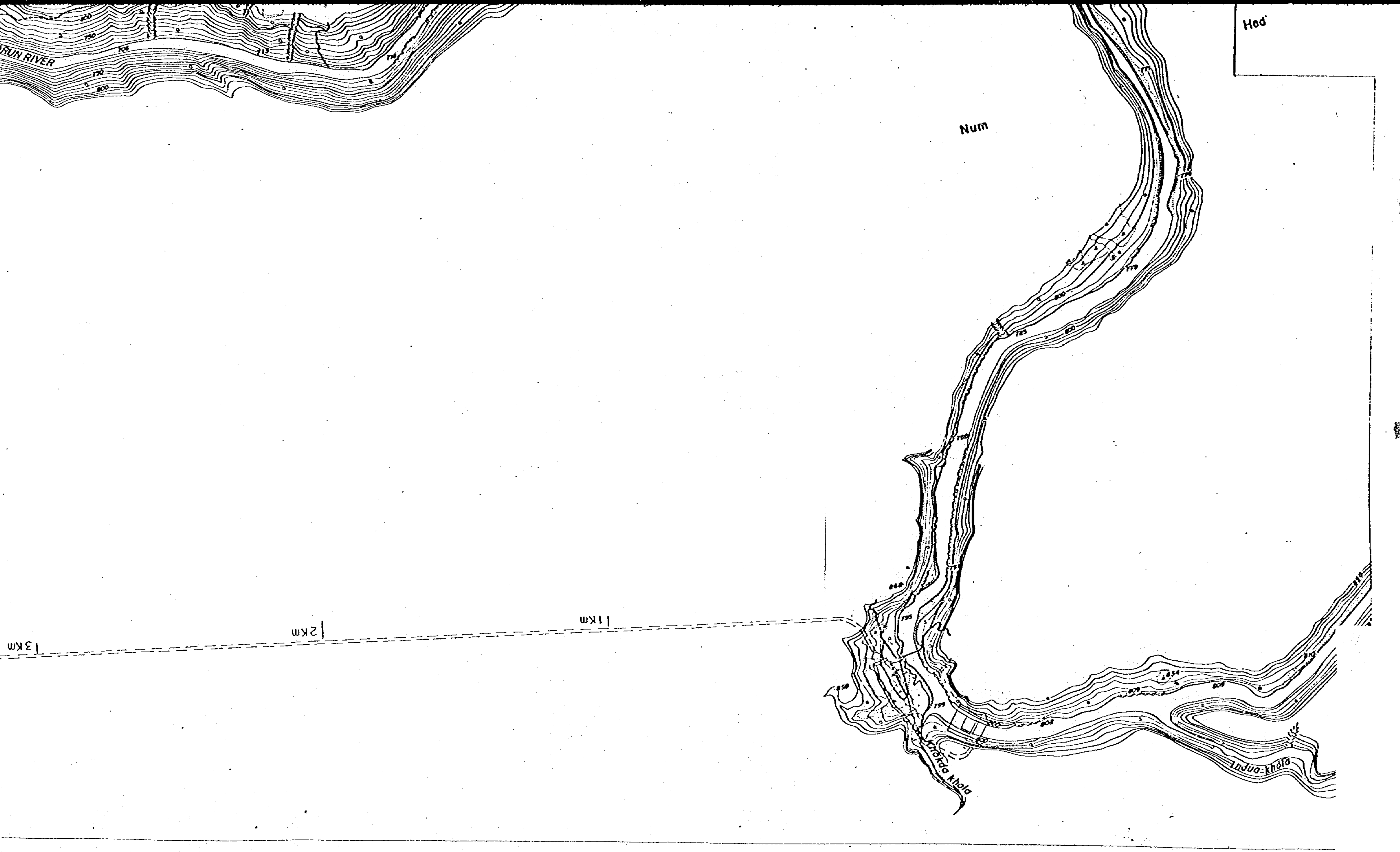


FIG. 3-6-14 HYDRO-ELECTRIC POWER DEVELOPMENT PROGRAM UP TO 2005 (ALTERNATIVE - 1 - 4)

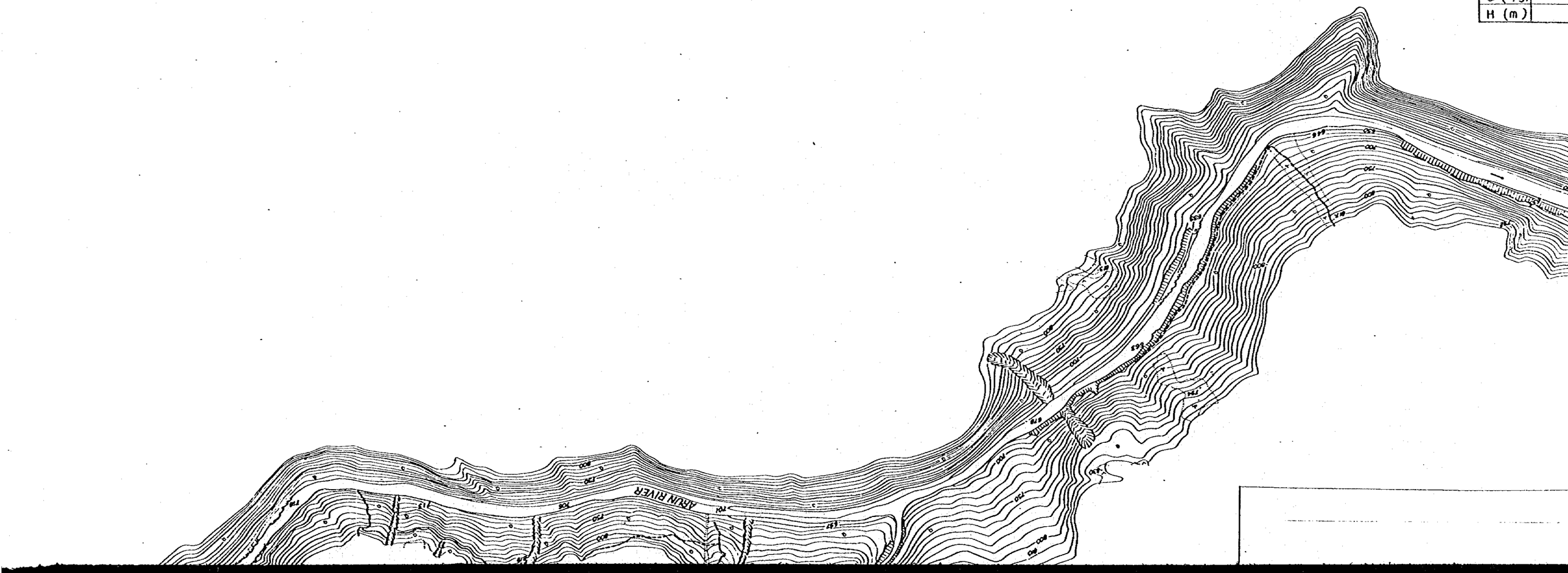
(4 of 4) (Alternative - 4)

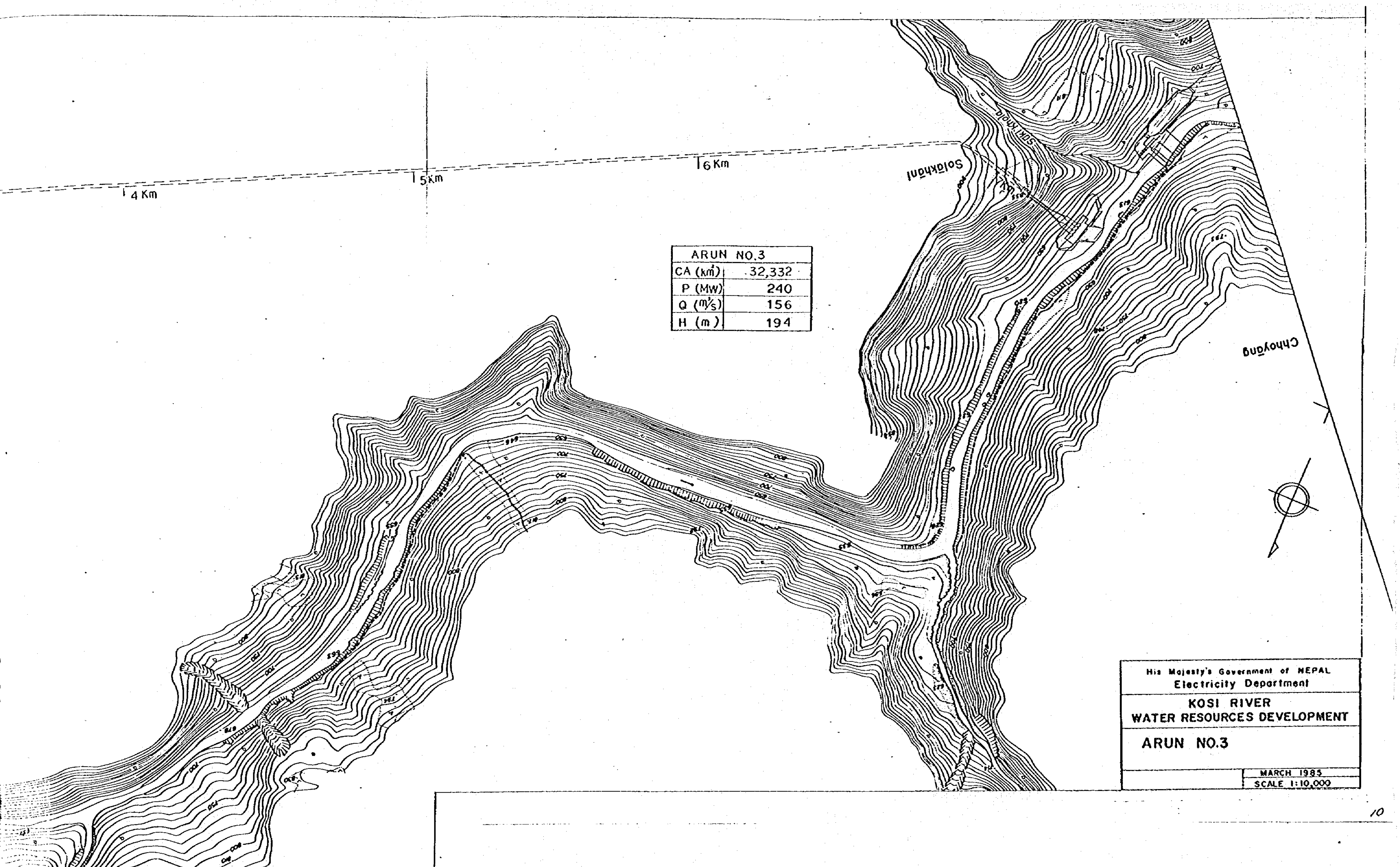


Hod
Num
RUN RIVER
Indua-khola
1Km
2Km
3Km

1 Km
2 Km
3 Km
4 Km
5 Km
6 Km

ARUN NO.	
CA (km²)	3
P (MW)	
Q (m³/s)	
H (m)	





ARUN NO.3	
CA (km^2)	32,332
P (MW)	240
Q (m^3/s)	156
H (m)	194

His Majesty's Government of NEPAL
Electricity Department

KOSI RIVER
WATER RESOURCES DEVELOPMENT

ARUN NO.3

MARCH 1985
SCALE 1:10,000

Num
Hed
Kosuwa
1Km
2Km

2Km

ARUN NO.3	
CA (km^2)	32,332
P (MW)	240
Q (m^3/s)	156
H (m)	194