INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-013-00-01-0-1

SCHEME : MALUPA

RIVER SYSTEM : CABATANGAN | WATER RESOURCES REGION : III | COORDINATES : N15-44-40 E121-21-30
STREAM : MALUPA | PROVINCE : QUEZON | STUDY LEVEL : IDENTIFIED IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	203.0	(MAIN : 203., INTER TRANSFER TOTAL	0.)	STREAM GAGE ID	: 4-4-001-NW-3118		
AVER. BASIN RAINFALL (MM/YR)	2503.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	242.		
AVERAGE DISCHARGE (M3/S)	14.2	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	17.1		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.61

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	217.5	GROSS STORAGE VOL. (MIL M3)	383.7		
	AVERAGE OPERATING LEVEL (EL.M)	201.8	ACTIVE STORAGE VOL. (MIL M3)	272.8		
	MINIMUM OPERATING LEVEL (EL.M)	170.4	DEAD STORAGE VOL. (MIL M3)	110.9		
	DRAWDOWN DEPTH (M)	47.1	SEDIMENT VOL. (MIL M3)	14.2		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	223.5	CREST LENGTH (M)	1236.7		
	DAM HEIGHT (M)	129.5	EMBANKMENT VOL. (MIL M3)	31.86		
WATERWAY	HEADRACE : LENGTH (M)	840.0	DIAMETER (WIDTH) (M)	2.6	NOS. :	1
	PENSTOCK : HORIZONT. L (M)	260.0	DIAMETER (M)	2.4	NOS. :	1
	DIVERSION : LENGTH (M)	1520.0	DIAMETER (M)	8.4	NOS. :	1
	EXCAVATION VOL TOTAL (1000 M3)	89.8				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	16.5	AVERAGE NET HEAD (M)	102.6		
	FIRM DISCHARGE (M3/S)	8.2	TAILWATER LEVEL (EL.M)	94.0		
POWER /ENERGY	INSATLLED CAPACITY (MW)	13.9	ANNUAL TOTAL ENERGY (GWH)	86.3		
	FIRM POWER (MW)	7.0	FIRM ENERGY (GWH)	61.0		
	MIN.GUARANTEED POWER (MW)	9.2	SECONDARY ENERGY (GWH)	25.3		

TRANSMISSION LINE — LENGTH (KM) : 52.0 — TO : MUNOZ — 69 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 18.0 — FROM : MARIA AURORA

CONSTRUCTION COST

TOTAL COST (MIL USD)	403.1	POWER COST (MIL USD)	396.0		
TOTAL COST/KW (USD/KW)	28952.1	TRANSMISSION COST (MIL USD)	1.9		
TOTAL COST/KWH (USD/KWH)	5.878	ACCESS ROAD COST (MIL USD)	5.1		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3267-II
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-023-00-01-0-1

SCHEME : UMIRAY-3

RIVER SYSTEM : UMIRAY | WATER RESOURCES REGION : III | COORDINATES : N15-04-32 E121-21-35
STREAM : UMIRAY | PROVINCE : AURORA | STUDY LEVEL : IDENTIFIED IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	335.0	(MAIN : 335.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-4-003-NW-430		
AVER. BASIN RAINFALL	(MM/YR) :	4954.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	879.
AVERAGE DISCHARGE	(M3/S) :	47.3	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.62

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	201.0	GROSS STORAGE VOL.	(MIL M3) :	1486.9		
	AVERAGE OPERATING LEVEL	(EL.M) :	182.5	ACTIVE STORAGE VOL.	(MIL M3) :	924.4		
	MINIMUM OPERATING LEVEL	(EL.M) :	145.4	DEAD STORAGE VOL.	(MIL M3) :	564.5		
	DRAWDOWN DEPTH	(M) :	55.6	SEDIMENT VOL.	(MIL M3) :	23.4		
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	207.0	CREST LENGTH	(M) :	1203.0		
	DAM HEIGHT	(M) :	147.0	EMBANKMENT VOL.	(MIL M3) :	25.91		
WATERWAY	HEADRACE : LENGTH	(M) :	1190.0	DIAMETER (WIDTH)	(M) :	5.8	NOS. :	2
	PENSTOCK : HORIZONT. L	(M) :	470.0	DIAMETER	(M) :	4.4	NOS. :	2
	DIVERSION : LENGTH	(M) :	1300.0	DIAMETER	(M) :	6.7	NOS. :	2
	EXCAVATION VOL TOTAL	(1000 M3) :	168.8					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	158.6	AVERAGE NET HEAD	(M) :	117.7		
	FIRM DISCHARGE	(M3/S) :	39.7	TAILWATER LEVEL	(EL.M) :	60.0		
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	153.7	ANNUAL TOTAL ENERGY	(GWH) :	392.8		
	FIRM POWER	(MW) :	38.4	FIRM ENERGY	(GWH) :	336.6		
	MIN.GUARANTEED POWER	(MW) :	100.3	SECONDARY ENERGY	(GWH) :	56.1		

TRANSMISSION LINE — LENGTH (KM) : 52.0 — TO : SAN JOSE — 230 K V DOUBLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 20.0 — FROM : ULALIKAN POINT

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	453.4	POWER COST	(MIL USD) :	439.0
TOTAL COST/KW	(USD/KW) :	2949.8	TRANSMISSION COST	(MIL USD) :	8.7
TOTAL COST/KWH	(USD/KWH) :	1.283	ACCESS ROAD COST	(MIL USD) :	5.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3265-II
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-023-00-02-0-1

SCHEME : UPPER UMIRAY

RIVER SYSTEM : UMIRAY
STREAM : UMIRAY
WATER RESOURCES REGION : III
PROVINCE : AURORA
COORDINATES : N14-57-25 E121-21-39
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	211.4	(MAIN : 211.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	:	4-4-003-NW-430
AVER. BASIN RAINFALL	(MM/YR) :	5164.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) :	879.
AVERAGE DISCHARGE	(M3/S) :	31.2	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) :	116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) :	322.0	GROSS STORAGE VOL.	(MIL M3) :	993.1	
	AVERAGE OPERATING LEVEL	(EL.M) :	300.4	ACTIVE STORAGE VOL.	(MIL M3) :	738.9	
	MINIMUM OPERATING LEVEL	(EL.M) :	257.2	DEAD STORAGE VOL.	(MIL M3) :	254.1	
	DRAWDOWN DEPTH	(M) :	64.8	SEDIMENT VOL.	(MIL M3) :	14.8	
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	328.0	CREST LENGTH	(M) :	408.0	
	DAM HEIGHT	(M) :	191.0	EMBANKMENT VOL.	(MIL M3) :	20.50	
WATERWAY	HEADRACE : LENGTH	(M) :	520.0	DIAMETER (WIDTH)	(M) :	5.9	NOS. : 2
	PENSTOCK : HORIZONT. L	(M) :	200.0	DIAMETER	(M) :	4.4	NOS. : 2
	DIVERSION : LENGTH	(M) :	1300.0	DIAMETER	(M) :	8.5	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	109.2				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	164.1	AVERAGE NET HEAD	(M) :	160.0	
	FIRM DISCHARGE	(M3/S) :	27.3	TAILWATER LEVEL	(EL.M) :	137.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	216.1	ANNUAL TOTAL ENERGY	(GWH) :	358.1	
	FIRM POWER	(MW) :	36.0	FIRM ENERGY	(GWH) :	315.5	
	MIN.GUARANTEED POWER	(MW) :	150.3	SECONDARY ENERGY	(GWH) :	42.6	

TRANSMISSION LINE : LENGTH (KM) : 41.0 TO : SAN JOSE 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 38.5 FROM : FROM NEAREST PUBLIC ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	401.8	POWER COST	(MIL USD) :	383.7	
TOTAL COST/KW	(USD/KW) :	1859.4	TRANSMISSION COST	(MIL USD) :	7.1	
TOTAL COST/KWH	(USD/KWH) :	1.224	ACCESS ROAD COST	(MIL USD) :	11.0	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3264-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-025-01-01-0-1

SCHEME : CATMON

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N15-02-35 E121-13-59
STREAM : ANGAT | PROVINCE : BULACAN | STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	254.0	(MAIN : 254., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-009-NW-326		
AVER. BASIN RAINFALL (MM/YR)	2250.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	258.		
AVERAGE DISCHARGE (M3/S)	8.2	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	8.3		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	300.0	GROSS STORAGE VOL. (MIL M3)	258.6		
	AVERAGE OPERATING LEVEL (EL.M)	289.0	ACTIVE STORAGE VOL. (MIL M3)	180.3		
	MINIMUM OPERATING LEVEL (EL.M)	266.9	DEAD STORAGE VOL. (MIL M3)	78.3		
	DRAWDOWN DEPTH (M)	33.1	SEDIMENT VOL. (MIL M3)	17.8		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	306.0	CREST LENGTH (M)	266.8		
	DAM HEIGHT (M)	91.0	EMBANKMENT VOL. (MIL M3)	2.56		
WATERWAY	HEADRACE : LENGTH (M)	550.0	DIAMETER (WIDTH) (M)	2.5	NOS. :	1
	PENSTOCK : HORIZONT. L (M)	110.0	DIAMETER (M)	1.8	NOS. :	1
	DIVERSION : LENGTH (M)	660.0	DIAMETER (M)	8.8	NOS. :	1
	EXCAVATION VOL TOTAL (1000 M3)	43.4				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	7.7	AVERAGE NET HEAD (M)	72.0		
	FIRM DISCHARGE (M3/S)	3.8	TAILWATER LEVEL (EL.M)	215.0		
POWER /ENERGY	INSATLLED CAPACITY (MW)	4.6	ANNUAL TOTAL ENERGY (GWH)	32.9		
	FIRM POWER (MW)	2.3	FIRM ENERGY (GWH)	20.0		
	MIN.GUARANTEED POWER (MW)	3.0	SECONDARY ENERGY (GWH)	12.9		

TRANSMISSION LINE — LENGTH (KM) : 34.0 — TO : SAN JOSE — 69 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 33.0 — FROM : ACLE

CONSTRUCTION COST

TOTAL COST (MIL USD)	78.4	POWER COST (MIL USD)	67.7
TOTAL COST/KW (USD/KW)	17211.4	TRANSMISSION COST (MIL USD)	1.4
TOTAL COST/KWH (USD/KWH)	3.290	ACCESS ROAD COST (MIL USD)	9.4

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3265-III
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-025-02-02-0-1

SCHEME : BALINTINGON

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N15-18-01 E121-07-19
STREAM : SUMACBAO | PROVINCE : NUEVA ECIJA | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	225.5	(MAIN : 226., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-052-NW-361		
AVER. BASIN RAINFALL	(MM/YR) :	2872.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	204.
AVERAGE DISCHARGE	(M3/S) :	10.1	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	6.4

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.61

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	160.0	GROSS STORAGE VOL.	(MIL M3) :	326.2		
	AVERAGE OPERATING LEVEL	(EL.M) :	149.9	ACTIVE STORAGE VOL.	(MIL M3) :	193.6		
	MINIMUM OPERATING LEVEL	(EL.M) :	129.6	DEAD STORAGE VOL.	(MIL M3) :	132.6		
	DRAWDOWN DEPTH	(M) :	30.4	SEDIMENT VOL.	(MIL M3) :	15.8		
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	166.0	CREST LENGTH	(M) :	427.5		
	DAM HEIGHT	(M) :	92.0	EMBANKMENT VOL.	(MIL M3) :	4.48		
WATERWAY	HEADRACE : LENGTH	(M) :	660.0	DIAMETER (WIDTH)	(M) :	2.5	NOS. :	1
	PENSTOCK : HORIZONT. L	(M) :	120.0	DIAMETER	(M) :	2.1	NOS. :	1
	DIVERSION : LENGTH	(M) :	890.0	DIAMETER	(M) :	8.6	NOS. :	1
	EXCAVATION VOL TOTAL	(1000 M3) :	55.3					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	12.0	AVERAGE NET HEAD	(M) :	72.9		
	FIRM DISCHARGE	(M3/S) :	6.0	TAILWATER LEVEL	(EL.M) :	74.0		
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	7.2	ANNUAL TOTAL ENERGY	(GWH) :	43.7		
	FIRM POWER	(MW) :	3.6	FIRM ENERGY	(GWH) :	31.4		
	MIN.GUARANTEED POWER	(MW) :	4.9	SECONDARY ENERGY	(GWH) :	12.2		

TRANSMISSION LINE : LENGTH (KM) : 33.0 | TO : CABANATUAN | 69 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD : LENGTH (KM) : 22.0 | FROM : PAPAYA

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	104.5	POWER COST	(MIL USD) :	96.9	
TOTAL COST/KW	(USD/KW) :	14562.1	TRANSMISSION COST	(MIL USD) :	1.3	
TOTAL COST/KWH	(USD/KWH) :	2.977	ACCESS ROAD COST	(MIL USD) :	6.3	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3265-IV
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-025-02-03-0-1

SCHEME : PAPAYA

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N15-21-39 E121-10-26
STREAM : CHICO | PROVINCE : NUEVA ECIJA | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	125.0	(MAIN : 125., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-052-NW-361		
AVER. BASIN RAINFALL (MM/YR)	2491.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	204.		
AVERAGE DISCHARGE (M3/S)	4.1	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	6.4		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	161.0	GROSS STORAGE VOL. (MIL M3)	127.2		
	AVERAGE OPERATING LEVEL (EL.M)	153.5	ACTIVE STORAGE VOL. (MIL M3)	89.8		
	MINIMUM OPERATING LEVEL (EL.M)	138.5	DEAD STORAGE VOL. (MIL M3)	37.4		
	DRAWDOWN DEPTH (M)	22.5	SEDIMENT VOL. (MIL M3)	8.7		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	167.0	CREST LENGTH (M)	409.0		
	DAM HEIGHT (M)	75.0	EMBANKMENT VOL. (MIL M3)	2.33		
WATERWAY	HEADRACE : LENGTH (M)	400.0	DIAMETER (WIDTH) (M)	2.5	NOS. :	1
	PENSTOCK : HORIZONT. L (M)	200.0	DIAMETER (M)	1.5	NOS. :	1
	DIVERSION : LENGTH (M)	640.0	DIAMETER (M)	7.5	NOS. :	1
	EXCAVATION VOL TOTAL (1000 M3)	30.6				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	4.9	AVERAGE NET HEAD (M)	59.5		
	FIRM DISCHARGE (M3/S)	2.4	TAILWATER LEVEL (EL.M)	92.0		
POWER /ENERGY	INSATLLED CAPACITY (MW)	2.4	ANNUAL TOTAL ENERGY (GWH)	14.4		
	FIRM POWER (MW)	1.2	FIRM ENERGY (GWH)	10.5		
	MIN.GUARANTEED POWER (MW)	1.7	SECONDARY ENERGY (GWH)	3.9		

TRANSMISSION LINE — LENGTH (KM) : 36.0 — TO : CABANATUAN — 69 K V SINGLE CIRCUIT . NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 22.0 — FROM : PAPAYA

CONSTRUCTION COST

TOTAL COST (MIL USD)	65.6	POWER COST (MIL USD)	57.9
TOTAL COST/KW (USD/KW)	27365.8	TRANSMISSION COST (MIL USD)	1.4
TOTAL COST/KWH (USD/KWH)	5.619	ACCESS ROAD COST (MIL USD)	6.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3266-III
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-025-03-04-0-1

SCHEME : LUBINGAN

RIVER SYSTEM : PAMPANGA
STREAM : LUBINGAN
WATER RESOURCES REGION : III
PROVINCE : NUEVA ECIJA
COORDINATES : N15-31-00 E121-19-00
STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 140.0	(MAIN : 140., INTER TRANSFER TOTAL : 0.)		STREAM GAGE ID	: 4-4-001-NW-3118		
AVER. BASIN RAINFALL	(MM/YR) : 2750.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 242.		
AVERAGE DISCHARGE	(M3/S) : 10.9	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 17.1		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.16

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 288.3	GROSS STORAGE VOL.	(MIL M3) : 66.9			
	AVERAGE OPERATING LEVEL	(EL.M) : 271.1	ACTIVE STORAGE VOL.	(MIL M3) : 54.9			
	MINIMUM OPERATING LEVEL	(EL.M) : 236.8	DEAD STORAGE VOL.	(MIL M3) : 12.0			
	DRAWDOWN DEPTH	(M) : 51.5	SEDIMENT VOL.	(MIL M3) : 9.8			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 294.3	CREST LENGTH	(M) : 432.2			
	DAM HEIGHT	(M) : 124.3	EMBANKMENT VOL.	(MIL M3) : 6.85			
WATERWAY	HEADRACE : LENGTH	(M) : 720.0	DIAMETER (WIDTH)	(M) : 2.5	NOS. : 1		
	PENSTOCK : HORIZONT. L	(M) : 140.0	DIAMETER	(M) : 1.8	NOS. : 1		
	DIVERSION : LENGTH	(M) : 1370.0	DIAMETER	(M) : 7.7	NOS. : 1		
	EXCAVATION VOL TOTAL	(1000 M3) : 67.7					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 8.6	AVERAGE NET HEAD	(M) : 98.3			
	FIRM DISCHARGE	(M3/S) : 4.3	TAILWATER LEVEL	(EL.M) : 170.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 6.9	ANNUAL TOTAL ENERGY	(GWH) : 57.8			
	FIRM POWER	(MW) : 3.5	FIRM ENERGY	(GWH) : 30.4			
	MIN.GUARANTEED POWER	(MW) : 4.3	SECONDARY ENERGY	(GWH) : 27.4			

TRANSMISSION LINE : LENGTH (KM) : 58.0 TO : MUNOZ 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 6.0 FROM : LIGAYA

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 135.9	POWER COST	(MIL USD) : 132.1		
TOTAL COST/KW	(USD/KW) : 19605.1	TRANSMISSION COST	(MIL USD) : 2.1		
TOTAL COST/KWH	(USD/KWH) : 3.521	ACCESS ROAD COST	(MIL USD) : 1.7		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3266-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-027-00-01-0-1

SCHEME : GUMAIN

RIVER SYSTEM : COLO | WATER RESOURCES REGION : III | COORDINATES : N15-01-30 E120-27-45
STREAM : GUMAIN | PROVINCE : PAMPANGA | STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	121.0	(MAIN : 121., INTER TRANSFER TOTAL	0.)	STREAM GAGE ID	: 4-3-052-NW-361		
AVER. BASIN RAINFALL (MM/YR)	2250.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	204.		
AVERAGE DISCHARGE (M3/S)	3.0	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	6.4		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.51

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	118.0	GROSS STORAGE VOL. (MIL M3)	60.8		
	AVERAGE OPERATING LEVEL (EL.M)	108.9	ACTIVE STORAGE VOL. (MIL M3)	48.5		
	MINIMUM OPERATING LEVEL (EL.M)	90.6	DEAD STORAGE VOL. (MIL M3)	12.3		
	DRAWDOWN DEPTH (M)	27.4	SEDIMENT VOL. (MIL M3)	8.5		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	124.0	CREST LENGTH (M)	340.1		
	DAM HEIGHT (M)	73.0	EMBANKMENT VOL. (MIL M3)	2.46		
WATERWAY	HEADRACE : LENGTH (M)	540.0	DIAMETER (WIDTH) (M)	2.5	NOS. :	1
	PENSTOCK : HORIZONT. L (M)	140.0	DIAMETER (M)	1.3	NOS. :	1
	DIVERSION : LENGTH (M)	910.0	DIAMETER (M)	6.6	NOS. :	1
	EXCAVATION VOL TOTAL (1000 M3)	33.7				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	3.4	AVERAGE NET HEAD (M)	56.3		
	FIRM DISCHARGE (M3/S)	1.7	TAILWATER LEVEL (EL.M)	51.0		
POWER /ENERGY	INSATLLED CAPACITY (MW)	1.6	ANNUAL TOTAL ENERGY (GWH)	10.0		
	FIRM POWER (MW)	0.8	FIRM ENERGY (GWH)	6.9		
	MIN.GUARANTEED POWER (MW)	1.0	SECONDARY ENERGY (GWH)	3.1		

TRANSMISSION LINE : LENGTH (KM) : 21.0 | TO : HERMOSA | 69 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 6.0 | FROM : PANLAG

CONSTRUCTION COST

TOTAL COST (MIL USD)	62.5	POWER COST (MIL USD)	59.8
TOTAL COST/KW (USD/KW)	39698.3	TRANSMISSION COST (MIL USD)	1.0
TOTAL COST/KWH (USD/KWH)	7.985	ACCESS ROAD COST (MIL USD)	1.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3065-II
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-02-0-1

SCHEME : PILA

RIVER SYSTEM : AGNO
STREAM : PILA
WATER RESOURCES REGION : III
PROVINCE : PANGASINAN
COORDINATES : N15-44-37 E120-15-20
STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	114.0	(MAIN : 114., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-017-NW-325		
AVER. BASIN RAINFALL	(MM/YR) :	2500.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	128.
AVERAGE DISCHARGE	(M3/S) :	5.7	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	7.4

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	193.0	GROSS STORAGE VOL.	(MIL M3) :	179.9	
	AVERAGE OPERATING LEVEL	(EL.M) :	177.8	ACTIVE STORAGE VOL.	(MIL M3) :	134.4	
	MINIMUM OPERATING LEVEL	(EL.M) :	147.5	DEAD STORAGE VOL.	(MIL M3) :	45.5	
	DRAWDOWN DEPTH	(M) :	45.5	SEDIMENT VOL.	(MIL M3) :	8.0	
MAIN DAM	CREST ELEVATION	(EL.M) :	199.0	CREST LENGTH	(M) :	983.5	
(WEIR)	DAM HEIGHT	(M) :	113.0	EMBANKMENT VOL.	(MIL M3) :	17.35	
WATERWAY	HEADRACE : LENGTH	(M) :	520.0	DIAMETER (WIDTH)	(M) :	2.5	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	260.0	DIAMETER	(M) :	1.8	NOS. : 1
	DIVERSION : LENGTH	(M) :	1000.0	DIAMETER	(M) :	6.6	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	37.8				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	8.0	AVERAGE NET HEAD	(M) :	88.8	
/HEAD	FIRM DISCHARGE	(M3/S) :	4.0	TAILWATER LEVEL	(EL.M) :	86.0	
POWER	INSATLLED CAPACITY	(MW) :	5.8	ANNUAL TOTAL ENERGY	(GWH) :	31.9	
/ENERGY	FIRM POWER	(MW) :	2.9	FIRM ENERGY	(GWH) :	25.6	
	MIN.GUARANTEED POWER	(MW) :	3.7	SECONDARY ENERGY	(GWH) :	6.3	

TRANSMISSION LINE LENGTH (KM) : 42.0 TO : CAMILING 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 10.0 FROM : PIAS

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	243.4	POWER COST	(MIL USD) :	238.9	
TOTAL COST/KW	(USD/KW) :	41604.6	TRANSMISSION COST	(MIL USD) :	1.6	
TOTAL COST/KWH	(USD/KWH) :	8.847	ACCESS ROAD COST	(MIL USD) :	2.9	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3067-III
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-03-0-1

SCHEME : SAN NICOLAS

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N16-07-20 E120-46-50
STREAM : AMBAYAOAN | PROVINCE : PANGASINAN | STUDY LEVEL : IDENTIFIED IN THE PREVIOUS STUDY

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	310.0	(MAIN : 310., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	2570.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	690.
AVERAGE DISCHARGE	(M3/S) :	15.7	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	42.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.50

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	240.1	GROSS STORAGE VOL.	(MIL M3) :	357.4	
	AVERAGE OPERATING LEVEL	(EL.M) :	222.7	ACTIVE STORAGE VOL.	(MIL M3) :	247.5	
	MINIMUM OPERATING LEVEL	(EL.M) :	188.0	DEAD STORAGE VOL.	(MIL M3) :	109.9	
	DRAWDOWN DEPTH	(M) :	52.2	SEDIMENT VOL.	(MIL M3) :	21.7	
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	246.1	CREST LENGTH	(M) :	795.3	
	DAM HEIGHT	(M) :	130.1	EMBANKMENT VOL.	(MIL M3) :	16.00	
WATERWAY	HEADRACE : LENGTH	(M) :	790.0	DIAMETER (WIDTH)	(M) :	2.9	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	310.0	DIAMETER	(M) :	2.5	NOS. : 1
	DIVERSION : LENGTH	(M) :	1470.0	DIAMETER	(M) :	8.2	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	85.4				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	19.5	AVERAGE NET HEAD	(M) :	101.7	
	FIRM DISCHARGE	(M3/S) :	9.8	TAILWATER LEVEL	(EL.M) :	116.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	16.4	ANNUAL TOTAL ENERGY	(GWH) :	97.1	
	FIRM POWER	(MW) :	8.2	FIRM ENERGY	(GWH) :	71.7	
	MIN.GUARANTEED POWER	(MW) :	10.3	SECONDARY ENERGY	(GWH) :	25.4	

TRANSMISSION LINE : LENGTH (KM) : 25.0 | TO : SAN MANUEL | 69 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 2.0 | FROM : STA.MARIA

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	250.1	POWER COST	(MIL USD) :	248.4	
TOTAL COST/KW	(USD/KW) :	15282.0	TRANSMISSION COST	(MIL USD) :	1.1	
TOTAL COST/KWH	(USD/KWH) :	3.153	ACCESS ROAD COST	(MIL USD) :	0.6	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3168-II
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-04-0-1

SCHEME : TABU

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N16-16-43 E120-44-33
STREAM : AGNO | PROVINCE : BENGUET | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1070.0	(MAIN : 1070., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) : 2838.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 690.		
AVERAGE DISCHARGE	(M3/S) : 63.3	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 42.7		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.06

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) : 414.0	GROSS STORAGE VOL.	(MIL M3) : 221.6			
	AVERAGE OPERATING LEVEL	(EL.M) : 404.4	ACTIVE STORAGE VOL.	(MIL M3) : 127.5			
	MINIMUM OPERATING LEVEL	(EL.M) : 385.1	DEAD STORAGE VOL.	(MIL M3) : 94.1			
	DRAWDOWN DEPTH	(M) : 28.9	SEDIMENT VOL.	(MIL M3) : 74.9			
MAIN DAM	CREST ELEVATION	(EL.M) : 420.0	CREST LENGTH	(M) : 250.0			
(WEIR)	DAM HEIGHT	(M) : 108.0	EMBANKMENT VOL.	(MIL M3) : 3.08			
WATERWAY	HEADRACE : LENGTH	(M) : 3000.0	DIAMETER (WIDTH)	(M) : 5.6	NOS. : 1		
	PENSTOCK : HORIZONT. L	(M) : 160.0	DIAMETER	(M) : 4.4	NOS. : 1		
	DIVERSION : LENGTH	(M) : 1250.0	DIAMETER	(M) : 7.6	NOS. : 2		
	EXCAVATION VOL TOTAL	(1000 M3) : 192.6					
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) : 75.1	AVERAGE NET HEAD	(M) : 109.0			
/HEAD	FIRM DISCHARGE	(M3/S) : 12.5	TAILWATER LEVEL	(EL.M) : 290.0			
POWER	INSATLLED CAPACITY	(MW) : 67.4	ANNUAL TOTAL ENERGY	(GWH) : 460.2			
/ENERGY	FIRM POWER	(MW) : 11.2	FIRM ENERGY	(GWH) : 98.3			
	MIN.GUARANTEED POWER	(MW) : 52.8	SECONDARY ENERGY	(GWH) : 361.9			

TRANSMISSION LINE : LENGTH (KM) : 27.0 — TO : SAN MANUEL — 115 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 6.0 — FROM : DALUPIRIP

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 161.8	POWER COST	(MIL USD) : 156.9		
TOTAL COST/KW	(USD/KW) : 2402.4	TRANSMISSION COST	(MIL USD) : 3.2		
TOTAL COST/KWH	(USD/KWH) : 0.782	ACCESS ROAD COST	(MIL USD) : 1.7		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3168-IV
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-05-0-2

SCHEME : AGNO-1

RIVER SYSTEM : AGNO
STREAM : AGNO
WATER RESOURCES REGION : III
PROVINCE : BENGUET
COORDINATES : N16-33-47 E120-47-55
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	347.1	(MAIN : 347., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	2941.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	690.
AVERAGE DISCHARGE	(M3/S) :	21.7	EVAPORATION RATE	(MM/DAY) :	3.0	GAGE AVER.DISCHARGE	(M3/S) :	42.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER
OUTPUT FACTOR : 0.70

PONDAGE	FULL SUPPLY LEVEL	(EL.M) :	824.3	PONDAGE STORAGE VOL.	(1000M3) :	129.3	
	AVERAGE OPERATING LEVEL	(EL.M) :	823.8	ACTIVE STORAGE VOL.	(1000M3) :	28.0	
	MINIMUM OPERATING LEVEL	(EL.M) :	823.4				
	DRAWDOWN DEPTH	(M) :	0.9				
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	824.3	CREST LENGTH	(M) :	60.8	
	WEIR HEIGHT	(M) :	7.3	WEIR CONCRETE VOL.	(1000 M3) :	7.8	
WATERWAY	HEADRACE : LENGTH	(M) :	2300.0	DIAMETER (WIDTH)	(M) :	2.7	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	165.0	DIAMETER	(M) :	2.1	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	13.7				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	11.3	AVERAGE NET HEAD	(M) :	49.4	
	FIRM DISCHARGE	(M3/S) :	1.0	TAILWATER LEVEL	(EL.M) :	770.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	4.6	ANNUAL TOTAL ENERGY	(GWH) :	25.9	
	FIRM POWER	(MW) :	0.4	FIRM ENERGY	(GWH) :	3.5	
	MIN.GUARANTEED POWER	(MW) :	0.4	SECONDARY ENERGY	(GWH) :	22.4	

TRANSMISSION LINE : LENGTH (KM) : 26.0 TO : LA TRINIDAD 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 9.0 FROM : NEAREST PUBLIC ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	13.6	POWER COST	(MIL USD) :	9.9	
TOTAL COST/KW	(USD/KW) :	2965.8	TRANSMISSION COST	(MIL USD) :	1.1	
TOTAL COST/KWH	(USD/KWH) :	1.336	ACCESS ROAD COST	(MIL USD) :	2.6	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3169-1 1964
TECHNICAL COMMENT : - NOT PROCEEDED TO 2ND SCREENING DUE TO DECREASE OF EXPECTED POWER AND ENERGY CAUSED BY MAXIMUM DISCHARGE CONSTRAINT.

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-06-0-2

SCHEME : AGNO-2

RIVER SYSTEM : AGNO
STREAM : AGNO
WATER RESOURCES REGION : III
PROVINCE : BENGUET
COORDINATES : N16-37-25 E120-49-47
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	255.7	(MAIN : 256., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	3011.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	690.
AVERAGE DISCHARGE	(M3/S) :	16.5	EVAPORATION RATE	(MM/DAY) :	3.0	GAGE AVER.DISCHARGE	(M3/S) :	42.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER
OUTPUT FACTOR : 0.70

PONDAGE	FULL SUPPLY LEVEL	(EL.M) :	1014.1	PONDAGE STORAGE VOL.	(1000M3) :	82.9	
	AVERAGE OPERATING LEVEL	(EL.M) :	1013.6	ACTIVE STORAGE VOL.	(1000M3) :	21.3	
	MINIMUM OPERATING LEVEL	(EL.M) :	1013.1				
	DRAWDOWN DEPTH	(M) :	1.1				
MAIN DAM	CREST ELEVATION	(EL.M) :	1014.1	CREST LENGTH	(M) :	52.4	
(WEIR)	WEIR HEIGHT	(M) :	7.1	WEIR CONCRETE VOL.	(1000 M3) :	6.7	
WATERWAY	HEADRACE : LENGTH	(M) :	7950.0	DIAMETER (WIDTH)	(M) :	2.4	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	385.0	DIAMETER	(M) :	1.8	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	38.0				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	8.6	AVERAGE NET HEAD	(M) :	148.5	
/HEAD	FIRM DISCHARGE	(M3/S) :	0.7	TAILWATER LEVEL	(EL.M) :	850.0	
POWER	INSATLLED CAPACITY	(MW) :	10.5	ANNUAL TOTAL ENERGY	(GWH) :	59.1	
/ENERGY	FIRM POWER	(MW) :	0.9	FIRM ENERGY	(GWH) :	7.9	
	MIN.GUARANTEED POWER	(MW) :	0.8	SECONDARY ENERGY	(GWH) :	51.2	

TRANSMISSION LINE : LENGTH (KM) : 27.6 TO : LA TRINIDAD 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 4.3 FROM : FROM NEAREST NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	21.8	POWER COST	(MIL USD) :	19.4	
TOTAL COST/KW	(USD/KW) :	2070.9	TRANSMISSION COST	(MIL USD) :	1.2	
TOTAL COST/KWH	(USD/KWH) :	0.937	ACCESS ROAD COST	(MIL USD) :	1.2	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 2.5 KMS.
MAP USED (1:50.000 SCALE) : 3169-1 1964
TECHNICAL COMMENT : - TWO STREAM INTAKES

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-00-07-0-2

SCHEME : AGNO-3

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N16-40-42 E120-49-20
STREAM : AGNO | PROVINCE : BENGUET | STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	195.7	(MAIN ; 196., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	2685.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	690.
AVERAGE DISCHARGE	(M3/S) :	11.9	EVAPORATION RATE	(MM/DAY) :	2.5	GAGE AVER.DISCHARGE	(M3/S) :	42.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER | OUTPUT FACTOR : 0.70

PONDAGE	FULL SUPPLY LEVEL	(EL.M) :	1215.2	PONDAGE STORAGE VOL.	(1000M3) :	32.6	
	AVERAGE OPERATING LEVEL	(EL.M) :	1214.0	ACTIVE STORAGE VOL.	(1000M3) :	15.3	
	MINIMUM OPERATING LEVEL	(EL.M) :	1212.8				
	DRAWDOWN DEPTH	(M) :	2.5				
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	1215.2	CREST LENGTH	(M) :	75.2	
	WEIR HEIGHT	(M) :	8.2	WEIR CONCRETE VOL.	(1000 M3) :	11.2	
WATERWAY	HEADRACE : LENGTH	(M) :	7250.0	DIAMETER (WIDTH)	(M) :	2.1	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	335.0	DIAMETER	(M) :	1.5	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	25.9				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	6.2	AVERAGE NET HEAD	(M) :	183.0	
	FIRM DISCHARGE	(M3/S) :	0.5	TAILWATER LEVEL	(EL.M) :	1015.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	9.3	ANNUAL TOTAL ENERGY	(GWH) :	52.4	
	FIRM POWER	(MW) :	0.8	FIRM ENERGY	(GWH) :	7.0	
	MIN.GUARANTEED POWER	(MW) :	0.7	SECONDARY ENERGY	(GWH) :	45.4	

TRANSMISSION LINE : LENGTH (KM) : 32.0 | TO : LA TRINIDAD | 69 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 0. | FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	17.1	POWER COST	(MIL USD) :	15.8	
TOTAL COST/KW	(USD/KW) :	1836.9	TRANSMISSION COST	(MIL USD) :	1.3	
TOTAL COST/KWH	(USD/KWH) :	0.829	ACCESS ROAD COST	(MIL USD) :	0.	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3170-II 1964
TECHNICAL COMMENT : - THICK ALLUVIAL DEPOSITS AT THE INTAKE SITE
- THREE STREAM INTAKES

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-01-08-0-1

SCHEME : CAMILING-1

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N15-33-29 E120-20-29
STREAM : CAMILING | PROVINCE : TARLAC | STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	243.0	(MAIN ; 243., INTER TRANSFER TOTAL ;	0.)	STREAM GAGE ID	: 4-3-017-NW-325		
AVER. BASIN RAINFALL (MM/YR)	2250.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	128.		
AVERAGE DISCHARGE (M3/S)	10.2	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	7.4		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	210.0	GROSS STORAGE VOL. (MIL M3)	321.5			
	AVERAGE OPERATING LEVEL (EL.M)	195.2	ACTIVE STORAGE VOL. (MIL M3)	224.9			
	MINIMUM OPERATING LEVEL (EL.M)	165.7	DEAD STORAGE VOL. (MIL M3)	96.6			
	DRAWDOWN DEPTH (M)	44.3	SEDIMENT VOL. (MIL M3)	17.0			
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	216.0	CREST LENGTH (M)	1423.0			
	DAM HEIGHT (M)	112.8	EMBANKMENT VOL. (MIL M3)	22.34			
WATERWAY	HEADRACE : LENGTH (M)	860.0	DIAMETER (WIDTH) (M)	2.5	NOS.	1	
	PENSTOCK : HORIZONT. L (M)	540.0	DIAMETER (M)	2.2	NOS.	1	
	DIVERSION : LENGTH (M)	1440.0	DIAMETER (M)	7.8	NOS.	1	
	EXCAVATION VOL TOTAL (1000 M3)	75.6					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	13.9	AVERAGE NET HEAD (M)	85.6			
	FIRM DISCHARGE (M3/S)	7.0	TAILWATER LEVEL (EL.M)	103.2			
POWER /ENERGY	INSATLLED CAPACITY (MW)	9.8	ANNUAL TOTAL ENERGY (GWH)	54.7			
	FIRM POWER (MW)	4.9	FIRM ENERGY (GWH)	43.0			
	MIN.GUARANTEED POWER (MW)	6.1	SECONDARY ENERGY (GWH)	11.6			

TRANSMISSION LINE — LENGTH (KM) : 25.0 — TO : BAMAMBANG — 69 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 6.0 — FROM : SAN BARTOLOME

CONSTRUCTION COST

TOTAL COST (MIL USD)	306.2	POWER COST (MIL USD)	303.4		
TOTAL COST/KW (USD/KW)	31178.6	TRANSMISSION COST (MIL USD)	1.1		
TOTAL COST/KWH (USD/KWH)	6.584	ACCESS ROAD COST (MIL USD)	1.7		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3066-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-01-09-0-1

SCHEME : CAMILING-2

RIVER SYSTEM : AGNO
STREAM : CAMILING
WATER RESOURCES REGION : 111
PROVINCE : TARLAC
COORDINATES : N15-32-52 E120-18-32
STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 191.2	(MAIN : 191..	INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-017-NW-325	
AVER. BASIN RAINFALL	(MM/YR) : 2250.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	128.
AVERAGE DISCHARGE	(M3/S) : 8.0	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	7.4

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	254.0	GROSS STORAGE VOL.	(MIL M3) :	254.9	
	AVERAGE OPERATING LEVEL	(EL.M) :	238.9	ACTIVE STORAGE VOL.	(MIL M3) :	189.6	
	MINIMUM OPERATING LEVEL	(EL.M) :	208.6	DEAD STORAGE VOL.	(MIL M3) :	65.4	
	DRAWDOWN DEPTH	(M) :	45.4	SEDIMENT VOL.	(MIL M3) :	13.4	
MAIN DAM	CREST ELEVATION	(EL.M) :	260.0	CREST LENGTH	(M) :	545.0	
(WEIR)	DAM HEIGHT	(M) :	112.0	EMBANKMENT VOL.	(MIL M3) :	7.05	
WATERWAY	HEADRACE : LENGTH	(M) :	440.0	DIAMETER (WIDTH)	(M) :	2.5	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	350.0	DIAMETER	(M) :	2.1	NOS. : 1
	DIVERSION : LENGTH	(M) :	980.0	DIAMETER	(M) :	7.4	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	45.8				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	11.3	AVERAGE NET HEAD	(M) :	87.1	
/HEAD	FIRM DISCHARGE	(M3/S) :	5.6	TAILWATER LEVEL	(EL.M) :	148.0	
POWER	INSATLLED CAPACITY	(MW) :	8.1	ANNUAL TOTAL ENERGY	(GWH) :	44.2	
/ENERGY	FIRM POWER	(MW) :	4.0	FIRM ENERGY	(GWH) :	35.4	
	MIN.GUARANTEED POWER	(MW) :	5.0	SECONDARY ENERGY	(GWH) :	8.7	

TRANSMISSION LINE : LENGTH (KM) : 29.0 TO : CAMILING 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 12.0 FROM : SAN BARTOLOME

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	135.2	POWER COST	(MIL USD) :	130.6	
TOTAL COST/KW	(USD/KW) :	16717.7	TRANSMISSION COST	(MIL USD) :	1.2	
TOTAL COST/KWH	(USD/KWH) :	3.554	ACCESS ROAD COST	(MIL USD) :	3.4	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3066-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 3-077-04-10-0-2

SCHEME : PAMPANG

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N16-14-16 E120-48-16
STREAM : PAMPANG | PROVINCE : BENGUET | STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	192.7	(MAIN : 193., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-3-093-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	2629.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	690.
AVERAGE DISCHARGE	(M3/S) :	10.1	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	42.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER | OUTPUT FACTOR : 0.70

PONDAGE	FULL SUPPLY LEVEL	(EL,M) :	363.5	PONDAGE STORAGE VOL.	(1000M3) :	52.4	
	AVERAGE OPERATING LEVEL	(EL,M) :	363.1	ACTIVE STORAGE VOL.	(1000M3) :	13.1	
	MINIMUM OPERATING LEVEL	(EL,M) :	362.6				
	DRAWDOWN DEPTH	(M) :	0.9				
MAIN DAM (WEIR)	CREST ELEVATION	(EL,M) :	363.5	CREST LENGTH	(M) :	50.5	
	WEIR HEIGHT	(M) :	6.5	WEIR CONCRETE VOL.	(1000 M3) :	5.6	
WATERWAY	HEADRACE : LENGTH	(M) :	5060.0	DIAMETER (WIDTH)	(M) :	2.0	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	215.0	DIAMETER	(M) :	1.5	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	16.0				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	5.3	AVERAGE NET HEAD	(M) :	146.0	
	FIRM DISCHARGE	(M3/S) :	0.5	TAILWATER LEVEL	(EL,M) :	206.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	6.3	ANNUAL TOTAL ENERGY	(GWH) :	35.6	
	FIRM POWER	(MW) :	0.5	FIRM ENERGY	(GWH) :	4.8	
	MIN.GUARANTEED POWER	(MW) :	0.5	SECONDARY ENERGY	(GWH) :	30.8	

TRANSMISSION LINE : LENGTH (KM) : 35.0 | TO : SAN MANUEL | 69 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 22.0 | FROM : SAN.NICOLAS

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	18.4	POWER COST	(MIL USD) :	10.7		
TOTAL COST/KW	(USD/KW) :	2893.3	TRANSMISSION COST	(MIL USD) :	1.4		
TOTAL COST/KWH	(USD/KWH) :	1.309	ACCESS ROAD COST	(MIL USD) :	6.3		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3168-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-007-00-01-0-1

SCHEME : KANAN

RIVER SYSTEM : AGOS | WATER RESOURCES REGION : IV | COORDINATES : N14-44-30 E121-31-54
STREAM : KANAN | PROVINCE : QUEZON | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 364.3	(MAIN : 364., INTER TRANSFER TOTAL : 0.)			STREAM GAGE ID	: 4-4-003-NW-430	
AVER. BASIN RAINFALL	(MM/YR) : 5569.	DENUDATION RATE	(MM/YR) : 1.4		GAGE CATCHMENT	(KM2) : 879.	
AVERAGE DISCHARGE	(M3/S) : 58.5	EVAPORATION RATE	(MM/DAY) : 3.5		GAGE AVER.DISCHARGE	(M3/S) : 116.1	

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 294.0	GROSS STORAGE VOL.	(MIL M3) : 1857.2			
	AVERAGE OPERATING LEVEL	(EL.M) : 273.0	ACTIVE STORAGE VOL.	(MIL M3) : 1384.1			
	MINIMUM OPERATING LEVEL	(EL.M) : 231.0	DEAD STORAGE VOL.	(MIL M3) : 473.1			
	DRAWDOWN DEPTH	(M) : 63.0	SEDIMENT VOL.	(MIL M3) : 25.5			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 300.0	CREST LENGTH	(M) : 880.0			
	DAM HEIGHT	(M) : 200.0	EMBANKMENT VOL.	(MIL M3) : 27.23			
WATERWAY	HEADRACE : LENGTH	(M) : 880.0	DIAMETER (WIDTH)	(M) : 5.7	NOS. : 2		
	PENSTOCK : HORIZONT. L	(M) : 220.0	DIAMETER	(M) : 4.3	NOS. : 2		
	DIVERSION : LENGTH	(M) : 1260.0	DIAMETER	(M) : 8.2	NOS. : 2		
	EXCAVATION VOL TOTAL (1000 M3) : 186.4						
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 153.8	AVERAGE NET HEAD	(M) : 168.9			
	FIRM DISCHARGE	(M3/S) : 51.3	TAILWATER LEVEL	(EL.M) : 100.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 213.9	ANNUAL TOTAL ENERGY	(GWH) : 690.7			
	FIRM POWER	(MW) : 71.3	FIRM ENERGY	(GWH) : 624.4			
	MIN.GUARANTEED POWER	(MW) : 153.1	SECONDARY ENERGY	(GWH) : 66.3			

TRANSMISSION LINE : LENGTH (KM) : 18.6 — TO : INFANTA — 230 K V DOUBLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 14.0 — FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 475.8	POWER COST	(MIL USD) : 467.9	
TOTAL COST/KW	(USD/KW) : 2224.7	TRANSMISSION COST	(MIL USD) : 3.9	
TOTAL COST/KWH	(USD/KWH) : 0.738	ACCESS ROAD COST	(MIL USD) : 4.0	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3364-III 1970
TECHNICAL COMMENT : - NONE

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-007-00-02-0-1

SCHEME : DARAITAN

RIVER SYSTEM : AGOS | WATER RESOURCES REGION : IV | COORDINATES : N14-36-00 E121-26-10
STREAM : KALIWA | PROVINCE : QUEZON | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	325.0	(MAIN : 325.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-4-003-NW-430		
AVER. BASIN RAINFALL	(MM/YR) :	3681.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	879.
AVERAGE DISCHARGE	(M3/S) :	32.7	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.40

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	234.0	GROSS STORAGE VOL.	(MIL M3) :	541.1	
	AVERAGE OPERATING LEVEL	(EL.M) :	221.8	ACTIVE STORAGE VOL.	(MIL M3) :	413.1	
	MINIMUM OPERATING LEVEL	(EL.M) :	197.4	DEAD STORAGE VOL.	(MIL M3) :	128.1	
	DRAWDOWN DEPTH	(M) :	36.6	SEDIMENT VOL.	(MIL M3) :	22.7	
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	240.0	CREST LENGTH	(M) :	280.0	
	DAM HEIGHT	(M) :	97.5	EMBANKMENT VOL.	(MIL M3) :	2.75	
WATERWAY	HEADRACE : LENGTH	(M) :	400.0	DIAMETER (WIDTH)	(M) :	6.4	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	140.0	DIAMETER	(M) :	4.9	NOS. : 1
	DIVERSION : LENGTH	(M) :	750.0	DIAMETER	(M) :	7.9	NOS. : 2
	EXCAVATION VOL TOTAL	(1000 M3) :	88.9				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	96.0	AVERAGE NET HEAD	(M) :	77.5	
	FIRM DISCHARGE	(M3/S) :	24.0	TAILWATER LEVEL	(EL.M) :	142.5	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	61.2	ANNUAL TOTAL ENERGY	(GWH) :	176.6	
	FIRM POWER	(MW) :	15.3	FIRM ENERGY	(GWH) :	134.1	
	MIN.GUARANTEED POWER	(MW) :	40.0	SECONDARY ENERGY	(GWH) :	42.5	

TRANSMISSION LINE — LENGTH (KM) : 23.0 — TO : DOLORES — 115 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 20.0 — FROM : STA.MARIA

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	125.9	POWER COST	(MIL USD) :	117.3	
TOTAL COST/KW	(USD/KW) :	2055.8	TRANSMISSION COST	(MIL USD) :	2.8	
TOTAL COST/KWH	(USD/KWH) :	0.857	ACCESS ROAD COST	(MIL USD) :	5.7	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3263-I 1970
TECHNICAL COMMENT :
- SITE GEOLOGY OF HARD LIMESTONE BUT FAULTED, JOINTED STRUCTURE SUSCEPTIBLE TO LEAKAGE.
- NOT PROCEEDED TO 2ND SCREENING DUE TO MUTUALLY EXCLUSIVE PLAN OF THE COMMITTED LAIBAN DAM.

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-007-00-03-0-1

SCHEME : UPPER AGOS-1M

RIVER SYSTEM : AGOS
STREAM : LENATIN
WATER RESOURCES REGION : IV
PROVINCE : RIZAL
COORDINATES : N14-37-39 E121-24-24
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	136.0	(MAIN : 136., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-4-003-NW-430		
AVER. BASIN RAINFALL	(MM/YR) :	3709.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	879.
AVERAGE DISCHARGE	(M3/S) :	14.2	EVAPORATION RATE	(MM/DAY) :	3.0	GAGE AVER.DISCHARGE	(M3/S) :	116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.70

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) :	252.0	GROSS STORAGE VOL.	(MIL M3) :	446.5		
	AVERAGE OPERATING LEVEL	(EL.M) :	242.9	ACTIVE STORAGE VOL.	(MIL M3) :	313.7		
	MINIMUM OPERATING LEVEL	(EL.M) :	224.7	DEAD STORAGE VOL.	(MIL M3) :	132.8		
	DRAWDOWN DEPTH	(M) :	27.3	SEDIMENT VOL.	(MIL M3) :	9.5		
MAIN DAM	CREST ELEVATION	(EL.M) :	258.0	CREST LENGTH	(M) :	244.7		
(WEIR)	DAM HEIGHT	(M) :	77.7	EMBANKMENT VOL.	(MIL M3) :	1.84		
WATERWAY	HEADRACE : LENGTH	(M) :	1300.0	DIAMETER (WIDTH)	(M) :	5.5	NOS. :	1
	PENSTOCK : HORIZONT. L	(M) :	95.0	DIAMETER	(M) :	4.4	NOS. :	1
	DIVERSION : LENGTH	(M) :	620.0	DIAMETER	(M) :	8.1	NOS. :	1
	EXCAVATION VOL TOTAL	(1000 M3) :	65.3					
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	72.3	AVERAGE NET HEAD	(M) :	75.2		
/HEAD	FIRM DISCHARGE	(M3/S) :	12.0	TAILWATER LEVEL	(EL.M) :	165.0		
POWER	INSATLLED CAPACITY	(MW) :	44.7	ANNUAL TOTAL ENERGY	(GWH) :	76.2		
/ENERGY	FIRM POWER	(MW) :	7.5	FIRM ENERGY	(GWH) :	65.3		
	MIN.GUARANTEED POWER	(MW) :	32.2	SECONDARY ENERGY	(GWH) :	11.0		

TRANSMISSION LINE : LENGTH (KM) : 18.0 TO : DOLORES 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 23.0 FROM : TANAY

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	93.8	POWER COST	(MIL USD) :	84.9	
TOTAL COST/KW	(USD/KW) :	2099.4	TRANSMISSION COST	(MIL USD) :	2.4	
TOTAL COST/KWH	(USD/KWH) :	1.369	ACCESS ROAD COST	(MIL USD) :	6.6	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3263-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-007-00-04-0-1

SCHEME : UPPER AGOS-1S

RIVER SYSTEM : AGOS
STREAM : LIMUTAN
WATER RESOURCES REGION : IV
PROVINCE : RIZAL
COORDINATES : N14-38-15 E121-24-30
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	135.7	(MAIN : 136.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-4-003-NW-430		
AVER. BASIN RAINFALL	(MM/YR) :	3799.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	879.
AVERAGE DISCHARGE	(M3/S) :	14.2	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.20

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) :	252.0	GROSS STORAGE VOL.	(MIL M3) :	141.2		
	AVERAGE OPERATING LEVEL	(EL.M) :	242.7	ACTIVE STORAGE VOL.	(MIL M3) :	89.4		
	MINIMUM OPERATING LEVEL	(EL.M) :	224.2	DEAD STORAGE VOL.	(MIL M3) :	51.7		
	DRAWDOWN DEPTH	(M) :	27.8	SEDIMENT VOL.	(MIL M3) :	9.5		
MAIN DAM	CREST ELEVATION	(EL.M) :	258.0	CREST LENGTH	(M) :	196.0		
(WEIR)	DAM HEIGHT	(M) :	77.7	EMBANKMENT VOL.	(MIL M3) :	1.58		
WATERWAY	HEADRACE : LENGTH	(M) :	500.0	DIAMETER (WIDTH)	(M) :	4.5	NOS. :	1
	PENSTOCK : HORIZONT. L	(M) :	60.0	DIAMETER	(M) :	3.7	NOS. :	1
	DIVERSION : LENGTH	(M) :	600.0	DIAMETER	(M) :	8.1	NOS. :	1
	EXCAVATION VOL TOTAL	(1000 M3) :	39.8					
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	46.9	AVERAGE NET HEAD	(M) :	60.7		
/HEAD	FIRM DISCHARGE	(M3/S) :	7.8	TAILWATER LEVEL	(EL.M) :	180.3		
POWER	INSATLLED CAPACITY	(MW) :	23.5	ANNUAL TOTAL ENERGY	(GWH) :	61.0		
/ENERGY	FIRM POWER	(MW) :	3.9	FIRM ENERGY	(GWH) :	34.3		
	MIN.GUARANTEED POWER	(MW) :	15.5	SECONDARY ENERGY	(GWH) :	26.7		

TRANSMISSION LINE LENGTH (KM) : 18.0 TO : DOLORES 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 23.0 FROM : TANAY

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	70.6	POWER COST	(MIL USD) :	63.1	
TOTAL COST/KW	(USD/KW) :	3007.5	TRANSMISSION COST	(MIL USD) :	0.9	
TOTAL COST/KWH	(USD/KWH) :	1.669	ACCESS ROAD COST	(MIL USD) :	6.6	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3263-I
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-007-00-05-0-1

SCHEME : UPPER AGOS-2

RIVER SYSTEM : AGOS
STREAM : KANAN
WATER RESOURCES REGION : IV
PROVINCE : QUEZON
COORDINATES : N14-48-40 E121-30-42
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	286.4	(MAIN ; 286.. INTER TRANSFER TOTAL	0.)	STREAM GAGE ID	: 4-4-003-NW-430		
AVER. BASIN RAINFALL (MM/YR)	5798.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	879.		
AVERAGE DISCHARGE (M3/S)	48.1	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	116.1		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVOIR	FULL SUPPLY LEVEL (EL.M)	316.0	GROSS STORAGE VOL. (MIL M3)	1526.3		
	AVERAGE OPERATING LEVEL (EL.M)	299.8	ACTIVE STORAGE VOL. (MIL M3)	1137.3		
	MINIMUM OPERATING LEVEL (EL.M)	267.3	DEAD STORAGE VOL. (MIL M3)	389.1		
	DRAWDOWN DEPTH (M)	48.7	SEDIMENT VOL. (MIL M3)	20.0		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	322.0	CREST LENGTH (M)	430.0		
	DAM HEIGHT (M)	156.0	EMBANKMENT VOL. (MIL M3)	10.71		
WATERWAY	HEADRACE : LENGTH (M)	380.0	DIAMETER (WIDTH) (M)	5.2	NOS. :	2
	PENSTOCK : HORIZONT. L (M)	180.0	DIAMETER (M)	4.0	NOS. :	2
	DIVERSION : LENGTH (M)	800.0	DIAMETER (M)	7.5	NOS. :	2
	EXCAVATION VOL TOTAL (1000 M3)	92.8				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	125.5	AVERAGE NET HEAD (M)	130.9		
	FIRM DISCHARGE (M3/S)	41.8	TAILWATER LEVEL (EL.M)	166.0		
POWER /ENERGY	INSATLLED CAPACITY (MW)	135.2	ANNUAL TOTAL ENERGY (GWH)	439.1		
	FIRM POWER (MW)	45.1	FIRM ENERGY (GWH)	394.8		
	MIN.GUARANTEED POWER (MW)	96.9	SECONDARY ENERGY (GWH)	44.4		

TRANSMISSION LINE LENGTH (KM) : 21.0 TO : INFANTA 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 18.6 FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST (MIL USD)	261.4	POWER COST (MIL USD)	251.8		
TOTAL COST/KW (USD/KW)	1933.2	TRANSMISSION COST (MIL USD)	4.3		
TOTAL COST/KWH (USD/KWH)	0.641	ACCESS ROAD COST (MIL USD)	5.3		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3364-III 1970
TECHNICAL COMMENT : - FAULTS AT THE RIGHT ABUTTMENT
- ADAPTABILITY OF THE PLAN DEPENDS ON ACCESSIBILITY

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 4-115-01-01-0-1

SCHEME : WAWA

RIVER SYSTEM : PASIG | WATER RESOURCES REGION : IV | COORDINATES : N14-43-30 E121-11-24
STREAM : WAWA | PROVINCE : RIZAL | STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 283.2	(MAIN : 283., INTER TRANSFER TOTAL : 0.)	STREAM GAGE ID	: 4-4-003-NW-430
AVER. BASIN RAINFALL	(MM/YR) : 3445.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 879.
AVERAGE DISCHARGE	(M3/S) : 26.4	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 116.1

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.67

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 151.0	GROSS STORAGE VOL.	(MIL M3) : 835.0		
	AVERAGE CPERATING LEVEL	(EL.M) : 136.9	ACTIVE STORAGE VOL.	(MIL M3) : 558.2		
	MINIMUM CPERATING LEVEL	(EL.M) : 108.8	DEAD STORAGE VOL.	(MIL M3) : 276.9		
	DRAWDOWN DEPTH	(M) : 42.2	SEDIMENT VOL.	(MIL M3) : 19.8		
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 157.0	CREST LENGTH	(M) : 277.5		
	DAM HEIGHT	(M) : 132.7	EMBANKMENT VOL.	(MIL M3) : 6.21		
WATERWAY	HEADRACE : LENGTH	(M) : 440.0	DIAMETER (WIDTH)	(M) : 5.3	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) : 160.0	DIAMETER	(M) : 4.2	NOS. : 1
	DIVERSION : LENGTH	(M) : 890.0	DIAMETER	(M) : 7.5	NOS. : 2
	EXCAVATION VOL TOTAL	(1000 M3) : 91.1			
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 67.1	AVERAGE NET HEAD	(M) : 110.1	
	FIRM DISCHARGE	(M3/S) : 22.4	TAILWATER LEVEL	(EL.M) : 24.3	
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 60.9	ANNUAL TOTAL ENERGY	(GWH) : 201.8	
	FIRM POWER	(MW) : 20.3	FIRM ENERGY	(GWH) : 177.7	
	MIN.GUARANTEED POWER	(MW) : 43.2	SECONDARY ENERGY	(GWH) : 24.1	

TRANSMISSION LINE : LENGTH (KM) : 21.0 | TO : DOLORES | 115 K V SINGLE CIRCUIT | NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 3.6 | FROM : MONTALBAN

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 164.4	POWER COST	(MIL USD) : 160.8
TOTAL COST/KW	(USD/KW) : 2701.5	TRANSMISSION COST	(MIL USD) : 2.6
TOTAL COST/KWH	(USD/KWH) : 0.889	ACCESS ROAD COST	(MIL USD) : 1.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - DENSE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50.000 SCALE) : 3263-IV 1970
TECHNICAL COMMENT :
- SADDLE FORMATION (+/- EL 180.0 M.) AT THE LEFT BANK
- SITE GEOLOGY OF WELL BEDDED AND MASSIVE LIMESTONE STRUCTURE WITH DEVELOPMENT OF JOINTS FAULTS AND CAVES SUSCEPTIBLE LEAKAGE.

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 5-014-01-01-0-1

SCHEME : BOSIGON

RIVER SYSTEM : MATOGDON | WATER RESOURCES REGION : V | COORDINATES : N14-10-07 E122-38-54
STREAM : BOSIGON | PROVINCE : CAMARINES NORTE | STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	335.7	(MAIN : 336., INTER TRANSFER TOTAL	0.)	STREAM GAGE ID	: 4-5-001-NW-501		
AVER. BASIN RAINFALL (MM/YR)	3923.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	28.		
AVERAGE DISCHARGE (M3/S)	36.3	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	3.3		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.38

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	80.0	GROSS STORAGE VOL. (MIL M3)	546.4			
	AVERAGE OPERATING LEVEL (EL.M)	72.3	ACTIVE STORAGE VOL. (MIL M3)	435.5			
	MINIMUM OPERATING LEVEL (EL.M)	56.8	DEAD STORAGE VOL. (MIL M3)	110.9			
	DRAWDOWN DEPTH (M)	23.2	SEDIMENT VOL. (MIL M3)	23.5			
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	86.0	CREST LENGTH (M)	295.5			
	DAM HEIGHT (M)	63.0	EMBANKMENT VOL. (MIL M3)	1.45			
WATERWAY	HEADRACE : LENGTH (M)	600.0	DIAMETER (WIDTH) (M)	4.9	NOS. :	2	
	PENSTOCK : HORIZONT. L (M)	90.0	DIAMETER (M)	4.1	NOS. :	2	
	DIVERSION : LENGTH (M)	600.0	DIAMETER (M)	7.3	NOS. :	1	
	EXCAVATION VOL TOTAL (1000 M3)	50.3					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	114.1	AVERAGE NET HEAD (M)	47.6			
	FIRM DISCHARGE (M3/S)	19.0	TAILWATER LEVEL (EL.M)	23.0			
POWER /ENERGY	INSATLLED CAPACITY (MW)	44.7	ANNUAL TOTAL ENERGY (GWH)	122.9			
	FIRM POWER (MW)	7.4	FIRM ENERGY (GWH)	65.3			
	MIN.GUARANTEED POWER (MW)	28.8	SECONDARY ENERGY (GWH)	57.6			

TRANSMISSION LINE LENGTH (KM) : 30.0 TO : LABO 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD)	91.7	POWER COST (MIL USD)	88.2		
TOTAL COST/KW (USD/KW)	2051.2	TRANSMISSION COST (MIL USD)	3.4		
TOTAL COST/KWH (USD/KWH)	1.111	ACCESS ROAD COST (MIL USD)	0.		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 10.0 KMS.
MAP USED (1:50,000 SCALE) : 3562-IV 1975
TECHNICAL COMMENT : - TOPOGRAPHIC LIMIT +/- EL 90.0 M
- SITE GEOLOGY OF DEEPLY WEATHERED BASALTIC FLOW UNDER THICK COVERAGE OF RESIDUAL SOIL

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 5-020-00-01-0-1

SCHEME : PULANTUNA

RIVER SYSTEM : BICOL | WATER RESOURCES REGION : V | COORDINATES : N13-52-01 E122-54-50
STREAM : PULANTUNA | PROVINCE : CAMARINES SUR | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	201.0	(MAIN : 201.. INTER TRANSFER TOTAL	0.)	STREAM GAGE ID	: 4-5-001-NW-501		
AVER. BASIN RAINFALL (MM/YR)	3500.	DENUDATION RATE (MM/YR)	1.4	GAGE CATCHMENT (KM2)	28.		
AVERAGE DISCHARGE (M3/S)	19.1	EVAPORATION RATE (MM/DAY)	3.5	GAGE AVER.DISCHARGE (M3/S)	3.3		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR — RESERVOIR DEVELOPMENT RATIO : 0.15

RESERVIOR	FULL SUPPLY LEVEL (EL.M)	65.0	GROSS STORAGE VOL. (MIL M3)	129.1		
	AVERAGE OPERATING LEVEL (EL.M)	59.9	ACTIVE STORAGE VOL. (MIL M3)	88.3		
	MINIMUM OPERATING LEVEL (EL.M)	49.7	DEAD STORAGE VOL. (MIL M3)	40.7		
	DRAWDOWN DEPTH (M)	15.3	SEDIMENT VOL. (MIL M3)	14.1		
MAIN DAM (WEIR)	CREST ELEVATION (EL.M)	71.0	CREST LENGTH (M)	157.5		
	DAM HEIGHT (M)	50.2	EMBANKMENT VOL. (MIL M3)	0.57		
WATERWAY	HEADRACE : LENGTH (M)	490.0	DIAMETER (WIDTH) (M)	3.6	NOS. :	1
	PENSTOCK : HORIZONT. L (M)	120.0	DIAMETER (M)	3.1	NOS. :	1
	DIVERSION : LENGTH (M)	640.0	DIAMETER (M)	6.6	NOS. :	1
	EXCAVATION VOL TOTAL (1000 M3)	27.4				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE (M3/S)	29.8	AVERAGE NET HEAD (M)	37.2		
	FIRM DISCHARGE (M3/S)	7.4	TAILWATER LEVEL (EL.M)	20.8		
POWER /ENERGY	INSATLLED CAPACITY (MW)	9.1	ANNUAL TOTAL ENERGY (GWH)	46.5		
	FIRM POWER (MW)	2.3	FIRM ENERGY (GWH)	19.9		
	MIN.GUARANTEED POWER (MW)	6.3	SECONDARY ENERGY (GWH)	26.6		

TRANSMISSION LINE — LENGTH (KM) : 36.0 — TO : LABO — 69 K V SINGLE CIRCUIT — NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 4.5 — FROM : VILLAZAR

CONSTRUCTION COST

TOTAL COST (MIL USD)	39.7	POWER COST (MIL USD)	37.0
TOTAL COST/KW (USD/KW)	4366.7	TRANSMISSION COST (MIL USD)	1.4
TOTAL COST/KWH (USD/KWH)	1.424	ACCESS ROAD COST (MIL USD)	1.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3561-I
TECHNICAL COMMENT :

C-7　既設水力発電所インベントリー

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : MAGAT

RIVER SYSTEM : CAGAYAN | WATER RESOURCES REGION : II | COORDINATES : N16-47-53 E121-22-37
STREAM : MAGAT | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	4143.0
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	210.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	193.0	GROSS STORAGE VOL.	(MIL M3) :	1250.0	
	AVERAGE OPERATING LEVEL	(EL,M) :	178.6	ACTIVE STORAGE VOL.	(MIL M3) :	782.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	164.0	DEAD STORAGE VOL.	(MIL M3) :	468.0	
	DRAWDOWN DEPTH	(M) :	29.0	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	200.0	CREST LENGTH	(M) :	416.0	
	DAM HEIGHT	(M) :	114.0	EMBANKMENT VOL.	(MIL M3) :	18.0	
WATERWAY	HEADRACE : LENGTH	(M) :	630.0	DIAMETER (WIDTH)	(M) :	12.0	NOS. : 6
	PENSTOCK : HORIZONT. L	(M) :	300.0	DIAMETER	(M) :	5.8	NOS. : 6
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	456.0	AVERAGE NET HEAD	(M) :	67.5	
	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	103.0	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	360.0	ANNUAL TOTAL ENERGY	(GWH) :	1237.0	
	FIRM POWER	(MW) :	-	FIRM ENERGY	(GWH) :	723.0	
	MIN. GUARANTEED POWER	(MW) :	200.0	SECONDARY ENERGY	(GWH) :	514.0	

TRANSMISSION LINE : LENGTH (KM) : 14.4 TO : SANTIAGO 230 K.V NOS.OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : - FROM :

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	391.3	POWER COST	(MIL US$) :	374.8
TOTAL COST/KW	(US$/KW) :	1087.0	TRANSMISSION COST	(MIL US$) :	3.5
TOTAL COST/KWH	(US$/KWH) :	0.446	ACCESS ROAD COST	(MIL US$) :	13.0

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : ANGAT

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N14-54-55 E121-10-06
STREAM : ANGAT | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	568.0
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	217.0	GROSS STORAGE VOL.	(MIL M3) :	1075.0	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	850.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	180.0	DEAD STORAGE VOL.	(MIL M3) :	225.0	
	DRAWDOWN DEPTH	(M) :	37.0	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	223.5	CREST LENGTH	(M) :	368.0	
	DAM HEIGHT	(M) :	131.0	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	457.0	DIAMETER (WIDTH)	(M) :	8.0	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	4.5	NOS. : 2
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	-	AVERAGE NET HEAD	(M) :	-	
/HEAD	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	-	
POWER	INSATLLED CAPACITY	(MW) :	218.0	ANNUAL TOTAL ENERGY	(GWH) :	398.0	
/ENERGY	FIRM POWER	(MW) :	150.0	FIRM ENERGY	(GWH) :	280.0	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	118.0	

TRANSMISSION-LINE : LENGTH (KM) : - , TO : - | 115 K V | NOS.OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 58.0 FROM : NATIONAL ROAD

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) : -
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) : -
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) : -

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : PANTABANGAN

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N16-49-00 E120-06-35
STREAM : PAMPANGA | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	853.0
AVER. BASIN RAINFALL	(MM/YR) :	1940.
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	216.0	GROSS STORAGE VOL.	(MIL M3) :	3000.0	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	1757.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	177.0	DEAD STORAGE VOL.	(MIL M3) :	1243.0	
	DRAWDOWN DEPTH	(M) :	39.0	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	232.0	CREST LENGTH	(M) :	1615.0	
	DAM HEIGHT	(M) :	107.0	EMBANKMENT VOL.	(MIL M3) :	12.9	
WATERWAY	HEADRACE : LENGTH	(M) :	576.0	DIAMETER (WIDTH)	(M) :	7.0	NOS. : 2
	PENSTOCK : HORIZONT. L	(M) :	133.0	DIAMETER	(M) :	6.0	NOS. : 1
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	82.0	AVERAGE NET HEAD	(M) :	-	
/HEAD	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	128.0	
POWER	INSATLLED CAPACITY	(MW) :	100.0	ANNUAL TOTAL ENERGY	(GWH) :	-	
/ENERGY	FIRM POWER	(MW) :	30.0	FIRM ENERGY	(GWH) :	263.0	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	-	

TRANSMISSION LINE : LENGTH (KM) : 2.0 | TO : MUNOZ | 230 K V | DOUBLE | CIRCUIT | NOS.OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 26.5 | FROM : -

CONSTRUCTION COST

	TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-	
	TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-	
	TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

INVENTORY OF EXISTING HYDROELECTRIC PLANT

SCHEME : MASIWAY

RIVER SYSTEM : PAMPANGA | WATER RESOURCES REGION : III | COORDINATES : N15-47-18 E121-05-39
STREAM : PAMPANGA | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	898.6
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	128.5	GROSS STORAGE VOL.	(MIL M3) :	-	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	4.9	
	MINIMUM OPERATING LEVEL	(EL,M) :	125.5	DEAD STORAGE VOL.	(MIL M3) :	-	
	DRAWDOWN DEPTH	(M) :	3.0	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	121.0	CREST LENGTH	(M) :	336.0	
	DAM HEIGET	(M) :	25.0	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	-	DIAMETER (WIDTH)	(M) :	-	NOS. : -
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	84.0	AVERAGE NET HEAD	(M) :	-	
	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	-	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	12.0	ANNUAL TOTAL ENERGY	(GWH) :	45.0	
	FIRM POWER	(MW) :	-	FIRM ENERGY	(GWH) :	-	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	-	

TRANSMISSION LINE LENGTH (KM) : - TO : : -
ACCESS ROAD LENGTH (KM) : - FROM : -
NOS.OF CIRCUIT : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : AMBUKLAO

RIVER SYSTEM : AGNO
STREAM : AGNO
WATER RESOURCES REGION : III
PROVINCE : -
COORDINATES : N16-28-42 E120-44-45

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	686.0
AVER. BASIN RAINFALL	(MM/YR) :	2295.
AVERAGE DISCHARGE	(M3/S) :	30.0

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	752.2	GROSS STORAGE VOL.	(MIL M3) :	327.2		
	AVERAGE OPERATING LEVEL	(EL,M) :	724.6	ACTIVE STORAGE VOL.	(MIL M3) :	258.0		
	MINIMUM OPERATING LEVEL	(EL,M) :	694.0	DEAD STORAGE VOL.	(MIL M3) :	69.2		
	DRAWDOWN DEPTH	(M) :	58.2	SEDIMENT VOL.	(MIL M3) :	-		
MAIN DAM	CREST ELEVATION	(EL,M) :	758.0	CREST LENGTH	(M) :	452.0		
	DAM HEIGHT	(M) :	129.0	EMBANKMENT VOL.	(MIL M3) :	5.8		
WATERWAY	HEADRACE : LENGTH	(M) :	558.0	DIAMETER (WIDTH)	(M) :	7.0	NOS. :	3
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	-	NOS. :	1
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. :	-
	EXCAVATION VOL TOTAL	(1000 M3) :	-					
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	-	AVERAGE NET HEAD	(M) :	-		
/HEAD	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	574.0		
POWER	INSATLLED CAPACITY	(MW) :	75.0	ANNUAL TOTAL ENERGY	(GWH) :	-		
/ENERGY	FIRM POWER	(MW) :	21.4	FIRM ENERGY	(GWH) :	300.0		
	MIN. GUARANTEED POWER	(MW) :	11.0	SECONDARY ENERGY	(GWH) :	-		

TRANSMISSION LINE : LENGTH (KM) : 30.0/8.0/18.0 TO : BAYOMBONG/BINGA/BAGUIO 230/69/13.2 K V NOS.OF CIRCUIT : 2/2/1

ACCESS ROAD LENGTH (KM) : 36.0 FROM : BAGUIO

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	66.0	POWER COST	(MIL US$) :	54.2
TOTAL COST/KW	(US$/KW) :	880.0	TRANSMISSION COST	(MIL US$) :	8.6
TOTAL COST/KWH	(US$/KWH) :	0.220	ACCESS ROAD COST	(MIL US$) :	3.3

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : BINGA

RIVER SYSTEM : AGNO | WATER RESOURCES REGION : III | COORDINATES : N16-25-10 E120-43-29
STREAM : AGNO | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	936.0
AVER. BASIN RAINFALL	(MM/YR) :	3328.
AVERAGE DISCHARGE	(M3/S) :	52.3

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	575.0	GROSS STORAGE VOL.	(MIL M3) :	90.6	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	33.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	555.0	DEAD STORAGE VOL.	(MIL M3) :	57.6	
	DRAWDOWN DEPTH	(M) :	20.0	SEDIMENT VOL.	(MIL M3) :	32.6	
MAIN DAM	CREST ELEVATION	(EL,M) :	586.0	CREST LENGTH	(M) :	215.0	
	DAM HEIGHT	(M) :	107.4	EMBANKMENT VOL.	(MIL M3) :	1.9	
WATERWAY	HEADRACE : LENGTH	(M) :	760.0	DIAMETER (WIDTH)	(M) :	5.6	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	2.4	NOS. : 4
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	84.8	AVERAGE NET HEAD	(M) :	149.0	
/HEAD	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	416.5	
POWER	INSATLLED CAPACITY	(MW) :	100.0	ANNUAL TOTAL ENERGY	(GWH) :	516.0	
/ENERGY	FIRM POWER	(MW) :	28.6	FIRM ENERGY	(GWH) :	481.3	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	34.7	

TRANSMISSION LINE LENGTH (KM): - TO : SAN MANUEL 230 K V NOS.OF CIRCUIT : -

ACCESS ROAD LENGTH (KM): - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	49.7	POWER COST	(MIL US$) :	34.8
TOTAL COST/KW	(US$/KW) :	497.0	TRANSMISSION COST	(MIL US$) :	12.0
TOTAL COST/KWH	(US$/KWH) :	0.101	ACCESS ROAD COST	(MIL US$) :	2.9

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : KALAYAAN

RIVER SYSTEM : PASIG | WATER RESOURCES REGION : IV | COORDINATES : N14-19-00 E121-28-00
STREAM : CALIRAYA | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2) : 129.0
AVER. BASIN RAINFALL (MM/YR) : -
AVERAGE DISCHARGE (M3/S) : -

SELECTED PLAN

TYPE OF DEVELOPMENT : PUMPED STORAGE

86.0

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	288.0	GROSS STORAGE VOL.	(MIL M3) :	86.0	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	78.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	286.0	DEAD STORAGE VOL.	(MIL M3) :	8.0	
	DRAWDOWN DEPTH	(M) :		SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	-	CREST LENGTH	(M) :		
	DAM HEIGHT	(M) :	42.0	EMBANKMENT VOL.	(MIL M3) :		
WATERWAY	HEADRACE : LENGTH	(M) :	-	DIAMETER (WIDTH)	(M) :	-	NOS. : -
	PENSTOCK : HORIZONT. L	(M) :	1300.0	DIAMETER	(M) :	6.0	NOS. : 2
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	120.0	AVERAGE NET HEAD	(M) :	282.0	
	FIRM DISCHARGE	(M3/S) :		TAILWATER LEVEL	(EL,M) :	-1.5	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	300.0	ANNUAL TOTAL ENERGY	(GWH) :	263.0	
	FIRM POWER	(MW) :	300.0	FIRM ENERGY	(GWH) :	263.0	
	MIN. GUARANTEED POWER	(MW) :	80.0	SECONDARY ENERGY	(GWH) :	-	

TRANSMISSION LINE LENGTH (KM) : - TO : - 230 K V NOS.OF CIRCUIT : -

ACCESS ROAD LENGTH (KM) : - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-	
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-	
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : CALIRAYA

RIVER SYSTEM : PASIG | WATER RESOURCES REGION : IV | COORDINATES : N14-16-05 E121-30-30
STREAM : CALIRAYA&LUMOT | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	129.0
AVER. BASIN RAINFALL	(MM/YR) :	3000.
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	288.0	GROSS STORAGE VOL.	(MIL M3) :	86.0	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	78.0	
	MINIMUM OPERATING LEVEL	(EL,M) :	276.0	DEAD STORAGE VOL.	(MIL M3) :	8.0	
	DRAWDOWN DEPTH	(M) :	12.0	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	292.0	CREST LENGTH	(M) :	500.0	
	DAM HEIGHT	(M) :	42.0	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	1125.0	DIAMETER (WIDTH)	(M) :	2.5	NOS. : 3
	PENSTOCK : HORIZONT. L	(M) :	740.0	DIAMETER	(M) :	-	NOS. : 1
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	-	AVERAGE NET HEAD	(M) :	276.5	
/HEAD	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	165.0	
POWER	INSATLLED CAPACITY	(MW) :	32.0	ANNUAL TOTAL ENERGY	(GWH) :	192.0	
/ENERGY	FIRM POWER	(MW) :	-	FIRM ENERGY	(GWH) :	180.0	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	12.0	

TRANSMISSION
LINE LENGTH (KM) : 85.8 TO : MAKATI LINE 115 K V NOS.OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) : -
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) : -
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) : -

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : BOTOCAN

RIVER SYSTEM : BOTOCAN | WATER RESOURCES REGION : IV | COORDINATES : N - - E - -
STREAM : BOTOCAN | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	64.8
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	4.7

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : -

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	505.8	GROSS STORAGE VOL.	(MIL M3) :	0.4	
	AVERAGE OPERATING LEVEL	(EL,M) :	503.0	ACTIVE STORAGE VOL.	(MIL M3) :	0.3	
	MINIMUM OPERATING LEVEL	(EL,M) :	499.1	DEAD STORAGE VOL.	(MIL M3) :	0.1	
	DRAWDOWN DEPTH	(M) :	6.7	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	-	CREST LENGTH	(M) :	55.8	
	DAM HEIGHT	(M) :	32.0	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	1180.5	DIAMETER (WIDTH)	(M) :	2.0	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	187.8	DIAMETER	(M) :	1.5	NOS. : 2
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	107.8	AVERAGE NET HEAD	(M) :	195.1	
/HEAD	FIRM DISCHARGE	(M3/S) :	25.4	TAILWATER LEVEL	(EL,M) :	307.9	
POWER	INSATLLED CAPACITY	(MW) :	17.0	ANNUAL TOTAL ENERGY	(GWH) :	54.0	
/ENERGY	FIRM POWER	(MW) :	4.0	FIRM ENERGY	(GWH) :	32.0	
	MIN. GUARANTEED POWER	(MW) :	3.0	SECONDARY ENERGY	(GWH) :	22.0	

TRANSMISSION LINE : LENGTH (KM) : - TO : - | 115 K V | NOS.OF CIRCUIT : -

ACCESS ROAD LENGTH (KM) : - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : LAKE BUHI-BARIT

RIVER SYSTEM : LAKE BUHI-BARIT | WATER RESOURCES REGION : V | COORDINATES : N13-23-30 E123-28-45
STREAM : BARIT | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	-
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	95.0	GROSS STORAGE VOL.	(MIL M3) :	3.3	
	AVERAGE OPERATING LEVEL	(EL,M) :	93.8	ACTIVE STORAGE VOL.	(MIL M3) :	1.2	
	MINIMUM OPERATING LEVEL	(EL,M) :	92.0	DEAD STORAGE VOL.	(MIL M3) :	2.1	
	DRAWDOWN DEPTH	(M) :		SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	97.0	CREST LENGTH	(M) :	135.0	
	DAM HEIGHT	(M) :	90.0	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	231.0	DIAMETER (WIDTH)	(M) :	2.3	NOS. : 1
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	DIVERSION : LENGTH	(M) :	125.0	DIAMETER	(M) :	3.5	NOS. : 1
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	12.3	AVERAGE NET HEAD	(M) :	-	
	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	-	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	1.8	ANNUAL TOTAL ENERGY	(GWH) :	-	
	FIRM POWER	(MW) :	-	FIRM ENERGY	(GWH) :	-	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	-	

TRANSMISSION LINE LENGTH (KM) : - TO : - NOS.OF CIRCUIT : -

ACCESS ROAD LENGTH (KM) : - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-	
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-	
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-	

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

I N V E N T O R Y O F E X I S T I N G H Y D R O E L E C T R I C P L A N T

SCHEME : CAWAYAN

RIVER SYSTEM : CAWAYAN | WATER RESOURCES REGION : V | COORDINATES : N13-00-00 E123-57-30
STREAM : CAWAYAN | PROVINCE : -

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	-
AVER. BASIN RAINFALL	(MM/YR) :	-
AVERAGE DISCHARGE	(M3/S) :	-

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) :	-	GROSS STORAGE VOL.	(MIL M3) :	-	
	AVERAGE OPERATING LEVEL	(EL,M) :	-	ACTIVE STORAGE VOL.	(MIL M3) :	-	
	MINIMUM OPERATING LEVEL	(EL,M) :	-	DEAD STORAGE VOL.	(MIL M3) :	-	
	DRAWDOWN DEPTH	(M) :	-	SEDIMENT VOL.	(MIL M3) :	-	
MAIN DAM	CREST ELEVATION	(EL,M) :	-	CREST LENGTH	(M) :	-	
	DAM HEIGHT	(M) :	-	EMBANKMENT VOL.	(MIL M3) :	-	
WATERWAY	HEADRACE : LENGTH	(M) :	-	DIAMETER (WIDTH)	(M) :	-	NOS. : -
	PENSTOCK : HORIZONT. L	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	DIVERSION : LENGTH	(M) :	-	DIAMETER	(M) :	-	NOS. : -
	EXCAVATION VOL TOTAL	(1000 M3) :	-				
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	0.65	AVERAGE NET HEAD	(M) :	77.2	
	FIRM DISCHARGE	(M3/S) :	-	TAILWATER LEVEL	(EL,M) :	-	
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	0.4	ANNUAL TOTAL ENERGY	(GWH) :	3.1	
	FIRM POWER	(MW) :	-	FIRM ENERGY	(GWH) :	-	
	MIN. GUARANTEED POWER	(MW) :	-	SECONDARY ENERGY	(GWH) :	-	

TRANSMISSION
LINE LENGTH (KM) : - TO : - NOS.OF CIRCUIT : -

ACCESS ROAD LENGTH (KM) : - FROM : -

CONSTRUCTION COST

TOTAL COST	(MIL US$) :	-	POWER COST	(MIL US$) :	-	
TOTAL COST/KW	(US$/KW) :	-	TRANSMISSION COST	(MIL US$) :	-	
TOTAL COST/KWH	(US$/KWH) :	-	ACCESS ROAD COST	(MIL US$) :	-	

OTHER INFORMATION

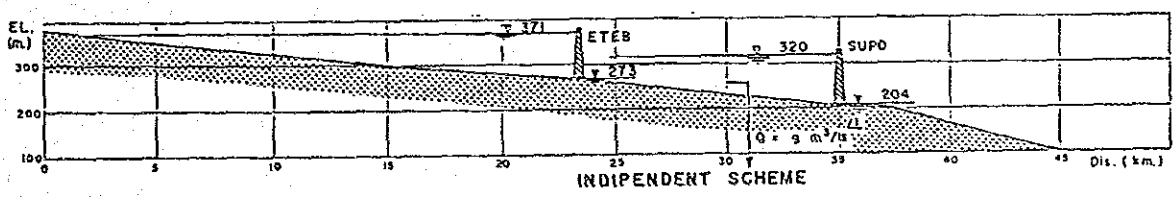
LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :

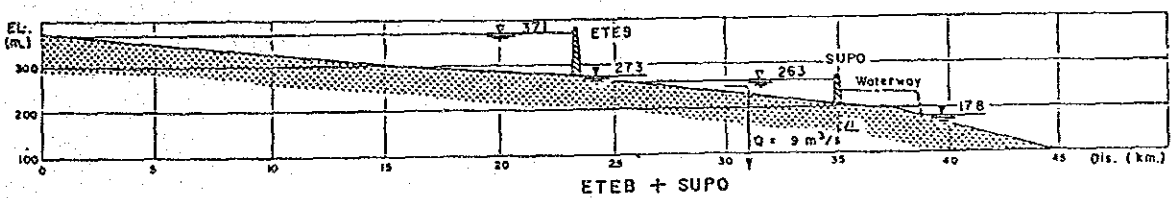
C-8　流域開発解析

アブラ川　　流域
アブログ川　流域
チコ川　　流域
アグノ川　　流域
アゴス川　　流域

アブラ川流域

ケース番号		計画地点	ID番号	満水位(m)	放水位(m)
1-3	-	エテブ	1-022-00-06-0-1	371.0	273.0
	-	スポ	1-022-00-05-3-1	263.0	204.0
1-4	-	エテブ	1-022-00-06-0-1	371.0	273.0
	-	スポ(ダム･水路)	1-022-00-05-4-1	263.0	178.0





FSL (Full Supply Level)

TWL (Tail Water Level)

アブログ川流域

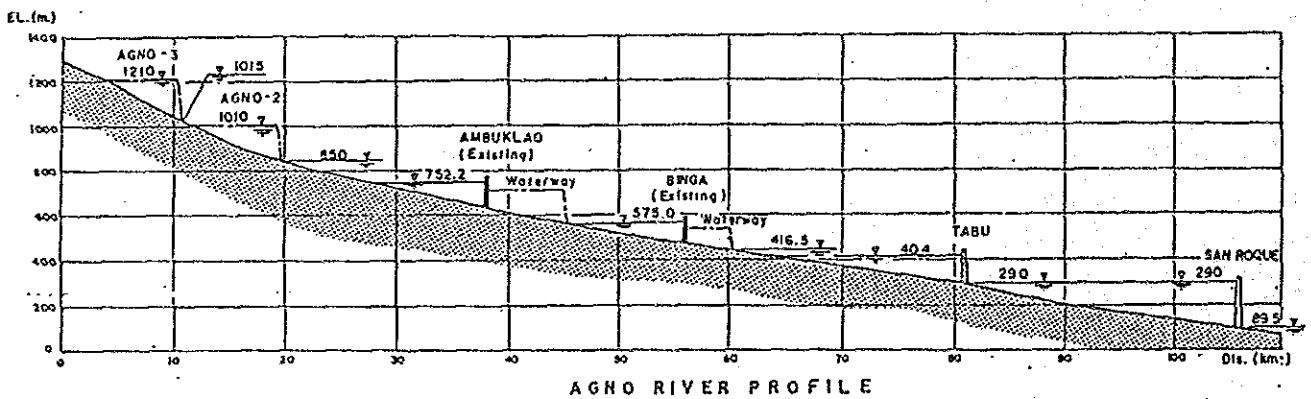
ケース番号		計画地点	ID番号	満水位(m)	放水位(m)
2-2	-	アグブル	2-006-01-06-0-1	346.0	185.0
	-	シシリタン	2-006-00-01-1-1	100.0	10.0
2-3	-	アグブル	2-006-01-06-0-1	346.0	185.0
	-	ジェネド	2-006-00-81-0-1	180.0	50.7
2-4	-	アグブル	2-006-01-06-0-1	346.0	185.0
	-	ブル	2-006-00-03-1-1	175.0	78.3
	-	シシリタン	2-006-00-01-2-1	68.3	10.0

チコ川流域

ケース番号		計画地点	ID番号	満水位(m)	放水位(m)
3-1	-	サダンガ	2-008-03-05-0-1	890.0	676.0
	-	チコ 1R	2-008-03-04-0-2	623.0	555.0
3-2	-	サダンガ(ダム･水路)	2-008-03-05-1-1	890.0	625.0
	-	チコ 1R	2-008-03-04-1-2	623.0	555.0
3-3	-	サダンガ	2-008-03-05-0-1	890.0	676.0
	-	バサオ	2-008-03-03-1-1	666.0	510.0

アグノ川流域

ケース番号		計画地点	ID番号	満水位(m)	放水位(m)
5-1	-	ビンガ(既設)	3-077-00-81-0-1	575.0	416.5
	-	タブ	3-077-00-04-1-1	404.0	290.0
5-2	-	ビンガ(既設)	3-077-00-81-0-1	575.0	416.5
	-	タブ(低ダム)	3-077-00-04-2-1	348.5	290.0

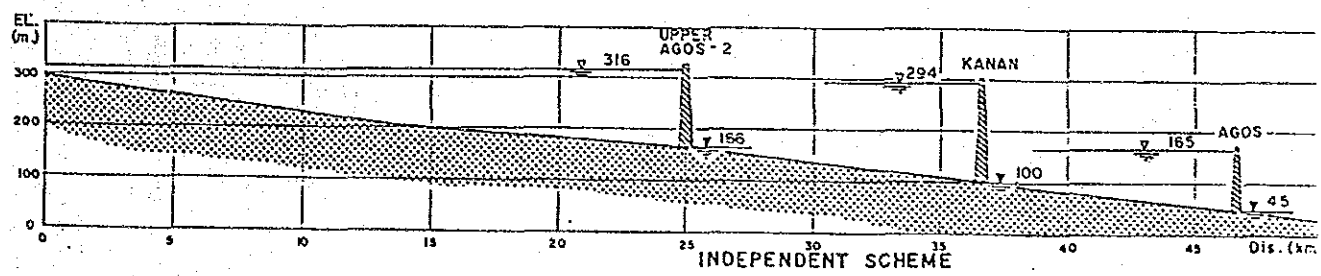


AGNO RIVER PROFILE

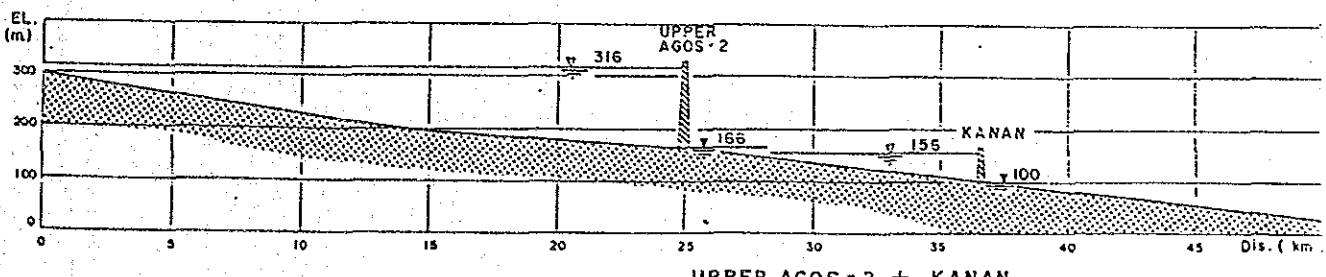
FSL (Full supply level)
TWL (Tail water level)

アゴス川流域

ケース番号		計画地点	ID番号	満水位(m)	放水位(m)
6-1	-	アッパーアゴス2	4-007-00-05-0-1	316.0	166.0
	-	カナン	4-007-00-01-0-1	156.0	100.0



INDEPENDENT SCHEME



UPPER AGOS-2 + KANAN

FSL (Full supply level) or Inlet Elev.
TWL (Tail water level)

PROJECT NAME : SUPO
PROJECT ID : 1-022-00-05-3
TYPE : RESERVOIR

****
* SUMMARY TABLE OF COST ESTIMATE *
****

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(67.2)	(61.3)	(64.7)	(68.2)	(56.4)	(61.9)	(68.2)	(48.7)	(56.3)	(64.7)
STORAGE DAM	13.70	11.78	12.73	13.70	10.18	11.62	13.70	8.63	10.77	13.70
SPILLWAY	14.56	13.80	14.17	14.56	13.09	13.74	14.56	12.35	13.35	14.56
DIVERSION TUNNEL	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67
INTAKE (PRESSURE TYPE)	3.43	3.28	3.21	3.14	3.03	2.93	2.87	2.64	2.51	2.44
HEADRACE TUNNEL (PRESSURE)	4.83	4.77	4.77	4.77	4.69	4.69	4.69	4.45	4.44	4.44
SURGE TANK	2.90	2.85	2.84	2.84	2.78	2.77	2.77	2.58	2.57	2.57
PENSTOCK	3.57	3.42	3.52	3.62	3.29	3.45	3.62	3.06	3.27	3.51
(PRESSURE SHAFT)	(1.40)	(1.39)	(1.40)	(1.41)	(1.38)	(1.40)	(1.41)	(1.35)	(1.37)	(1.39)
(STEEL LINER)	(2.17)	(2.03)	(2.12)	(2.21)	(1.91)	(2.05)	(2.21)	(1.71)	(1.90)	(2.11)
POWERHOUSE BUILDING	6.22	5.82	6.03	6.24	5.46	5.81	6.19	4.83	5.31	5.83
(SUPER STRUCTURE)	(2.76)	(2.59)	(2.68)	(2.77)	(2.43)	(2.58)	(2.75)	(2.15)	(2.36)	(2.59)
(SUB STRUCTURE)	(3.46)	(3.23)	(3.35)	(3.47)	(3.03)	(3.23)	(3.44)	(2.68)	(2.95)	(3.24)
MISCELLANEOUS CIVIL WORK	4.04	3.87	3.95	4.03	3.71	3.83	4.00	3.51	3.70	3.94
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	24.35	23.19	23.75	24.31	22.10	23.03	24.05	20.00	21.33	22.69
ENGINEERING/ADMINISTRATION	13.66	13.06	13.33	13.61	12.50	12.94	13.52	11.72	12.37	13.17
CONTINGENCIES	24.59	23.50	23.99	24.50	22.50	23.30	24.33	21.09	22.26	23.70
S U B T O T A L	147.52	141.01	143.97	146.99	135.02	139.76	145.98	126.53	133.55	142.20
ACCESS ROAD (ROAD LENGTH 3.1 KM)										
CONSTRUCTION COST	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
ENGINEERING ADMINSITRATION	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
CONTINEGENCIES	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
S U B T O T A L	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
TRANSMISSION LINE SYSTEM (T/L LENGTH 31.7 KM)										
TRANSMISSION LINE	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
SWITCHYARD AND SUBSTATION	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
ENGINEERING/ADMINISTRATION	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
CONTINGENCIES	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
S U B T O T A L	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
T O T A L	152.00	145.48	148.44	151.46	139.49	144.26	150.45	131.00	138.02	146.67
EVALUATION INDICES										
U S D / K W	2262.6	2373.0	2294.0	2221.6	2473.9	2331.4	2206.2	2687.5	2452.7	2268.1
U S D / K W H	0.895	0.934	0.905	0.877	0.969	0.915	0.867	1.028	0.941	0.871

1-4-3 ABRA PAGE : 1

REGION NO. : 1 BASIN NO. : 22

NUMBER OF PROJECTS : 2

LIST OF PROJECTS

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	1-022-00-06-0-1	ETEB	911.0	2750.0	4-1-008
2	1-022-00-05-4-1	SUPO (D+W ALT.)	1293.0	2750.0	4-1-008

- CONNECTION MATRIX 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 : ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	1-022-00-05-0-1	0	
2	1-022-00-05-4-1	1	1-022-00-06-0-1

PROJECT NAME : ETEB
PROJECT ID : 1- 22- 0- 6-0-1
TYPE : RESERVOIR

BASIN NAME : ABRA
RIVER NAME : ABRA

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.60	0.55	0.55	0.55	0.50	0.50	0.50	0.45	0.45	0.45
FULL SUPPLY LEVEL (M) :	371.0	349.9	359.6	371.0	346.2	357.7	371.0	342.6	355.8	371.0
MIN. OPERATING LEVEL(M) :	331.4	303.9	319.5	335.1	303.7	321.3	338.9	303.5	323.0	342.5
POWER										
FIRM DISCHARGE (M3/S) :	39.4	38.2	38.1	38.0	36.7	36.6	36.5	35.3	35.2	35.1
PLANT PEAK DIS. (M3/S) :	157.8	152.6	152.3	152.0	146.9	146.6	146.2	141.2	140.8	140.4
AVERAGE NET HEAD (M) :	82.5	59.5	71.1	83.7	57.1	70.4	84.9	54.6	69.7	86.1
INSTALLED CAPACITY (MW) :	107.1	74.8	89.1	104.7	69.0	84.9	102.2	63.5	80.8	99.5
GUARANTEED POWER (MW) :	69.3	34.6	52.9	71.2	33.0	53.0	72.8	31.5	52.7	73.8
AVERAGE FIRM POWER (MW) :	26.8	18.7	22.3	26.2	17.3	21.2	25.5	15.9	20.2	24.9
FIRM ENERGY (MIL KWH/Y) :	235.	164.	195.	229.	151.	186.	224.	139.	177.	218.
SECONDARY ENERGY (") :	62.	54.	61.	69.	57.	66.	77.	59.	71.	84.
ANNUAL AVERAGE E-GY (") :	298.	217.	256.	299.	208.	252.	301.	198.	247.	302.
D A M										
DAM HEIGHT (M) :	104.0	82.9	92.6	104.0	79.2	90.7	104.0	75.6	88.8	104.0
EMBANKMENT VOL.(MIL M3) :	6.063	3.461	4.550	6.063	3.111	4.320	6.063	2.777	4.097	6.063
EVALUATION INDECES										
CH/V :	19627.	26031.	22294.	18899.	26530.	22081.	18171.	27123.	21846.	17444.
C/V :	205.	348.	264.	198.	372.	267.	190.	401.	271.	183.
P/(20VT+VD) :	9.5	8.7	9.2	9.3	8.4	9.0	9.1	8.0	8.8	8.9
E(FIRM)/(20VT+VD) :	20.9	19.0	20.1	20.4	18.3	19.7	20.0	17.6	19.2	19.5
E(F+SEC*0.3)/(20VT+VD) :	22.5	20.9	22.0	22.3	20.4	21.8	22.0	19.9	21.5	21.7

PROJECT NAME : ETEB
PROJECT ID : 1-022-00-06-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE (UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(107.1)	(74.8)	(89.1)	(104.7)	(69.0)	(84.9)	(102.2)	(63.5)	(80.8)	(99.5)
STORAGE DAM	58.77	36.01	45.73	58.77	32.81	43.70	58.77	29.71	41.73	58.77
SPILLWAY	18.74	15.51	17.01	18.74	14.96	16.71	18.74	14.41	16.42	18.74
DIVERSION TUNNEL	33.28	33.28	33.28	33.28	33.28	33.28	33.28	33.28	33.28	33.28
INTAKE (PRESSURE TYPE)	4.18	4.23	4.07	3.94	4.00	3.83	3.70	3.78	3.60	3.47
HEADRACE TUNNEL (PRESSURE)	4.44	4.34	4.33	4.32	4.22	4.21	4.21	4.10	4.09	4.09
SURGE TANK	2.87	2.79	2.78	2.76	2.69	2.67	2.66	2.58	2.57	2.55
PENSTOCK	4.93	3.94	4.38	4.87	3.77	4.26	4.81	3.61	4.14	4.73
(PRESSURE SHAFT)	(1.55)	(1.47)	(1.51)	(1.55)	(1.45)	(1.50)	(1.54)	(1.44)	(1.49)	(1.53)
(STEEL LINER)	(3.38)	(2.47)	(2.87)	(3.33)	(2.32)	(2.76)	(3.27)	(2.17)	(2.65)	(3.20)
POWERHOUSE BUILDING	8.48	6.61	7.42	8.25	6.18	7.09	8.01	5.77	6.77	7.77
(SUPER STRUCTURE)	(3.77)	(2.94)	(3.30)	(3.67)	(2.75)	(3.15)	(3.56)	(2.56)	(3.01)	(3.45)
(SUB STRUCTURE)	(4.71)	(3.67)	(4.12)	(4.58)	(3.43)	(3.94)	(4.45)	(3.20)	(3.76)	(4.32)
MISCELLANEOUS CIVIL WORK	6.78	5.34	5.95	6.75	5.10	5.79	6.71	4.86	5.63	6.67
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	30.02	25.17	27.20	29.22	23.86	26.16	28.40	22.57	25.12	27.55
ENGINEERING/ADMINISTRATION	21.56	17.15	19.02	21.36	16.36	18.47	21.16	15.58	17.92	20.95
CONTINGENCIES	38.81	30.87	34.23	38.45	29.45	33.24	38.09	28.05	32.25	37.71
S U B T O T A L	232.88	185.24	205.40	230.73	176.88	199.43	228.50	168.31	193.53	226.28
ACCESS ROAD (ROAD LENGTH 0.2 KM)										
CONSTRUCTION COST	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
ENGINEERING ADMINSITRATION	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONTINEGENCIES	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
S U B T O T A L	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TRANSMISSION LINE SYSTEM (T/L LENGTH 36.5 KM)										
TRANSMISSION LINE	4.05	4.05	4.05	4.05	2.48	4.05	4.05	2.48	4.05	4.05
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.62	0.96	0.96	0.62	0.96	0.96
ENGINEERING/ADMINISTRATION	0.63	0.63	0.63	0.63	0.39	0.63	0.63	0.39	0.63	0.63
CONTINGENCIES	0.85	0.85	0.85	0.85	0.52	0.85	0.85	0.52	0.85	0.85
S U B T O T A L	6.48	6.48	6.48	6.48	4.01	6.48	6.48	4.01	6.48	6.48
T O T A L	239.43	191.79	211.95	237.28	180.76	205.98	235.09	172.39	200.08	232.84
EVALUATION INDICES										
U S D / K W	2235.6	2563.5	2377.8	2266.5	2618.7	2425.1	2301.0	2716.2	2477.4	2341.1
U S D / K W H	0.946	1.066	0.993	0.949	1.075	1.001	0.953	1.100	1.010	0.958

PROJECT NAME : SUPO (D+W ALT.)
PROJECT ID : 1- 22- 0- 5-4-1
TYPE : RESERVOIR

BASIN NAME : ABRA
RIVER NAME : ABRA

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.01
FULL SUPPLY LEVEL (M) :	263.0	258.5	260.7	263.0	254.4	258.2	263.0	250.0	255.9	263.0
MIN. OPERATING LEVEL(M) :	246.5	244.2	248.0	251.8	244.1	250.0	255.9	243.7	251.8	260.0
POWER										
FIRM DISCHARGE (M3/S) :	39.5	38.8	38.8	38.8	37.9	37.9	37.9	35.2	35.1	35.1
PLANT PEAK DIS. (M3/S) :	158.0	155.3	155.2	155.1	151.7	151.6	151.4	140.6	140.4	140.2
AVERAGE NET HEAD (M) :	76.3	72.6	75.3	78.1	69.8	74.3	79.4	66.7	73.3	80.6
INSTALLED CAPACITY (MW) :	99.3	92.8	96.2	99.7	87.2	92.6	98.9	77.3	84.7	93.1
GUARANTEED POWER (MW) :	80.9	76.8	81.3	85.9	74.9	81.7	88.6	68.9	77.7	86.4
AVERAGE FIRM POWER (MW) :	24.8	23.2	24.1	24.9	21.8	23.2	24.7	19.3	21.2	23.3
FIRM ENERGY (MIL KWH/Y) :	217.	203.	211.	218.	191.	203.	217.	169.	186.	204.
SECONDARY ENERGY (") :	108.	105.	108.	111.	103.	108.	115.	107.	116.	128.
ANNUAL AVERAGE E-GY (") :	326.	308.	319.	330.	294.	311.	332.	276.	302.	331.
D A M										
DAM HEIGHT (M) :	65.0	60.5	62.7	65.0	56.4	60.2	65.0	52.0	57.9	65.0
EMBANKMENT VOL.(MIL M3) :	1.145	0.963	1.052	1.145	0.815	0.948	1.145	0.674	0.869	1.145
EVALUATION INDECES										
CH/V :	89049.	98402.	92522.	87371.	107493.	97012.	85221.	113209.	95156.	78829.
C/V :	1088.	1271.	1163.	1068.	1468.	1260.	1043.	1644.	1275.	966.
P/(20VT+VD) :	14.4	13.8	14.2	14.5	13.4	13.9	14.4	12.3	13.1	13.8
E(FIRM)/(20VT+VD) :	31.4	30.3	31.0	31.7	29.2	30.5	31.6	26.9	28.6	30.2
E(F+SEC*0.3)/(20VT+VD) :	36.1	35.0	35.8	36.5	34.0	35.3	36.6	32.0	34.0	35.8

PROJECT NAME : SUPO (D+W ALT.)
PROJECT ID : 1-022-00-05-4
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE (UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(99.3)	(92.8)	(96.2)	(99.7)	(87.2)	(92.6)	(98.9)	(77.3)	(84.7)	(93.1)
STORAGE DAM	13.70	11.78	12.73	13.70	10.18	11.62	13.70	8.63	10.77	13.70
SPILLWAY	14.56	13.80	14.17	14.56	13.09	13.74	14.56	12.35	13.35	14.56
DIVERSION TUNNEL	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67	31.67
INTAKE (PRESSURE TYPE)	3.43	3.28	3.21	3.14	3.03	2.93	2.87	2.64	2.51	2.44
HEADRACE TUNNEL (PRESSURE)	11.99	11.84	11.84	11.83	11.64	11.63	11.63	11.03	11.02	11.00
SURGE TANK	3.59	3.53	3.53	3.52	3.45	3.44	3.44	3.20	3.20	3.19
PENSTOCK	5.23	5.02	5.14	5.26	4.85	5.04	5.25	4.51	4.77	5.05
(PRESSURE SHAFT)	(1.71)	(1.70)	(1.71)	(1.72)	(1.69)	(1.71)	(1.72)	(1.66)	(1.68)	(1.70)
(STEEL LINER)	(3.51)	(3.32)	(3.43)	(3.54)	(3.16)	(3.33)	(3.53)	(2.86)	(3.09)	(3.35)
POWERHOUSE BUILDING	8.07	7.67	7.86	8.04	7.30	7.60	7.94	6.57	6.98	7.43
(SUPER STRUCTURE)	(3.59)	(3.41)	(3.49)	(3.57)	(3.24)	(3.38)	(3.53)	(2.92)	(3.10)	(3.30)
(SUB STRUCTURE)	(4.48)	(4.26)	(4.36)	(4.47)	(4.06)	(4.22)	(4.41)	(3.65)	(3.88)	(4.13)
MISCELLANEOUS CIVIL WORK	4.61	4.43	4.51	4.59	4.26	4.38	4.55	4.03	4.21	4.45
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	29.03	27.95	28.40	28.84	26.88	27.62	28.43	24.61	25.64	26.73
ENGINEERING/ADMINISTRATION	15.73	15.12	15.38	15.65	14.55	14.96	15.50	13.66	14.26	15.03
CONTINGENCIES	28.32	27.22	27.69	28.16	26.18	26.93	27.91	24.58	25.68	27.05
S U B T O T A L	169.93	163.32	166.11	168.97	157.09	161.56	167.45	147.48	154.05	162.30
ACCESS ROAD (ROAD LENGTH 3.1 KM)										
CONSTRUCTION COST	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
ENGINEERING ADMINSITRATION	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
CONTINEGENCIES	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
S U B T O T A L	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
TRANSMISSION LINE SYSTEM (T/L LENGTH 31.7 KM)										
TRANSMISSION LINE	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
CONTINGENCIES	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
S U B T O T A L	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
T O T A L	176.61	170.00	172.79	175.65	163.77	168.24	174.13	154.16	160.73	168.97
EVALUATION INDICES										
U S D / K W	1779.0	1831.0	1795.7	1762.2	1878.6	1816.2	1760.4	1995.3	1897.0	1815.6
U S D / K W H	0.707	0.724	0.711	0.698	0.738	0.715	0.693	0.766	0.729	0.698

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-00-06-0-1

SCHEME : ETEB

RIVER SYSTEM : ABRA | WATER RESOURCES REGION : I | COORDINATES : N17-10-42 E120-40-22
STREAM : ABRA | PROVINCE : ILOCOS SUR | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 911.0	(MAIN : 911., INTER TRANSFER TOTAL : 0.)				STREAM GAGE ID	: 4-1-006-NW-106	
AVER. BASIN RAINFALL	(MM/YR) : 2750.	DENUDATION RATE	(MM/YR) : 1.4			GAGE CATCHMENT	(KM2) : 2575.	
AVERAGE DISCHARGE	(M3/S) : 51.4	EVAPORATION RATE	(MM/DAY) : 3.5			GAGE AVER.DISCHARGE	(M3/S) : 134.6	

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.60

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 371.0	GROSS STORAGE VOL.	(MIL M3) : 1626.2			
	AVERAGE OPERATING LEVEL	(EL.M) : 357.8	ACTIVE STORAGE VOL.	(MIL M3) : 972.5			
	MINIMUM OPERATING LEVEL	(EL.M) : 331.4	DEAD STORAGE VOL.	(MIL M3) : 653.7			
	DRAWDOWN DEPTH	(M) : 39.6	SEDIMENT VOL.	(MIL M3) : 63.8			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 377.0	CREST LENGTH	(M) : 461.8			
	DAM HEIGHT	(M) : 104.0	EMBANKMENT VOL.	(MIL M3) : 6.06			
WATERWAY	HEADRACE : LENGTH	(M) : 460.0	DIAMETER (WIDTH)	(M) : 5.8	NOS. : 2		
	PENSTOCK : HORIZONT. L	(M) : 220.0	DIAMETER	(M) : 4.5	NOS. : 2		
	DIVERSION : LENGTH	(M) : 970.0	DIAMETER	(M) : 8.6	NOS. : 4		
	EXCAVATION VOL TOTAL	(1000 M3) : 259.0					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 157.8	AVERAGE NET HEAD	(M) : 82.5			
	FIRM DISCHARGE	(M3/S) : 39.4	TAILWATER LEVEL	(EL.M) : 273.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 107.1	ANNUAL TOTAL ENERGY	(GWH) : 296.4			
	FIRM POWER	(MW) : 26.8	FIRM ENERGY	(GWH) : 234.6			
	MIN.GUARANTEED POWER	(MW) : 69.3	SECONDARY ENERGY	(GWH) : 61.9			

TRANSMISSION LINE : LENGTH (KM) : 36.5 | TO : SAN ESTEBAN | 230 K V DOUBLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 0.2 | FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 239.4	POWER COST	(MIL USD) : 232.9		
TOTAL COST/KW	(USD/KW) : 2235.6	TRANSMISSION COST	(MIL USD) : 6.5		
TOTAL COST/KWH	(USD/KWH) : 0.946	ACCESS ROAD COST	(MIL USD) : 0.1		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3171-IV
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-00-05-3-1

SCHEME : SUPO

RIVER SYSTEM : ABRA
STREAM : ABRA
WATER RESOURCES REGION : 1
PROVINCE : ILOCOS SUR
COORDINATES : N17-14-42 E120-40-36
STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1293.0	(MAIN : 1293.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-1-008-NW-106		
AVER. BASIN RAINFALL	(MM/YR) : 2750.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 2575.		
AVERAGE DISCHARGE	(M3/S) : 63.9	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 134.6		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.02

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 263.0	GROSS STORAGE VOL.	(MIL M3) : 142.6			
	AVERAGE OPERATING LEVEL	(EL.M) : 260.6	ACTIVE STORAGE VOL.	(MIL M3) : 40.3			
	MINIMUM OPERATING LEVEL	(EL.M) : 255.9	DEAD STORAGE VOL.	(MIL M3) : 102.3			
	DRAWDOWN DEPTH	(M) : 7.1	SEDIMENT VOL.	(MIL M3) : 26.7			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 269.0	CREST LENGTH	(M) : 212.8			
	DAM HEIGHT	(M) : 65.0	EMBANKMENT VOL.	(MIL M3) : 1.14			
WATERWAY	HEADRACE : LENGTH	(M) : 500.0	DIAMETER (WIDTH)	(M) : 5.7	NOS. : 2		
	PENSTOCK : HORIZONT. L	(M) : 200.0	DIAMETER	(M) : 4.5	NOS. : 2		
	DIVERSION : LENGTH	(M) : 750.0	DIAMETER	(M) : 8.5	NOS. : 5		
	EXCAVATION VOL TOTAL (1000 M3) : 247.0						
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 151.4	AVERAGE NET HEAD	(M) : 54.7			
	FIRM DISCHARGE	(M3/S) : 37.9	TAILWATER LEVEL	(EL.M) : 204.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 68.2	ANNUAL TOTAL ENERGY	(GWH) : 229.9			
	FIRM POWER	(MW) : 17.0	FIRM ENERGY	(GWH) : 149.3			
	MIN.GUARANTEED POWER	(MW) : 59.3	SECONDARY ENERGY	(GWH) : 80.6			

TRANSMISSION LINE : LENGTH (KM) : 31.7 TO : SAN ESTEBAN 115 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 2

ACCESS ROAD LENGTH (KM) : 3.1 FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 150.5	POWER COST	(MIL USD) : 146.0		
TOTAL COST/KW	(USD/KW) : 2206.2	TRANSMISSION COST	(MIL USD) : 3.6		
TOTAL COST/KWH	(USD/KWH) : 0.867	ACCESS ROAD COST	(MIL USD) : 0.9		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) : 3171-IV
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 1-022-00-05-4-1

SCHEME : SUPO (D+W ALT.)

RIVER SYSTEM : ABRA | WATER RESOURCES REGION : I | COORDINATES : N17-14-42 E120-40-36
STREAM : ABRA | PROVINCE : ILOCOS SUR | STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1293.0	(MAIN ; 1293., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-1-008-NW-106		
AVER. BASIN RAINFALL	(MM/YR) : 2750.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 2575.		
AVERAGE DISCHARGE	(M3/S) : 63.9	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 134.6		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.03

RESERVIOR	FULL SUPPLY LEVEL	(EL,M) : 263.0	GROSS STORAGE VOL.	(MIL M3) : 142.6			
	AVERAGE OPERATING LEVEL	(EL,M) : 259.3	ACTIVE STORAGE VOL.	(MIL M3) : 60.5			
	MINIMUM OPERATING LEVEL	(EL,M) : 251.8	DEAD STORAGE VOL.	(MIL M3) : 82.1			
	DRAWDOWN DEPTH	(M) : 11.2	SEDIMENT VOL.	(MIL M3) : 26.7			
MAIN DAM (WEIR)	CREST ELEVATION	(EL,M) : 269.0	CREST LENGTH	(M) : 212.8			
	DAM HEIGHT	(M) : 65.0	EMBANKMENT VOL.	(MIL M3) : 1.14			
WATERWAY	HEADRACE : LENGTH	(M) : 1240.0	DIAMETER (WIDTH)	(M) : 5.7	NOS. : 2		
	PENSTOCK : HORIZONT. L	(M) : 240.0	DIAMETER	(M) : 4.5	NOS. : 2		
	DIVERSION : LENGTH	(M) : 750.0	DIAMETER	(M) : 8.5	NOS. : 5		
	EXCAVATION VOL TOTAL	(1000 M3) : 287.3					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 155.1	AVERAGE NET HEAD	(M) : 78.1			
	FIRM DISCHARGE	(M3/S) : 38.8	TAILWATER LEVEL	(EL,M) : 178.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 99.7	ANNUAL TOTAL ENERGY	(GWH) : 329.6			
	FIRM POWER	(MW) : 24.9	FIRM ENERGY	(GWH) : 218.3			
	MIN.GUARANTEED POWER	(MW) : 85.9	SECONDARY ENERGY	(GWH) : 111.3			

TRANSMISSION LINE : LENGTH (KM) : 31.7 | TO : SAN ESTEBAN | 230 K V DOUBLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD : LENGTH (KM) : 3.1 | FROM : NEAREST PROVINCIAL ROAD

CONSTRUCTION COST

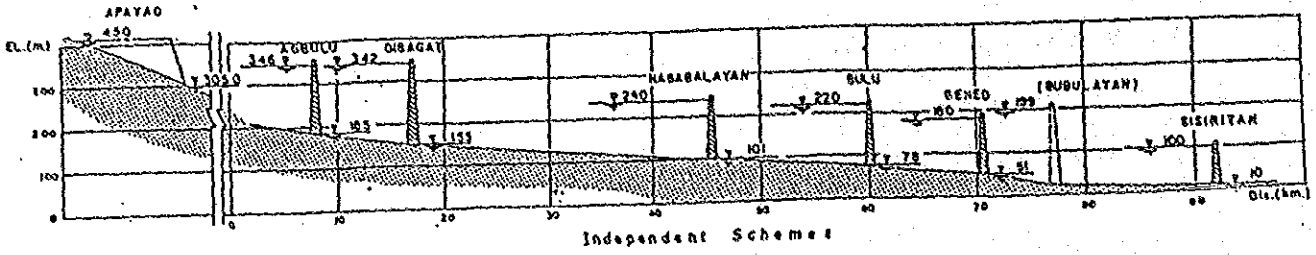
TOTAL COST	(MIL USD) : 175.6	POWER COST	(MIL USD) : 169.0		
TOTAL COST/KW	(USD/KW) : 1762.2	TRANSMISSION COST	(MIL USD) : 5.8		
TOTAL COST/KWH	(USD/KWH) : 0.698	ACCESS ROAD COST	(MIL USD) : 0.9		

OTHER INFORMATION

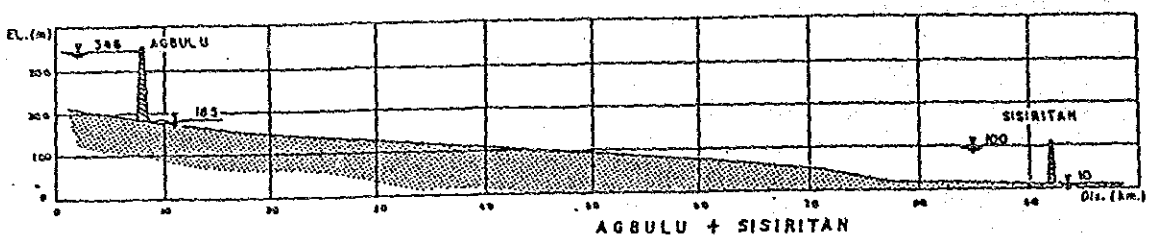
LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50.000 SCALE) : 3171-IV 1979
TECHNICAL COMMENT :
- REGULATING EFFECT BY ETEB PLAN IS EXAMINED
- CONSTRAINED FSL (MAXIMUM=EL 263.0M) DUE TO TWL OF ETEB
- DIVERSION FOR IRRIGATION REQUIREMENT (9.0 CMS) IS CONSIDERED

ABULOG RIVER BASIN

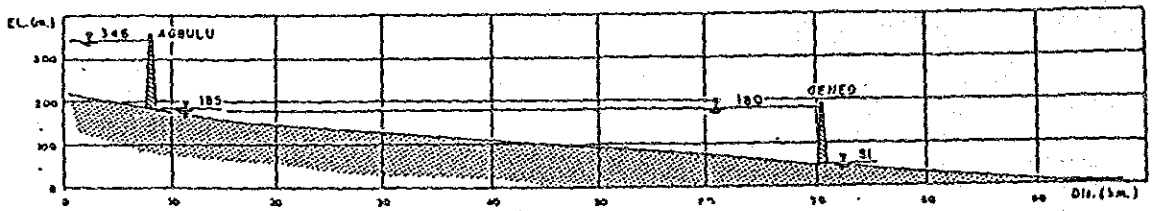
Case No.		Scheme	ID No.	FSL(m)	TWL(m)
2-2	-	Agubulu	2-006-01-06-0-1	346.0	185.0
	-	Sisiritan	2-006-00-01-1-1	100.0	10.0
2-3	-	Agbulu	2-006-01-06-0-1	346.0	185.0
	-	Gened	2-006-00-81-0-1	180.0	50.7
2-4	-	Agbulu	2-006-01-06-0-1	346.0	185.0
	-	Bulu	2-006-00-03-1-1	175.0	78.3
	-	Sisiritan	2-006-00-01-2-1	68.3	10.0



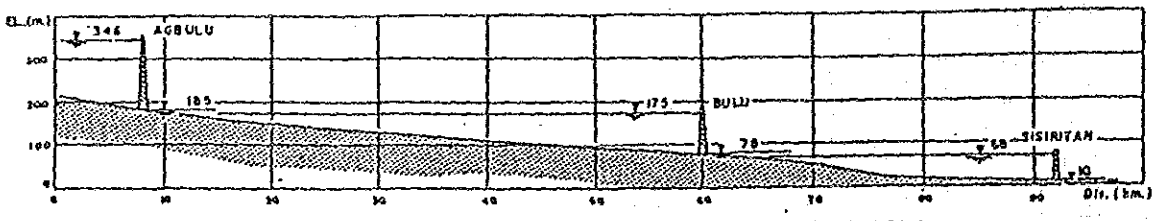
Independent Schemes



AGBULU + SISIRITAN



AGBULU + GENED



AGBULU + BULU + SISIRITAN

FSL (Full supply level)

TWL (Tail water level)

2-2-3 ABULOG PAGE : 1

REGION NO. : 2 BASIN NO. : 6

NUMBER OF PROJECTS : 2

LIST OF PROJECTS

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-006-01-06-0-1	AGBULU	706.0	3977.0	4-2-005
2	2-006-00-01-1-1	SISIRITAN	1870.0	4004.0	4-2-005

- CONNECTION MATRIX 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 : ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-006-01-05-0-1	0	
2	2-006-00-01-1-1	1	2-006-01-06-0-1

PROJECT NAME : ASBULU
PROJECT ID : 2- 6- 1- 6-0-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : APAYAO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.75	0.40	0.40	0.40	0.30	0.30	0.30	0.20	0.20	0.20
FULL SUPPLY LEVEL (M) :	346.0	300.8	316.4	346.0	289.4	310.0	346.0	275.9	301.9	346.0
MIN. OPERATING LEVEL(M) :	278.1	226.3	271.2	316.0	225.4	275.0	324.5	224.2	278.1	332.0
POWER										
FIRM DISCHARGE (M3/S) :	64.6	49.9	49.6	49.1	42.1	41.7	41.2	33.1	32.6	32.1
PLANT PEAK DIS. (M3/S) :	194.1	149.9	148.9	147.6	126.5	125.3	123.7	99.4	98.0	96.3
AVERAGE NET HEAD (M) :	135.6	88.6	113.6	147.8	80.7	110.5	150.5	71.7	106.5	153.2
INSTALLED CAPACITY (MW) :	216.6	109.4	139.3	179.5	84.0	114.0	153.3	58.6	86.0	121.4
GUARANTEED POWER (MW) :	137.4	45.8	97.4	147.8	37.7	85.6	132.1	29.0	69.7	108.6
AVERAGE FIRM POWER (MW) :	72.1	36.4	46.4	59.8	28.0	38.0	51.0	19.5	28.6	40.4
FIRM ENERGY (MIL KWH/Y) :	632.	319.	406.	524.	245.	332.	447.	171.	251.	354.
SECONDARY ENERGY (") :	81.	138.	159.	198.	163.	197.	258.	180.	234.	328.
ANNUAL AVERAGE E-GY (") :	713.	457.	565.	722.	408.	529.	705.	351.	485.	682.
D A M										
DAM HEIGHT (M) :	167.0	121.8	137.4	167.0	110.4	131.0	167.0	96.9	122.9	167.0
EMBANKMENT VOL.(MIL M3) :	10.090	4.462	6.052	10.090	3.497	5.357	10.090	2.535	4.560	10.090
EVALUATION INDECES										
CH/V :	31953.	40037.	33253.	24232.	38758.	30007.	20299.	36593.	25839.	15821.
C/V :	202.	353.	258.	154.	380.	246.	129.	412.	226.	100.
P/(20VT+VD) :	16.3	14.7	15.5	13.8	13.3	13.9	11.9	11.3	11.9	9.5
E(FIRM)/(20VT+VD) :	47.5	43.0	45.1	40.1	38.8	40.6	34.6	32.9	34.7	27.8
E(F+SEC*0.3)/(20VT+VD) :	49.3	48.6	50.4	44.7	46.5	47.8	40.6	43.3	44.4	35.5

PROJECT NAME : AGBULU
PROJECT ID : 2-006-01-06-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(216.6)	(109.4)	(139.3)	(179.5)	(84.0)	(114.0)	(153.3)	(58.6)	(86.0)	(121.4)
STORAGE DAM	91.68	44.96	58.67	91.68	36.34	52.74	91.68	27.44	45.82	91.68
SPILLWAY	24.99	18.85	20.97	24.99	17.30	20.10	24.99	15.45	18.99	24.99
DIVERSION TUNNEL	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37
INTAKE (PRESSURE TYPE)	5.81	4.81	4.12	3.67	3.97	3.31	2.90	3.06	2.46	2.16
HEADRACE TUNNEL (PRESSURE)	8.74	7.26	7.23	7.18	6.43	6.39	6.33	4.44	4.40	4.34
SURGE TANK	3.98	3.11	3.06	3.02	2.63	2.59	2.55	2.03	1.98	1.94
PENSTOCK	4.98	2.71	3.57	4.72	2.29	3.13	4.26	1.48	2.17	3.12
(PRESSURE SHAFT)	(1.05)	(0.84)	(0.96)	(1.08)	(0.80)	(0.93)	(1.05)	(0.45)	(0.53)	(0.61)
(STEEL LINER)	(3.93)	(1.87)	(2.61)	(3.64)	(1.49)	(2.20)	(3.20)	(1.03)	(1.63)	(2.51)
POWERHOUSE BUILDING	14.54	8.46	9.91	11.71	6.70	8.19	9.94	3.44	4.42	5.53
(SUPER STRUCTURE)	(6.46)	(3.76)	(4.41)	(5.20)	(2.98)	(3.64)	(4.42)	(1.53)	(1.96)	(2.46)
(SUB STRUCTURE)	(8.08)	(4.70)	(5.51)	(6.50)	(3.72)	(4.55)	(5.52)	(1.91)	(2.46)	(3.07)
MISCELLANEOUS CIVIL WORK	8.55	5.33	6.20	8.17	4.60	5.64	7.95	3.69	4.83	7.51
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	45.24	29.62	32.92	36.75	24.36	27.83	31.62	18.59	21.95	25.43
ENGINEERING/ADMINISTRATION	26.14	17.68	20.38	25.10	15.13	18.28	24.47	12.00	15.42	22.89
CONTINGENCIES	50.21	31.83	36.68	46.67	27.23	32.91	44.61	21.60	27.76	41.20
S U B T O T A L	301.23	190.97	220.07	280.03	163.36	197.48	267.67	129.59	166.58	247.17
ACCESS ROAD (ROAD LENGTH 6.5 KM)										
CONSTRUCTION COST	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
ENGINEERING ADMINSITRATION	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
CONTINEGENCIES	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
S U B T O T A L	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
TRANSMISSION LINE SYSTEM (T/L LENGTH 78.6 KM)										
TRANSMISSION LINE	8.72	8.72	8.72	8.72	8.72	8.72	8.72	5.34	8.72	8.72
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.62	0.96	0.96
ENGINEERING/ADMINISTRATION	1.21	1.21	1.21	1.21	1.21	1.21	1.21	0.75	1.21	1.21
CONTINGENCIES	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.01	1.63	1.63
S U B T O T A L	12.53	12.53	12.53	12.53	12.53	12.53	12.53	7.72	12.53	12.53
T O T A L	315.62	205.36	234.45	294.41	177.74	211.86	282.05	139.16	180.97	261.56
EVALUATION INDICES										
U S D / K W	1457.3	1877.4	1683.6	1640.1	2115.3	1856.9	1840.3	2373.6	2105.5	2154.1
U S D / K W H	0.481	0.570	0.517	0.505	0.605	0.541	0.538	0.618	0.564	0.578

PROJECT NAME : SISIRITAN
PROJECT ID : 2- 6- 0- 1-1-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : ABULOG

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.35	0.30	0.30	0.30	0.25	0.25	0.25	0.20	0.20	0.20
FULL SUPPLY LEVEL (M) :	100.0	80.0	89.3	100.0	73.9	86.1	100.0	67.0	82.6	100.0
MIN. OPERATING LEVEL(M) :	58.0	32.4	48.8	65.2	33.1	52.6	72.1	32.7	55.6	78.5
POWER										
FIRM DISCHARGE (M3/S) :	162.2	156.4	156.1	155.8	147.6	147.3	146.9	138.8	138.4	137.9
PLANT PEAK DIS. (M3/S) :	648.7	625.4	624.4	623.3	590.4	589.2	587.6	555.2	553.6	551.7
AVERAGE NET HEAD (M) :	73.6	52.0	63.5	76.0	48.3	62.7	78.3	43.6	61.4	80.3
INSTALLED CAPACITY (MW) :	393.1	267.9	326.5	389.8	234.8	304.3	378.5	199.3	279.7	364.8
GUARANTEED POWER (MW) :	231.9	99.8	179.1	258.0	97.6	186.5	274.8	90.2	188.2	285.3
AVERAGE FIRM POWER (MW) :	98.3	67.0	81.6	97.4	58.7	76.1	94.6	49.8	69.9	91.2
FIRM ENERGY (MIL KWH/Y) :	861.	587.	715.	854.	514.	666.	829.	436.	613.	799.
SECONDARY ENERGY (") :	183.	164.	187.	213.	179.	214.	256.	185.	238.	298.
ANNUAL AVERAGE E-GY (") :	1044.	750.	902.	1067.	693.	881.	1085.	621.	851.	1097.
D A M										
DAM HEIGHT (M) :	96.0	76.0	85.3	96.0	69.9	82.1	96.0	63.0	78.6	96.0
EMBANKMENT VOL.(MIL M3) :	11.449	6.734	8.728	11.449	5.567	8.007	11.449	4.472	7.245	11.449
EVALUATION INDECES										
CH/V :	39137.	49694.	43429.	37577.	51772.	42889.	35433.	53893.	42404.	33239.
C/V :	447.	732.	564.	429.	836.	580.	405.	979.	602.	380.
P/(20VT+VD) :	22.4	21.1	22.2	22.3	20.7	22.0	21.9	19.7	21.7	21.4
E(FIRM)/(20VT+VD) :	49.0	46.1	48.6	48.9	45.3	48.3	48.0	43.2	47.6	46.8
E(F+SEC*0.3)/(20VT+VD) :	52.2	50.0	52.4	52.6	50.0	52.9	52.5	48.7	53.1	52.0

PROJECT NAME : SISIRITAN
PROJECT ID : 2-006-00-01-1
TYPE : RESERVOIR

****
* SUMMARY TABLE OF COST ESTIMATE *
****

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(393.1)	(267.9)	(326.5)	(389.8)	(234.8)	(304.3)	(378.5)	(199.3)	(279.7)	(364.8)
STORAGE DAM	102.38	64.40	80.78	102.38	54.54	74.92	102.38	45.04	68.65	102.38
SPILLWAY	19.91	16.50	18.08	19.91	15.46	17.55	19.91	14.29	16.95	19.91
DIVERSION TUNNEL	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44
INTAKE (PRESSURE TYPE)	14.68	14.59	14.06	13.60	13.43	12.86	12.38	12.24	11.64	11.12
HEADRACE TUNNEL (PRESSURE)	23.52	22.91	22.88	22.85	21.04	21.01	20.97	20.14	20.10	20.04
SURGE TANK	12.56	12.15	12.10	12.05	11.40	11.34	11.29	10.72	10.65	10.60
PENSTOCK	20.26	16.17	18.11	20.24	14.40	16.65	19.12	13.29	15.86	18.70
(PRESSURE SHAFT)	(6.30)	(6.01)	(6.16)	(6.31)	(5.31)	(5.47)	(5.63)	(5.23)	(5.41)	(5.59)
(STEEL LINER)	(13.96)	(10.16)	(11.95)	(13.93)	(9.09)	(11.17)	(13.50)	(8.05)	(10.44)	(13.11)
POWERHOUSE BUILDING	60.50	46.28	52.79	59.36	38.50	45.73	52.85	33.82	42.35	50.49
(SUPER STRUCTURE)	(26.89)	(20.57)	(23.46)	(26.38)	(17.11)	(20.33)	(23.49)	(15.03)	(18.82)	(22.44)
(SUB STRUCTURE)	(33.61)	(25.71)	(29.33)	(32.98)	(21.39)	(25.41)	(29.36)	(18.79)	(23.53)	(28.05)
MISCELLANEOUS CIVIL WORK	13.76	10.72	12.01	13.59	9.51	11.08	13.02	8.55	10.38	12.73
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	101.82	84.28	92.07	99.62	77.39	86.89	95.75	69.93	81.35	91.53
ENGINEERING/ADMINISTRATION	35.02	30.95	32.75	34.74	29.19	31.47	33.97	27.61	30.41	33.48
CONTINGENCIES	85.17	68.08	75.41	83.96	61.26	70.19	80.62	55.41	65.96	78.49
S U B T O T A L	511.02	408.48	452.48	503.77	367.57	421.14	483.71	332.47	395.75	470.91
ACCESS ROAD (ROAD LENGTH 10.5 KM)										
CONSTRUCTION COST	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31
ENGINEERING ADMINSITRATION	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
CONTINGENCIES	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
S U B T O T A L	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99
TRANSMISSION LINE SYSTEM (T/L LENGTH 48.0 KM)										
TRANSMISSION LINE	10.56	10.56	10.56	10.56	10.56	10.56	10.56	5.33	10.56	10.56
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	1.44	1.44	1.44	1.44	1.44	1.44	1.44	0.79	1.44	1.44
CONTINGENCIES	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.06	1.94	1.94
S U B T O T A L	14.90	14.90	14.90	14.90	14.90	14.90	14.90	8.14	14.90	14.90
T O T A L	528.92	426.37	470.38	521.67	385.47	439.03	501.60	343.60	413.64	488.81
EVALUATION INDICES										
U S D / K W	1345.6	1591.7	1440.6	1338.4	1641.9	1442.8	1325.1	1723.9	1478.7	1340.1
U S D / K W H	0.578	0.671	0.610	0.569	0.679	0.601	0.554	0.698	0.605	0.550

****
**2-3-2 ABULOG **
********** PAGE : 1

REGION NO. : 2 BASIN NO. : 6

NUMBER OF PROJECTS : 2

L I S T O F P R O J E C T S

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-006-01-06-0-1	AGBULU	706.0	3977.0	4-2-005
2	2-006-00-81-0-1	GENED	1583.1	4000.0	4-2-005

- C O N N E C T I O N M A T R I X 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
C(I,J)=0 : ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-006-01-06-0-1	0	
2	2-006-00-81-0-1	1	2-006-01-06-0-1

PROJECT NAME : AGBULU
PROJECT ID : 2- 6- 1- 6-0-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : APAYAO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.75	0.40	0.40	0.40	0.30	0.30	0.30	0.20	0.20	0.20
FULL SUPPLY LEVEL (M) :	346.0	300.8	316.4	346.0	289.4	310.0	345.0	275.9	301.9	346.0
MIN. OPERATING LEVEL(M) :	278.1	226.3	271.2	316.0	225.4	275.0	324.5	224.2	278.1	332.0
POWER										
FIRM DISCHARGE (M3/S) :	64.6	49.9	49.6	49.1	42.1	41.7	41.2	33.1	32.6	32.1
PLANT PEAK DIS. (M3/S) :	194.1	149.9	148.9	147.6	126.5	125.3	123.7	99.4	98.0	96.3
AVERAGE NET HEAD (M) :	135.6	88.6	113.6	147.8	80.7	110.5	150.5	71.7	106.5	153.2
INSTALLED CAPACITY (MW) :	216.6	109.4	139.3	179.5	84.0	114.0	153.3	58.6	86.0	121.4
GUARANTEED POWER (MW) :	137.4	45.8	97.4	147.8	37.7	85.6	132.1	29.0	69.7	108.6
AVERAGE FIRM POWER (MW):	72.1	36.4	46.4	59.8	28.0	38.0	51.0	19.5	28.6	40.4
FIRM ENERGY (MIL KWH/Y) :	632.	319.	406.	524.	245.	332.	447.	171.	251.	354.
SECONDARY ENERGY (") :	81.	138.	159.	198.	163.	197.	258.	180.	234.	328.
ANNUAL AVERAGE E-GY (") :	713.	457.	565.	722.	408.	529.	705.	351.	485.	682.
D A M										
DAM HEIGHT (M) :	167.0	121.8	137.4	167.0	110.4	131.0	167.0	96.9	122.9	167.0
EMBANKMENT VOL.(MIL M3) :	10.090	4.462	6.052	10.090	3.497	5.357	10.090	2.535	4.560	10.090
EVALUATION INDECES										
CH/V :	31953.	40037.	33253.	24232.	38758.	30007.	20299.	36593.	25839.	15821.
C/V :	202.	253.	258.	154.	380.	246.	129.	412.	226.	100.
P/(20VT+VD) :	16.3	14.7	15.5	13.8	13.3	13.9	11.9	11.3	11.9	9.5
E(FIRM)/(20VT+VD) :	47.5	43.0	45.1	40.1	38.8	40.6	34.6	32.9	34.7	27.8
E(F+SEC*0.3)/(20VT+VD) :	49.3	46.6	50.4	44.7	46.5	47.8	40.6	43.3	44.4	35.5

PROJECT NAME : AGBULU
PROJECT ID : 2-006-01-06-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1 (216.6)	2 (109.4)	3 (139.3)	4 (179.5)	5 (84.0)	6 (114.0)	7 (153.3)	8 (58.6)	9 (86.0)	10 (121.4)
POWER DEVELOPMENT (INST.CAP(MW))										
STORAGE DAM	91.68	44.96	58.67	91.68	36.34	52.74	91.68	27.44	45.82	91.68
SPILLWAY	24.99	18.85	20.97	24.99	17.30	20.10	24.99	15.45	18.99	24.99
DIVERSION TUNNEL	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37
INTAKE (PRESSURE TYPE)	5.81	4.81	4.12	3.67	3.97	3.31	2.90	3.06	2.46	2.16
HEADRACE TUNNEL (PRESSURE)	8.74	7.26	7.23	7.18	6.43	6.39	6.33	4.44	4.40	4.34
SURGE TANK	3.98	3.11	3.06	3.02	2.63	2.59	2.55	2.03	1.98	1.94
PENSTOCK	4.98	2.71	3.57	4.72	2.29	3.13	4.26	1.48	2.17	3.12
(PRESSURE SHAFT)	(1.05)	(0.84)	(0.98)	(1.08)	(0.80)	(0.93)	(1.05)	(0.45)	(0.53)	(0.61)
(STEEL LINER)	(3.93)	(1.87)	(2.61)	(3.64)	(1.49)	(2.20)	(3.20)	(1.03)	(1.63)	(2.51)
POWERHOUSE BUILDING	14.54	8.46	9.91	11.71	6.70	8.19	9.94	3.44	4.42	5.53
(SUPER STRUCTURE)	(6.46)	(3.76)	(4.41)	(5.20)	(2.98)	(3.64)	(4.42)	(1.53)	(1.96)	(2.46)
(SUB STRUCTURE)	(8.08)	(4.70)	(5.51)	(6.50)	(3.72)	(4.55)	(5.52)	(1.91)	(2.46)	(3.07)
MISCELLANEOUS CIVIL WORK	8.55	5.33	6.20	8.17	4.60	5.64	7.95	3.69	4.83	7.51
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	45.24	29.62	32.92	36.75	24.36	27.83	31.62	18.59	21.95	25.43
ENGINEERING/ADMINISTRATION	26.14	17.68	20.38	25.10	15.13	18.28	24.47	12.00	15.42	22.89
CONTINGENCIES	50.21	31.83	36.68	46.67	27.23	32.91	44.61	21.60	27.76	41.20
S U B T O T A L	301.23	190.97	220.07	280.03	163.36	197.48	267.67	129.59	166.58	247.17
ACCESS ROAD (ROAD LENGTH 6.5 KM)										
CONSTRUCTION COST	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
ENGINEERING ADMINSITRATION	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
CONTINEGENCIES	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
S U B T O T A L	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
TRANSMISSION LINE SYSTEM (T/L LENGTH 78.6 KM)										
TRANSMISSION LINE	8.72	8.72	8.72	8.72	8.72	8.72	8.72	5.34	8.72	8.72
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.62	0.96	0.96
ENGINEERING/ADMINISTRATION	1.21	1.21	1.21	1.21	1.21	1.21	1.21	0.75	1.21	1.21
CONTINGENCIES	1.63	1.63	1.63	1.63	1.63	1.63	1.62	1.01	1.63	1.63
S U B T O T A L	12.53	12.53	12.53	12.53	12.53	12.53	12.53	7.72	12.53	12.53
T O T A L	315.62	205.36	234.45	294.41	177.74	211.86	282.05	139.16	180.97	261.56
EVALUATION INDICES										
U S D / K W	1457.3	1877.4	1683.6	1640.1	2115.3	1858.9	1840.3	2373.6	2105.5	2154.1
U S D / K W H	0.481	0.570	0.517	0.505	0.605	0.541	0.538	0.618	0.564	0.578

PROJECT NAME : GENED
PROJECT ID : 2- 6- 0-81-0-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : ABULOG

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.50	0.37	0.37	0.37	0.37	0.37	0.27	0.27	0.27	0.27
FULL SUPPLY LEVEL (M) :	180.0	167.7	169.3	171.8	175.2	180.0	157.1	159.8	171.2	180.0
MIN. OPERATING LEVEL(M) :	96.3	96.0	106.3	116.7	127.0	137.3	95.6	109.8	138.2	152.5
POWER										
FIRM DISCHARGE (M3/S) :	149.9	143.3	143.1	142.9	142.7	142.5	134.0	133.8	133.2	132.8
PLANT PEAK DIS. (M3/S) :	450.3	430.3	429.8	429.2	428.6	427.8	402.6	401.8	400.1	398.9
AVERAGE NET HEAD (M) :	97.9	89.7	94.1	99.1	104.8	111.3	82.5	89.0	105.8	116.4
INSTALLED CAPACITY (MW) :	362.9	317.7	333.0	350.3	369.7	392.1	273.3	294.2	348.3	382.4
GUARANTEED POWER (MW) :	148.6	141.2	175.7	210.0	244.1	278.0	130.9	175.2	262.8	306.7
AVERAGE FIRM POWER (MW) :	120.8	105.8	110.9	116.6	123.1	130.6	91.0	98.0	116.0	127.3
FIRM ENERGY (MIL KWH/Y) :	1059.	927.	971.	1022.	1078.	1144.	797.	858.	1016.	1115.
SECONDARY ENERGY (") :	121.	145.	148.	152.	158.	166.	177.	183.	206.	224.
ANNUAL AVERAGE E-GY (") :	1179.	1072.	1120.	1174.	1236.	1309.	975.	1042.	1222.	1339.
D A M										
DAM HEIGHT (M) :	179.0	166.7	168.3	170.8	174.2	179.0	156.1	158.8	170.2	179.0
EMBANKMENT VOL.(MIL M3) :	12.711	10.401	10.686	11.124	11.756	12.711	8.639	9.078	11.019	12.711
EVALUATION INDECES										
CH/V :	46802.	49351.	48626.	47617.	46267.	44374.	50381.	49103.	44509.	41399.
C/V :	372.	434.	422.	405.	383.	353.	489.	465.	381.	330.
P/(20VT+VD) :	18.6	18.7	19.3	19.8	20.2	20.3	18.3	19.1	20.1	20.1
E(FIRM)/(20VT+VD) :	54.4	54.6	56.3	57.8	58.8	59.3	53.4	55.8	58.7	58.7
E(F+SEC*0.3)/(20VT+VD) :	56.2	57.2	58.9	60.3	61.4	61.9	56.9	59.4	62.2	62.3

PROJECT NAME : GENED
PROJECT ID : 2-006-00-81-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(362.9)	(317.7)	(333.0)	(350.3)	(369.7)	(392.1)	(273.3)	(294.2)	(348.3)	(382.4)
STORAGE DAM	112.17	94.15	96.40	99.84	104.77	112.17	80.06	83.60	99.02	112.17
SPILLWAY	32.63	30.62	30.89	31.29	31.85	32.63	28.87	29.33	31.19	32.63
DIVERSION TUNNEL	18.28	18.28	18.28	18.28	18.28	18.28	18.28	18.28	18.28	18.28
INTAKE (PRESSURE TYPE)	12.62	11.62	11.22	10.83	10.47	10.16	10.53	9.97	9.02	8.71
HEADRACE TUNNEL (PRESSURE)	35.30	34.17	34.14	34.11	34.08	34.03	32.58	32.54	32.44	30.36
SURGE TANK	10.47	10.00	9.98	9.95	9.93	9.90	9.37	9.33	9.26	9.15
PENSTOCK	16.72	15.40	16.08	16.82	17.63	18.54	14.03	14.93	17.13	17.61
(PRESSURE SHAFT)	(4.49)	(4.44)	(4.52)	(4.60)	(4.67)	(4.74)	(4.37)	(4.47)	(4.67)	(4.06)
(STEEL LINER)	(12.23)	(10.95)	(11.56)	(12.22)	(12.96)	(13.80)	(9.66)	(10.46)	(12.47)	(13.55)
POWERHOUSE BUILDING	42.92	38.69	39.91	41.26	42.75	44.43	34.23	35.94	40.15	38.18
(SUPER STRUCTURE)	(19.08)	(17.20)	(17.74)	(18.34)	(19.00)	(19.75)	(15.21)	(15.97)	(17.84)	(16.97)
(SUB STRUCTURE)	(23.85)	(21.49)	(22.17)	(22.92)	(23.75)	(24.68)	(19.02)	(19.96)	(22.31)	(21.21)
MISCELLANEOUS CIVIL WORK	14.06	12.65	12.84	13.12	13.49	14.01	11.40	11.70	12.82	13.36
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	83.34	76.91	78.52	80.28	82.19	84.33	69.75	72.05	77.58	80.80
ENGINEERING/ADMINISTRATION	34.43	32.65	32.94	33.32	33.79	34.43	30.93	31.38	32.88	33.59
CONTINGENCIES	82.59	75.03	76.24	77.82	79.85	82.58	68.00	69.81	75.95	78.97
S U B T O T A L	495.53	450.17	457.42	466.91	479.07	495.50	408.02	418.85	455.72	473.83
ACCESS ROAD (ROAD LENGTH 46.1 KM)										
CONSTRUCTION COST	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14
ENGINEERING ADMINSITRATION	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
CONTINEGENCIES	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
S U B T O T A L	13.14	13.14	13.14	13.14	13.14	13.14	13.14	13.14	13.14	13.14
TRANSMISSION LINE SYSTEM (T/L LENGTH 36.0 KM)										
TRANSMISSION LINE	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
CONTINGENCIES	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
S U B T O T A L	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49	11.49
T O T A L	520.16	474.80	482.06	491.54	503.71	520.13	432.65	443.48	480.36	498.47
EVALUATION INDICES										
U S D / K W	1433.4	1494.6	1447.5	1403.2	1362.6	1326.6	1583.2	1507.2	1379.2	1303.7
U S D / K W H	0.475	0.489	0.475	0.460	0.447	0.436	0.509	0.486	0.446	0.422

**2-4-3 ABULOG **

PAGE : 1

REGION NO. : 2 BASIN NO. : 6

NUMBER OF PROJECTS : 3

L I S T O F P R O J E C T S

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-006-01-06-0-1	AGBULU	706.0	3977.0	4-2-005
2	2-006-00-03-1-1	BULU	1540.0	4020.0	4-2-005
3	2-006-00-01-2-1	SISIRITAN	1870.0	4004.0	4-2-005

- C O N N E C T I O N M A T R I X - 1/

	1	2	3
1	0	0	0
2	1	0	0
3	0	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 : ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-006-01-06-0-1	0	
2	2-006-00-03-1-1	1	2-006-01-06-0-1
3	2-006-00-01-2-1	1	2-006-00-03-1-1

PROJECT NAME : ASBULU
PROJECT ID : 2- 6- 1- 6-0-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : APAYAO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.75	0.40	0.40	0.40	0.30	0.30	0.30	0.20	0.20	0.20
FULL SUPPLY LEVEL (M) :	346.0	300.8	316.4	346.0	289.4	310.0	346.0	275.9	301.9	346.0
MIN. OPERATING LEVEL(M) :	278.1	226.3	271.2	316.0	225.4	275.0	324.5	224.2	278.1	332.0
POWER										
FIRM DISCHARGE (M3/S) :	64.6	49.9	49.6	49.1	42.1	41.7	41.2	33.1	32.6	32.1
PLANT PEAK DIS. (M3/S) :	194.1	149.9	148.9	147.6	126.5	125.3	123.7	99.4	98.0	96.3
AVERAGE NET HEAD (M) :	135.6	88.6	113.6	147.8	80.7	110.5	150.5	71.7	106.5	153.2
INSTALLED CAPACITY (MW) :	216.6	109.4	139.3	179.5	84.0	114.0	153.3	58.6	86.0	121.4
GUARANTEED POWER (MW) :	137.4	45.8	97.4	147.8	37.7	85.6	132.1	29.0	69.7	108.6
AVERAGE FIRM POWER (MW) :	72.1	36.4	46.4	59.8	28.0	38.0	51.0	19.5	28.6	40.4
FIRM ENERGY (MIL KWH/Y) :	632.	319.	406.	524.	245.	332.	447.	171.	251.	354.
SECONDARY ENERGY (") :	81.	138.	159.	198.	163.	197.	258.	180.	234.	328.
ANNUAL AVERAGE E-GY (") :	713.	457.	565.	722.	408.	529.	705.	351.	485.	682.
D A M										
DAM HEIGHT (M) :	167.0	121.8	137.4	167.0	110.4	131.0	167.0	96.9	122.9	167.0
EMBANKMENT VOL.(MIL M3) :	10.090	4.462	6.052	10.090	3.497	5.357	10.090	2.535	4.560	10.090
EVALUATION INDECES										
CH/V :	31953.	40037.	33253.	24232.	38758.	30007.	20299.	36593.	25839.	15821.
C/V :	202.	353.	258.	154.	380.	246.	129.	412.	226.	100.
P/(20VT+VD) :	16.3	14.7	15.5	13.8	13.3	13.9	11.9	11.3	11.9	9.5
E(FIRM)/(20VT+VD) :	47.5	43.0	45.1	40.1	38.8	40.6	34.6	32.9	34.7	27.8
E(F+SEC*0.3)/(20VT+VD) :	49.3	48.6	50.4	44.7	46.5	47.8	40.6	43.3	44.4	35.5

PROJECT NAME : AGBULU
PROJECT ID : 2-006-01-06-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE (UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(216.6)	(109.4)	(139.3)	(179.5)	(84.0)	(114.0)	(153.3)	(58.6)	(86.0)	(121.4)
STORAGE DAM	91.68	44.96	58.67	91.68	36.34	52.74	91.68	27.44	45.82	91.68
SPILLWAY	24.99	18.85	20.97	24.99	17.30	20.10	24.99	15.45	18.99	24.99
DIVERSION TUNNEL	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37	16.37
INTAKE (PRESSURE TYPE)	5.81	4.81	4.12	3.67	3.97	3.31	2.90	3.06	2.46	2.16
HEADRACE TUNNEL (PRESSURE)	8.74	7.26	7.23	7.18	6.43	6.39	6.33	4.44	4.40	4.34
SURGE TANK	3.98	3.11	3.06	3.02	2.63	2.59	2.55	2.03	1.98	1.94
PENSTOCK	4.98	2.71	3.57	4.72	2.29	3.13	4.26	1.46	2.17	3.12
(PRESSURE SHAFT)	(1.05)	(0.84)	(0.96)	(1.08)	(0.80)	(0.93)	(1.05)	(0.45)	(0.53)	(0.61)
(STEEL LINER)	(3.93)	(1.87)	(2.61)	(3.64)	(1.49)	(2.20)	(3.20)	(1.03)	(1.63)	(2.51)
POWERHOUSE BUILDING	14.54	8.46	9.91	11.71	6.70	8.19	9.94	3.44	4.42	5.53
(SUPER STRUCTURE)	(6.46)	(3.76)	(4.41)	(5.20)	(2.98)	(3.64)	(4.42)	(1.53)	(1.96)	(2.46)
(SUB STRUCTURE)	(8.08)	(4.70)	(5.51)	(6.50)	(3.72)	(4.55)	(5.52)	(1.91)	(2.46)	(3.07)
MISCELLANEOUS CIVIL WORK	8.55	5.33	6.20	8.17	4.60	5.64	7.95	3.69	4.83	7.51
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	45.24	29.62	32.92	36.75	24.36	27.83	31.62	18.59	21.95	25.43
ENGINEERING/ADMINISTRATION	26.14	17.68	20.38	25.10	15.13	18.28	24.47	12.00	15.42	22.89
CONTINGENCIES	50.21	31.63	36.68	46.67	27.23	32.91	44.61	21.60	27.76	41.20
S U B T O T A L	301.23	190.97	220.07	280.03	163.36	197.48	267.67	129.59	166.58	247.17
ACCESS ROAD (ROAD LENGTH 6.5 KM)										
CONSTRUCTION COST	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
ENGINEERING ADMINSITRATION	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
CONTINEGENCIES	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
S U B T O T A L	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
TRANSMISSION LINE SYSTEM (T/L LENGTH 78.6 KM)										
TRANSMISSION LINE	8.72	8.72	8.72	8.72	8.72	8.72	8.72	5.34	8.72	8.72
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.62	0.96	0.96
ENGINEERING/ADMINISTRATION	1.21	1.21	1.21	1.21	1.21	1.21	1.21	0.75	1.21	1.21
CONTINGENCIES	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.01	1.63	1.63
S U B T O T A L	12.53	12.53	12.53	12.53	12.53	12.53	12.53	7.72	12.53	12.53
T O T A L	315.62	205.36	234.45	294.41	177.74	211.86	282.05	139.16	180.97	261.56
EVALUATION INDICES										
U S D / K W	1457.3	1877.4	1683.6	1640.1	2115.3	1858.9	1840.3	2373.6	2105.5	2154.1
U S D / K W H	0.481	0.570	0.517	0.505	0.605	0.541	0.538	0.618	0.564	0.578

PROJECT NAME : BULU
PROJECT ID : 2- 6- 0- 3-1-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : ABULOG

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.39	0.36	0.36	0.26	0.26	0.26	0.26	0.26	0.16	0.16
FULL SUPPLY LEVEL (M) :	175.0	172.9	175.0	161.5	164.1	167.3	171.1	175.0	147.6	175.0
MIN. OPERATING LEVEL(M) :	107.3	108.2	115.9	107.8	115.9	124.0	132.2	140.3	108.1	155.9
POWER										
FIRM DISCHARGE (M3/S) :	141.4	140.2	140.1	131.2	131.1	131.0	130.8	130.6	115.5	114.5
PLANT PEAK DIS. (M3/S) :	565.5	560.9	560.4	524.9	524.5	523.8	523.2	522.5	462.0	458.1
AVERAGE NET HEAD (M) :	72.1	71.0	74.9	63.4	67.7	72.5	77.6	82.9	54.3	88.1
INSTALLED CAPACITY (MW) :	335.7	327.9	345.6	273.8	292.4	312.7	334.4	356.5	206.7	332.1
GUARANTEED POWER (MW) :	119.7	122.7	156.1	113.4	146.4	179.3	212.1	244.8	101.5	270.7
AVERAGE FIRM POWER (MW) :	83.9	82.0	86.4	68.5	73.1	78.2	83.6	89.1	51.7	83.0
FIRM ENERGY (MIL KWH/Y) :	735.	718.	757.	600.	640.	685.	732.	781.	453.	727.
SECONDARY ENERGY (") :	127.	130.	134.	154.	159.	166.	174.	182.	185.	264.
ANNUAL AVERAGE E-GY (") :	863.	848.	891.	754.	800.	851.	906.	963.	638.	991.
D A M										
DAM HEIGHT (M) :	102.7	100.6	102.7	89.2	91.8	95.0	98.8	102.7	75.3	102.7
EMBANKMENT VOL.(MIL M3) :	6.883	6.554	6.883	4.979	5.296	5.760	6.295	6.883	3.394	6.883
EVALUATION INDECES										
CH/V :	61331.	62450.	60745.	67556.	65415.	62344.	59368.	56540.	72430.	49549.
C/V :	648.	675.	642.	831.	781.	717.	655.	598.	1073.	525.
P/(20VT+VD) :	26.7	26.8	27.5	26.1	27.0	27.7	28.3	28.7	24.0	27.4
E(FIRM)/(20VT+VD) :	58.4	58.7	60.2	57.1	59.1	60.6	61.9	62.8	52.5	60.0
E(F+SEC*0.3)/(20VT+VD) :	61.4	61.8	63.4	61.5	63.5	65.0	66.3	67.2	58.9	66.5

PROJECT NAME : BULU
PROJECT ID : 2-006-00-03-1
TYPE : RESERVOIR

****
* SUMMARY TABLE OF COST ESTIMATE *
****

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(335.7)	(327.9)	(345.6)	(273.8)	(292.4)	(312.7)	(334.4)	(356.5)	(206.7)	(332.1)
STORAGE DAM	65.64	62.90	65.64	49.47	52.22	56.19	60.72	65.64	35.40	65.64
SPILLWAY	19.98	19.63	19.98	17.78	18.20	18.73	19.34	19.98	15.52	19.98
DIVERSION TUNNEL	24.37	24.37	24.37	24.37	24.37	24.37	24.37	24.37	24.37	24.37
INTAKE (PRESSURE TYPE)	14.54	14.27	13.95	12.85	12.52	12.20	11.90	11.60	10.70	9.19
HEADRACE TUNNEL (PRESSURE)	19.75	19.63	19.62	18.72	18.71	18.69	18.67	18.66	16.22	16.13
SURGE TANK	10.96	10.86	10.83	10.15	10.12	10.09	10.06	10.03	8.87	8.73
PENSTOCK	11.56	11.43	11.97	10.34	10.89	11.47	12.09	12.74	8.40	11.82
(PRESSURE SHAFT)	(3.60)	(3.00)	(3.67)	(3.55)	(3.62)	(3.69)	(3.76)	(3.83)	(3.02)	(3.36)
(STEEL LINER)	(7.96)	(7.83)	(8.30)	(6.80)	(7.27)	(7.78)	(8.33)	(8.91)	(5.37)	(8.45)
POWERHOUSE BUILDING	48.17	47.28	48.96	41.01	42.84	44.78	46.81	48.83	29.74	40.70
(SUPER STRUCTURE)	(21.41)	(21.02)	(21.76)	(18.23)	(19.04)	(19.90)	(20.80)	(21.70)	(13.22)	(18.09)
(SUB STRUCTURE)	(26.76)	(26.27)	(27.20)	(22.79)	(23.80)	(24.88)	(26.00)	(27.13)	(16.52)	(22.61)
MISCELLANEOUS CIVIL WORK	10.75	10.52	10.77	9.24	9.49	9.83	10.20	10.59	7.46	9.83
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	89.16	87.89	89.97	78.66	81.00	83.43	85.94	88.40	65.44	80.71
ENGINEERING/ADMINISTRATION	31.23	30.91	31.30	28.94	29.37	29.89	30.45	31.02	25.97	29.74
CONTINGENCIES	69.22	67.94	69.47	60.31	61.95	63.94	66.11	68.37	49.62	63.37
S U B T O T A L	415.32	407.66	416.82	361.86	371.67	383.61	396.65	410.25	297.70	380.20
ACCESS ROAD (ROAD LENGTH 4.0 KM)										
CONSTRUCTION COST	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
ENGINEERING ADMINSITRATION	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
CONTINEGENCIES	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
S U B T O T A L	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
TRANSMISSION LINE SYSTEM (T/L LENGTH 69.0 KM)										
TRANSMISSION LINE	15.18	15.18	15.18	15.18	15.18	15.18	15.18	15.18	7.66	15.18
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	1.08	2.02
CONTINGENCIES	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	1.45	2.72
S U B T O T A L	20.88	20.88	20.88	20.88	20.88	20.88	20.88	20.88	11.15	20.88
T O T A L	437.35	429.68	438.84	383.88	393.69	405.63	418.67	432.27	309.99	402.22
EVALUATION INDICES										
U S D / K W	1302.7	1310.5	1269.6	1402.0	1346.4	1297.1	1252.1	1212.4	1500.0	1211.1
U S D / K W H	0.565	0.568	0.551	0.594	0.572	0.552	0.534	0.517	0.610	0.499

PROJECT NAME : SISIRITAN
PROJECT ID : 2- 6- 0- 1-2-1
TYPE : RESERVOIR

BASIN NAME : ABULOG
RIVER NAME : ABULOG

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.11	0.11	0.11	0.11	0.08	0.08	0.08	0.05	0.05	0.05
FULL SUPPLY LEVEL (M) :	68.3	53.8	60.7	68.3	48.7	58.0	68.3	43.0	55.2	68.3
MIN. OPERATING LEVEL(M) :	51.9	32.9	42.4	51.9	32.6	44.7	56.7	32.4	46.8	61.3
POWER										
FIRM DISCHARGE (M3/S) :	159.1	159.4	159.2	159.1	153.8	153.6	153.4	148.2	147.9	147.6
PLANT PEAK DIS. (M3/S) :	477.6	478.8	478.2	477.6	462.0	461.3	460.6	445.1	444.2	443.3
AVERAGE NET HEAD (M) :	50.8	35.0	42.7	50.8	31.5	41.6	52.3	27.7	40.5	53.8
INSTALLED CAPACITY (MW) :	199.8	137.9	168.1	199.8	120.0	158.1	198.5	101.5	147.9	196.4
GUARANTEED POWER (MW) :	149.4	79.0	114.3	149.4	75.5	118.4	161.0	72.0	121.5	170.8
AVERAGE FIRM POWER (MW) :	66.5	45.9	56.0	66.5	39.9	52.7	66.1	33.8	49.2	65.4
FIRM ENERGY (MIL KWH/Y) :	583.	402.	490.	583.	350.	461.	579.	296.	431.	573.
SECONDARY ENERGY (") :	113.	84.	98.	113.	84.	105.	129.	79.	110.	144.
ANNUAL AVERAGE E-GY (") :	696.	486.	588.	696.	433.	566.	707.	375.	542.	717.
D A M										
DAM HEIGHT (M) :	64.3	49.8	56.7	64.3	44.7	54.0	64.3	39.0	51.2	64.3
EMBANKMENT VOL.(MIL M3) :	4.677	2.697	3.578	4.677	2.193	3.233	4.677	1.654	2.868	4.677
EVALUATION INDECES										
CH/V :	60334.	78218.	68521.	60334.	81628.	69074.	58131.	88284.	70301.	55907.
C/V :	1072.	1864.	1404.	1072.	2212.	1498.	1034.	2826.	1626.	995.
P/(20VT+VD) :	20.1	17.4	19.1	20.1	16.3	18.9	20.2	15.1	18.6	20.1
E(FIRM)/(20VT+VD) :	58.8	50.7	55.6	58.8	47.7	55.0	58.9	44.1	54.3	58.8
E(F+SEC*0.3)/(20VT+VD) :	62.2	53.9	59.0	62.2	51.1	58.7	62.8	47.6	58.5	63.2

PROJECT NAME : SISIRITAN
PROJECT ID : 2-006-00-01-2
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(199.8)	(137.9)	(168.1)	(199.8)	(120.0)	(158.1)	(198.5)	(101.5)	(147.9)	(196.4)
STORAGE DAM	46.85	28.96	37.07	46.85	24.17	33.93	46.85	18.89	30.56	46.85
SPILLWAY	14.51	12.04	13.22	14.51	11.17	12.76	14.51	10.21	12.27	14.51
DIVERSION TUNNEL	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44
INTAKE (PRESSURE TYPE)	9.32	9.74	9.51	9.32	9.01	8.74	8.50	8.18	7.92	7.75
HEADRACE TUNNEL (PRESSURE)	17.17	17.20	17.18	17.17	16.76	16.74	16.73	16.32	16.30	16.27
SURGE TANK	9.15	9.18	9.16	9.15	8.86	8.84	8.82	8.53	8.50	8.48
PENSTOCK	12.43	10.51	11.45	12.43	9.94	11.12	12.38	9.36	10.78	12.29
(PRESSURE SHAFT)	(4.56)	(4.42)	(4.49)	(4.56)	(4.37)	(4.47)	(4.55)	(4.32)	(4.44)	(4.53)
(STEEL LINER)	(7.88)	(6.09)	(6.95)	(7.88)	(5.57)	(6.65)	(7.83)	(5.03)	(6.34)	(7.76)
POWERHOUSE BUILDING	29.40	22.98	26.22	29.40	20.70	24.87	28.92	18.29	23.49	28.36
(SUPER STRUCTURE)	(13.07)	(10.22)	(11.65)	(13.07)	(9.20)	(11.05)	(12.85)	(8.13)	(10.44)	(12.61)
(SUB STRUCTURE)	(16.34)	(12.77)	(14.57)	(16.34)	(11.50)	(13.82)	(16.07)	(10.16)	(13.05)	(15.76)
MISCELLANEOUS CIVIL WORK	8.01	6.60	7.26	8.01	6.10	6.92	7.91	5.56	6.56	7.80
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	65.42	55.43	60.57	65.42	51.23	57.97	64.17	46.73	55.30	62.78
ENGINEERING/ADMINISTRATION	26.68	24.18	25.40	26.68	22.42	24.78	26.47	20.44	24.11	26.24
CONTINGENCIES	52.08	43.65	47.70	52.08	40.36	45.63	51.35	36.79	43.45	50.56
SUB TOTAL	312.46	261.92	286.19	312.46	242.18	273.76	308.09	220.74	260.69	303.34
ACCESS ROAD (ROAD LENGTH 10.5 KM)										
CONSTRUCTION COST	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31	2.31
ENGINEERING ADMINSITRATION	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
CONTINEGENCIES	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
SUB TOTAL	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99	2.99
TRANSMISSION LINE SYSTEM (T/L LENGTH 48.0 KM)										
TRANSMISSION LINE	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
CONTINGENCIES	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
SUB TOTAL	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
TOTAL	323.59	273.05	297.32	323.59	253.31	284.89	319.22	231.87	271.82	314.47
EVALUATION INDICES										
USD / KW	1619.9	1980.2	1768.6	1619.9	2111.6	1801.5	1608.6	2284.7	1837.9	1601.0
USD / KWH	0.525	0.639	0.572	0.525	0.676	0.578	0.517	0.725	0.585	0.510

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-006-00-01-1-1

SCHEME : SISIRITAN

RIVER SYSTEM : ABULOG
STREAM : ABULOG
WATER RESOURCES REGION : II
PROVINCE : KAL-APAYAO
COORDINATES : N18-09-42 E121-21-00
STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1870.0	(MAIN : 1870., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-2-005-NW-203		
AVER. BASIN RAINFALL	(MM/YR) : 4004.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 2066.		
AVERAGE DISCHARGE	(M3/S) : 200.9	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 227.2		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.30

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) : 100.0	GROSS STORAGE VOL.	(MIL M3) : 3443.0			
	AVERAGE OPERATING LEVEL	(EL.M) : 88.4	ACTIVE STORAGE VOL.	(MIL M3) : 1900.8			
	MINIMUM OPERATING LEVEL	(EL.M) : 65.2	DEAD STORAGE VOL.	(MIL M3) : 1542.2			
	DRAWDOWN DEPTH	(M) : 34.8	SEDIMENT VOL.	(MIL M3) : 81.5			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 106.0	CREST LENGTH	(M) : 890.5			
	DAM HEIGHT	(M) : 96.0	EMBANKMENT VOL.	(MIL M3) : 11.45			
WATERWAY	HEADRACE : LENGTH	(M) : 620.0	DIAMETER (WIDTH)	(M) : 6.1	NOS. : 7		
	PENSTOCK : HORIZONT. L	(M) : 250.0	DIAMETER	(M) : 4.8	NOS. : 7		
	DIVERSION : LENGTH	(M) : 970.0	DIAMETER	(M) : 7.8	NOS. : 3		
	EXCAVATION VOL TOTAL	(1000 M3) : 299.8					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 623.3	AVERAGE NET HEAD	(M) : 76.0			
	FIRM DISCHARGE	(M3/S) : 155.8	TAILWATER LEVEL	(EL.M) : 10.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 389.8	ANNUAL TOTAL ENERGY	(GWH) : 1067.0			
	FIRM POWER	(MW) : 97.4	FIRM ENERGY	(GWH) : 853.6			
	MIN.GUARANTEED POWER	(MW) : 258.0	SECONDARY ENERGY	(GWH) : 213.4			

TRANSMISSION LINE LENGTH (KM) : 48.0 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 10.5 FROM : PUOTOL

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 521.7	POWER COST	(MIL USD) : 503.8		
TOTAL COST/KW	(USD/KW) : 1338.4	TRANSMISSION COST	(MIL USD) : 14.9		
TOTAL COST/KWH	(USD/KWH) : 0.569	ACCESS ROAD COST	(MIL USD) : 3.0		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 3.0 KMS.
MAP USED (1:50,000 SCALE) : 3274-II 1979
TECHNICAL COMMENT : - SERIES DEVELOPMENT PLAN WITH AGBULU
- REGULATION EFFECT BY AGBULU RESERVOIR IS CONSIDERED

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-006-00-01-2-1

SCHEME : SISIRITAN

RIVER SYSTEM : ABULOG
STREAM : ABULOG
WATER RESOURCES REGION : II
PROVINCE : KAL-APAYAO
COORDINATES : N18-09-42 E121-21-00
STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1870.0	(MAIN : 1870.. INTER TRANSFER TOTAL : 0.)				STREAM GAGE ID	: 4-2-005-NW-203	
AVER. BASIN RAINFALL	(MM/YR) : 4004.	DENUDATION RATE	(MM/YR) : 1.4			GAGE CATCHMENT	(KM2) : 2066.	
AVERAGE DISCHARGE	(M3/S) : 200.9	EVAPORATION RATE	(MM/DAY) : 3.5			GAGE AVER.DISCHARGE	(M3/S) : 227.2	

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.11

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) : 68.3	GROSS STORAGE VOL.	(MIL M3) : 1679.7			
	AVERAGE OPERATING LEVEL	(EL.M) : 62.8	ACTIVE STORAGE VOL.	(MIL M3) : 696.9			
	MINIMUM OPERATING LEVEL	(EL.M) : 51.9	DEAD STORAGE VOL.	(MIL M3) : 982.8			
	DRAWDOWN DEPTH	(M) : 16.4	SEDIMENT VOL.	(MIL M3) : 81.5			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 74.3	CREST LENGTH	(M) : 676.5			
	DAM HEIGHT	(M) : 64.3	EMBANKMENT VOL.	(MIL M3) : 4.68			
WATERWAY	HEADRACE : LENGTH	(M) : 620.0	DIAMETER (WIDTH)	(M) : 6.4	NOS. : 5		
	PENSTOCK : HORIZONT. L	(M) : 250.0	DIAMETER	(M) : 5.0	NOS. : 5		
	DIVERSION : LENGTH	(M) : 970.0	DIAMETER	(M) : 7.8	NOS. : 3		
	EXCAVATION VOL TOTAL	(1000 M3) : 261.9					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 477.6	AVERAGE NET HEAD	(M) : 50.8			
	FIRM DISCHARGE	(M3/S) : 159.1	TAILWATER LEVEL	(EL.M) : 10.0			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 199.8	ANNUAL TOTAL ENERGY	(GWH) : 696.0			
	FIRM POWER	(MW) : 66.5	FIRM ENERGY	(GWH) : 582.7			
	MIN.GUARANTEED POWER	(MW) : 149.4	SECONDARY ENERGY	(GWH) : 113.3			

TRANSMISSION LINE LENGTH (KM) : 48.0 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 10.5 FROM : PUOTOL

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 323.6	POWER COST	(MIL USD) : 312.5		
TOTAL COST/KW	(USD/KW) : 1619.9	TRANSMISSION COST	(MIL USD) : 8.1		
TOTAL COST/KWH	(USD/KWH) : 0.525	ACCESS ROAD COST	(MIL USD) : 3.0		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 8.0 KMS.
MAP USED (1:50.000 SCALE) : 3274-II 1977
TECHNICAL COMMENT :
- SERIES DEVELOPMENT PLAN WITH BULU AND AGBULU
- CONSTRAINED FSL (MAX 68.3 M) DUE TO TWL OF BULU
- REGULATION EFFECTS BY BULU AND AGBULU ARE CONSIDERED

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-006-00-03-1-1

SCHEME : BULU

RIVER SYSTEM : ABULOG | WATER RESOURCES REGION : II | COORDINATES : N18-02-30 E121-13-00
STREAM : ABULOG | PROVINCE : KAL-APAYAO | STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1540.0	(MAIN : 1540., INTER TRANSFER TOTAL : 0.)		STREAM GAGE ID	: 4-2-005-NW-203
AVER. BASIN RAINFALL	(MM/YR) : 4020.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 2066.
AVERAGE DISCHARGE	(M3/S) : 166.2	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.26

RESERVOIR	FULL SUPPLY LEVEL	(EL.M) : 175.0	GROSS STORAGE VOL.	(MIL M3) : 2198.6		
	AVERAGE OPERATING LEVEL	(EL.M) : 163.4	ACTIVE STORAGE VOL.	(MIL M3) : 1384.8		
	MINIMUM OPERATING LEVEL	(EL.M) : 140.3	DEAD STORAGE VOL.	(MIL M3) : 813.8		
	DRAWDOWN DEPTH	(M) : 34.7	SEDIMENT VOL.	(MIL M3) : 58.4		
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 181.0	CREST LENGTH	(M) : 473.5		
	DAM HEIGHT	(M) : 102.7	EMBANKMENT VOL.	(MIL M3) : 6.88		
WATERWAY	HEADRACE : LENGTH	(M) : 600.0	DIAMETER (WIDTH)	(M) : 6.1	NOS. : 6
	PENSTOCK : HORIZONT. L	(M) : 170.0	DIAMETER	(M) : 4.7	NOS. : 6
	DIVERSION : LENGTH	(M) : 1170.0	DIAMETER	(M) : 7.5	NOS. : 3
	EXCAVATION VOL TOTAL	(1000 M3) : 277.2			
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 522.5	AVERAGE NET HEAD	(M) : 82.9	
	FIRM DISCHARGE	(M3/S) : 130.6	TAILWATER LEVEL	(EL.M) : 78.3	
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 356.5	ANNUAL TOTAL ENERGY	(GWH) : 962.8	
	FIRM POWER	(MW) : 89.1	FIRM ENERGY	(GWH) : 780.8	
	MIN.GUARANTEED POWER	(MW) : 244.8	SECONDARY ENERGY	(GWH) : 182.0	

TRANSMISSION LINE : LENGTH (KM) : 69.0 | TO : CAMALANIUGAN | 230 K V DOUBLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 4.0 | FROM : KABUGAO

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 432.3	POWER COST	(MIL USD) : 410.2
TOTAL COST/KW	(USD/KW) : 1212.4	TRANSMISSION COST	(MIL USD) : 20.9
TOTAL COST/KWH	(USD/KWH) : 0.517	ACCESS ROAD COST	(MIL USD) : 1.1

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - DENSED POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 10.0 KMS.
MAP USED (1:50,000 SCALE) : 3274-III 1975
TECHNICAL COMMENT :
- SERIES DEVELOPMENT PLAN WITH SISIRITAN AND AGBULU
- CONSTRAINED FSL (MAX=175 M) DUE TO TWL OF AGBULU
- REGULATION EFFECT BY AGBULU IS CONSIDERED

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-006-00-81-0-1

SCHEME : GENED

RIVER SYSTEM : ABULOG
STREAM : ABULOG
WATER RESOURCES REGION : II
PROVINCE : KAL-APAYAO
COORDINATES : N18-05-18 E121-16-38
STUDY LEVEL : SCALED (FEASIBILITY STUDY)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) : 1583.1	(MAIN : 1583., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-2-005-NW-203		
AVER. BASIN RAINFALL	(MM/YR) : 4000.	DENUDATION RATE	(MM/YR) : 1.4	GAGE CATCHMENT	(KM2) : 2066.		
AVERAGE DISCHARGE	(M3/S) : 169.9	EVAPORATION RATE	(MM/DAY) : 3.5	GAGE AVER.DISCHARGE	(M3/S) : 227.2		

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.37

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) : 180.0	GROSS STORAGE VOL.	(MIL M3) : 2809.6			
	AVERAGE OPERATING LEVEL	(EL.M) : 165.8	ACTIVE STORAGE VOL.	(MIL M3) : 1976.1			
	MINIMUM OPERATING LEVEL	(EL.M) : 137.3	DEAD STORAGE VOL.	(MIL M3) : 833.5			
	DRAWDOWN DEPTH	(M) : 42.7	SEDIMENT VOL.	(MIL M3) : 61.4			
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) : 186.0	CREST LENGTH	(M) : 459.0			
	DAM HEIGHT	(M) : 179.0	EMBANKMENT VOL.	(MIL M3) : 12.71			
WATERWAY	HEADRACE : LENGTH	(M) : 1330.0	DIAMETER (WIDTH)	(M) : 6.0	NOS. : 5		
	PENSTOCK : HORIZONT. L	(M) : 257.1	DIAMETER	(M) : 4.6	NOS. : 5		
	DIVERSION : LENGTH	(M) : 870.0	DIAMETER	(M) : 7.5	NOS. : 3		
	EXCAVATION VOL TOTAL	(1000 M3) : 328.5					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) : 427.6	AVERAGE NET HEAD	(M) : 111.3			
	FIRM DISCHARGE	(M3/S) : 142.5	TAILWATER LEVEL	(EL.M) : 50.7			
POWER /ENERGY	INSATLLED CAPACITY	(MW) : 392.1	ANNUAL TOTAL ENERGY	(GWH) : 1309.2			
	FIRM POWER	(MW) : 130.6	FIRM ENERGY	(GWH) : 1143.7			
	MIN.GUARANTEED POWER	(MW) : 278.0	SECONDARY ENERGY	(GWH) : 165.5			

TRANSMISSION LINE LENGTH (KM) : 36.0 TO : ST MAROGLA 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 46.1 FROM :

CONSTRUCTION COST

TOTAL COST	(MIL USD) : 520.1	POWER COST	(MIL USD) : 495.5		
TOTAL COST/KW	(USD/KW) : 1326.6	TRANSMISSION COST	(MIL USD) : 11.5		
TOTAL COST/KWH	(USD/KWH) : 0.436	ACCESS ROAD COST	(MIL USD) : 13.1		

OTHER INFORMATION

LAND USE IN RESERVOIR AREA :
SUBMERGED ROAD :
MAP USED (1:50,000 SCALE) :
TECHNICAL COMMENT :

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-006-01-06-0-1

SCHEME : AGBULU

RIVER SYSTEM : ABULOG
STREAM : APAYAO
WATER RESOURCES REGION : II
PROVINCE : KAL-APAYAO
COORDINATES : N18-08-20 E121-05-00
STUDY LEVEL : UNSCALED (PRE-F/S.RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	706.0	(MAIN : 706., INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-2-005-NW-203		
AVER. BASIN RAINFALL	(MM/YR) :	3977.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	2066.
AVERAGE DISCHARGE	(M3/S) :	75.2	EVAPORATION RATE	(MM/DAY) :	3.5	GAGE AVER.DISCHARGE	(M3/S) :	227.2

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR
RESERVOIR DEVELOPMENT RATIO : 0.75

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	346.0	GROSS STORAGE VOL.	(MIL M3) :	2370.0		
	AVERAGE OPERATING LEVEL	(EL.M) :	323.4	ACTIVE STORAGE VOL.	(MIL M3) :	1779.7		
	MINIMUM OPERATING LEVEL	(EL.M) :	278.1	DEAD STORAGE VOL.	(MIL M3) :	590.3		
	DRAWDOWN DEPTH	(M) :	67.9	SEDIMENT VOL.	(MIL M3) :	49.4		
MAIN DAM	CREST ELEVATION	(EL.M) :	352.0	CREST LENGTH	(M) :	380.0		
(WEIR)	DAM HEIGHT	(M) :	167.0	EMBANKMENT VOL.	(MIL M3) :	10.09		
WATERWAY	HEADRACE : LENGTH	(M) :	780.0	DIAMETER (WIDTH)	(M) :	6.4	NOS. :	2
	PENSTOCK : HORIZONT. L	(M) :	120.0	DIAMETER	(M) :	4.8	NOS. :	2
	DIVERSION : LENGTH	(M) :	1120.0	DIAMETER	(M) :	7.7	NOS. :	2
	EXCAVATION VOL TOTAL (1000 M3)	:	160.8					
DISCHARGE	PLANT MAX. DISCHARGE	(M3/S) :	194.1	AVERAGE NET HEAD	(M) :	135.6		
/HEAD	FIRM DISCHARGE	(M3/S) :	64.6	TAILWATER LEVEL	(EL.M) :	185.0		
POWER	INSATLLED CAPACITY	(MW) :	216.6	ANNUAL TOTAL ENERGY	(GWH) :	712.6		
/ENERGY	FIRM POWER	(MW) :	72.1	FIRM ENERGY	(GWH) :	631.8		
	MIN.GUARANTEED POWER	(MW) :	137.4	SECONDARY ENERGY	(GWH) :	80.8		

TRANSMISSION LINE LENGTH (KM) : 78.6 TO : CAMALANIUGAN 230 K V DOUBLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 6.5 FROM : NEAREST NATIONAL ROAD

CONSTRUCTION COST

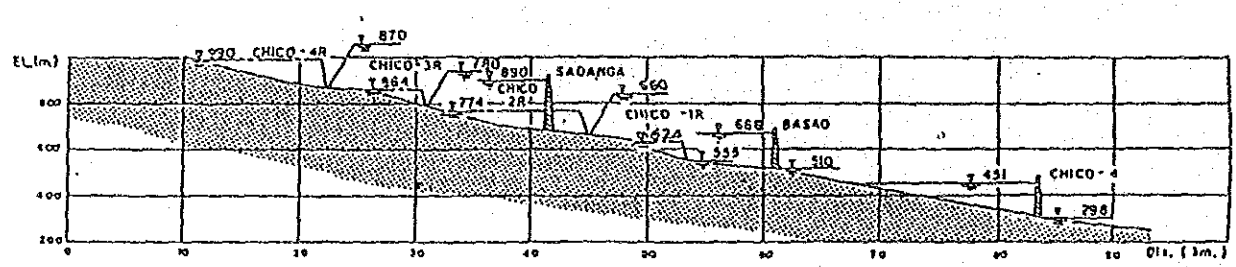
TOTAL COST	(MIL USD) :	315.6	POWER COST	(MIL USD) :	301.2	
TOTAL COST/KW	(USD/KW) :	1457.3	TRANSMISSION COST	(MIL USD) :	12.5	
TOTAL COST/KWH	(USD/KWH) :	0.481	ACCESS ROAD COST	(MIL USD) :	1.9	

OTHER INFORMATION

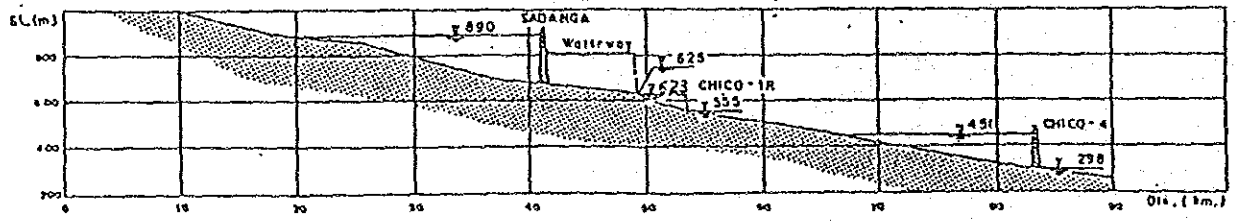
LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3274-III 1977
TECHNICAL COMMENT : - SERIES DEVELOPMENT PLAN WITH SISIRITAN AND AGBULU

CHICO RIVER BASIN

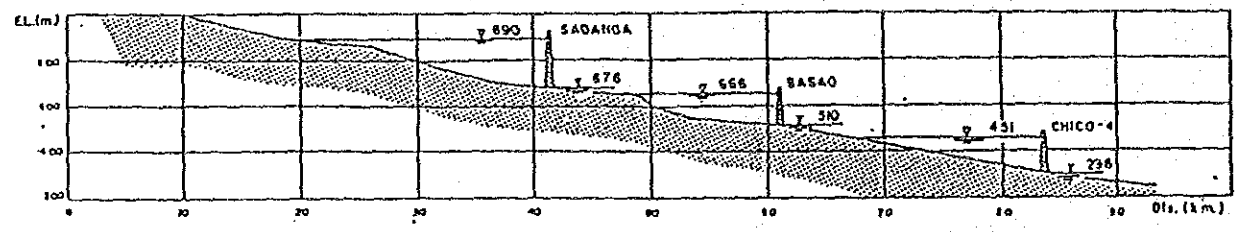
Case No.		Scheme	ID No.	FSL(m)	TWL(m)
3-1	-	Sadanga	2-008-03-05-0-1	890.0	676.0
	-	Chico 1R	2-008-03-04-0-2	623.0	555.0
3-2	-	Sadanga (D+W)	2-008-03-05-1-1	890.0	625.0
	-	Chico 1R	2-008-03-04-1-2	623.0	555.0
3-3	-	Sadanga	2-008-03-05-0-1	890.0	676.0
	-	Basao	2-008-03-03-1-1	666.0	510.0



INDEPENDENT SCHEMES



SADANGA with waterway + CHICO-1R



SADANGA + BASAO

FSL (Full supply level)

TWL (Tail water level)

**3-1-1 CHICO **

PAGE : 1

REGION NO. : 2 BASIN NO. : 8

NUMBER OF PROJECTS : 2

LIST OF PROJECTS

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-008-03-05-0-1	SADANGA	725.0	3413.0	4-2-063
2	2-008-03-04-0-2	CHICO-1R	806.8	3372.0	4-2-063

- CONNECTION MATRIX 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 ; PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 ; ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-008-03-05-0-1	0	
2	2-008-03-04-0-2	1	2-008-03-05-0-1

PROJECT NAME : SADANGA
PROJECT ID : 2- 8- 3- 5-0-1
TYPE : RESERVOIR

BASIN NAME : CAGAYAN
RIVER NAME : CHICO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6
RESERVOIR						
RESERVOIR DEVELOP. COEF :	0.95	0.85	0.80	0.75	0.70	0.65
FULL SUPPLY LEVEL (M) :	890.0	890.0	890.0	890.0	890.0	890.0
MIN. OPERATING LEVEL(M) :	738.7	780.2	792.6	802.8	811.6	820.2
POWER						
FIRM DISCHARGE (M3/S) :	41.4	40.6	40.2	39.8	39.5	38.9
PLANT PEAK DIS. (M3/S) :	165.4	162.4	160.8	159.3	157.8	155.5
AVERAGE NET HEAD (M) :	159.5	173.1	177.1	180.5	183.3	186.1
INSTALLED CAPACITY (MW) :	217.2	231.4	234.6	236.7	238.2	238.2
GUARANTEED POWER (MW) :	76.1	127.2	141.5	152.9	162.2	170.2
AVERAGE FIRM POWER (MW):	54.3	57.8	58.6	59.2	59.5	59.6
FIRM ENERGY (MIL KWH/Y) :	476.	507.	514.	518.	522.	522.
SECONDARY ENERGY (") :	62.	70.	74.	79.	83.	90.
ANNUAL AVERAGE E-GY (") :	537.	577.	588.	597.	605.	611.
D A M						
DAM HEIGHT (M) :	220.0	220.0	220.0	220.0	220.0	220.0
EMBANKMENT VOL.(MIL M3) :	23.099	23.099	23.099	23.099	23.099	23.099
EVALUATION INDECES						
CH/V :	11854.	11620.	11507.	11395.	11284.	11111.
C/V :	56.	55.	55.	54.	54.	53.
P/(20VT+VD) :	7.9	8.4	8.5	8.6	8.6	8.6
E(FIRM)/(20VT+VD) :	17.2	18.3	18.6	18.8	18.9	18.9
E(F+SEC*0.3)/(20VT+VD) :	17.9	19.1	19.4	19.6	19.8	19.9

PROJECT NAME : SADANGA
PROJECT ID : 2-008-03-05-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6
POWER DEVELOPMENT (INST.CAP(MW))	(217.2)	(231.4)	(234.6)	(236.7)	(238.2)	(238.2)
STORAGE DAM	189.00	189.00	189.00	189.00	189.00	189.00
SPILLWAY	32.42	32.42	32.42	32.42	32.42	32.42
DIVERSION TUNNEL	23.58	23.58	23.58	23.58	23.58	23.58
INTAKE (PRESSURE TYPE)	6.64	5.84	5.56	5.32	5.10	4.85
HEADRACE TUNNEL (PRESSURE)	12.69	12.52	12.43	12.35	12.27	12.13
SURGE TANK	3.86	3.77	3.73	3.69	3.65	3.59
PENSTOCK	6.57	7.47	7.72	7.92	8.08	8.20
(PRESSURE SHAFT)	(1.34)	(1.45)	(1.48)	(1.51)	(1.53)	(1.55)
(STEEL LINER)	(5.24)	(6.02)	(6.24)	(6.41)	(6.55)	(6.65)
POWERHOUSE BUILDING	13.81	14.31	14.40	14.44	14.46	14.39
(SUPER STRUCTURE)	(6.14)	(6.36)	(6.40)	(6.42)	(6.43)	(6.39)
(SUB STRUCTURE)	(7.67)	(7.95)	(8.00)	(8.02)	(8.03)	(7.99)
MISCELLANEOUS CIVIL WORK	14.43	14.45	14.44	14.44	14.43	14.41
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	42.16	43.01	43.09	43.09	43.02	42.73
ENGINEERING/ADMINISTRATION	32.79	32.85	32.85	32.84	32.83	32.80
CONTINGENCIES	75.59	75.84	75.84	75.82	75.77	75.62
S U B T O T A L	453.54	455.05	455.07	454.90	454.60	453.71
ACCESS ROAD (ROAD LENGTH 0. KM)						
CONSTRUCTION COST	0.	0.	0.	0.	0.	0.
ENGINEERING ADMINSITRATION	0.	0.	0.	0.	0.	0.
CONTINEGENCIES	0.	0.	0.	0.	0.	0.
S U B T O T A L	0.	0.	0.	0.	0.	0.
TRANSMISSION LINE SYSTEM (T/L LENGTH 28.1 KM)						
TRANSMISSION LINE	3.12	6.18	6.18	6.18	6.18	6.18
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	0.51	0.89	0.89	0.89	0.89	0.89
CONTINGENCIES	0.69	1.21	1.21	1.21	1.21	1.21
S U B T O T A L	5.28	9.24	9.24	9.24	9.24	9.24
T O T A L	458.81	464.29	464.31	464.14	463.84	462.95
EVALUATION INDICES						
U S D / K W	2112.1	2006.9	1979.6	1960.7	1947.3	1943.4
U S D / K W H	0.928	0.880	0.866	0.856	0.849	0.844

PROJECT NAME : CHICO-1R
PROJECT ID : 2- 8- 3- 4-0-2
TYPE : RUN-OF-RIVER

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	CASE 2	CASE 3
HEAD PONDAGE			
OUTPUT FACTOR	1.000	0.900	0.857
FULL SUPPLY LEVEL (M)	622.4	622.9	623.0
NORMAL OPERATING LEVEL(M)	622.4	622.9	623.0
MINIMUM OPERATING LEVEL (M)	622.4	622.9	623.0
DIVERSION WEIR HEIGHT INC. 3M F-B	8.4	8.9	9.0
WATER DEPTH AT TRASHRACK (M)	5.4	5.9	6.0
CHANNEL WIDTH AT TRASHRACK (M)	17.7	19.6	20.2
PONDAGE STORAGE VOLUME (1000 M3)	271.5	308.6	332.5
WATERWAY			
NUMBER OF WATERWAY	1	1	1
INSIDE DIAMETER OF HEADRACE (M)	4.3	4.6	4.7
HEADRACE TUNNEL LENGTH (M)	2950.0	2950.0	2950.0
INSIDE DIAMETER OF PENSTOCK (M)	3.5	3.8	3.9
PENSTOCK LENGTH (HORIZONTAL) (M)	135.0	135.0	135.0
EXCAVATION VOLUME (1000 M3)	44.2	51.3	53.8
POWER			
FIRM DISCHARGE (M3/S)	39.4	39.4	39.4
DEPENDABLE DISCHARGE (M3/S)	39.4	39.4	39.4
PLANT PEAK DISCHARGE (M3/S)	39.3	47.8	51.0
TAIL WATER LEVEL (M)	555.0	555.0	555.0
NET HEAD (M)	62.2	62.7	62.9
INSTALLED CAPACITY (MW)	20.1	24.7	26.4
DEPENDABLE PEAK POWER (MW)	20.2	20.3	20.4
FIRM POWER (MW)	20.2	20.3	20.4
GUARANTEED POWER OUTPUT (MW)	18.2	18.3	18.3
FIRM ENERGY/YEAR (10**6 KWH)	176.7	178.0	178.5
SECONDARY ENERGY/YEAR (10**6 KWH)	0.	15.0	17.7
ANNUAL ENERGY (MIL KWH/YR)	176.7	193.0	196.2
PARAMETERS			
P(INSTALLED)/(20VT) (W/M3)	22.8	24.1	24.5
P(DEPENDABLE)/(20VT) (W/M3)	22.8	19.8	18.9
E(FIRM)/(20VT) (KWH/M3)	200.0	173.7	165.9
E(F+0.3*SECONDARY)/(20VT) (")	200.0	178.1	170.9

PROJECT NAME : CHICO-1R
PROJECT ID : 2-008-03-04-0
TYPE : RUN-OF-RIVER

* SUMMARY TABLE OF COST ESTIMATE *

(UNIT : MILLION USD)

ITEM		CASE 1	CASE 2	CASE 3
POWER DEVELOPMENT (INST.CAP(MW))		(20.1)	(24.7)	(26.4)
DIVERSION DAM/WEIR	:	1.03	1.15	1.19
INTAKE (NON-PRESSURE TYPE)	:	0.94	1.08	1.13
HEADRACE TUNNEL (NON-PRES.)	:	7.01	7.89	8.20
HEAD TANK	:	0.67	0.76	0.79
PENSTOCK	:	0.91	1.03	1.07
(PRESSURE SHAFT)	:	(0.42)	(0.45)	(0.46)
(STEEL LINER)	:	(0.49)	(0.58)	(0.62)
POWERHOUSE BUILDING	:	1.24	1.52	1.62
(SUPER STRUCTURE)	:	(0.55)	(0.67)	(0.72)
(SUB STRUCTURE)	:	(0.69)	(0.84)	(0.90)
MISCELLANEOUS CIVIL WORK	:	0.59	0.67	0.70
CONSTRUCTION FACILITIES	:	0.	0.	0.
POWER EQUIPMENT	:	7.56	9.07	9.62
ENGINEERING/ADMINISTRATION	:	2.49	2.89	3.04
CONTINGENCIES	:	4.49	5.21	5.47
S U B T O T A L	:	26.92	31.26	32.82
ACCESS ROAD (ROAD LENGTH 0. KM)				
CONSTRUCTION COST	:	0.	0.	0.
ENGINEERING ADMINSITRATION	:	0.	0.	0.
CONTINEGENCIES	:	0.	0.	0.
S U B T O T A L	:	0.	0.	0.
TRANSMISSION LINE SYSTEM (T/L LENGTH 20.5 KM)				
TRANSMISSION LINE	:	0.47	0.47	0.47
SWITCHYARD AND SUBSTATION	:	0.27	0.27	0.27
ENGINEERING/ADMINISTRATION	:	0.09	0.09	0.09
CONTINGENCIES	:	0.13	0.13	0.13
S U B T O T A L	:	0.96	0.96	0.96
T O T A L	:	27.88	32.22	33.78
EVALUATION INDICES				
U S D / K W	:	1386.9	1304.9	1279.9
U S D / K W H	:	0.158	0.177	0.184

****
**3-2-1 CHICO **
********** PAGE : 1

REGION NO. : 2 BASIN NO. : 8

NUMBER OF PROJECTS : 2

LIST OF PROJECTS

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-008-03-05-1-1	SADANGA	725.0	3413.0	4-2-063
2	2-008-03-04-1-2	CHICO-1R	806.8	3372.0	4-2-063

- CONNECTION MATRIX 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 : ** IS NOT **

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-008-03-05-1-1	0	
2	2-008-03-04-1-2	1	2-008-03-05-1-1

PROJECT NAME : SADANGA
PROJECT ID : 2- 8- 3- 5-1-1
TYPE : RESERVOIR

BASIN NAME : CAGAYAN
RIVER NAME : CHICO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6
RESERVOIR						
RESERVOIR DEVELOP. COEF :	0.95	0.85	0.80	0.75	0.70	0.65
FULL SUPPLY LEVEL (M) :	890.0	890.0	890.0	890.0	890.0	890.0
MIN. OPERATING LEVEL(M) :	738.7	780.2	792.6	802.8	811.6	820.2
POWER						
FIRM DISCHARGE (M3/S) :	41.4	40.6	40.2	39.8	39.5	38.9
PLANT PEAK DIS. (M3/S) :	165.4	162.4	160.8	159.3	157.8	155.5
AVERAGE NET HEAD (M) :	208.2	221.8	225.8	229.1	232.0	234.8
INSTALLED CAPACITY (MW) :	283.5	296.4	299.0	300.5	301.4	300.4
GUARANTEED POWER (MW) :	139.2	189.1	202.9	213.6	222.3	229.5
AVERAGE FIRM POWER (MW) :	70.9	74.1	74.7	75.1	75.3	75.1
FIRM ENERGY (MIL KWH/Y) :	621.	649.	655.	658.	660.	658.
SECONDARY ENERGY (") :	76.	86.	92.	97.	102.	110.
ANNUAL AVERAGE E-GY (") :	697.	736.	746.	755.	762.	768.
D A M						
DAM HEIGHT (M) :	220.0	220.0	220.0	220.0	220.0	220.0
EMBANKMENT VOL.(MIL M3) :	23.099	23.099	23.099	23.099	23.099	23.099
EVALUATION INDECES						
CH/V :	14604.	14317.	14178.	14040.	13904.	13691.
C/V :	56.	55.	55.	54.	54.	53.
P/(20VT+VD) :	9.9	10.3	10.4	10.5	10.5	10.5
E(FIRM)/(20VT+VD) :	21.6	22.6	22.8	23.0	23.0	23.0
E(F+SEC*0.3)/(20VT+VD) :	22.4	23.5	23.8	24.0	24.1	24.2

PROJECT NAME : SADANGA
PROJECT ID : 2-008-03-05-1
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6
POWER DEVELOPMENT (INST.CAP(MW))	(283.5)	(296.4)	(299.0)	(300.5)	(301.4)	(300.4)
STORAGE DAM	189.00	189.00	189.00	189.00	189.00	189.00
SPILLWAY	32.42	32.42	32.42	32.42	32.42	32.42
DIVERSION TUNNEL	23.58	23.58	23.58	23.58	23.58	23.58
INTAKE (PRESSURE TYPE)	6.64	5.84	5.56	5.32	5.10	4.85
HEADRACE TUNNEL (PRESSURE)	21.98	21.69	21.54	21.40	21.25	21.02
SURGE TANK	4.36	4.27	4.22	4.18	4.14	4.07
PENSTOCK	12.11	13.23	13.53	13.75	13.92	14.03
(PRESSURE SHAFT)	(2.01)	(2.12)	(2.15)	(2.18)	(2.20)	(2.21)
(STEEL LINER)	(10.09)	(11.11)	(11.37)	(11.57)	(11.73)	(11.81)
POWERHOUSE BUILDING	16.50	16.88	16.93	16.93	16.91	16.79
(SUPER STRUCTURE)	(7.33)	(7.50)	(7.52)	(7.53)	(7.52)	(7.46)
(SUB STRUCTURE)	(9.16)	(9.38)	(9.40)	(9.41)	(9.40)	(9.33)
MISCELLANEOUS CIVIL WORK	15.33	15.34	15.34	15.33	15.32	15.29
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	47.53	48.08	48.06	47.97	47.83	47.44
ENGINEERING/ADMINISTRATION	33.99	34.03	34.03	34.01	33.99	33.94
CONTINGENCIES	80.69	80.87	80.84	80.78	80.69	80.49
S U B T O T A L	484.11	485.23	485.04	484.66	484.15	482.92
ACCESS ROAD (ROAD LENGTH 0. KM)						
CONSTRUCTION COST	0.	0.	0.	0.	0.	0.
ENGINEERING ADMINSITRATION	0.	0.	0.	0.	0.	0.
CONTINEGENCIES	0.	0.	0.	0.	0.	0.
S U B T O T A L	0.	0.	0.	0.	0.	0.
TRANSMISSION LINE SYSTEM (T/L LENGTH 28.1 KM)						
TRANSMISSION LINE	6.18	6.18	6.18	6.18	6.18	6.18
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	0.89	0.89	0.89	0.89	0.89	0.89
CONTINGENCIES	1.21	1.21	1.21	1.21	1.21	1.21
S U B T O T A L	9.24	9.24	9.24	9.24	9.24	9.24
T O T A L	493.35	494.47	494.28	493.90	493.39	492.16
EVALUATION INDICES						
U S D / K W	1739.9	1668.2	1653.3	1643.5	1637.1	1636.1
U S D / K W H	0.766	0.733	0.724	0.719	0.714	0.712

PROJECT NAME : CHICO-1R
PROJECT ID : 2- 8- 3- 4-1-2
TYPE : RUN-OF-RIVER

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	CASE 2	CASE 3
HEAD PONDAGE			
OUTPUT FACTOR	1.000	0.900	0.864
FULL SUPPLY LEVEL (M)	622.5	622.9	623.0
NORMAL OPERATING LEVEL(M)	622.5	622.9	623.0
MINIMUM OPERATING LEVEL (M)	622.5	622.9	623.0
DIVERSION WEIR HEIGHT INC. 3M F-B	8.5	8.9	9.0
WATER DEPTH AT TRASHRACK (M)	5.5	5.9	6.0
CHANNEL WIDTH AT TRASHRACK (M)	17.9	19.7	20.2
PONDAGE STORAGE VOLUME (1000 M3)	273.2	313.1	332.2
WATERWAY			
NUMBER OF WATERWAY	1	1	1
INSIDE DIAMETER OF HEADRACE (M)	4.3	4.6	4.7
HEADRACE TUNNEL LENGTH (M)	2950.0	2950.0	2950.0
INSIDE DIAMETER OF PENSTOCK (M)	3.5	3.8	3.8
PENSTOCK LENGTH (HORIZONTAL) (M)	135.0	135.0	135.0
EXCAVATION VOLUME (1000 M3)	44.7	51.7	53.8
POWER			
FIRM DISCHARGE (M3/S)	40.0	40.0	40.0
DEPENDABLE DISCHARGE (M3/S)	40.0	40.0	40.0
PLANT PEAK DISCHARGE (M3/S)	39.8	48.4	51.0
TAIL WATER LEVEL (M)	555.0	555.0	555.0
NET HEAD (M)	62.3	62.7	62.9
INSTALLED CAPACITY (MW)	20.4	25.0	26.4
DEPENDABLE PEAK POWER (MW)	20.5	20.6	20.7
FIRM POWER (MW)	20.5	20.6	20.7
GUARANTEED POWER OUTPUT (MW)	18.4	18.6	18.6
FIRM ENERGY/YEAR (10**6 KWH)	179.5	180.8	181.2
SECONDARY ENERGY/YEAR (10**6 KWH)	0.	14.8	16.8
ANNUAL ENERGY (MIL KWH/YR)	179.5	195.6	198.0
PARAMETERS			
P(INSTALLED)/(20VT) (W/M3)	22.9	24.2	24.5
P(DEPENDABLE)/(20VT) (W/M3)	22.9	19.9	19.2
E(FIRM)/(20VT) (KWH/M3)	200.8	174.8	168.5
E(F+0.3*SECONDARY)/(20VT) (")	200.8	179.0	173.2

PROJECT NAME : CHICO-1R
PROJECT ID : 2-008-03-04-1
TYPE : RUN-OF-RIVER

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	CASE 2	CASE 3
POWER DEVELOPMENT (INST.CAP(MW))	(20.4)	(25.0)	(26.4)
DIVERSION DAM/WEIR	1.04	1.15	1.19
INTAKE (NON-PRESSURE TYPE)	0.95	1.09	1.13
HEADRACE TUNNEL (NON-PRES.)	7.07	7.95	8.19
HEAD TANK	0.68	0.76	0.79
PENSTOCK	0.92	1.04	1.07
(PRESSURE SHAFT)	(0.42)	(0.45)	(0.46)
(STEEL LINER)	(0.50)	(0.59)	(0.62)
POWERHOUSE BUILDING	1.26	1.53	1.62
(SUPER STRUCTURE)	(0.56)	(0.68)	(0.72)
(SUB STRUCTURE)	(0.70)	(0.85)	(0.90)
MISCELLANEOUS CIVIL WORK	0.60	0.68	0.70
CONSTRUCTION FACILITIES	0.	0.	0.
POWER EQUIPMENT	7.67	9.17	9.61
ENGINEERING/ADMINISTRATION	2.52	2.92	3.04
CONTINGENCIES	4.54	5.26	5.47
S U B T O T A L	27.23	31.55	32.80
ACCESS ROAD (ROAD LENGTH 0. KM)			
CONSTRUCTION COST	0.	0.	0.
ENGINEERING ADMINSITRATION	0.	0.	0.
CONTINEGENCIES	0.	0.	0.
S U B T O T A L	0.	0.	0.
TRANSMISSION LINE SYSTEM (T/L LENGTH 20.5 KM)			
TRANSMISSION LINE	0.47	0.47	0.47
SWITCHYARD AND SUBSTATION	0.27	0.27	0.27
ENGINEERING/ADMINISTRATION	0.09	0.09	0.09
CONTINGENCIES	0.13	0.13	0.13
S U B T O T A L	0.96	0.96	0.96
T O T A L	28.19	32.51	33.76
EVALUATION INDICES			
U S D / K W	1380.4	1300.0	1280.2
U S D / K W H	0.157	0.176	0.181

**3-3-2 CHICO **

PAGE : 1

REGION NO. : 2 BASIN NO. : 8

NUMBER OF PROJECTS : 2

LIST OF PROJECTS

NO.	PROJECT ID	PROJECT NAME	CA (SQ.KM)	RAIN (MM)	STREAM GAGE ID
1	2-008-03-05-0-1	SADANGA	725.0	3413.0	4-2-063
2	2-008-03-03-1-1	BASAO	897.0	3344.0	4-2-063

- CONNECTION MATRIX 1/ -

	1	2
1	0	0
2	1	0

1/ C(I,J)=1 : PROJECT-J IS DIRECTLY UPSTREAM OF PROJECT-I
- C(I,J)=0 : -"- IS NOT -"-

SEQ NO.	PROJECT ID	NUP	ID(S) OF U/S PROJECT(S)
1	2-008-03-05-0-1	0	
2	2-008-03-03-1-1	1	2-008-03-05-0-1

PROJECT NAME : SADANGA
PROJECT ID : 2- 8- 3- 5-0-1
TYPE : RESERVOIR

BASIN NAME : CAGAYAN
RIVER NAME : CHICO

****
* SUMMARY TABLE OF OUTPUTS *
****

ITEMS	CASE 1	2	3	4	5	6
RESERVOIR						
RESERVOIR DEVELOP. COEF :	0.95	0.85	0.80	0.75	0.70	0.65
FULL SUPPLY LEVEL (M) :	890.0	890.0	890.0	890.0	890.0	890.0
MIN. OPERATING LEVEL(M) :	738.7	780.2	792.6	802.8	811.6	820.2
POWER						
FIRM DISCHARGE (M3/S) :	41.4	40.6	40.2	39.8	39.5	38.9
PLANT PEAK DIS. (M3/S) :	165.4	162.4	160.8	159.3	157.8	155.5
AVERAGE NET HEAD (M) :	159.5	173.1	177.1	180.5	183.3	186.1
INSTALLED CAPACITY (MW) :	217.2	231.4	234.6	236.7	238.2	238.2
GUARANTEED POWER (MW) :	76.1	127.2	141.5	152.9	162.2	170.2
AVERAGE FIRM POWER (MW) :	54.3	57.8	58.6	59.2	59.5	59.6
FIRM ENERGY (MIL KWH/Y) :	476.	507.	514.	518.	522.	522.
SECONDARY ENERGY (") :	61.	70.	74.	79.	83.	90.
ANNUAL AVERAGE E-GY (") :	537.	577.	588.	597.	605.	611.
D A M						
DAM HEIGHT (M) :	220.0	220.0	220.0	220.0	220.0	220.0
EMBANKMENT VOL.(MIL M3) :	23.099	23.099	23.099	23.099	23.099	23.099
EVALUATION INDECES						
CH/V :	11855.	11620.	11507.	11395.	11284.	11111.
C/V :	56.	55.	55.	54.	54.	53.
P/(20VT+VD) :	7.9	8.4	8.5	8.6	8.6	8.6
E(FIRM)/(20VT+VD) :	17.2	18.3	18.6	18.8	18.9	18.9
E(F+SEC*0.3)/(20VT+VD) :	17.9	19.1	19.4	19.6	19.8	19.9

PROJECT NAME : SADANGA
PROJECT ID : 2-008-03-05-0
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE

(UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6
POWER DEVELOPMENT (INST.CAP(MW))	(217.2)	(231.4)	(234.6)	(236.7)	(238.2)	(238.2)
STORAGE DAM	189.00	189.00	189.00	189.00	189.00	189.00
SPILLWAY	32.42	32.42	32.42	32.42	32.42	32.42
DIVERSION TUNNEL	23.58	23.58	23.58	23.58	23.58	23.58
INTAKE (PRESSURE TYPE)	6.64	5.84	5.56	5.32	5.10	4.85
HEADRACE TUNNEL (PRESSURE)	12.69	12.52	12.43	12.35	12.27	12.13
SURGE TANK	3.86	3.77	3.73	3.69	3.65	3.59
PENSTOCK	6.57	7.47	7.72	7.92	8.08	8.20
(PRESSURE SHAFT)	(1.34)	(1.45)	(1.48)	(1.51)	(1.53)	(1.55)
(STEEL LINER)	(5.24)	(6.02)	(6.24)	(6.41)	(6.55)	(6.65)
POWERHOUSE BUILDING	13.81	14.31	14.40	14.44	14.46	14.39
(SUPER STRUCTURE)	(6.14)	(6.36)	(6.40)	(6.42)	(6.43)	(6.39)
(SUB STRUCTURE)	(7.67)	(7.95)	(8.00)	(8.02)	(8.03)	(7.99)
MISCELLANEOUS CIVIL WORK	14.43	14.45	14.44	14.44	14.43	14.41
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	42.16	43.01	43.09	43.09	43.02	42.73
ENGINEERING/ADMINISTRATION	32.79	32.85	32.85	32.84	32.83	32.80
CONTINGENCIES	75.59	75.84	75.84	75.82	75.77	75.62
S U B T O T A L	453.54	455.05	455.07	454.90	454.60	453.71
ACCESS ROAD (ROAD LENGTH 0. KM)						
CONSTRUCTION COST	0.	0.	0.	0.	0.	0.
ENGINEERING ADMINSITRATION	0.	0.	0.	0.	0.	0.
CONTINEGENCIES	0.	0.	0.	0.	0.	0.
S U B T O T A L	0.	0.	0.	0.	0.	0.
TRANSMISSION LINE SYSTEM (T/L LENGTH 28.1 KM)						
TRANSMISSION LINE	3.12	6.18	6.18	6.18	6.18	6.18
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96
ENGINEERING/ADMINISTRATION	0.51	0.89	0.89	0.89	0.89	0.89
CONTINGENCIES	0.69	1.21	1.21	1.21	1.21	1.21
S U B T O T A L	5.28	9.24	9.24	9.24	9.24	9.24
T O T A L	458.82	464.29	464.31	464.14	463.84	462.95
EVALUATION INDICES						
U S D / K W	2112.1	2006.9	1979.6	1960.7	1947.3	1943.4
U S D / K W H	0.928	0.880	0.866	0.856	0.849	0.844

PROJECT NAME : BASAO
PROJECT ID : 2- 8- 3- 3-1-1
TYPE : RESERVOIR

BASIN NAME : CAGAYAN
RIVER NAME : CHICO

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* SUMMARY TABLE OF OUTPUTS *
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ITEMS	CASE 1	2	3	4	5	6	7	8	9	10
RESERVOIR										
RESERVOIR DEVELOP. COEF :	0.21	0.09	0.09	0.03	0.03	0.03	0.03	0.03	0.02	0.02
FULL SUPPLY LEVEL (M) :	666.0	623.9	666.0	588.0	602.9	622.6	643.9	666.0	583.8	666.0
MIN. OPERATING LEVEL(M) :	556.6	556.4	637.7	556.3	581.8	607.3	632.8	658.3	556.2	659.8
POWER										
FIRM DISCHARGE (M3/S) :	47.6	45.7	45.6	44.7	44.6	44.6	44.6	44.5	43.8	43.6
PLANT PEAK DIS. (M3/S) :	142.9	137.4	137.0	134.2	134.1	134.0	133.9	133.7	131.5	131.0
AVERAGE NET HEAD (M) :	114.9	87.2	141.4	63.6	81.7	103.0	125.3	148.1	60.8	148.6
INSTALLED CAPACITY (MW) :	135.2	98.6	159.5	70.2	90.2	113.5	138.1	163.0	65.8	160.3
GUARANTEED POWER (MW) :	47.1	45.4	131.7	44.6	71.1	97.4	123.7	149.8	43.7	148.4
AVERAGE FIRM POWER (MW):	45.0	32.8	53.1	23.4	30.0	37.8	46.0	54.3	21.9	53.4
FIRM ENERGY (MIL KWH/Y) :	394.	287.	465.	205.	263.	331.	403.	476.	192.	467.
SECONDARY ENERGY (") :	61.	54.	75.	40.	48.	59.	70.	83.	41.	89.
ANNUAL AVERAGE E-GY (") :	455.	341.	540.	245.	311.	390.	473.	558.	233.	557.
D A M										
DAM HEIGHT (M) :	162.0	119.9	162.0	84.0	98.9	118.6	139.9	162.0	79.8	162.0
EMBANKMENT VOL.(MIL M3) :	14.251	6.270	14.251	2.526	3.773	6.085	9.476	14.251	2.245	14.251
EVALUATION INDECES										
CH/V :	15941.	25222.	15235.	41367.	33129.	24982.	19136.	14847.	43063.	14545.
C/V :	105.	230.	101.	558.	373.	231.	148.	99.	615.	97.
P/(20VT+VD) :	6.9	8.6	8.2	9.1	10.1	10.1	9.4	8.4	8.9	8.3
E(FIRM)/(20VT+VD) :	20.2	25.1	23.9	26.6	29.4	29.4	27.5	24.5	26.0	24.1
E(F+SEC*0.3)/(20VT+VD) :	21.2	26.5	25.1	28.2	31.0	31.0	28.9	25.8	27.6	25.5

PROJECT NAME : BASAO
PROJECT ID : 2-008-03-03-1
TYPE : RESERVOIR

SUMMARY TABLE OF COST ESTIMATE (UNIT : MILLION USD)

ITEM	CASE 1	2	3	4	5	6	7	8	9	10
POWER DEVELOPMENT (INST.CAP(MW))	(135.2)	(98.6)	(159.5)	(70.2)	(90.2)	(113.5)	(138.1)	(163.0)	(65.8)	(160.3)
STORAGE DAM	123.95	60.51	123.95	27.35	38.83	58.95	86.79	123.95	24.67	123.95
SPILLWAY	25.83	19.77	25.83	14.61	16.76	19.58	22.65	25.83	14.01	25.83
DIVERSION TUNNEL	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
INTAKE (PRESSURE TYPE)	5.25	4.33	3.39	3.42	3.10	2.90	2.73	2.58	3.25	2.45
HEADRACE TUNNEL (PRESSURE)	10.88	10.58	10.56	10.40	10.40	10.39	10.39	10.38	10.25	10.23
SURGE TANK	3.30	3.15	3.12	3.06	3.05	3.04	3.04	3.03	3.00	2.97
PENSTOCK	9.83	8.25	11.72	7.05	8.09	9.32	10.66	12.07	6.84	11.92
(PRESSURE SHAFT)	(2.67)	(2.67)	(2.87)	(2.69)	(2.75)	(2.80)	(2.86)	(2.91)	(2.68)	(2.90)
(STEEL LINER)	(7.16)	(5.58)	(8.64)	(4.36)	(5.35)	(6.52)	(7.80)	(9.16)	(4.16)	(9.02)
POWERHOUSE BUILDING	9.59	7.66	10.56	6.07	7.17	8.35	9.51	10.62	5.77	10.43
(SUPER STRUCTURE)	(4.26)	(3.41)	(4.69)	(2.70)	(3.19)	(3.71)	(4.23)	(4.72)	(2.56)	(4.64)
(SUB STRUCTURE)	(5.33)	(4.26)	(5.87)	(3.37)	(3.98)	(4.64)	(5.28)	(5.90)	(3.21)	(5.80)
MISCELLANEOUS CIVIL WORK	10.89	7.17	10.91	5.05	5.83	7.08	8.74	10.88	4.84	10.84
CONSTRUCTION FACILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
POWER EQUIPMENT	31.89	27.17	33.71	23.08	25.82	28.63	31.25	33.66	22.21	33.10
ENGINEERING/ADMINISTRATION	28.25	22.21	28.39	16.15	18.52	22.17	25.51	28.34	15.49	28.27
CONTINGENCIES	57.75	39.98	58.25	29.07	33.33	39.91	48.08	58.09	27.89	57.82
S U B T O T A L	346.51	239.90	349.48	174.42	200.01	239.44	288.46	348.53	167.33	346.92
ACCESS ROAD (ROAD LENGTH 2.5 KM)										
CONSTRUCTION COST	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
ENGINEERING ADMINSITRATION	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
CONTINEGENCIES	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
S U B T O T A L	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
TRANSMISSION LINE SYSTEM (T/L LENGTH 15.6 KM)										
TRANSMISSION LINE	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.06	1.73
SWITCHYARD AND SUBSTATION	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.62	0.96
ENGINEERING/ADMINISTRATION	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.21	0.34
CONTINGENCIES	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.28	0.45
S U B T O T A L	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	2.17	3.48
T O T A L	350.71	244.09	353.68	178.62	204.20	243.63	292.65	352.73	170.22	351.12
EVALUATION INDICES										
U S D / K W	2594.1	2476.7	2216.8	2543.5	2264.0	2145.8	2119.9	2163.8	2586.8	2190.9
U S D / K W H	0.850	0.804	0.725	0.824	0.736	0.698	0.691	0.705	0.834	0.710

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-03-03-1-1

SCHEME : BASAO

RIVER SYSTEM : CAGAYAN | WATER RESOURCES REGION : II | COORDINATES : N17-14-32 E121-07-30
STREAM : CHICO | PROVINCE : KAL-APAYAO | STUDY LEVEL : UNSCALED (PRE-F/S,RECONNAISSANCE)

HYDRO/TOPO. INFORMATION

CATCHMENT AREA	(KM2) :	897.0	(MAIN : 897.. INTER TRANSFER TOTAL :	0.)	STREAM GAGE ID	: 4-2-063-NP-		
AVER. BASIN RAINFALL	(MM/YR) :	3344.	DENUDATION RATE	(MM/YR) :	1.4	GAGE CATCHMENT	(KM2) :	874.
AVERAGE DISCHARGE	(M3/S) :	55.9	EVAPORATION RATE	(MM/DAY) :	3.0	GAGE AVER.DISCHARGE	(M3/S) :	54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RESERVOIR | RESERVOIR DEVELOPMENT RATIO : 0.03

RESERVIOR	FULL SUPPLY LEVEL	(EL.M) :	666.0	GROSS STORAGE VOL.	(MIL M3) :	391.7		
	AVERAGE OPERATING LEVEL	(EL.M) :	663.4	ACTIVE STORAGE VOL.	(MIL M3) :	50.2		
	MINIMUM OPERATING LEVEL	(EL.M) :	658.3	DEAD STORAGE VOL.	(MIL M3) :	341.5		
	DRAWDOWN DEPTH	(M) :	7.7	SEDIMENT VOL.	(MIL M3) :	12.0		
MAIN DAM (WEIR)	CREST ELEVATION	(EL.M) :	672.0	CREST LENGTH	(M) :	603.6		
	DAM HEIGHT	(M) :	162.0	EMBANKMENT VOL.	(MIL M3) :	14.25		
WATERWAY	HEADRACE : LENGTH	(M) :	1210.0	DIAMETER (WIDTH)	(M) :	5.3	NOS. :	2
	PENSTOCK : HORIZONT. L	(M) :	420.0	DIAMETER	(M) :	4.1	NOS. :	2
	DIVERSION : LENGTH	(M) :	1850.0	DIAMETER	(M) :	8.1	NOS. :	2
	EXCAVATION VOL TOTAL	(1000 M3) :	258.6					
DISCHARGE /HEAD	PLANT MAX. DISCHARGE	(M3/S) :	133.7	AVERAGE NET HEAD	(M) :	148.1		
	FIRM DISCHARGE	(M3/S) :	44.5	TAILWATER LEVEL	(EL.M) :	510.0		
POWER /ENERGY	INSATLLED CAPACITY	(MW) :	163.0	ANNUAL TOTAL ENERGY	(GWH) :	558.2		
	FIRM POWER	(MW) :	54.3	FIRM ENERGY	(GWH) :	475.5		
	MIN.GUARANTEED POWER	(MW) :	149.8	SECONDARY ENERGY	(GWH) :	82.6		

TRANSMISSION LINE : LENGTH (KM) : 15.6 | TO : BATONG BUHAY | 230 K V DOUBLE CIRCUIT | NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 2.5 | FROM : LUPLUPA

CONSTRUCTION COST

TOTAL COST	(MIL USD) :	352.7	POWER COST	(MIL USD) :	348.5
TOTAL COST/KW	(USD/KW) :	2163.8	TRANSMISSION COST	(MIL USD) :	3.5
TOTAL COST/KWH	(USD/KWH) :	0.705	ACCESS ROAD COST	(MIL USD) :	0.7

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : MIXED - SCARCE POPULATION
SUBMERGED ROAD : PROVINCIAL ROAD 4.5 KMS.
MAP USED (1:50.000 SCALE) : 3271-II 1979
TECHNICAL COMMENT :
- DEVELOPMENT PLAN WITH SADANGA (2-008-03-05-0-1)
- CONSTRAINED FSL (MAX=666 M) DUE TO TWL OF SADANGA
- REGULATION EFFECT BY DADANGA IS CONSIDERED

INVENTORY OF HYDROPOWER SITES

SCHEME ID : 2-008-03-04-0-2

SCHEME : CHICO-IR

RIVER SYSTEM : CAGAYAN
STREAM : CHICO
WATER RESOURCES REGION : II
PROVINCE : MT.PROVINCE
COORDINATES : N17-11-10 E121-03-53
STUDY LEVEL : NEWLY IDENTIFIED THROUGH LHPPS

HYDRO/TOPO. INFORMATION

CATCHMENT AREA (KM2)	: 806.8	(MAIN : 807., INTER TRANSFER TOTAL : 0.)	STREAM GAGE ID	: 4-2-063-NP-
AVER. BASIN RAINFALL (MM/YR)	: 3372.	DENUDATION RATE (MM/YR)	: 1.4	GAGE CATCHMENT (KM2)	: 874.
AVERAGE DISCHARGE (M3/S)	: 51.0	EVAPORATION RATE (MM/DAY)	: 3.0	GAGE AVER.DISCHARGE (M3/S)	: 54.8

SELECTED PLAN

TYPE OF DEVELOPMENT : RUN-OF-RIVER
OUTPUT FACTOR : 0.86

PONDAGE	FULL SUPPLY LEVEL (EL.M)	: 623.0	PONDAGE STORAGE VOL.(1000M3)	: 332.5		
	AVERAGE OPERATING LEVEL (EL.M)	: 623.0	ACTIVE STORAGE VOL. (1000M3)	: 0.		
	MINIMUM OPERATING LEVEL (EL.M)	: 623.0				
	DRAWDOWN DEPTH (M)	: 0.				
MAIN DAM	CREST ELEVATION (EL.M)	: 623.0	CREST LENGTH (M)	: 110.0		
(WEIR)	WEIR HEIGHT (M)	: 9.0	WEIR CONCRETE VOL. (1000 M3)	: 18.4		
WATERWAY	HEADRACE : LENGTH (M)	: 2950.0	DIAMETER (WIDTH) (M)	: 4.7	NOS.	: 1
	PENSTOCK : HORIZONT. L (M)	: 135.0	DIAMETER (M)	: 3.9	NOS.	: 1
	EXCAVATION VOL TOTAL (1000 M3)	: 53.8				
DISCHARGE	PLANT MAX. DISCHARGE (M3/S)	: 51.0	AVERAGE NET HEAD (M)	: 62.9		
/HEAD	FIRM DISCHARGE (M3/S)	: 39.4	TAILWATER LEVEL (EL.M)	: 555.0		
POWER	INSATLLED CAPACITY (MW)	: 26.4	ANNUAL TOTAL ENERGY (GWH)	: 196.2		
/ENERGY	FIRM POWER (MW)	: 20.4	FIRM ENERGY (GWH)	: 178.5		
	MIN.GUARANTEED POWER (MW)	: 18.3	SECONDARY ENERGY (GWH)	: 17.7		

TRANSMISSION LINE : LENGTH (KM) : 20.5 TO : BATONG BUHAY 69 K V SINGLE CIRCUIT NOS. OF CIRCUIT : 1

ACCESS ROAD LENGTH (KM) : 0. FROM : NATIONAL ROAD BESIDE DAMSITE

CONSTRUCTION COST

TOTAL COST (MIL USD)	: 33.8	POWER COST (MIL USD)	: 32.8
TOTAL COST/KW (USD/KW)	: 1279.9	TRANSMISSION COST (MIL USD)	: 1.0
TOTAL COST/KWH (USD/KWH)	: 0.184	ACCESS ROAD COST (MIL USD)	: 0.

OTHER INFORMATION

LAND USE IN RESERVOIR AREA : FOREST - SCARCE POPULATION
SUBMERGED ROAD : NONE
MAP USED (1:50,000 SCALE) : 3271-IV 1979
TECHNICAL COMMENT : - SERIES DEVELOPMENT PLAN WITH SADANGA (2-008-03-05-01)
- REGULATION EFFECT BY SADANGA IS CONSIDERED