	Bacayation, weathered rock	m3	9,000	6.00	54,000	
	Excavation, hard rock	m3	12,000	10.00	120,000	
	Concrete, substructure	m3	8,600	250.00	2,150,000	
	Concrete, second stage Reinforcement	m3	2,200	140,00	308,000 840,000	
	Others (20%)	ton L.S.	560	1,500.00	700,700	
	Outers (2010)	LAO,			700,700	
	Subtotal					4,204,200
2.70	TAILRACE					
	Excavation					·
	Excavation common	m3	1,200	3.50	4,200	
	Excavation, weathered rock	m3	1,200	6.00	7,200	
	Excavation hard rock	m3	1,800	10.00	18,000	
	Concrete, structure	m3	900	140.00	126,000	
	Reinforcement	ton	30	1,500.00	45,000	
	Others (20%)	L.S.			40,080	
÷	Subtotal					240,480
2.80	ARCHITECTURAL BUILDINGS	m2.	1,200	1,100.00	1,320,000	1,320,000
2.90	ACCESS ROAD					
	New construction	km	0	600,000,00	0	
	Upgraded	km km	79	50,000.00	3,950,000	
	Subtotal					3,950,000
			-			3,930,000
3.00	METAL WORKS				and the second	
	Penstock steel pipes	lon	400	5,000.00	2,000,000	
	Gates	ton	60	7,000.00	420,000	
	Subtotal					2,420,000
4.00	GENERATING EQUIPMENT					
	Turbines	. toe	230	18,700.00	4,301,000	
	Generators	ton ton	330	20,400.00	6,732,000	
	Transformers	MVA	62	4,500.00	279,000	
	è radiomers	(HT)	04	4,300.00	217,000	
	Subtotal					11,312,000
5.00	TRANSMISSION LINES AND	km	2	46,000.00	92,000	92,000
	SUBSTATIONS					
	Total of Direct Cost					96,145,629
6.00	LAND AQUISITION AND COMPENSATION	LS			0	4,807,281
7.00	ADMINISTRATION EXPENSES	LS			0	961,456
8.00	ENGINEERING SERVICES	LS			0 :	6,730,194
9.00	PHYSICAL CONTINGENCY	LS			. 0	9,614,563
	V-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1				3	
	GRAND TOTAL				118,259,123	118,259,123

Item No.	Work Item	Unit			nount	<del></del>
· · · · · ·		·	F,C	.(U\$\$) F.0	C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				8,685,177
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
2.10	DIVERSION TUNNEL					
	Open Excavation of Inlet &Outlet				•	
	Open excavation common Open excavation weathered rock	1n3 m3	2,4(X) 2,400	3.50 6.00	8,400 14,400	
	Open excavation, hard rock	m3	4,000	10.00	40,000	
	Concrete of Inlet &Outlet	m3	1,600	140.00	224,000	
	Tunnel Excavation Tunnel Concrete	m3 m3	50,900 16,100	55.00 160.00	2,799,500 2,576,000	
	Reinforcement bar	ın3	360	1,500.00	540,000	
	Plug Concrete Others (20%)	m3 L.S.	2,300	160.00	368,000 1,314,060	
						7,884,36
	Subtolai					7,004,30
2.20	COFFER DAM					
	Excavation	-2	47.000	1 50	167.660	
	Excavation,common Embankment	m3	47,900	3.50	167,650	
	Embankment, core	<b>1113</b>	73,400	5,00	367,000	-
	Embankment, filter Embankment, rock	m3 m3	18,700 383,900	10.00 6.00	187,000 2,303,400	
	Others (20%)	L.S.	300,700	0,00	605,010	
	Subsotal					3,630,06
						-,-55,00
2.30	MAIN DAM					
	Excavation corpora	2	237,300	3.50	830,550	
	Excavation, common  Excavation, weathered rock	m3 m3	91,600	6.00	549,600	
	Excavation, hard	m3	188,500	10.00	1,885,000	
	Embankment Embankment,core	m3	904,400	5.00	4,522,000	•
	Embankment, filter	m3	206,300	10.00	2,063,000	
	Embankment, rock	т3 т	5,384,400 24,700	6,00 70,00	32,306,400 1,729,000	
	Curtain Grouting Consolidation Grouting	na na	5,200	90.00	468,000	
	Others (10%)	L.S.			4,435,355	
	Subtotal					48,788,90
2.40	SPILLWAY					
	Excavation					
	Excavation, common	m3	105,800	3.50	370,300	
	Excavation, weathered rock Excavation, hard rock	m3 m3	148,600 564,000	6.00 10.00	891,600 5,640,000	
	Concrete	m3	31,800	140.00	4,452,000	
	Reinforcement bars Others (20%)	torn L.S.	950	1,500.00	1,425,000 2,555,780	
		L.G.			2,333,700	
	Subtotal					15,334,68
.50	WATERWAY					
.51	INTAKE		•			
	Excavation					
	Excavation common	m3	4,600	3.50	16,100	
	Excavation, weathered rock Excavation, hard rock	m3 m3	4,600 6,100	6.00 10.00	27,600 61,000	
	Concrete, open structure	m3	6,900	140.00	966,000	
	Reinforcement Others (20%)	ton L.S.	210	1,500.00	315,000 277,140	
		LA.			277,140	
	Subtotal					1,662,84
.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	16,500	55.00	907,500	
	Concrete, turnel	m3	5,250	160.00	840,000	
	Reinforcement	ton	55	1,500.00	82,500	
	Consolidation grout Curtain grout	m m	1,200 400	90.00 70.00	108,000 28,000	
	Backfill growt	m3	120	200.00	24,000	
	Others (20%)	L.S.			398,000	
	Subtotal					2,388,00
.54	PENSTOCK					
	Excavation, unnel	m3	7,900	55.00	434,500	
	Concrete,tunnel	m3	2,750	160.00	440,000	
	Reinforcement	ton	55 0	1,500.00	82,500 0	
	Curtain grout Backfill grout	m m3	110	70,00 200,00	22,000	
	Others (20%)	L.S.			195,800	
	Subtotal		:			1,174,80
60	open powerhouse					:
	Excavation Excavation, common	m3	12,300	3.50	43,050	
					•	

		Excavation, weathered rock	m3	12,300	6.00	73,800	
		Excavation hard rock	m3	16,400	10.00	164,000	
		Concrete, substructure	m3	11,700	250.00	2,925,000	
		Concrete, second stage	m3	3,000	140.00	420,000	
		Reinforcement	ton	760	1,500.00	1,140,000	. *
		Others (20%)	L.S			953,170	
		Subtotal					5,719,020
	2.70	TAILRACE					
		Excavation					
		Excavation common	m3	1,500	3.50	5,250	
		Excavation, weathered rock	m3	1,500	6.00	9,000	
		Excavation, hard rock	m3	2,500	10.00	25,000	
		Concrete, structure	m3	1,000	140.00	140,000	•
		Reinforcement	ton	30	1,500.00	45,000	•
	-	Others (20%)	L.S.			44,850	
	•	Subtoral					269,100
	2.80	ARCHITECTURAL BUILDINGS	m2	1,400	1,100.00	1,540,000	1,540,000
·	2.90	ACCESS ROAD					
		New construction	· km	0 -	600,000,000	0	
		Upgraded	km	79	50,000,00	3,950,000	
		Subtotal					3,950,000
	3.00	METAL WORKS					
		Penstock steel pipes	ton	510	5,000.00	2,550,000	
		Gates	ton	70	7,000.00	490,000	
		Subtotal				•	3,040,000
	4.00	GENERATING EQUIPMENT					
		Turbines	ton	260	18,700,00	4,862,000	
		Generators Transformers	ton.	400 · · · · · · · · · · · · · · · · · ·	20,400.00	8,160,000	
		1 mostomers	MVA	. "	4,300.00	331,100	
		Subtotal		,	•		13,353,100
	5.00	TRANSMISSION LINES AND SUBSTATIONS	km	2	46,000.00	92,000	92,000
		Total of Direct Cost					117,512,042
						•	
	6.00	LAND AQUISITION AND COMPENSATION	LS			. 0	5,875,602
	7.00	ADMINISTRATION EXPENSES	LS			0	1,175,120
	8.00	ENGINEERING SERVICES	LS			. 0	8,225,843
	9.00	PHYSICAL CONTINGENCY	LS			0	11,751,204
		GRAND TOTAL				144,539,811	144,539,811

Item No.	Work Item	Unit			nount C.(US\$)	
	DATE OF OTHER PARTY.	1.0				a 10/ 2
1,00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				8,406,3
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	14,600	3.50	51,100	
	Open excavation, weathered rock	m3	14,600	6.00	87,600	
	Open excavation hard rock Concrete	រាជិ	19,400	10.00	194,000	
	Mass concrete	m3	28,300	90.00	2,367,000	
	Reinforced cencrete	m3	67,600	140.00	9,464,000	
	Reinforcement bar	ton m	2,100 3,900	1,500.00 70.00	3,150,000 273,000	
	Curtain grouting  Consolidation grouting	ELT.	2,300	90.00	207,000	
	Others (20%)	L.S.			3,158,740	
	Subtotal					18,952,4
.40	DESANDING BASIN					
	Excavation tunnel	m3	156,900	55.00	8,629,500	
	Concrete, tunnel	m3	37,800	160.00	6,048,000	
	Reinforcement bars	ton	380	1,500.00	570,000	
	Others (20%)	L.S.			3,049,500	
	Subtotal					18,297,0
.50	WATERWAY					
2.51	INTAKE					
	Escavation					
	Excavation, common	m3	2,100	3.50	7,350	
	Excavation, weathered rock	m3	2,100	6,00	12,600	
	Excavation hard rock	m3 m3	2,800 3,100	10.00 140.00	28,000 434,000	
	Concrete, open structure Reinforcement	ton	90	1,500.00	135,000	
	Others (20%)	L.S.			123,390	
	Subtotal				•	740,3
.52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	220,700	55.00	12,138,500	
	Concrete, tunnel	m3	71,400	160.00	11,424,000	
	Reinforcement	ton	720	1,500.00	1,030,000	
	Consolidation grout	m	19,900 350	90.00 70.00	1,791,000 24,500	
	Curtain grout Backfill grout	m m3	1,600	200.00	320,000	
	Others (20%)	L.S.			5,355,600	
	Subtotal					32,133,6
.53	SURGE TANK					
	Excavation, shaft	m3	20,600	55,00	1,133,000	
	Concrete, shaft	m3	6,000	160.00	960,000	
	Reinforcement	ton	180	1,500.00	270,000	
	Consolidation grout Others (20%)	m L.S.	300	90.00	27,000 478,000	
		L.J.			470,000	
	Subtotal	•				2,868,0
.54	PENSTOCK		-			
	Excavation, tunnel	m3	12,000	55.00	660,000	
	Concrete,tunnel	m3	4,800	160.00	768,000	
	Reinforcement Curtain grout	ton . Th	100 380	1,500.00 70.00	150,000 21,000	
	Backfill grout	m3	150	200.00	30,000	
	Others (20%)	L.S.			325,800	
	Subtotal		•			1,954,8
60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	18,000	3.50	63,000	
	Excavation, weathered rock Excavation, hard rock	m3	18,000 24,000	6.00	108,000	
	PECSVSLING DATA FOCK	m3	24,000	10.00	240,000	
			17 100	240.00	4.275.000	
	Concrete, substructure Concrete, second stage	m3 m3	17,100 4,300	250.00 140.00	4,275,000 602,000	

		Others (20%)	L.S.			1,417,600		
		Subtotal					8,505,600	
	2.70	TAILRACE						
		Excavation						
		Bxcavation,common	m3	4,500	3.50	15,750		
		Excavation, weathered rock	m3	4,500	6.00	27,000		
		Excavation, hard rock	m3	6,800	10.00	68,000		
		Concrete, structure	m3	2,100	140.00	294,000		
		Reinforcement	Fort	70	1,500.00	105,000		
		Others (20%)	LS.		1,500.00	101,950		
		,						
		Sudiotal					611,700	
	2.80	ARCHITECTURAL BUILDINGS	m2	7,000	1,100.00	7,700,000	7,700,000	
٠.	2.90	ACCESS ROAD						
		New construction	m	162	600,000.00	97,200,000		
		Upgraded	m	79	50,000.00	3,950,000		
	•							
		Subtoral		•			101,150,000	
	3.00	METAL WORKS						
		Penstock steel pipes	ton	5,200	5,000.00	26,000,000		
		Gates	tor.	270	7,000.00	1,890,000		
•		Subtotal					27,890,000	
	4.00	GENERATING EQUIPMENT						
		Turbines	ton	850	18,700.00	15,895,000		
	-	Generators	ton	1,800	20,400.00	36,720,000		
		Transformers	MVA	193	3,400.00	656,200		
		Subtotal					53,271,200	
	5.00	TRANSMISSION LINES AND SUBSTATIONS	km	81	46,000.00	3,726,000	3,725,000	
		Total of Direct Cost					286,207,028	
	6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,862,070	
	7.00	ADMINISTRATION EXPENSES	LS			0	2,862,070	
	8.00	ENGINEERING SERVICES	LS			Đ	20,034,492	
	9.00	PHYSICAL CONTINGENCY	LS				28,620,703	
				••				
		GRAND TOTAL				340,586,363	340,586,363	

	Work Jiem	Unit		it price (US\$)	Amount F.C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				6,170,93
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
:.10	INTAKE DAM					
	Open Excavation					
	Open excavation common Open excavation, weathered rock	m3 m3	13,200 13,200	3.50 6.00	46,200 79,200	
	Open excavation,hard rock	ni3	17,600	10.00	176,000	
	Concrete		,,			
	Mass concrete	1213	24,500	90.00	2,205,000	
	Reinforced concrete	m3	52,900	140.00	8,806,000	
	Reinforcement bar Curtain grousing	ton m	1,900 3,600	1,500.00 70.00	2,850,000 252,000	
	Consolidation growing	113	2,300	90.00	207,000	
	Others (20%)	L.S.			2,924,280	
	Subtota!			*		17,545,6
.40	DESANDING BASIN					
	Excavation,tuncel	m3	104,600	55.00	5,753,000	
	Concrete, tunnel	m3	25,200	160.00	4,032,000	
	Reinforcement bars	ton	250	1,500.00	375,000	
	Others (20%)	L.S.			2,032,000	•
	Subtotal					12,192,0
2.50	WATERWAY					
2.51	INTAKE					
	Excavation					
	Excavation, common	m3	1,700	3.50	5,950	
	Excavation weathered rock	m3	1,700	6.00	10,200	
	Excavation hard rock Concrete, open structure	т3 m3	2,200 2,500	10.00 140.00	22,000 350,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			101,630	
	Subtotal					609,7
2.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	143,600	55.00	7,898,000	
	Concrete, tunnel	m3	48,100	160.00	7,696,000	
	Reinforcement	ton	480	1,500.00	720,000	
	Consolidation group	m m	16,000 300	90.00 70.00	1,440,000 21,000	
	Curtain grout  Backfill grout	m3	1,400	200.00	280,000	
	Others (20%)	L.S.	.,		3,611,000	
	Subtotal	÷				21,666,0
2.53	SURGE TANK					
2.53		m3	13,700	55.00	753,500	
2.53	SURGE TANK  Excavation, shaft Concrete, shaft	m3 m3	13,700 4,000	55.00 160.00	753,500 640,000	
2.53	Excavation, shaft Concrete, shaft Reinforcement	m3 ton	4,000 120	160.00 1,500.00	640,000 180,000	
2.53	Excavation, shaft Concrete, shaft	m3	4,000	160.00	640,000	
2.53	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout	m3 ton m	4,000 120	160.00 1,500.00	640,000 180,000 22,500	
	Excavation, shaft Concrete, shaft Reinforcement Consolidation growt Others (20%)	m3 ton m	4,000 120	160.00 1,500.00	640,000 180,000 22,500	
	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%) Subtotal PENSTOCK	m3 ton m L.S.	4,000 120 250	160.00 1,500.00 90.00	640,000 180,000 22,500 319,200	
	Excavation, shaft Concrete, shaft Reinforcement Consolidation growt Others (20%) Subtotal PENSTOCK Excavation, turned	m3 ton m L.S.	4,000 120 250 9,500	160.00 1,500.00 90.00	640,000 180,000 22,500 319,200	1,915,2
	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%) Subtotal PENSTOCK	m3 ton m L.S.	4,000 120 250	160.00 1,500.00 90.00	640,000 180,000 22,500 319,200 522,500 672,000	
	Excavation, shaft Concrete, shaft Reinforcemen Consolidation growt Others (20%) Subtotal PENSTOCK Excavation, turnel Concrete, turnel	m3 ton m L.S.	4,000 120 250 9,500 4,200 90 250	160.00 1,500.00 90.00 555.00 160.00 1,500.00 70.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500	
	Excavation, shaft Concrete, shaft Reinforcemen Consolidation grout Others (20%)  Subtotal PENSTOCK  Excavation, turnet Concrete, turnel Reinforcement	m3 ton m L.S. m3 ton	4,000 120 250 9,500 4,200 90	160.00 1,500.00 90.00 55.00 160.00 1,500.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000	
	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, turnel Concrete, turnel Reinforcement Cuttain grout Backfill grout	m3 ton m L.S. m3 ton m3 ton m3	4,000 120 250 9,500 4,200 90 250	160.00 1,500.00 90.00 555.00 160.00 1,500.00 70.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000	1,915,7
.54	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnel Concrete, tunnel Reinforcement Curtain grout Backfill grout Others (20%)	m3 ton m L.S. m3 ton m3 ton m3	4,000 120 250 9,500 4,200 90 250	160.00 1,500.00 90.00 555.00 160.00 1,500.00 70.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000	1,915,7
!.5 <b>4</b>	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnet Concrete, lumnel Reinforcement Cuttain grout Backfill grout Others (20%)	m3 ton m L.S. m3 ton m3 ton m3	4,000 120 250 9,500 4,200 90 250	160.00 1,500.00 90.00 555.00 160.00 1,500.00 70.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000	1,915,
2.54	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnel Concrete, tunnel Reinforcement Curtain grout Backfill grout Others (20%)  Subtotal  OPEN POWERHOUSE	m3 ton m L.S. m3 ton m3 ton m3	4,000 120 250 9,500 4,200 90 250	160.00 1,500.00 90.00 555.00 160.00 1,500.00 70.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000	1,915,
2.54	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnel Concrete, tunnel Reinforcement Cuttain grout Backfill grout Others (20%)  Subtotal  OPEN POWERHOUSE  Excavation Excavation, common Excavation, weathered rock	m3 ton m L.S.  m3 ton m m3 ton m3 L.S.	4,000 120 250 9,500 4,200 90 250 120	160.00 1,500.00 90.00 55.00 160.00 70.00 200.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000 274,200	1,915,
2.54	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnel Concrete, tunnel Reinforcement Cuttain grout Backfill grout Others (20%)  Subtotal  OPEN POWERHOUSE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton m L.S.  m3 ton m ton m L.S.	4,000 120 250 9,500 4,200 90 250 120 12,000 16,000	160.00 1,500.00 90.00 55.00 160.00 1,500.00 70.00 200.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000 274,200	1,915,7
2.54	Excavation, shaft Concrete, shaft Reinforcement Consolidation grout Others (20%)  Subtotal  PENSTOCK  Excavation, tunnel Concrete, tunnel Reinforcement Cuttain grout Backfill grout Others (20%)  Subtotal  OPEN POWERHOUSE  Excavation Excavation, common Excavation, weathered rock	m3 ton m L.S.  m3 ton m m3 ton m3 L.S.	4,000 120 250 9,500 4,200 90 250 120	160.00 1,500.00 90.00 55.00 160.00 70.00 200.00	640,000 180,000 22,500 319,200 522,500 672,000 135,000 17,500 24,000 274,200	

	Others (20%)	18.			936,000	
	Subtotal					5,616,000
2.70	TAILRACE					
	Excavation					
	Excavation common	m3	3,800	3.50	13,300	
	Excavation, weathered rock	m3	3,800	6.00	22,800	
					-	
	Excavation,hard rock	m3	5,500	10.00	55,000	
	Concrete, structure	m3	1,800	140.00	252,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	L.S.			86,620	
٠	Subtotal	*			•	519,720
	·		•			٠.
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD		•			٠,
	•					
	New construction	m	162	600,000.00	97,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal			٠.		101,150,000
3.00	METAL WORKS					:
	Penstock steel pipes	ton	4,000	5,000.00	20,000,000	
	Gates	ton	180	7,000.00	1,260,000	
	Subtotal				•	21,260,000
4.00	GENERATING EQUIPMENT					
4.00	OBMIGATION DOOR (MEAT)				1	
	Turbines	ton	600	18,700.00	11,220,000	
	Generators	ton	1,500	20,400.00	30,600,000	
	Transformers	MVA	129	3,800.00	490,200	
	Subtotal					42,310,200
					4	
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	81	46,000.00	3,726,000	3,726,000
	Total of Direct Cost					242,926,738
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,429,267
7.00	ADMINISTRATION EXPENSES	LS			0	2,429,267
8.00	ENGINEERING SERVICES	I.S			0	17,004,872
9.00	PHYSICAL CONTINGENCY	LS			0.	24,292,674
	GRAND TOTAL				289,082,818	289,082,818

ltem No.	Work Item	Unit			Amount C.C.(US\$)	
·			1.0	······································		
1.00	PREPARATORY WORKS (10 % of Civil Works)	1\$.				5,072,0
2.00	CIVIL WORKS					
					4	
10	INTAKE DAM				•	
	Open Excavation		11,800	3.50	41.200	•
	Open excavation, common Open excavation, weathered rock	m3 m3	11,800	6.00	41,300 70,800	
	Open excavation hard rock	m3	15,800	10.00	158,000	
	Concrete	_				
	Mass concrete Reinforced concrete	m3 m3	22,800 58,800	90.00 140.00	2,052,000 8,204,000	
	Reinforcement bar	ton	1,800	1,500.00	2,700,000	
	Custain grouting	m	3,400	70.00	238,000	
	Consolidation grouting	m	2,300	90.00	207,000	
	Others (20%)	L.S.			2,734,220	
	Subtotal					16,405,3
.40	DESANDING BASIN					
	Excavation,tunnel	m3	78,500	55.00	4,317,500	
	Concrete, tunnel	m3	18,900	160.00	3,024,000	
	Reinforcement bars	ton	190	1,500.00	285,000	
	Others (20%)	L.S.			1,525,300	
	Subtotal					9,151,8
2.50	WATERWAY					
2.51	INTAKE				•	
	Excavation					
	Excevation, common	m3	1,400	3.50	4,900	
	Excavation, weathered rock	m3	1,400	6.00	8,400	
	Excavation hard rock	m3	1,900	10.00	19,000	
	Concrete,open structure	m3	2,100 70	140.00 1,500.00	294,000 105,000	
	Reinforcement Others (20%)	ton L.S.	10	1,200.00	86,260	
	Subtotal				· .	517,5
2.52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	111,300	55.00	6,121,500	
	Concrete, tunnel Reinforcement	m3 10n	38,200 390	160.00 1,500.00	6,112,000 585,000	•
	Consolidation grout	m	14,000	90.00	1,260,000	
	Curtain grout	m	270	70.00	18,900	
	Backfill grout	m3	1,250	200.00	250,000	
	Others (20%)	L.S.			2,869,480	
	Subtotal				-	17,216,8
.53	SURGE TANK					
	Excavation, shaft	m3	10,300	55.00	566,500	
	Concrete, shaft	m3	3,000	160.00	480,000	
	Reinforcement	ton	90	1,509.00	135,000	
	Consolidation grout Others (20%)	m L.S.	200	90.00	18,000 239,900	
		2.3.			235,500	
	Subtotal					1,439,4
.54	PENSTOCK					
	Excavation,tunnel	m3	7,300	55.00	401,500	
	Concrete, tunnel	m3	3,600	160.00	576,000	1
	Reinforcement	ton m	70 200	1,500.00 70.00	105,000 14,000	
	Curtain grout  Backfill grout	m3	100	200.00	20,000	
	Others (20%)	L.S.			223,300	
	Subtoral					1,339,8
60	OPEN POWERHOUSE			.*		
	Excavation					
	Excavation, common	m3	9,000	3.50	31,500	
	Excavation, weathered rock	m3	9,000	6.00	54,000	
	Excavation, hard tock	m3	12,000	10.00	120,000	
			R KUD	250.00	11 1 EG AAA	
	Concrete, substructure  Concrete, second stage	m3 m3	8,600 2,200	140.00	2,150,000 308,000	

	Others (20%)	L.S.			703,700	
	Subtotal					4,222,200
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	3,000	3.50	10,500	
	Excavalion weathered rock	m3	3,000	6.00	18,000	
	Excavation, hard rock	m3	5,000	10.00	50,000	
	Concrete, structure	ın3	1,500	140.00	210,000	
	Reinforcement	ton	45	1,500.00	67,500	
	Others (20%)	L.S.			71,200	
	Subtotal					427,200
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	162	600,000.00	97,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					101,150,000
3.00	METAL WORKS			•		. *
	Penstock steel pipes	ton	2,900	5,000.00	14,500,000	
	Gates	ton	140	7,000.00	980,000	
	Subcoral					15,480,000
4.00	GENERATING EQUIPMENT		•			-
	Turbines	tou	480	18,700.00	8,976,000	
	Generators	ton	1,150	20,400.00	23,460,000	
	Transformers	MVA	97	4,100.00	397,700	
	Subtotal			•		32,833,700
5.00	TRANSMISSION LINES AND SUBSTATIONS	kon	81	46,000.00	3,726,000	3,726,000
	Total of Disect Cost					214,481,876
6.00	LAND AQUISITION AND COMPENSATION	1.8			o	2,144,819
7.00	ADMINISTRATION EXPENSES	LS			. 0	2,144,819
8.00	ENGINEERING SERVICES	1.8			ø	15,013,731
9.00	PHYSICAL CONTINGENCY	I.S			0	21,448,188
	GRAND TOTAL				255,233,432	255,233,432

liem No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	L.: <b>S.</b>			-	5,903,71
	(10 % of Civil Works)					
.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	13,800	3.50	48,300	
	Open excavation,weathered rock Open excavation,hard rock	m3 m3	13,800 18,400	10.00	82,800 184,000	
	Concrete  Concrete	ms	10,400	. 10.00	101,000	
	Mass concrete	m3	25,500	90.00	2,295,000	
	Reinforced concrete	m3	66,700	140.00	9,338,000	
	Reinforcement bar	ton	2,000	1,500.00	3,000,000	
	Curtain grouting	m m	2,900 2,300	70.00 90.00	203,000 207,000	
	Consolidation grouting Others (20%)	L.S.	2,000	90.00	3,071,620	
	Subtoral					18,429,7
.40	DESANDING BASIN					
	Excavation,tunnel	m3	127,100	55.00	6,990,500	
	Concrete, tunnel	m3	30,600	160.00	4,896,000	
	Reinforcement bars Others (20%)	ton L.S.	310	1,500.00	465,000 2,470,300	
	Sulvotal					14,821,8
2.50	WATERWAY		:			, .
2.51	INTAKE					
	Excavation			•		
	Excavation common	m3	1,900	3.50	6,650	* *
	Excavation weathered rock	m3	1,900	6.00	11,400	
	Excavation,hard took	m3	2,500	10.00	25,000	
	Concrete, open structure Reinforcement	m3	2,800 90	140.00 1,500.00	392,000 135,000	
	Others (20%)	ton L.S.		1,200.00	114,010	
٠	Subtotal					684,0
2.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	92,400	55.00	5,032,000	
	Concrete, tunnel	m3	30,400	160.00	4,864,000	
	Reinforcement	ton	310	1,500.00	465,000	
	Consolidation grout	m	9,200	90.00	828,000	
	Curisin grout	m m²	300 780	70.00 200.00	21,000 156,000	
	Backfill grout Others (20%)	m3 L.S.	100	200.00	2,283,200	
	Sublotal					13,699,2
.53	SURGE TANK					
	Excavation, shaft	m3	14,100	55.00	775,500	
	Concrete, shaft	m3	4,100	160.00	656,000	
	Reinforcement	ton	130	1,500.00	195,000	
	Consolidation grout Others (20%)	m L.S.	250	90.00	22,500 329,800	
	Subtotal					1,978,8
.54	PENSTOCK					
	Excavation,tunnel	m3	5,100	55.00	280,500	
	Concrete,turnet	m3	2,200	160.00	352,000	
	Reinforcement	ton	45	1,500.00	67,500	
	Curtain grout	m	250	70.00	17,500	
	Backfill grout Others (20%)	m3 L.S.	80	200.00	16,000 146,700	
	Subtotal		**			880,2
50	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	17,000	3.50	59,500	
	Excavation, weathered rock	m3	17,000	6.00	102,000	
	Excavation hard rock	ൻ3 m3	23,000 16,200	10.00 250.00	230,000 4,050,000	
	Concrete, substructure Concrete, second stage	m3	4,100	140.00	574,000	* * * *

	Others (20%)	18.			1,333,100		
	Subtotal					7,998,600	
2.70	TAILRACE						
	Excavation						
	Excavation, common	m3	4,000	3.50	14,000		
	Excavation, weathered rock	m3	4,000	6.00	24,000		
	Excavation, hard rock	m3	6,000	10.00	60,000		÷
	Concrete, structure	m3	1,900	140.00	266,000		
	Reinforcement	ton	60	1,500.00	90,000		
	Others (20%)	L.S.			90,800		
	Subtotal					544,800	
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000	
					-,,	1,000,000	
2.90	ACCESS ROAD						
	New construction	m	197	600,000.00	118,200,000		
	Upgraded	113	79	50,000.00	3,950,000		*
	Subtotal					122,150,000	
	Subbal					122,130,000	
3.00	METAL WORKS						
	Penstock steel pipes	ton	2,550	5,000.00	12,750,000		•
	Gates	100	220	7,000.00	1,540,000		
	Subtotal					14,290,000	
4.00	GENERATING EQUIPMENT						
	Turbines	ton	780	18,700.00	14,586,000		
	Generators	ton	1,800	20,400.00	36,720,000		
	Transformers	MVA	196	3,400.00	666,400		
					-		
	Subtotal					51,972,400	
5.00	TRANSMISSION LINES AND	km	. 100	46,000.00	4,600,000	4,600,000	
	SUBSTATIONS						
	Total of Direct Cost					264,553,298	
6.00	LAND AQUISITION AND COMPENSATION	LS				2,645,533	
7.00	ADMINISTRATION EXPENSES	LS			0	2,645,533	
8.00	ENGINEERING SERVICES	LS			0	18,518,731	
9.00	PHYSICAL CONTINGENCY	LS			0	26,455,330	
,,,,					•		
	GRAND TOTAL				314,818,425	314,818,425	

Item No.	Work Item	Unit			meunt .C.(US <b>\$</b> )	
1.00	PREPARATORY WORKS	L.S.				4,434,8
	(10 % of Civil Works)					
.00	CIVIL WORKS					
.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	12,500	3.50	43,750	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	12,500 16,600	6.00 10.00	75,000 166,000	
	Concrete				,	
	Mass concrete	m3	23,800	90.00	2,142,000	
	Reinforced concrete Reinforcement bar	m3 ton	82,100 1,900	140.00 1,500.00	8,694,000 2,850,000	
	Curtain grouting	m	3,800	70.00	252,000	
	Consolidation grouting	m	2,200	90.00	198,000	
	Others (20%)	L.S.			2,884,150	
	Subtotal					17,304,9
40	DESANDING BASIN				•	
	Excavation,tunnel	m3	84,800	55.00	4,664,000	
	Concrete, tunnel	m3	20,400	160.00	3,264,000	
	Reinforcement bars	ton	210	1,500.00	315,000	
	Others (20%)	L.S.			1,648,600	
	Subtota!				•	9,891,6
50	WATERWAY					
.51	INTAKE					
	Excavation					
	Excavation, common	m3	1,500	3.50	5,250	
	Excavation, weathered rock	m3	1,500	6.00	9,000	
	Excavation hard rock	m3	2,000 2,200	10.00 140.00	20,000 308,000	
	Concrete, open structure Reinforcement	m3 ton	2,200 65	1,500.00	97,500	
	Others (20%)	L.S.		-,	87,950	
	Subtotal					527,7
.52	HEADRACE TUNNEL					
		2	57 400	## PO	7 140 600	
	Excavation,turnel Concrete, tunnel	m3 m3	57,100 19,600	.55.00 160.00	3,140,500 3,136,000	
	Reinforcement	ton	200	1,500.00	300,000	
	Consolidation grout	m	7,200	90.00	648,000	
	Curtain grout	m m	250 700	70.00 200.00	17,500	
	Backfill grout Others (20%)	m3 L.S.	700	200.00	140,000 1,476,400	
	Subtotal					8,858,40
.53	SURGE TANK					
		_•	10.400	## OD	617.000	
	Excavation, shaft Concrete, shaft	m3 m3	9,400 2,800	55.00 160.00	517,000 448,000	
	Reinforcement	ten	80	1,500.00	120,000	
	Consolidation grout	m	200	90.00	18,000	
	Others (20%)	L.S.			220,600	
	Subtotal					1,323,60
.54	PENSTOCK					
	Excavation, tunnel	m3	3,900	55.00	214,500	
	Concrete, tunnel	m3	1,900	160.00	304,000	
	Reinforcement Curtain grout	ton m	40 200	1,500.00 70.00	60,000 14,000	
	Backfill grout	m3	60	200.00	12,000	
	Others (20%)	L.S.			. 120,900	
	Subtotal		•			725,4
50	OPEN POWERHOUSE		•			
	Excavation					
	Excavation common	m3	11,300	3.50	39,550	
	Excavation, weathered rock fixcavation, hard rock	m3 m3	11,300 15,100	6.00 10.00	67,800 151,000	
	Concrete, substructure	m3	10,800	250.00	2,700,000	
	Concrete, second stage	m3	2,700	140.00	378,000	
			700			

	Others (20%)	L.S.			877,270		
	Subtotal					5,263,620	
2.70	TAILRACE						
•	Excavation						
	Excavation, common	m3	3,200	3.50	11,200		
	Excavation, weathered rock	m3	3,200	6.00	19,200		
	Excavation hard rock	m3	4,800	10.00	48,000		
	Concrete, structure	m3	1,600	140.00	224,000		
	Reinforcement	ton	50	1,500.00	75,000		•
	Others (20%)	L.S.			75,480		
	Subtotal					452,880	
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000	
2.90	ACCESS ROAD	•					
	New construction	m	197	600,000.00	118,200,000		
	Upgraded	m	79	50,000.00	3,950,000		
	Subtotal					122,150,000	
3,00	METAL WORKS						
÷	Description and allows		1,800	5,000.00	9,000,000		
	Penstock steel pipes Gates	ton ton	1,800	7,000.00	1,015,000		
				7,000.00	1,010,000	•	
	Subtotal					10,015,000	
4.00	GENERATING EQUIPMENT						
•	Turbines	ton	580	18,700.00	10,472,000		
	Generators	ton	1,350	20,400.00	27,540,000		
	Transformers	MVA	130	3,800.00	494,000		
	Subtotal					38,506,000	
5.00	TRANSMISSION LINES AND SUBSTATIONS	km .	100	46,000.00	4,600,000	4,600,000	
	Total of Direct Cost					229,553,910	
6.00	LAND AQUISITION AND COMPENSATION	LS .			. 0	2,295,539	
0.00	ADMINISTRATION EXPENSES	LS			. 0	2,295,539	
7.00		2.3					
7.00 8.00		1.8			. 0	16.068.774	
8.00	ENGINEERING SERVICES	LS				16,069,774	
		ls Ls			0	16,068,774 22,955,391	
8.00	ENGINEERING SERVICES						

tem No.	Work Item	Unit			Amount F.C.(US\$)	
00 PF	REPARATORY WORKS	1S.				2 606 8
Pr	(10 % of Civil Works)	1.3.				3,685,8
.00 CI	VIL WORKS					
.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	11,200	3.50	39,200	
	Open excavation, weathered rock	m3	11,200	6.00	67,200	
	Open excavation, hard rock Concrete	m3	14,900	10.00	149,000	
	Mass concrete	m3	22,100	90.00	1,989,000	
	Reinforced concrete	m3	57,800	140.00	8,092,000	
	Reinforcement bar	ton	1,800	1,500.00	2,700,000	
	Curtain grounds	m	3,400	70.00	238,000	
	Consolidation growing	in L.S.	2,200	90.00	198,000 2,694,480	
	Others (20%)	L. <del>3</del> .			2,034,400	
	Subtotal					16,166,8
10	DESANDING BASIN					
	Excavation,tunnel	т3	63,600	55.00	3,498,000	
	Concrete, tunnel	m3	15,300	160.00	2,448,000	
	Reinforcement bars	ton	180	1,500.00	240,000	
	Others (20%)	L.S.			1,237,200	
	Subtotal					7,423,7
50	WATERWAY					
51	INTAKE					
	Excavation					
	Excavation common	m3	1,300	3.50	4,550	
	Excavation, weathered rock	m3	1,300	6.00	7,800	
	Excavation hard rock	m3	1,700	10.00	17,000	
	Concrete,open structure	m3	1,900	140.00	266,000	
	Reinforcement	ton	55	1,500.00	82,500	
	Others (20%)	L.S.			75,570	
	Subtotal					453,4
52	HEADRACE TUNNEL					
	Excavation, turnel	m3	42,600	55.00	2,343,000	
	Concrete, turnel	m3	15,200	160.00	2,432,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Consolidation grout	m	6,200	90.00	558,000	
	Curtain grout	m	200	70.00	14,000	
	Backfill grout	m3	650	200.00	130,000	
	Others (20%)	L.S.			1,140,400	
	Subtotal	•				6,842,
53	SURGE TANK					
	Excavation, shaft	£m	7,100	55.00	390,500	
	Concrete, shaft	m3	2,100	160.00	336,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Consolidation grout	m	150	90.00	13,500	
	Others (20%)	L.S.			166,000	•
	Subtotal					996,
54	PENSTOCK					
*	Excavation, tunnel	m3	3,300	55.00	181,500	
	Concrete,tunnel	m3	1,700	160.00	272,000	
	Reinforcement	ton	35	1,500.00	52,500	
	Curtain grout	m	150	70.00	10,500	
	Backfill grout Others (20%)	m3 L.S.	50	200.00	10,000 1 <i>0</i> 5,300	
		Long.			Marke	631,
	Subjects					031,
<b>60</b>	OPEN POWERHOUSE					
	Excavation  Excavation, common	т3	8,500	3.50	29,750	
	Excavation, weathered rock	m3	8,500	6.00	51,000	
	Excavation, hard rock	m3	11,300	10.00	113,000	
	Concrete, substructure	m3	8,100	250.00	2,025,000	
	Concrete, second stage	rn3	2,100	140,00	294,000	100
			530	1,500.00	795,000	

	Others (20%)	L.S.			661,550	
	Subtotal					3,969,300
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	2,900	3.50	10,150	
	Excavation weathered rock	m3	2,900	6.00	17,400	
	Excavation hard nock	m3	4,300	10.00	43,000	
	Concrete, structure	m3	1,300	140.00	182,000	
	•		40	1,500.00		
	Reinforcement Others (20%)	ton L.S.	40	1,500.00	60,000 62,510	
	Others (20%)	12.3.			02,310	
	Subtotal					375,060
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction		197	600,000.00	118,200,000	
		m 	79	50,000.00	3,950,000	
	Upgraded	m	73	30,000.00	3,930,000	
	Subtotal					122,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,450	5,000.00	7,250,000	
	Gates	ton	100	7,000.00	700,000	
	Gallis	****	100	7,000.00	700,000	
,	Subtotal					7,950,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	440	18,700.00	8,228,000	•
	Generators	ton	1,150	20,400.00	23,460,000	
	Transformers	MYA	98	4,100.00	401,800	
	11anstolaters	SIVA	30	4,100.00	401,000	
	Subtotal					32,089,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	100	46,000.00	4,600,000	4,600,000
	Total of Direct Cost					211,733,686
6.00	LAND AQUISITION AND COMPENSATION	LS			. 0	2,117,337
7.00	ADMINISTRATION EXPENSES	LS			ø	2,117,337
8.00	ENGINEERING SERVICES	LS			σ	14,821,357
9.00	PHYSICAL CONTINGENCY	LS		÷	, σ	21,173,367
	GRAND TOTAL				251,963,063	251,963,063

Item No.	Work Item	Unit			mount C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				6,671,850
	(10 % of Civit Works)					,
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	14,200	3.50	49,700	
	Open excavation, weathered rock	m3	14,200 19,000	6.00 10.00	85,200 190,000	
	Open excavation hard rock Concrete	m3	13,000	10.00	130,000	
	Mass concrete	m3	\$6,000	90.00	2,340,000	
	Reinforced concrete	m3	67,200	140.00	9,408,000	
	Reinforcement bar	ton	2,100 3,900	1,500.00 70.00	3,150,000	
	Curtain grouting Consolidation grouting	m m	2,300	90.00	273,000 207,000	
	Others (20%)	L.S.	2,0-2	24.12	3,140,580	
	Subtotat					18,843,480
2.40	DESANDING BASIN					
	Excession,tonnel	m3	143,100	55,00	7,870,500	
	Concrete, tunnel	m3	34,500	160.00	5 520,000	
	Reinforcement bars	ton	350	1,500.00	525,000	
	Others (20%)	L.S.			2,783,100	
	Subtotal					16,698,600
2.50	WATERWAY				•	
2.51	INTAKE					
	Excavation					
	Excavation common	т3	2,000	3.50	7,000	
	Excavation weathered rock	m3	2,000	6.00	12,000	
	Excavation, hard rock	m3	2,600	10.00	26,000	
	Concrete, open structure Reinforcement	m3 ton	3,000 90	140.00 1,500.00	420,000 135,000	
	Others (20%)	L.S.	-	1,300.00	120,000	
÷	Subtotal					720,000
2.52	HEADRACE TUNNEL				•	
	Excavation, tunnel	m3	142,300	55.00	7,826,500	
	Concrete, tunnel	m3	46,100	160.00	7,376,000	
	Reinforcement	toti	460	1,500.00	690,000	
	Consolidation grout	ni 	12,900 320	90.00 70.00	1,161,000 22,400	
•	Custain grout Backfill grout	m Fm	980	200.00	196,000	
	Others (20%)	L.S.	545		3,454,380	
	Subtotal					20,726,280
2.53	SURGE TANK					
		a	4£ 000	* C CO	024 000	-
•	Excavation, shaft Concrete, shaft	ങ3 m3	15,800 4,900	55.00 160.00	924,000 784,000	•
	Reinforcement	ton	150	1,500.00	225,000	
	Consolidation grout	m	300	90.00	27,000	
	Others (20%)	L.S.			392,000	
	Subtotal					2,352,000
2.54	PENSTOCK				·	
	Excavation, turnel	m3	7,300	55.00	401,500	
	Concrete, tunnel	m3	3,000	160.00	480,000	
	Reinforcement	ton	60 · 300	1,500.00 70.00	90,000 21,000	
	Curtain grout Beckfill grout	m m3	100	200.00	20,000	
	Others (20%)	L.S.			202,500	
	Subtotal					1,215,000
2.60	OPEN POWERHOUSE					
	Excavation		:			,
	Excavation, common	m3	12,100	3.50	42,350	
	Excavation, weathered rock	m3	12,100	6.00	72,600	
	Dan band					
	Excavation, hard rock Concrete, substructure	m3 m3	18,100 11,500	[0.00 250.00	161,000 2.875,000	
	Excavation, hard rock Concrete, substructure Concrete, second stage	m3 m3 m3	18,100 11,500 2,900	250.00 140.00	2,875,000 406,000	

		Others (20%)	1			936,390	
		Subtotal					5,618,340
	2.70	TAILRACE					
		Excavation					
		Excavation, common	m3	4,000	3.50	14,000	
		Excavation, weathered rock	m3	4,000	6.00	24,000	
		Excavation, hard rock	m3	6,000	10.00	60,000	
		Concrete, structure	т3	1,900	140.00	266,000	
		Reinforcement	ion	60	1,500.00	90,000	
		Others (20%)	L.S.			90,800	•
•		Subtotal					544,800
				•			•
	2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
<u>.</u>	2.90	ACCESS ROAD			•		
		New construction Upgraded	m m	174 79	600,000.00 50,000.00	104,400,000 3,950,000	
		Subtoral					108,350,000
•	3.00	MBTAL WORKS	•	•			
		Penstock steel pipes	ton	2,200	5,000.00	11,000,000	
		Gates	ton	240	7,000.00	1,680,000	
		Subtotal					12,680,000
•							12,000,000
	4.00	GENERATING EQUIPMENT		•			
		Turbines	ton	650	18,700.00	12,155,000	
		Generators	ten	1,350	20,400.00	27,540,000	
		Transformers	MVA	111	3,900.00	432,900	
•		Subtotal					40,127,900
		TRANSMISSION LINES AND SUBSTATIONS	km	88	46,000.00	4,048,000	4,048,000
		Total of Direct Cost					244,096,250
						•	
	6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,440,963
	7.00	ADMINISTRATION EXPENSES	LS			0	2,440,963
•	8.00	ENGINEERING SERVICES	LS			0	17,086,738
-	9.00	PHYSICAL CONTINGENCY	LS	12		0	24,409,625
		GRAND TOTAL				290,474,538	290,474,538

Item No.	Work Itan	Unit		nit price C.(USS)	Amount F.C.(US\$)	
		·····		(		
1.00	PREPARATORY WORKS	L.S.				4,988,99
	(10 4 of Civil Works)				•	
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	rs3	12,900	3.50		
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	12,900 17,200	6.00		
	Contrete					
	Mass concrete	m3	24,200	90.00	2,178,000	
	Reinforced concrete	m3	62,600	140.00		
	Reinforcement bar	ton	1,900	1,500.00		
	Curtain grouting	m m	3,600 2,300	70.00 90.00		
	Consolidation growling Others (20%)	L.S.	2,300	70.00	2,909,110	
						17.454.466
	Subtotal					17,454,660
2.40	DESANDING BASIN					
	Excavation,tunnel	m3	95,300	55.00	5,241,500	
	Concrete, tunnel	m3	23,000	160.00		
	Reinforcement bars	nol	230	1,500.00		
	Others (20%)	L.S.			1,853,300	
	Subtotat					11,119,800
2.50	WATERWAY					
2.51	INTAKE					
	Excavation					
	Excavation common	m3	1,600	3.50		
	Excavation, weathered rock Excavation, hard rock	m3 m3	1,600 2,100	6.00 10.00		
	Concrete,open structure	m3	2,400	140.00		
	Reinforcement	ton	70	1,500.00	105,000	
	Others (20%)	L.S.			95,440	
	Subtotal					572,640
2.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	92,600 31,000	55.00 160.00		
	Concrete, namel Reinforcement	m3 ton	310	1,500.00		
	Consolidation grout	m.	10,300	90.00		
	Curtain grout	m	300	70.00		
	Backfill grout	- m3	900	200.00		
	Others (20%)	L.\$.			2,329,200	
	Subtotal					13,975,200
2.53	SURGE TANK					
		_	. 44 500	***		
	Excavation, shaft Concrete, shaft	m3 m3	11,200 3,300	55.00 160.00		
	Reinforcement	ton	100	1,500.00		
	Consolidation grout	m	250	90.00		
	Others (20%)	L.S.			263,300	
	Subtotal	÷				1,579,800
2.54	PENSTOCK					
2.34			- **-			•
	Excavation,tunnel	m3	5,400	55.00		
	Concrete,tunnel Reinforcement	m3 ton	2,600 50	160.00 1,500.00		
	Conain grout	TO TO	250	70.00		
	Backfill grout	m3	90	200,00	18,000	1.
	Others (20%)	L.S.			164,700	
	Subtotal				· ·	988,200
2.60	OPEN POWERHOUSE			-		
	Excavation Excavation,common	gt3	8,100	3.50	28,350	
	Excavation, weathered rock	m3	8,100	6.00	and the second s	
	Excavation hard rock	rı3	10,700	10,00		
	Concrete, substructure	m3	7,700	250,00		
	Concrete, second stage	m3	2,000	140.00		
	Reinforcement	ton	500	1,500.00	750,000	

	Others (20%)	L.S.			627,790	•	
	Subtotal					3,766,740	
2.70	TAILRACE				•		
	Excavation						
			0.500	2.60	10.040		
	Excavation, common	m3	3,500	3.50	12,250		
	Excavation, weathered rock	m3	3,500	6.00	21,000		
	Excavation, hald rock	m3	5,000	16.00	50,000		
	Concrete, structure	m3	1,500	140.00	210,000		
•	Reinforcement	tòn	45	1,500.00	67,500		
	Others (20%)	L.S.			72,150		
	Subtotal					432,900	
					•		
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000	
		**	.,,,,,	-,,,,,,,,	-,,	.,,	
2.90	ACCESS ROAD						
	New construction	m	174	600,000.00	104,400,000		
	Upgraded	m	79	50,000.00	3,950,000		
	Subtotal					108,350,000	
	a comit Manua						
3.00	METAL WORKS						
	Penstock steel pipes	ton	1,500	5,000.00	7,500,000		
	Gates	. Ion	160	7,000.00	1,120,000		
	Subtotal					8,620,000	
4.00	GENERATING EQUIPMENT						
4.00	OBREKATING EQUIFMENT						
	Turbines	Ion	460	18,700.00	8,602,000		
	Generators	ton .	950	20,400.00	19,380,000		
٠	Teansformers	MVA	74	4,300.00	318,200		. *
	Subtotal					28,300,200	
							•
5.00	TRANSMISSION LINES AND	km	88	46,000.00	4,048,000	4,048,000	
	SUBSTATIONS						
	Total of Direct Cost					208,597,134	
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,085,971	
		•					
7.00	ADMINISTRATION EXPENSES	l.s			0	2,085,971	
8.00	ENGINEERING SERVICES	LS			0	14,601,799	
9.00	PHYSICAL CONTINGENCY	LS			. 0	20,859,713	•
			. * *			•	
	GRAND TOTAL				243,230,589	248,230,589	

Item No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				4,154,340
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation Open excavation common	m3	11,500	3.50	40,250	
	Open excavation, weathered rock	m3	11,500	6.00	69,000	
	Open excavation hard tock	m3	15,400	10.00	154,000	
	Concrete	_2	22 500		0.005.000	
	Mass concrete Reinforced concrete	m3 m3	22,500 58,300	90.00 140.00	2,025,000 8,162,000	
	Reinforcement bar	ton	1,800	1,500.00	2,700,000	
	Curtain growing	m	3,400	70.00	238,000	
	Consolidation growting Others (20%)	m L.S.	2,200	90.00	198,000 2,717,250	
	Subtotal				, .	16,303,500
2.40						10,000,000
2.40	DESANDING BASIN					
	Excavation turnel	m3	71,700	55.00	3,943,500	
	Concrete, tunnel Reinforcement bars	m3 ton	17,300 180	160.00 1,500.00	2,768,000 270,000	
	Others (20%)	L.S.		1,500,00	1,396,300	
	Subtotal					8,377,800
2.50	WATERWAY					
2.51	INTAKE					
• • • • • • • • • • • • • • • • • • • •			•			
	Excavation  Excavation, common	m3	1,400	3.50	4,900	
	Excavation, weathered rock	m3	1,400	6.00	8,400	
	Excavation, hard rock	m3	1,800	10.00	18,000	
	Concrete open structure Reinforcement	m3 ton	2,000 60	1,500.00	280,000 90,000	•
	Others (20%)	L.S.	•	1,500.00	80,260	
٠	Subtotal					481,560
2.52	HEADRACE TUNNEL					
<b>L</b> .32			7			
	Excavation tunnel Concrete, tunnel	m3 m3	71,800 24,600	55.00 160.00	3,949,000 3,936,000	
	Reinforcement	ton	250	1,500.00	375,000	
	Consolidation grout	m	9,000	90.00	810,000	
	Curtain grout	m	250	70.00	17,500	
	Backfill grout Others (20%)	m3 L.S.	. 800	200.00	1,849,500	
	Subtolal					11,097,000
2.53	SURGE TANK					11,000,000
4.33						
	Excavation, shaft Concrete, shaft	m3 m3	8,400 2,500	55.00 160.00	462,000 400,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Consolidation grout	TRI .	200	90.00	18,000	
	Others (20%)	L.S.			200,000	
	Subtotal					1,200,000
2.54	PENSTOCK					* -
	Excavation,tunnel	т3	4,600	55.00	253,000	
	Concrete, tunnel	m3	2,300	160.00	368,000	
	Reinforcement Curtain grout	ton ja	45 200	1,500.00 70.00	67,500 14,000	
	Backfill grout	m3	80	200.00	16,000	
	Others (20%)	L.S.			143,700	
	Subtotal			•	•	862,200
2.60	OPEN POWERHOUSE					
	Excavation		•			
	Excavation, common	m3	6,100	3.50	21,350	•
	Excavation, weathered rock Excavation, hard rock	m3 m3	8,100 8,100	6.00 : 10.00	38,600 81,000	
	Concrete, substructure	m3	5,800	250.00	1,450,000	
	Concrete, second stage	m3	1,500	140.00	210,000	
	22110, 4101 2240010 484				-	

	Others (20%)	L.S.			473,790	
	Subtotal	,				2,842,740
2.70	TAILRACE					
	Bacavation			-		
•	Excavation, common	m3	3,000	3.50	10,500	
	Excavation, weathered rock	m3	3,000	6.00	18,000	
	Excavation,hard rock	m3	4,500	10.00	45,000	*
	Concrete, structure	m3	1,300	140.00	182,000	
	Reinforcement	ton	40	1,500.00	60,000	4.7
	Others (20%)	L.S.			63,100	
	Subtotal					378,600
2.80	ARCHITECTURAL BUILDINGS	π2	3,500	1,100.00	3,850,000	3,859,000
2.90	ACCESS ROAD					
	New construction	m .	174	600,000.00	104,400,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					108,350,000
3.00	METAL WORKS		•			
	Penstock steel pipes Clates	ton ton	1,300 120	5,000.00 7,000.00	6,500,000 840,000	•
	Subtotel					7,340,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	360	18,700.00	6,732,000	
	Generators	ton ·	890	20,400.00	16,320,000	
	Transformers	MVA	55	4,600.00	253,000	
	Subtotal					23,305,600
5.00	TRANSMISSION LINES AND SUBSTATIONS	ken	88	46,000.00	4,048,000	4,048,000
	Total of Direct Cost					192,590,740
6.00	LAND AQUISITION AND COMPENSATION	LS			0	1,925,907
7.00	ADMINISTRATION EXPENSES	LS			0	1,925,907
8.00	ENGINEERING SERVICES	LS			. 0	13,481,352
9.00	PHYSICAL CONTINGENCY	LS		٠.	0	19,259,074
	4,					
	GRAND TOTAL				229,182,981	229,182,981

				B/Q of TR-4	(Draft Rate 0.33	3)	
em No.	Work Item	Unit	Quantity		Amount F.C.(US\$)		
00	PREPARATORY WORKS	L.S.				2,176,482	
	(10 % of Civil Works)						
00	CIVIL WORKS						
10	INTAKE DAM						
	Open Excavation Open excavation, common	m3	8,100	3.50	28,350		
	Open excavation, weathered rock	m3	8,100		48,600		
	Open excavation hard rock	m3	10,700	10.00	107,000		
	Concrete		14.000		1 200 000		
	Mass concrete Reinforced concrete	m3 m3	14,000 55,400		1,260,000 7,756,000		
	Reinforcement bar	ton	1,700		2,550,000		
	Curtain grouting	m	3,900		273,000		
	Consolidation grouting	m	1,700	90.00	153,000		
	Others (20%)	L.S.			2,435,190		
	Subtotal					14,611,140	
0	DESANDING BASIN						
	Excavation tunnel	m3	15,000	55.00	825,000		
	Concrete, tunnel	m3	4,100	160.00	656,000		
	Reinforcement bars	ton	40	1,500.00	60,000		
	Others (20%)	1\$.			308,200		
	Subtotal			•		1,849,200	
0	WATERWAY						
1	INTAKE						
	Promotion						•
	Excavation	ma	700	3.50	2,450		
	Excavation, common  Excavation, weathered rock	m3 m3	700	6.00	4,260		
	Excavation, hard rock	m3	900		9,000		
	Concrete,open structure	m3	1,000		140,000		
	Reinforcement	ten	30	1,500.00	45,000		
	Others (20%)	LS.			40,130		
	Subtotal					240,780	
2	HEADRACE TUNNEL						
	Excavation, tunnel	m3	21,600		1,188,000		
	Concrete, tunnel	m3	8,400		1,344,000		
	Reinforcement	ton m	40 100	-,	60,000 9.000		
	Consolidation grows Curtain growt	m m	130		9,000 9,100		
	Curtain grout  Backfill grout	m m3	50		10,000		
	Others (20%)	L.S.	-		524,020		
	Subtotal					3,144,120	
	HEAD POND						
	Excavation						
	Excavation common	m3 ·	1,500		5,250		
	Excavation, weathered rock	m3	1,500		9,000		
	Excavation, hard rock	m3	2,000 1,800		20,000 252,000		
	Concrete, open structure Reinforcement	m3 ten	1,800 55		252,000 82,500		
	Others (20%)	L.S.		-1-00-00	73,750		
	Subtotal					442,500	
	PENSTOCK						
	Excavation			•			
	Excavation, common	m3	2,800		9,800	•	
	Excavation, weathered rock	ra3	2,800		16,800		
	Excavation,hard took	m3	3,700		37,000		
	Concrete, open structure Reinforcement	m3 ton	2,900 45		406,000 67,500		
	Others (20%)	L.S.	43	,,200.00	107,420		
	Subural	ē				644,520	
	OPEN POWERHOUSE						•
	Excavation	:					
	Excavation, common	10·3	1,400		4,900		
	Excavation, weathered rock	m3	1,400	6.00	8,400		*
	Excavation,hard rock	m3	1,800	10.00	18,000		

	Concrete, substructure	p13	1,300	250.00	325,000	
	Concrete, second stage :	m3	350	140.00	49,000	
	Reinforcement	ton	90	1,500.00	135,000	
	Others (20%)	L.S.			108,060	
	Subtotal					648,360
2.70	TAILRACE				•	
	Excavation					
	Excavation common	m3	1,000	3.50	3,500	
	Excavation, weathered rock	m3	1,000	6.00	6,000	
	Excavation hard rock	m3	1,600	10.00	16,000	
	Concrete, structure	m3	700	140.00	98,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.	•	•	30,700	
	Subtotal	•				184,200
2.80	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000
						-, .,
2.90	ACCESS ROAD					
	New construction	m	20	600,000.00	12,000,000	
	Upgraded	m	0	50,000.00	0	*
	Subtotal					12,000,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	400	5,000.00	2,000,000	
	Gates	ton	30	7,000.00	210,000	
	Subtotal			1.		2,210,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	90	18,700.00	1,683,000	
	Generators	ton	249	20,400.00	4,896,000	
	Transformers	MVA	11	6,100.00	67,100	
	Subtotal					6,646,100
5.00	TRANSMISSION LINES AND SUBSTATIONS	kni	148	46,000.00	6,808,000	6,808,000
	Total of Direct Cost					54,355,402
6.00	LAND AQUISITION AND COMPENSATION	LS			0	543,554
7.00	ADMINISTRATION EXPENSES	LS		÷	0	543,554
8.00	ENGINEERING SERVICES	is				3,804,878
9.00	PHYSICAL CONTINGENCY	LS			0	5,435,540
	GRAND TOTAL		•		64,682,928	64,682,928
						,,-

	ARATORY WORKS (10 % of Civil Works)  WORKS  INTAKE DAM  Open Excavation Open excavation, common Open excavation, weathered rock Open excavation, hard rock Concrete Mass concrete Reinforced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	n.S. m3 m3 m3 ton n.S. m3 m3 ton L.S.	7,300 7,300 9,700 13,100 50,800 1,550 3,600 1,700  10,000 2,700 30	3.50 6.00 10.00 90.00 140.00 1,500.00 70.00 90.00	25,550 43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000 205,400	1,947,85 13,424,85 1,232,40
2.40 CIVIL 2.40	(10 % of Civil Works)  WORKS  INTAKE DAM  Open Excavation Open excavation, common Open excavation, weathered rock Open excavation, hard took Concrete Mass concrete Reinforced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 m3 ton m is. m3 ton L.s.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	6.00 10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	13,424,87
2.40	Open Excavation Open excavation, common Open excavation, common Open excavation, deathered rock Open excavation, hard rock Concrete Mass concrete Reinfocced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%) Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%) Subtotal  WATERWAY INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 ton m is.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	6.00 10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	
.50	Open Excavation Open excavation, common Open excavation, weathered rock Open excavation, hard tock Concrete Mass concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, ommon Excavation, weathered rock Excavation, hard rock	m3 m3 ton m is.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	6.00 10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	
.50	Open excavation, common Open excavation, weathered rock Open excavation, hard rock Concrete Mass concrete Reinfocced concrete Reinfocced concrete Reinfocced prouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 ton m is.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	6.00 10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	
50	Open excavation, common Open excavation, weathered rock Open excavation, hard rock Concrete Mass concrete Reinfocced concrete Reinfocced concrete Reinfocced prouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 ton m is.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	6.00 10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	43,800 97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	
50	Open excavation, weathered rock Open excavation, hard rock Concrete Mass concrete Reinfocced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 ton m in.s.	7,300 9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	10.00 90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	97,000 1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 45,000	
50	Open excavation, hard took Concrete Mass concrete Reinforced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%) Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%) Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton m in i.s.  m3 ton L.s.	9,700 13,100 50,800 1,550 3,600 1,700 10,000 2,700 30	90.00 140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	1,179,000 7,112,000 2,325,000 252,000 153,000 2,237,470 550,000 452,000 45,000	
50	Mass concrete Reinfocced concrete Reinfoccement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 m3 ton L.S.	50,800 1,550 3,600 1,700 10,000 2,700 30	140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	7,112,000 2,325,000 252,000 153,600 2,237,470 550,000 432,000 45,000	
50	Reinfocced concrete Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 m3 ton L.S.	50,800 1,550 3,600 1,700 10,000 2,700 30	140.00 1,500.00 70.00 90.00 55.00 160.00 1,500.00	7,112,000 2,325,000 252,000 153,600 2,237,470 550,000 432,000 45,000	
50	Reinforcement bar Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m m is. m3 m3 ton i.s.	1,550 3,600 1,700 10,000 2,700 30	1,500.00 70,00 90.00 55.00 160.00 1,500.00	2,325,000 252,000 153,000 2,237,470 550,000 432,000 45,000	
50	Curtain grouting Consolidation grouting Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m 1S. m3 m3 ton 1S.	3,600 1,700 10,000 2,700 30	70.00 50.00 55.00 160.00 1,500.00	252,000 153,000 2,237,470 550,000 432,000 45,000	
50	Consolidation growing Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m 1s. m3 m3 ton L.s.	1,700 10,000 2,700 30	55.00 160.00 1,500.00	153,600 2,237,470 550,000 432,600 45,000	
o	Others (20%)  Subtotal  DESANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3 ton L.S. m3 m3	10.000 2,700 30	55,00 160,00 1,500,00	2,237,470 550,000 432,000 45,000	
o	Subtotal  DES ANDING BASIN  Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton L.S. m3 m3	2,700 30	160.00 1,500.00	550,000 432,000 45,000	
ю	DESANDING BASIN  Excavation, numel Concrete, tunnel Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton L.S. m3 m3	2,700 30	160.00 1,500.00	432,000 45,000	
ю	Excavation, tunnel Concrete, tunnel Reinforcement bars Others (20%) Subtotal WATERWAY INTAKE Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton L.S. m3 m3	2,700 30	160.00 1,500.00	432,000 45,000	1,232,4
	Concrete, tunnel Reinforcement bars Others (20%) Subtotal WATERWAY INTAKE Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3 ton L.S. m3 m3	2,700 30	160.00 1,500.00	432,000 45,000	1,232,46
	Reinforcement bars Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation  Excavation, common  Excavation, weathered rock  Excavation, hard rock	ton L.S. m3 m3	30 600	1,500.00	45,000	1,232,4
	Others (20%)  Subtotal  WATERWAY  INTAKE  Excavation  Excavation, common  Excavation, weathered rock  Excavation, hard rock	L.S.  m3 m3	600			1,232,4
	Subtotal  WATERWAY  INTAKE  Excavation  Excavation, common  Excavation, weathered rock  Excavation, hard rock	113 113		3.50	203,400	1,232,4
	WATERWAY INTAKE  Excavation Excavation,common Excavation,weathered rock Excavation,hard rock	m3		3.50		1,232,4
	INTAKE  Excavation  Excavation,common  Excavation,weathered rock  Excavation,hard rock	m3		3.50	·	
	Excavation Excavation, common Excavation, weathered rock Excavation, hard rock	m3		3.50	•	
	Excavation, common Excavation, weathered rock Excavation, hard rock	m3		3.50		
·	Excavation, common Excavation, weathered rock Excavation, hard rock	m3		3.50		
·	Excavation, weathered rock Excavation, hard rock	m3		3.30	2,100	
·	Excavation hard rock			6.00	3,600	
			750	10.00	7,500	
	Concrete open structure	m3	850	140.00	119,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.		•	33,940	
	Subtotal					203,6
52	HEADRACE TUNNEL			•		
	Excavation turnel	m3	21,600	55.00	1,188,000	
	Concrete, tunnel	m3	8,400	160.00	1,344,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout	Th	100	90.00	9,000	
	Curtain grout	m	130	70.00	9,100	
	Backfell grout Others (20%)	ms L.S.	50	200,00	10,000 524,020	
	Subtotal	~~.				3,144,1
						5,144,0
3	HEAD POND					
	Excavation,common	m3	. 1,200	3.50	4,200	
	Excavation, weathered rock	m3	1,200	6.00	7,200	
	Excavation, hard rock	ne3	1,550	10.00	15,500	
	Concrete, open structure	m3	1,400	140.00	196,000	
	Reinforcement	ton	45	1,500.00	67,500	
	Others (20%)	L.S.		•	58,080	
	Subtotal					348.4
4	PENSTOCK					
	Excavation					:
	Excavation, common	m3	2,500	3.50	8,750	
	Excavation, weathered rock	m3	2,500	6.00	15,000	
	Excavation,hard rock	m3	3,400	10.00	34,000	
	Concrete, open structure	m3	2,500	140.00	350,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.			93,550	
	Subtotal					561,3
,	OPEN POWERHOUSE					
	Excavation Excavation, common	m3	900	3.50	3,150	
	Excavation, weathered rock	m3	900	6.00	5,400	
•	Excavation,hard rock	m3	1,200	10.00	12,000	

	Concrete, substructure	m3	850	250.00	212,500	
	Concrete, second stage	m3	250	140.00	35,000	
	Reinforcement	ton	55	1,500.00	82,500	
	Others (20%)	L.S.			70,110	
	Subtotal					420,660
2.70	TAILRACE					-
-	Excavation					
	Excavation common	m3	800	3,50	2,800	
	Excavation, weathered rock	m3	800	6.00	4,800	•
	Excavation hard rock	m3	1,200	10.00	12,000	
	Concrete, structure	m3	500	140.00	70,000	
	Reinforcement	ton	20	1,500,00	30,000	
	Others (20%)	L.S.			23,920	
	Subtotal					143,520
2.80	ARCHITECTURAL BUILDINGS	m2	2,000	1,100.00	2,200,000	2,200,000
2.90	ACCESS ROAD					
5.70	ACCESS NOAD					
	New construction	m	20	600,000.00	12,000,000	
	Upgraded	m	0	50,000.00	0	
	Subtotal					12,000,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	320	5,000.00	1,600,000	
	Gates	ton	30	7,000.00	210,000	
	Subtotal					1,810,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	65	18,700.00	1,215,500	
	Generators	ton	180	20,400.00	3,672,000	
	Transformers	MVA	7	6,500.00	45,500	
	Subtotal					4,933,000
5.00	TRANSMISSION LINES AND	km	148	46,000.00	6,808,000	6,808,000
	SUBSTATIONS				-,	.,
	Total of Direct Cost		÷			49,177,834
6.00	LAND AQUISITION AND COMPENSATION	LS			0	491,778
7.00	ADMINISTRATION EXPENSES	LS			. 0	491,778
8.00	ENGINEERING SERVICES	LS			0	3,442,448
9.00	PHYSICAL CONTINGENCY	LS			. 0	4,917,783
	GRAND TOTAL				58,521,622	58,521,622

hem No	Work hem	Unit			nount C.(US\$)	
.00	DDED AD ATODY WODE	L.S.				1,778,07
1.00	PREPARATORY WORKS (10 % of Civil Works)	<b>L</b> .3.				1,778,07
2.00	CIAIT MOSKZ					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation common	m3	8,500	3.50	22,750	
	Open excavation, weathered rock Open excavation, hard tock Concrete	m3 m3	6,500 8,700	6.00 10.00	39,000 87,000	
	Mass concrete	m3	12,200	90.00	1,098,000	
	Reinforced concrete	m3	46,500	140.00	6,510,000	
	Reinforcement bar Curtain grouting	10/1 m	1,400 3,400	1,500.00 70.00	2,100,000 238,000	
	Consolidation growling	m	1,700	90.00	153,000	
	Others (20%)	L.S.			2,049,550	
	Subtotal		,			12,297,30
2.40	DESANDING BASIN					
	Excavation,tunnel	m3	7,500	55.00	412,500	
	Concrete, tunnel	m3	2,100	160.00	336,000	
	Reinforcement bars Others (20%)	n L.S.	20	1,500.00	30,000 155,700	
		4.3.			133,700	
	Subtoial					934,20
2.50	WATERWAY			-		
2.51	INTAKE					
	Excavation	_3	500	2.60	1 460	
	Bxcavation,common Excavation,weathered rock	m3 m3	500 500	3.50 6.00	1,750 . 3,000	
	Excavation hard rock	m3	650	10.00	6,500	
	Concrete, open structure	m3	700	140.00	98,000	
	Reinforcement Others (20%)	ton L.S.	20	1,500.00	30,000 27,850	
	Subtotal					167,10
2.52	HEADRACE TUNNEL					
	Excavation tunnel	m3	21,600	55.00	1,188,000	
	Concrete, turnel	m3	8,400	160.00	1,344,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout Curtain grous	m m	100 130	90.00 70.00	9,000 9,100	
	Backfill grout	m3	50	200.00	10,000	
	Others (20%)	L.S.			524,020	
	Subtotal					3,144,17
.53	HEAD POND				·	. *
	Excavation	2	950	2.60	2 22 6	
	Excavation, common  Excavation, weathered rock	m3 m3	950 950	3.50 6.00	3,325 5,700	
	Excavation,hard rock	m3	1,250	10.00	12,500	
	Concrete, open structure	m3	1,300	140.00	182,000	
	Reinforcement Others (20%)	ton L.S.	40	1,500.00	60,000 52,705	
	Subtotal					316,2
.54	PENSTOCK					
	Excavation				•	
	Excavation, common	m3	2,300	3.50	8,050	
	Excavation, weathered rock	m3	2,300	6.00	13,800	
	Excavation hard rock Concrete, open structure	m3 m3	3,100 2,100	10.00 140.00	31,000 294,000	
	Reinforcement	ton	35	1,500.00	52,500	
	Others (20%)	L.S.			79,870	
	Subtotal		* *			479,2
60	OPEN POWERHOUSE	•				
	Excavation  Excavation,common	m3	700	3.50	2,450	
	Excavation, common  Excavation, weathered rock	m3 ma	700 700	6.00	2,450 4,200	
					· •- • •	

	Concrete, substructure	m3	650	250.00	162,500	
	Concrete, second stage	m3	200	140.00	28,000	
	Reinforcement	ton	45	1,500.00	67,500	
	Others (20%)	L.S.	v +		54,730	
	Subtotal			•		328,380
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	700	3.50	2,450	
	Excavation, weathered rock	m3	700	6.00	4,200	
	Excavation hard rock	m3	1,000	10.00	10,000	
	Concrete, structure	m3	400	140.00	56,000	
	Reinforcement	ton	15	1,500.00	22,500	
-	Others (20%)	L.S.			19,030	
	Subtotal				•	114,180
2.80	ARCHITECTURAL BUILDINGS	m2	1,500	1,100.00	1,650,000	1,650,000
2.90	ACCESS ROAD					
	New construction	m	20	600,000.00	12,000,000	
	Upgraded	m	. 0	50,000.00	0	
	Subtotal				•	12,000,000
						12,000,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	230	5,000.00	1,150,000	
	Gates	ton	15	7,000.00	105,000	
	Subtotal					1,255,000
4.00	GENERATING EQUIPMENT				÷*	
	Turbines	ton	50	18,700.00	935,000	
	Generators	ton	150	20,400.00	3,060,000	
	Transformers	MVA	5	6,750.00	40,500	
	Subtotal					4,035,500
					-	
5.00	TRANSMISSION LINES AND SUBSTATIONS	kan	148	46,000.00	6,808,000	6,808,000
	Total of Direct Cost					45,307,303
						-
6.00	LAND AQUISITION AND COMPENSATION	LS			0	453,073
7.00	ADMINISTRATION EXPENSES	LS			0	453,073
8.00	ENGINEERING SERVICES	LS	**	**	. 0	3,171,511
9.00	PHYSICAL CONTINGENCY	LS			0	4,530,730
	GRAND TOTAL				53,915,691	53,915,691

Item No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	18.				6,736,91
	(10 % of Civil Works)				-	
2.00	CIVIL WORKS					
.10	INTAKE DAM					
	Open Excavation	•	47 000	1.50	(2.550	
	Open excavation, common Open excavation, weathered rock	m3 เก3	17,900 17,900	3.50 6.00	62,650 107,400	
	Open excavation, hard rock	m3	23,900	10.00	239,000	
	Concrete					
	Mass concrete	m3	31,700	90.00	2,853,000	
	Reinforced concrete	m3 ton	72,400 2,200	140.00 1,500.00	10,136,000 3,300,000	
	Reinforcement bar Curtain grouting	m	3,900	70.00	273,000	
	Consolidation grouting	m	2,600	90.00	234,000	
	Others (20%)	L.S.			3,441,010	
	Subtotal					20,646,0
.40	DESANDING BASIN					
	Excavation, tunnel	m3	143,700	55.00	7,903,500	
	Concrete, tunnel	m3	34,600	160.00	5,536,000	•
	Reinforcement bars Others (20%)	ton L.S.	350	1,500.00	525,000 2,793,900	
	Subtotal					16,757,40
.50	WATERWAY					
.51	INTAKE				•	
	Excavation					
	Excavation, common	m3	2,000	3.50	7,000	
	Excavation, weathered rock	m3	2,000	6.00	12,000	
	Excavation,hard rock	m3	2,600	!0.00	26,000	
	Concrete, open structure Reinforcement	m3 ton	2,900 90	140.00 1,500.00	406,900 135,000	
	Others (20%)	L.S.		Manage	117,200	
	Subtotal					703,20
:.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	133,900	55.00	7,364,500	
	Concrete, tunnel	m3	44,000	160.00	7,040,000	
	Reinforcement  Consolioation grout	ton m	440 13,400	1,500.00 90.00	660,000 1,206,000	
	Curtain grout	m	300	70.00	21,000	
	Backfill grout	m3	1,150	200.00	230,000	
	Others (20%)	L.S.			3,304,300	
	Subtotal					19,825,8
.53	SURGE TANK					
	Escavation, shaft	m3	17,500	55.00	962,500	
	Concrete, shaft	m3	5,100	160.00	816,000	
	Reinforcement	ton n	- 150 300	1,500.00 90.00	225,000 27,000	
	Consolidation grout Others (20%)	L.S.	500	34.00	406,100	
	Subtotal					2,436.6
54	PENSTOCK	**				
	Excavation,tunnel	m3	8,400	55.00	462,000	
	Concrete, tunnel	m3	3,400	160.00	544,000	
	Reinforcement	tou	70 300	1,500.00 70.00	105,000 21,000	
	Curtain grout Backfill grout	nt m3	110	200.00	22,000	
	Others (20%)	L.S.	,		230,800	
	Subtotal				:	1,384,8
60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	11,000	3.50	38,500	
	Excavation, weathered rock Excavation, hard rock	ជា3 m3	11,000 14,600	6.00 10.00	66,000 146,000	
	Concrete, substructure	m3	10,400	250.00	2,600,000	
	Concrete, second stage	m3	2,600	140.00	364,000	
	Reinforcement	ton	680	1,500.00	1,020,000	
		- 132				

	Others (20%)	L.S.			846,900	
	Subtotal					5,081,400
2.70	TAILRACE					
	Excavation				:	
	Excavation common	m3	4,200	3.50	14,700	
	Bacavation weathered rock	m3	4,200	6.00	25,200	
	Excavation, hard rock	m3	6,300	10.00	63,000	
	Concrete, structure	m3	1,800	140.00	252,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	. L.S.			88,980	
	Subtotal				•	533,880
				±*		
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	177	600,000.00	106,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					110,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,900	5,000.00	9,500,000	
	Gates	ton	200	7,000.00	1,400,000	
	Subtotal					10,900,000
4.00	GENERATING EQUIPMENT					•
	Turbines	ton	500	18,700.00	9,350,000	
	Generators	ton	930	20,400.00	18,972,000	
	Transformers	MVA	96	4,100.00	393,600	
	Subtotal					28,715,600
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	156	46,000.00	7,176,000	7,176,000
	Total of Direct Cost					237,647,654
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,376,477
7.00	ADMINISTRATION EXPENSES	LS			0	2,376,477
8.00	ENGINEERING SERVICES	LS			0	16,635,336
9.00	PHYSICAL CONTINGENCY	LS			0	23,764,765
	GRAND TOTAL				282,800,703	282,800,708
	Olivaria rosta				_32,000,00	2021000,100

Item No.	Work Item	Unit			mount C.C.(US\$)	
						ć ana do
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.Ş.				5,374,70
2.00	CIVII. WORKS					•
2.10	INTAKE DAM					
	Open Excavetion					
	Open excavation, common	m3	16,200	3.50	56,700	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	16,200 21,600	6.00 10.00	97,200 216,000	
	Concrete	,				
	Mass concrete	m3	29,600	90.00	2,664,000	
	Reinforced concrete	m3 ten	67,800 2,050	140.00 1,500.00	9,492,000 3,075,000	
	Reinforcement bar Curtain grouting	m	3,600	70.00	252,000	
	Consolidation grouting	m	2,600	90.00	234,000	
	Others (20%)	L.S.			3,217,380	
	Subtotal					19,304,28
.40	DESANDING BASIN					
	Excavation,tunnel	m3	95,900	55.00	5,274,500	
	Concrete, tunnel	m3	23,100	160.00	3,696,000	
	Reinforcement bars	ton	230	1,500.00	345,000	
	Others (20%)	L.S.			1,863,100	
	Subtotal					11,178,60
.50	WATERWAY					
.51	INTAKE					
	Excavation					
	Excavation, common	· m3	1,600	3.50	5,600	
	Excavation, weathered rock	m3	1,600	6.00	9,600	
	Excavation,hard rock	m3 3	2,100 2,400	10.00 140.00	21,000 336,000	
	Concrete, open structure Reinforcement	m3 ton	70	1,500.00	105,000	
	Others (20%)	L.S.			95,440	
	Subtotal				•	572,6
.52	HEADRACE TUNNEL					
	<b>.</b>	2	100 900	£5.00	5021000	
	Excavation,tunnel Concrete, tunnel	m3 m3	106,800 35,800	55.00 160.00	5,874,000 5,728,000	
	Reinforcement	ton	360	1,500.00	540,000	
	Consolidation grout	m	11,900	90.00	1,071,000	
	Curtain grout	m	250	70.00	17,500	
	Backfill grout	m3	1,050	200.00	210,000 2,688,100	
	Others (20%)	L.S.			2,000,100	
	Subtotal					16,128,6
53	SURGE TANK					
	Excavation, shaft	m3	11,700	55.00	643,500	
	Concrete, shaft	m3	3,400 100	160.00	544,000 150,000	
	Reinforcement  Consolidation grout	ton m	250	1,500.00 90.00	150,000 22,500	
	Others (20%)	L.S.			272,000	
	Subtotal				•	1,632,0
54	PENSTOCK					
	Excavation,tunnel	m3	6,000	55.00	330,000	
	Concrete, tunnel	m3	2,800	160.00	448,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Curtain grout  Backfill grout	m m3	250 100	70.00 200.00	17,500 20,000	
	Others (20%)	L.S.		200.00	181,100	
	Subtotal		**			1,086,6
60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	7,300	3.50	25,550	
	Excavation, weathered rock	m3	7,300 9,800	6.00	43,800	
	Excavation, hard rock Concrete, substructure	m3 m3	9,800 7,000	10.00 250.00	98,000 1,750,000	
		m3	1,700	140.00	238,000	
	Concrete, second stage					

	Others (20%)	L.S.			566,070	
	Subtoral					3,396,420
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	3,500	3.50	12,250	
	Excavation, weathered rock	m3	3,500	6.00	21,000	
	Excavation, hard rock	m3	5,500	10.00	55,000	
	Concrete, structure	<b>ខា</b> 3	1,500	140.00	210,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Others (20%)	1\$.			74,650	
	Subtotal		•			447,900
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	Managarantan		4	con oco c=	101 000 000	
	New construction	m	177	600,000.00	106,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal		•			110,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,250	5,000.00	6,250,000	
	Gates	ton	130	7,000.00	910,000	
			100	.,	310,000	
	Subsolut					7,160,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	360	18,700.00	6,732,000	
	Generators	ton	720	20,400.00	14,688,000	
	Transformers	MVA	64	4.500.00	288,000	
	Subtotal					21,708,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	156	46,000.00	7,176,000	7,176,000
	Total of Direct Cost					210,815,744
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,108,157
7.00	ADMINISTRATION EXPENSES	LS			0.	2,108,157
8.00	ENGINEERING SERVICES	LS			0	14,757,102
9.00	PHYSICAL CONTINGENCY	LS	•		0	21,081,574
	GRAND TOTAL				250,870,735	250,870,735

ltem No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	ts.				4,488,56
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation common	m3	14,500	3.50	50,750	
	Open excavation, weathered rock	m3	14,500	6.00	87,000	
	Open excavation, hard rock	m3	19,400	10.00	194,000	
	Concrete Mass concrete	m3	27,500	90.00	2,475,000	
	Reinforced concrete	m3	63,500	140.00	8,890,000	
	Reinforcement bas	ten	1,900	1,500.00	2,850,000	
	Curtain grouting	m	3,400	70,00	238,000	
	Consolidation grouting	m	2,500	90.00	225,000	
	Others (20%)	L.S.			3,001,950	
	Subtotal					18,011,70
40	DESANDING BASIN				-	1.1
	Excavation tunnel	m3	72,000	\$5,00	3,960,000	
	Concrete, tannel	m3	17,400	160.00	2,784,000	
	Reinforcement bars	ten	180	1,500.00	270,000	
	Others (20%)	L.S.			1,402,800	
	Subtotal	*				8,416,80
50	WATERWAY					
51	INTAKE		•			
	Form size				•	
	Excavation	m3	1,400	3.50	4,900	
	Excavation common  Excavation, weathered rock	m3	1,400	6.00	8,400	
	Excavation, hard rock	- m3	1,800	10.00	18,000	
	Concrete, open structure	m3	2,000	140.00	289,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	L.S.			80,260	
	Subtotal					481,56
.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	82,800	55.00	4,554,000	
	Concrete, turnel	rn3	28,400	160.00	4,544,000	
	Reinforcement	ton	290	1,500.00	435,000	
	Consolidation grout	m	10,400	90.00	936,000	
	Curtain grout	EN	200	70.00	14,000	
	Backfill growt	m3	950	200.00	190,000	
	Others (20%)	L.S.			2,134,600	
	Subtotal					12,807,60
53	SURGE TANK					•
	Excavation, shaft	m3	8,800	55.00	484,000	
	Concrete, shaft	m3	2,600	160.00	416,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Consolidation grout	m L.S.	500	90.00	18,000 207,600	
	Others (20%)	L.S.			207,000	
	Subtotal	•				1,245,60
54	PENSTOCK					
	Excavation, tunnel	m3	5,000	55.00	275,000	.*
	Concrete,tunnel	m3	2,500	160.00	400,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Curtain grout	m	. 200	70.00	14,000	
	Backfill grout Others (20%)	m3 L.\$.	90	200.00	18,000 156,400	
	Subtotal				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	020 40
^			•			938,40
ð	OPEN POWERHOUSE		•			
	Excavation  Fix a vation common	m3	5,500	3.60	10.250	
	Excavation,common  Excavation,weathered rock	m3 m3	5,500 5,500	3.50 6.00	19,250 33,000	
				10.00	73,000	
	hxcavation bard rock	m3				
	Excavation,hard rock Concrete, substructure	m3 m3	7,300 5,300			
	Excavation, hard rock Concrete, substructure Concrete, second stage	m3 m3 m3	5,300 1,350	250.00 140.00	1,325,000	

	Others (20%)	LS.			432,850	
	Subtotal					2,597,100
2,70	TAILRACE					
	Excavation					
	Excavation common	m3	3,200	3.50	11,200	•
	Excavation, weathered rock	m3 .	3,200	6.00	19,200	
	Excavation hard rock	m3	5,000	10.00	50,000	
	Concrete, structure	m3	1,300	140.00	182,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.			64,480	:
	Subtotal					386,880
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,490,000
		<del>-11-11-</del>	-1444			
2.90	ACCESS ROAD					
	New construction	m	177	600,000.00	106,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					110,150,000
3.00	METAL WORKS					
3.00	MBTAL WORKS					
	Penstock steel pipes	ton	1.050	5,000.00	5,250,000	
	Gates	ton	100	7,000.00	700,000	
	Subtotal					5,950,000
4.00	GENERATING EQUIPMENT					
				. 0 100 00	£ 422.000	
	Turbines	ton	290	18,700.00	5,423,000	
	Generators Transformers	ton MVA	800 48	20,400.00 4,700.00	12,240,000 225,600	
	I 13942101115:17	MYA	40	4,700.00	223,000	100
	Subtorat					17,888,600
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	. 156	46,000.00	7,176,000	7,176,000
	Total of Direct Cost					194,938,804
6.00	LAND AQUISITION AND COMPENSATION	LS			0	1,949,388
7.00	ADMINISTRATION EXPENSES	LS			0	1,949,388
8.00	BNGINEERING SERVICES	LS			0	13,645,716
9.00	PHYSICAL CONTINGENCY	LS		-	0	19,493,880
	GRAND TOTAL				231,977,177	231,977,177

	Work Item	Unit			imount i.C.(US\$)	
1.00	PREPARATORY WORKS (10 % of Civil Works)	1\$.				5,656,7
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	17,700	3.50	61,950	
	Open excavation, weathered rock	m3	17,700	6.00	105,200	
	Open excavation hard rock	m3	23,500	10.00	235,000	
	Concrete					
	Mass concrete	m3	31,400	90.00	2,826,000	
	Reinforced concrete	រោ3	72,100	140.00	10,094,000	
	Reinforcement bar	ton	2,200 3,900	1,500.00 70.00	3,300,000 273,000	
	Curtain growting Consolidation grouting	m m	2,600	90.00	234,000	
	Others (20%)	L.S.	2,000	**	3,426,030	
	Subtotal					20,556,1
40	DESANDING BASIN					
	Excavation,tunnel	rn3	127,100	55.00	6,990,500	
	Concrete, turnel	m3	30,600	160.00	4,896,000	
	Reinforcement bars	ton	310	1,500.00	465,000	
	Others (20%)	L.S.			2,470,300	
	Subtotal				•	14,821,8
.50	WATERWAY				4. *	
.51	INTAKE					
	Excavation					
	Excavation, common	m3	1,900	3.50	6,650	
	Excavation, weathered rock	m3	1,900	6.00	11,400	
	Excavation hard rock	m3	2,500	10.00	25,000	•
	Concrete,open structure	m3	2,800	140.00	392,000	
	Reinforcement	ton	90	1,500.00	135,000	
	Others (20%)	L.S.		-	114,010	
	Subtotal					684,0
.52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	90,100	55.00	4,955,500	
	Concrete, tunnel	m3	29,600	160.00	4,736,000	
	Reinforcement	ton	300	1,500.00	450,000	
	Consolidation grout	បា	3,000	90.00	810,000	
	Curtain grout	m	300	70.00	21,000	
	Backfill grout	m3	890	200.00	160,000	
	Others (20%)	L.Ş.			2,225,500	
	Subtotal					13,359,
53	SURGE TANK					
	Excavation, shaft	m3	14,000	55.00	770,000	
	Concrete, shaft	m3	4,100	160.00	656,000	
	Reinforcement	ten	120	1,500.00	180,000	
	Consolidation grout Others (20%)	m L.S.	300	90.00	27,000 326,600	
	Subtotal	<del></del>				1,959
					•	2,503,
54	PENSTOCK					•
	Excavation, turnel	m3	6,300 2,700	55.00	346,500 432,000	
	Concrete, tunnel Reinforcement	m3 ton	2,700 60	160.00 1,500.00	432,000 90,000	
	Curtain grout	m ·	300 : -	70.00	21,000	
	Backfill grout	m3	90	200.00	18,000	
	Others (20%)	L.S.			181,500	
	Subtotal					1,089,
	ADMI TOURDING					
50 50	OPEN POWERHOUSE					
50						
50	OPEN POWERHOUSE  Excavation  Excavation,common	m3	7,600	3.50	26,600	
50	Excavation	m3 m3	7,600	6.00	26,600 45,600	
50	Excavation  Excavation, common  Excavation, weathered rock  Excavation, hard rock	m3 m3	7,600 10,200	6.00 10.00	45,600 102,000	
50	Excavation Excavation,common Excavation,weathered rock	m3	7,600	6.00	45,600	

	Others (20%)	L.S.				594,040	
	Subtotal						3,564,240
2.70	TAILRACE						
	Excavation						
	Excavation, common	m3		4,200	3.50	14,700	,
	Excavation, weathered rock	m3		4,200	6.00	25,200	
	Excavation, hard rock	m3		6,300	10.00	63,000	
	Concrete, structure	m3		1,800	140.00	252,000	
	Reinforcement	ton		60	1,500.00	90,000	
	Others (20%)	L.S.		•		88,980	
	Subtotal						533,880
			:				
2.80	ARCHITECTURAL BUILDINGS	m2		6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD		7 - 1				
	New construction	m		199	600,000.00	119,400,000	
	Upgraded	· m		79	50,000.00	3,950,000	*
	Subtotal				•		123,350,000
3.00	METAL WORKS						
	Penstock steel pipes	ton		1,100	5,000.00	5,500,000	
	Gates	lon		180	7,000.00	1,260,000	
	Subtolal	•					6,760,000
4.00	GENERATING EQUIPMENT						
	Turbines	ton	•	400	18,700.00	7,480,000	
	Generators	ton		680	20,400.00	13,872,000	
	Transformers	MVA		59	4,500.00	265,500	
	Subtotal	* .					21,617,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km		176	46,000.00	8,096,000	8,096,000
	Total of Direct Cost						228,648,036
6.00	LAND AQUISITION AND COMPENSATION	LS				0	2,286,480
7.00	ADMINISTRATION EXPENSES	LS				0 ,	2,286,480
8.00	ENGINEBRING SERVICES	LS				0	16,005,363
9.00	PHYSICAL CONTINGENCY	LS				0	22,864,801
	GRAND TOTAL					272,091,163	272,091,163

iem No.	Work Item	Unit			nount C.(USS)	
.00.	PREPARATORY WORKS	1\$.				4,329,39
.,	(10 % of Civil Works)					.,,,,
2.00	CIVIL WORKS			: :		
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	16,000	3.50	56,000	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	16,000 21,300	6.00 10.00	96,000 213,000	
	Contrate	pi(3	21,000	10.10	1.5,500	
	Mass concrete	m3	29,300	90.00	2,637,000	
	Reinforced concrete	Enr	67,400	140.00	9,436,000	
	Reinforcement bar Curtain grouting	ton m	2,050 3,800	70.00	3,075,000 252,000	
	Consolidation grouting	170	2,600	90.00	234,000	
	Others (20%)	L.S.			3,199,800	
•	Subtotal					19,198,80
.40	DESANDING BASIN					•
	Excavation,tunnel	m3	84,800	55.00	4,664,000	
	Concrete, tunnel	m3	20,400	160.00	3,264,000	
	Reinforcement bars	ton r s	210	1,500.00	315,000	
	Others (20%)	L.S.			1,648,600	n an :
	Subtotal					9,891,60
.50	WATERWAY	: '				
.51	INTAKE					
	Excavation  Excavation,common	m3	1,500	3.50	5,250	
	Excavation, weathered rock	т3	1,500	6.00	9,000	
	Excavation, hard rock	m3	2,000	10.00	20,000	
	Concrete, open structure	m3	2,200 70	140.00 1,500.00	308,000 105,000	
	Reinforcement Others (20%)	ton L.S.	70	1,300.00	89,450	
	Subtotal		•			536,70
52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	55,700	\$5.00	3,063,500	
	Concrete, tunnel	m3	19,100	160.00	3,056,000	
	Reinforcement	ton	200	1,500.00	300,000	
	Consolidation grout	m 	7,000 250	90.00 70.00	630,000 17,500	
	Curtain grout Backfill grout	m3	720	200.00	144,000	
	Others (20%)	L.S.			1,442,200	
	Subiotal					8,653,20
.53	SURGE TANK					
	Excavation, shaft	m3	9,400	55.00	517,000	
	Concrete, shaft	m3	2,700 80	160.00	432,000	
	Reinforcement Consolidation grout	tên M	80 250	1,500.00 90.00	120,000 22,500	
	Others (20%)	1S.	***	/00	218,300	
	Subtoral					1,309,80
54	PENSTOCK					
	Excavation, tunnel	m3	4,600	55,00	253,000	-
	Concrete, tunnel	m3	2,200	160.00	352,000	
	Reinforcement Curtain grout	ton . In	45 250	1,500.00 70.00	67,500 17,590	
	Backfill grout	m3	80	200.00	16,000	
	Others (20%)	L.S.			141,200	
	Subtotal					847,20
50	OPEN POWERHOUSE	*				
	Excavation	en3 .	5,100	2 40	17 050	
	Excavation, common  Excavation, weathered rock	m3 m3	5,100 5,100	3.50 6.00	17,850 30,600	
	Excavation, hard rock	m3	6,800	10.00	68,000	
	Concrete, substructure	m3	4.900	250.00	1,225,000	
	Concrete, second stage	m3	1,200	140.00	168,000	
	Reinforcement	- 140	320	1,500.00	480,000	
		1.1/1				

Subtoral   2,387.2			_				
2.70 TAILRACE    Excession   E		Others (20%)	I,.S.			397,890	
Ricavation   Ricavation   Ricavation   Ricavation, common   193   3,800   3.50   13,300   22,200   2		Subtotal					2,387,34
Escavation, common   m3   3,800   3.50   13,300	2.70	TAILRACE		,			
Basewalion, common   m3   3,800   3.50   13.300		Programme 1					
Excavation, weathered neck m3			m2	109.0	3.60	13 300	
Excavation-hard took							
Concrete, structure							
Reinforcement   ton   50   1,500,00   175,000   175,000   175,000   18,720							
Substitute   Content (19%)   L.S.   T8,720				-		-	
2.80 ARCHITECTURAL BUILDINGS m2 5,000 1,100.00 5,500,000 5,500,000 2.90 ACCESS ROAD    New construction   m   198 600,000.00 119,400,000     Upgraded   m   79 50,000.00 3,950,000     Subtotal   123,350,6   Penstock steel pipes   ton   760 5,000.00 3,800,000     Gates   ton   120 7,000.00 840,000     Subtotal   4,640,6   4,00 GENERATING EQUIPMENT     Turbines   ton   280 18,700.00 5,236,000     Generators   ton   530 20,400.00 10,812,000     Transformers   MVA   40 4,500.00 196,000     Subtotal   16,244,6   Substitution   176 46,000.00 8,096,000 8,096,000     Substitution   176 46,000.00 8,096,000 8,096,000     Substitution   176 46,000.00 8,096,000 8,096,000     Substitution   176 46,000.00 8,096,000 8,096,000 8,096,000     Substitution   176 46,000.00 8,096,000 8,096,000 8,096,000     Substitution   176 46,000.00 8,096,000					1,000.00		
2.80 ARCHITECTURAL BUILDINGS m2 5,000 1,100.00 5,500,000 5,500,000 2.90 ACCESS ROAD  New construction m 198 600,000.00 119,400,000 Upgraded m 79 50,000.00 3,950,000  Subtotal 123,350,6  3.00 METAL WORKS  Penstock steel pipes ton 760 5,000.00 3,800,000 Gates ton 120 7,000.00 840,000  Subtotal 4,640,6  4.00 GENERATING EQUIPMENT  Turbines ton 280 18,700.00 5,236,000 Generators ton 530 20,400.00 10,812,000 Transformers MVA 40 4,500.00 196,000  Subtotal 16,244,6  5.00 TRANSMISSION LINES AND km 176 46,000.00 8,096,000 8,096,000  Substations  Total of Direct Cost 205,453,2  6.00 LAND AQUISITION AND COMPENSATION LS 0 2,054,5  8.00 ENGINEERING SERVICES LS 0 14,381,5  9.00 PHYSICAL CONTINGENCY LS 0 14,381,5  9.00 PHYSICAL CONTINGENCY LS 0 16,545,5		Subtotal					460 3
2.90 ACCESS ROAD    New construction		Sundai					
2.90 ACCESS ROAD    New construction	2.80	ARCSHTECTURAL BUILDINGS	m?	5.000	1.100.00	5.500.000	5 500.0
New construction   m   199   600,000.00   119,400,000   119,400,000   119,400,000   119,400,000   119,400,000   119,400,000   1123,350,000   1123,350,000   1123,350,000   1123,350,000   1123,350,000   1123,350,000   1124,000,000   1124,000,000   1124,000,000   1124,000,000   1124,000,000   1124			11111	0,000	1,100.00	2,500,022	3,34
Upgraded   m   79   50,000.00   3,950,000	2.90	ACCESS ROAD					
Upgraded   m   79   50,000.00   3,950,000		New construction	m	199	600.000.00	119,400,000	
Penstock steel pipes							
Penstock steel pipes   ton   760   5,000.00   3,800,000   Gates   ton   120   7,000.00   340,000   4,640,00   120   7,000.00   340,000   3,800,000		Subtotal		-			123,350,0
Penstock steel pipes   ton   760   5,000.00   3,800,000     Gates   ton   120   7,000.00   840,000     Subtotal							
Subtotal   120 7,000.00 840,000   4,640,00	3.00	METAL WORKS					
Subtotal   4,640,6		Penstock steel pipes	ton	760	5,000.00	3,800,000	
4.00 GENERATING EQUIPMENT  Turbines ton 280 18,700.00 5,236,000 Generators ton 530 20,400.00 10,812,000 Transformers MVA 40 4,900.00 196,000  Subtotal 16,244,0  5.00 TRANSMISSION LINES AND km 176 46,000.00 8,096,000 8,096,000 SUBSTATIONS  Total of Direct Cost 205,453,2  6.00 LAND AQUISITION AND COMPENSATION LS 0 2,054,5  7.00 ADMINISTRATION EXPENSES LS 0 2,054,5  8.00 ENGINEERING SERVICES LS 0 14,381,5  9.00 PHYSICAL CONTINGENCY LS 0 20,545,5		Gates	ton	120	7,000.00	840,000	
Turbines ton 280 18,700.00 5,236,000 Generators ton 530 20,400.00 10,812,000 Transformers MVA 40 4,900.00 196,000 H96,000 Substitution 16,244,00 Transformers MVA 176 46,000.00 8,096,000 8,096,000 Substitution Total of Direct Cost 205,453,300 Generators I.S 0 2,054,500 Generators I.S 0 20,545,500 Ge		Subtotal					4,640,0
Generators   ton   530   20,400.00   10,812,000     Transformers   MVA   40   4,900.00   196,000     Subtotal   16,244,000     Subtotal   176   46,000.00   8,096,000   8,096,000     SUBSTATIONS   176   46,000.00   8,096,000   8,096,000     Total of Direct Cost   205,453,200     Company	4.00	GENERATING EQUIPMENT					
Generators   ton   530   20,400.00   10,812,000     Transformers   MVA   40   4,900.00   196,000     Subtotal   16,244,000     Subtotal   176   46,000.00   8,096,000   8,096,000     SUBSTATIONS   176   46,000.00   8,096,000   8,096,000     Total of Direct Cost   205,453,200     Company		'm II'	2.	290	10 700 00	£ 32£ 000	
Transformers   MVA   40   4,900.00   196,000							
Substitute   16,244,0							
5.00 TRANSMISSION LINES AND km 176 46,000.00 8,096,000 8		[170]210111613	MIX.	40	4,700.00	130,000	
SUBSTATIONS           Total of Direct Cost         205,453,3           6.00         LAND AQUISITION AND COMPENSATION         LS         0         2,054,5           7.00         ADMINISTRATION EXPENSES         LS         0         2,054,5           8.00         ENGINEERING SERVICES         LS         0         14,381,7           9.00         PHYSICAL CONTINGENCY         LS         0         20,545,3		Subtotal					16,244,0
Total of Direct Cost       205,453,3         6.00       LAND AQUISITION AND COMPENSATION       LS       0       2,054,5         7.00       ADMINISTRATION EXPENSES       LS       0       2,054,5         8.00       ENGINEERING SERVICES       LS       0       14,381,5         9.00       PHYSICAL CONTINGENCY       LS       0       20,545,5	5.00		km .	176	46,000.00	8,096,000	8,096,0
6:00         LAND AQUISITION AND COMPENSATION         LS         0         2,054,5           7:00         ADMINISTRATION EXPENSES         LS         0         2,054,5           8:00         ENGINEERING SERVICES         LS         0         14,381,5           9:00         PHYSICAL CONTINGENCY         LS         0         20,545,5							205,453,3
7.00         ADMINISTRATION EXPENSES         1.S         0         2,054.5           8.00         ENGINEERING SERVICES         LS         0         14,381.5           9.00         PHYSICAL CONTINGENCY         LS         0         20,545.5							
8.00         ENGINEERING SERVICES         LS         0         14,381,           9.00         PHYSICAL CONTINGENCY         LS         0         20,545,	6.00	LAND AQUISITION AND COMPENSATION	LS			Û	2,054,5
9.00 PHYSICAL CONTINGENCY LS 0 20,545.	7.00	ADMINISTRATION EXPENSES	2.1			0	2,054,5
	8.00	ENGINEERING SERVICES	L\$			0	14,381,7
	9.00	PHYSICAL CONTINGENCY	LS			. 0	20,545,3

	Work Item	Unit		Init price	Amount	
			F	.C.(US\$)	F.C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				3,641,22
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
1.10	INTAKE DAM					
	Open Excavation					
	Open excavation common	m3	14,300	3.50	50,050	
	Open excavation weathered rock	m3	14,300	6.00	and the second s	
	Open excavation, hard rock	m3	19,100	10.00	191,000	
	Concrete  Mass concrete	т3	27,200	90.00	2,448,000	
	Reinforced concrete	m3	63,200	140.00		
	Reinforcement bar	ton	1,900	1,500.00		
	Curtain grouting	m	3,400	70.00		
	Consolidation growing	m L.S.	2,500	90.00	225,000 2,987,170	
	Others (20%)	1,4-3.			2,967,170	
	Subtotal					17,923,02
.40	DESANDING BASIN					
	Excavation,tunnel	m3	63,600	55.0X	3,498,000	
	Concrete, turnsel	m3	15,300	160.00	2,448,000	
	Reinforcement bars	ton	160	1,500.00	•	
	Others (20%)	L.S.			1,237,200	
	Subtotal					7,423,20
.50	WATERWAY					
.51	INTAKE					
	Well and					
	Excavation	_	4.000			
	Excavation, common  Excavation, weathered rock	m3 m3	1,300 1,300	3.50 6.00		
	Excavation hard rock	m3	1,700	10.00	-	
	Concrete, open structure	m3	1,900	140.00	266,000	
	Reinforcement	ton	60	1,500.00		
	Others (20%)	L.S.			77,070	
	Subtotal					462,42
2.52	HEADRACE TUNNEL					
	Engageting turnel	m3	41,500	55.00	2,282,500	
	Excavation,tunnel Concrete, tunnel	m3	14,700	160.00		
	Reinforcement	ton	150	1,500.00		
	Consolidation grout	m	6,000	90.00	-	
	Curtain grout	m	200	70.00		
	Backfill grout Others (20%)	m3 L.S.	650	200.00	) 130,000 1,108,700	
					•••••	4 652 20
	Subtotal					6,652,20
.53	SURGE TANK				**	
	Excavation, shaft	m3	7,000	55.00	385,000	
	Concrete, shaft	m3	2,100	160.00		
	Reinforcement Consolidation grout	ton m	60 200	1,500.00 90.00		•
	Others (20%)	L.S.	200	20.00	165,800	
	Subtoral					994,80
.54	PENSTOCK					•
.34	PENSIOCK					
	Excavation,tunnel	m3	3,700	55.00	203,500	
	Concrete,tunnel	m3	2,000	160.00	•	
	Reinforcement Curtain grout	ton m	40 200	1,500.00 70.00		
	Backfili grout	m3	70	200.00	•	
	Others (20%)	L.S.			122,300	
	Subtotal			•		733,80
.60	OPEN POWERHOUSE					
	Excavation					
		m3	3,800	3.50	13,300	
	Excavation, common	-,-				
	Excavation, common  Excavation, weathered rock	m3	3,800	6.00	and the second s	
	Excavation, weathered rock Excavation, hard rock	m3 m3	3,800 5,100	10.00	22,800 51,000	
	Excavation, weathered rock	m3	3,800		22,800 51,000 925,000	·

	Others (20%)	L.S.			305,420	
	Subtotal					1,832,520
	Subolai					1,632,320
2.70	TAILRACE		•			
	Excavation					
	Excavation, common	m3	3,500	3.50	12,250	
	Excavation, weathered rock	m3	3,500	6.00	21,000	
	Excavation, hard rock	m3	5,000	10.00	50,000	
	Concrete, structure	m3	1,300	140.00	182,000	
	Reinforcement	ton .	.40	1,500.00	60,000	
	Others (20%)	L.S.			65,050	
	latotduS					390,300
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD				4	
	New construction	m	199	600,000.00	119,400,000	
	Upgraded	m ·	79	50,000.00	3,950,000	
	Subtotel					123,350,000
3.00	METAL WORKS					
3.00	MASTAL HORKS	•				
	Penstock steel pipes	ton	600	5,000.00	3,000,000	
	Gates	ton	90	7,000.00	630,000	
				•		
	Subtotal				-	3,630,000
4.00	GENERATING EQUIPMENT	•				
4.00	GENERATING EQUITABLE					
	Turbines	ten	220	18,700.00	4,114,000	
	Generators	ton	450	20,400.00	9,180,000	•
	Transformers	MVA	30	5,200.00	156,000	
	•					
	Subtotal					13,450,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	176	46,000.00	8,096,000	8,096,000
	Total of Direct Cost					192,979,486
6.00	LAND AQUISITION AND COMPRISATION	រេ			0.	1,929,795
7.00	ADMINISTRATION EXPENSES	LS .			. 0	1,929,795
8.00	ENGINEERING SERVICES	LS		* .	0	13,508,564
9.00	PHYSICAL CONTINGENCY	LS			0	19,297,949
	GRAND TOTAL				229,645,588	229,645,588

tem No.	Work Item	Unit		Unit price F.C.(US\$)	Amount F.C.(US\$)	
				· · · · · · · · · · · · · · · · · · ·		
.00	PREPARATORY WORKS (10 % of Civil Works)	1S.				4,813,94
.00	CIVIL WORKS			•		
.10	INTAKÉ DAM					
	Open Excavation					
	Open excavation, common	m3	15,800	3.5		
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	15,800 21,100	6.0 10.0		
	Concrete	613	21,100		211,000	
	Mass concrete	m3	28,800	90.0		
	Reinforced concrete	m3	69,300 2,100	. 140.0 1,500.0		
	Reinforcement bar Curtain grouting	ton m	3,900	70.0		
	Consolidation grouting	· m	2,400	90.0	•	
	Others (20%)	L.S.			3,258,820	
	Subtotal				. *	19,552,9
10	DESANDING BASIN					
	Excavation,tunnel	m3	64,500	55.0	0 3,547,500	
	Concrete, tunnel	m3	16,400	160.0		
	Reinforcement bars	ton	165	1,500.0		-
	Others (20%)	L.S.			1,283,800	
	Subtotal					7,702,8
50	WATERWAY				•	
51	INTAKE					
	Excavation					
	Excavation common	m3	1,400	3.5		
	Excavation weathered rock	m3	1,400	6.0		
	Excavation hard rock	m3 m3	1,800 2,100	10.6 140.6	•	
	Concrete, open structure Reinforcement	ton	60	1,500.6		
	Others (20%)	L.S.			83,060	
	Subtotal					498,3
52	HEADRACE TUNNEL					
	Excavation,turnel	m3	76,200	55.0	00 4,191,000	
	Concrete, tunnel	m3	28,200	. 160.0		
	Reinforcement	ton	270	1,500.0		
	Consolidation grout	m	9,600	90.0	· ·	
	Custain grout	m m	300 1,050	70.0 200.0		
	Backfill grout Others (20%)	m3 1\$.	1,000	200.0	1,976,600	
	Subtotal					11,859,
53	SURGE TANK				·	
	Excavation, shaft	m3	8,800	55.0	00 484,000	
	Concrete, shaft	m3	2,600	160.0		
	Reinforcement	ton	80	1,500.0		
	Consolidation grout Others (20%)	m L.S.	300	90.0	00 27,000 209,400	
	Subtotal	2.0.				1,256,
í4						
.,	PENSTOCK		7 000		n san awa	
	Excavation,tunnel Concrete,tunnel	m3 m3	7,800 3,900	55.0 160.0		
	Reinforcement	ton	80	1,500.		
	Curtain grout	m	300	70.0	00 21,000	
	Backfill grout Others (20%)	m3 L.S.	170	200.0	245,600 245,600	
		L.J.			213,000	1 472 4
_	Subtotal		•			1,473,0
0	OPEN POWERHOUSE					
	Excavation	m3	10,900	3.3	50 38,150	
	liggavatica common				201120	
	Excavation.common  Excavation.weathered rock	m3	10,900	6.0	00 65,400	
	Excavation common  Excavation weathered rock  Excavation hard rock		10,900 14,500	10.0	00 145,000	
	Excavation, weathered rock	m3	10,900		00 145,000 00 2,600,000	

	Others (20%)	L.S.			843,510	
	Subtorat					5,061,060
2.70	TAILRACE					
	Excavation					
	Excavation common	m3	6,500	3.50	22,750	
	Excavation, weathered rock	m3	6,500	6.00	39,000	
	Excavation, hard rock	m3	8,800	10.00	88,000	-
	Concrete, structure	m3	2,500	140.00	350,000	
	Reinforcement	ton	75	1,500.00	112,500	
	Others (20%)	L.S.		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	122,450	
	Subtotal					734,700
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	00.001,1	6,600,000	6,600,000
2.90	ACCESS ROAD					
				******		
	New construction	m	256	600,000.00	153,600,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal		-			157,550,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	3,400	5,000.00	17,000,000	
	Gaics	ton	100	7,000.00	700,000	
	Subtotal					17,700,000
4.00	GENERATING EQUIPMENT			4		
	Turbines	nos	440	18,700.00	8,228,000	
			1,200	20,400.00	24,480,000	
	Generators	ton : MVA	1,200	4,500.00	630,000	
-	Transformers	MVA	. 140	4,300.00	030,000	
	Subsocial					33,338,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	219	46,000.00	10,074,000	10,074,000
	Total of Direct Cost					278,215,384
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,782,154
7.00	ADMINISTRATION EXPENSES	· LS			0	2,782,154
8.00	ENGINEERING SERVICES	LS			0	19,475,077
9.00	PHYSICAL CONTINGENCY	LS			0	27,821,538
	GRAND TOTAL				331,076,307	331,076,307

tem No.	Work Item	Unit			mount .C.(US\$)	
		1.0				2 004 2
.00	PREPARATORY WORKS (10 % of Civil Works)	1S.				3,896,2
2.00.	CIVIL WORKS					
10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	14,300	3.50	50,050	
	Open excavation, weathered tock	m3 2	14,300	6.00	85,800	
	Open excavation,hard rock Concrete	m3	19,100	10.00	000,161	
	Mass concrete	m3	26,800	90.00	2,412,000	
	Reinforced concrete	m3	64,600	140.00	9,044,000	
	Reinforcement bar	ton	1,950	1,500.00	2,925,000	
	Curtain grouting	m	3,600	70.00	252,000	
	Consolidation growing	m L.S.	2,400	90.00	216,000	
	Others (20%)	15.			3,035,170	
	Subtotal		•			18,211,0
40	DESANDING BASIN				:	
	Excavation, tunnel	m3	43,100	55.00	2,370,500	
	Concrete, tunnel	m3	10,900	160.00	1,744,000	
	Reinforcement bars	ton	110	1,500.00	165,000	
	Others (20%)	L.S.			855,900	
	Subtotal					5,135,4
50	WATERWAY					
Si	INTAKE					
	Excavation					
	Excavation, common	m3	1,100	3.50	3,850	
	Excavation, weathered rock	m3	1,100	6.00	6,600	
	Excavation,hard rock	m3	1,500	10.00	15,000	
	Concrete,open structure	m3	1,700 50	140.00 1,500.00	238,000 75,000	
	Reinforcement Others (20%)	ton L.S.	30	1,300.00	67,690	
	Subtotal				0.402	406,
••						400,7
52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	56,800	55.00	3,124,000	
	Concrete, turnel	m3	20,100 200	160.00 1,500.00	3,216,000 300,000	
	Reinforcemem  Consolidation grout	10si m	8,200	90.00	738,000	
	Curtain grout	m	250	70.00	17,500	
	Backfill grout	m3	950	200.00	190,000	
	Others (20%)	L.S.		200140	1,517,100	
	Subtota)					9,102,
3	SURGE TANK					
•		m3	5,900	55.00	324,500	
	Excavation, shaft Concrete, shaft	m3 m3	1,700	160.00	272,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Consolidation grout	m	. 250	90.00	22,500	
	Others (20%)	L.S.			138,800	
	Subtotal					832,
4	PENSTOCK					
	Excavation,tunnel	· rn3	6,100	55.00	335,500	
	Concrete,tunnel	m3	3,400	160.00	544,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Curtain grout	na -2	250	70.00	17,500	
	Backfill grout Others (20%)	m3 L.S.	150	200.00	30,000 206,400	
		Londo.	•	•	- 200,400	1.030
	Subtotal	•	•			1,238,4
}	OPEN POWERHOUSE					
,						
,	Excavation	-				
,	Excavation, common	m3	7,300	3.50	25,550	
,	Excavation, common Excavation, weathered rock	m3	7,300	6.00	43,500	
,	Excavation, common Excavation, weathered rock Excavation, hard rock	m3 m3	7,300 9,700	6.00 10.00	43,500 97,000	
,	Excavation, common Excavation, weathered rock	m3	7,300	6.00	43,500	

	Others (20%)	L.S				563,670	
	Subtotal						3,382,020
2.70	TAILRACE		-				
	Excavation						
	Excavation common	m3		5,500	3.50	19,250	
	Excavation, weathered rock	m3		5,500	6.00	33,000	
	Excavation, hard rock	m3		8,000	10.00	80,000	
	Concrete, structure	m3		2,200	140.00	308,000	
	Reinforcement	ion		70	1,500.00	105,000	
	Others (20%)	L.S.			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	109,050	
-	Subtotal						654,300
2.80	ARCHITECTURAL BUILDINGS	m2		5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD						•
	New construction	m		256	600,000.00	153,600,000	
	Upgraded	m		79	50,000.00	3,950,000	
	Subto12:					•	157,550,000
3.00	METAL WORKS						
	Penstock steel pipes	ton		2,400	5,000.00	12,000,000	
	Gates	ton		70	7,000.00	490,000	
•	Subtotal				•		12,490,000
4.00	GENERATING EQUIPMENT						
	Turbines	ton		310	18,700.00	5,797,000	
	Generators	ton		880	20,400.00	17,952,000	
	Transformers	MVA		90	4,200.00	378,000	
	Subtotal					÷	24,127,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km		219	46,000.00	10,074,000	10,074,000
	Total of Direct Cost				4	·	252,599,948
6.00	LAND AQUISITION AND COMPENSATION	LS				0	2,525,999
7.00	ADMINISTRATION EXPENSES	LŠ	٠			0	2,525,999
8.00	ENGINEERING SERVICES	LS				0	17,681,996
9.00	PHYSICAL CONTINGENCY	LS				0	25,259,995
	GRAND TOTAL					300,593,938	300,593,938

tem No.	Work Item	Unit			mount	
			<u>F</u>	.C.(US\$) F.	C.(US\$)	
.00	PREPARATORY WORKS	1				3,281,9
	(10 % of Civil Works)					
00	CIVIL WORKS					
10	INTAKE DAM			•		
	Open Excavation					
	Open excavation common	m3	12,800	3.50	44,800	
	Open excavation, weathered rock	m3 3	12,800	6.00	76,800	
	Open excavation hard rock Concrete	m3	17,100	10.00	171,000	
	Mass concrete	m3	25,000	90.00	2,250,000	
	Reinforced concrete	m3	60.226	140.00	8,431,640	
	Reinforcement bar	ton	1,850	1,500.00	2,775,000	
	Curtain grouting  Consolidation grouting	LSJ.	3,400	70.00 90.00	238,000 216,000	
	Others (20%)	L.S.	2,400	90.00	2,840,648	
	Subtotal					17,043,
0	DESANDING BASIN					,
U				<b>45.00</b>	1 dat 000	
	Excavation,tunnel Concrete, tunnel	m3 m3	32,400 8,200	55.00 160.00	1,782,000 1,312,000	
	Concrete, tunnel Reinforcement bars	ton	0,200 85	1,500.00	1,312,000	
	Others (20%)	L.S.		-10-1-20-0	644,300	
	Subsotal					3,865,
0	WATERWAY					
1	INTAKE					
•						
	Excavation Excavation common	m3	1,600	3.50	3,500	
	Excavation, weathered rock	m3	1,000	6.00	6,000	
	Excavation, hard rock	m3	1,300	10.00	13,000	
	Concrete, open structure	m3	1,400	140.00	196,000	
	Reinforcement Others (20%)	ton L.S.	45	1,500.00	67,500 57,200	
	Subtotat					343,
2	HEADRACE TUNNEL					515,
**		2	40.200		2 214 600	:
	Excavation,tunnel Concrete, tunnel	m3 m3	40,300 14,900	55.00 160.00	2,216,500 2,384,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Consolidation grout	m	6,900	90.00	621,000	
	Curtain grout	m	200	70.00	14,000	
	Backfill grout	m3	860	200.00	172,000	
	Others (20%)	L.Ş.			1,126,500	
	Subtotal					6,759,
3	SURGE TANK					
	Excavation, shaft	m3	4,400	55.00	242,000	
	Concrete, shaft	m3	1,390	160.00	208,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout Others (20%)	m L.S.	200	90.00	18,000 105,600	
	Subtotal				•	633,
a.						525,
4	PENSTOCK	_				٠
	Excavation,tunnel Concrete,tunnel	m3 m3	4,990 3,000	55.00 160.00	269,500 480,000	
	Reinforcement	ton	- 60	1,500.00	90,000	
	Curtain grout	m	200	70.00	14,000	
	Backfill grout	m3	120	200.00	24,000	
	Others (20%)	L.S.			175,500	
	Subtotal					1,053,
•	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	5,500	3.50	19,250	
	Excavation, weathered rock	m3	5,500	6.00	33,000	
		1	2 555	10.00		
	Excavation, hard rock	m3 m3	7,300 5,200	(0.00 250.00	73,000 1,300,000	
		m3 m3 m3	7,300 5,200 1,300	(0.00 250.00 140.00	73,000 1,300,000 182,000	

	Others (20%)	L.S.			423,450	
	Subiotal					2,540,700
2.70	TAILRACE	•				
	Excavation					
	Excavation, common	m3	4,800	3.50	16,800	
	Excavation, weathered rock	m3	4.800	6.00	28,800	
	Excavation,hard rock	m3	6,800	10.00	68,000	
	Concrete, structure	m3	2,000	140.00	280,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	L.S.			96,720	
	Subtotal					580,320
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	256	600,000.00	153,600,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					157,550,000
3.00	METAL WORKS					· ·
-	Penstock steel pipes	ton	1,800	5,000.00	9,000,000	
	Gates	100	50	7,000.00	350,000	
	Subtotal					9,350,000
4.00	GENERATING EQUIPMENT					
		•		18 700 00	4 676 000	
	Turbines	ton	250	18,700.00	4,675,000	
	Generators	ton	730 66	20,400.00	14,892,000	:
	Transformers	MVA	. 00	4,400.00	290,400	
	Subtotal					19,857,400
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	219	46,000.00	10,074,000	10,074,000
	Total of Direct Cost					237,332,859
	·				_	
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,373,329
7.00	ADMINISTRATION EXPENSES	LS			0	2,373,329
8.00	ENGINEERING SERVICES	LS			0	16,613,300
9.00	PHYSICAL CONTINGENCY	LS			. 6	23,733,286
	GRAND TOTAL				282,426,102	282,426,102

Item No.	Work Item	Unit		t price	Amount	
			EC	(USS)	F.C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				43,991,158
	(10 % of Civil Works)					
.00	CIVIL WORKS				*	
.10	DIVERSION TUNNEL					
	Open Excavation of Inlet & Outlet	m3	20,000	3.50	70,000	
	Open excavation common Open excavation weathered rock	rn3	20,000	6.00	120,000	
	Open excavation, hard rock Concrete of Inlet & Outlet	m3 m3	30,000 10,000	10.00 140.00		
	Tunnel Excavation	m3	645,100	55.00		
	Thunel Concrete	Em Em	187,500 2,000	160.00 1,500.00		
	Reinforcement bar Plug Concrete	m3	17,100	160.00	2,736,000	
	Others (20%)	L.S.			14,621,300	
	Subtoral					87,727,800
2.20	COFFER DAM					
	Excavation	т3	72,900	3.50	255,150	
	Excavation, common Embankment	no.				
	Embartament, core	m3 m3	117,700 29,400	\$.00 10.00		
	Embankment filter Embankment rock	1113 Ern	679,400	6.00		
	Others (20%)	L.S.			1,042,810	
	Subtotal					6,255,860
2.30	MAIN DAM			•		
	Excavation	.0	659.200	3.60	2 202 700	
	Excavation, common Excavation, weathered rock	m3 m3	658,200 47,200	3.50 6.00	2,303,700 283,200	
	Excavation, hard	нЗ	136,700	10.00		
	Embankment Embankment,core	m3	3,437,300	5.00	17,186,500	
	Embankment, filter	m3	756,800	10.00	7,568,000	
	Embankment, rock Curtain Grooting	m3 m	23,494,000 72,000	6.00 70.00	140,964,000 5,040,000	
	Consolidation Grouting	m	14,000	90.00	1,260,000	
	Others (10%)	L.S.			17,597,240	
2.40	Subtotal SPILLWAY					193,569,640
2.40						
	Excavation, common	m3	384,200	3.50	1,344,700	•
	Excavation, weathered rock Excavation hard rock	m3 m3	536,700 4,071,400	6.00 10.00	3,220,200 40,714,000	
	Contrete	ப்ப டி	150,100	140.00	21,014,000	
	Reinforcement bars Others (20%)	tom L.S.	4,500	1,500.00	6,750,000 14,608,580	
	Subtotal				.*	87,651,486
.50	WATERWAY					**********
.51	INTAKE					
	Excavation					
	Excavation, common	т3	8,300	3.50	29,650	
	Excavation, weathered rock Excavation, hard rock	m3 m3	- 8,300 11,100	6.00 10.00	49,800 111,000	
	Concrete, open structure	m3	12,500	140.00	1,750,000	
	Reinforcement Others (20%)	ton L.S.	400	1,500.60	600,000 507,970	
	Subtotal					3,047,820
.52	HEADRACE TUNNEL					3,011,020
.52		3	303.000	22.00	11 165 000	
	Excavation,tunnel Concrete, tunnel	m3 m3	203,000 61,200	55.00 160.00	11,165,000 9,792,000	
	Reinforcement	ton	620	1,500.00	930,000	
	Consolidation grout Curtain grout	m m	10,000 1,200	90.00 70.00		
	Backfill grout	m3	1,000	200.00	200,000	
	Others (20%)	L.S.		÷	4,614,200	49 405 40
<b>6</b> 2	Subtotal					27,685,200
53	PENSTOCK		<b>44</b> 44-			
	Excavation,tunnel Concrete,tunnel	m3 m3	52,600 12,700	55.00 160.00	2,893,000 2,032,000	
	Reinforcement	ton	250	1,500.00	375,000	
	Custain grout  Backfill grout	ro m3	0 550	70.00 200.00	110,000	
	Others (20%)	L.S.	556	2,77,00	1,082,000	
	Subtotal					6,492,000
60	OPEN POWERHOUSE	٠.				
	Excavation					
	Excavation, common	m3	57,700	3.50	201,950	

	Excavation, weathered rock	m3		\$7,700	6.00	346,200	
	Excavation,hard rock	m3		76,900	10.00	769,000	
	Concrete, substructure	m3		54,900	250.00	13,725,000	
	Concrete, second stage	1n3		008,81	140.00	1,932,000	
	Reinforcement	ton		3,600	G0.007,1	5,400,000	
	Others (20%)	L.S.				4,474,830	
	Subtotal			•			26,848,980
2.70	TAILRACE						
	Excavation						
	Excavation common	m3		7,000	3.50	24,500	
	Excavation, weathered rock	m3		7,000	6.00	42,000	
	Excavation.hard rock	m3		9,000	10.00	90,000	
	Concrete, structure	m3		2,000	140.00	280,000	
	Reinforcement	ton		60	1,500.00	90,000	
	Others (20%)	L.S.				105,300	
	Subtotal						631,800
2.80	ARCHITECTURAL BUILDINGS	m2		5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD						
	New construction	· m		80	600,000.00	48,000,000	
	Upgraded	m		69	50,000.00	3,450,000	
	Subjectal						51,450,000
	Succeeding						31,450,000
3.00	METAL WORKS						
	Penstock steel pipes	ton		11,300	5,000,00	56,500,000	
	Gates	ton		600	7,000.00	4,200,000	
	Sulpotal						60,700,000
4.00	GENERATING EQUIPMENT						
	mudding.	•		2.100	10.700.00	67 070 000	
	Turbines	ton		3,100	18,700.00	\$7,970,000	
	Generators	ton		4,150	20,400.00	84,660,000	
	Transformers	MVA		678	2,900.00	1,966,200	
	Subtotal						144,596,200
	• '						
5.00	TRANSMISSION LINES AND SUBSTATIONS	km		152	46,000.00	6,992,000	6,992,000
.*	Total of Direct Cost				:	•	753,140,938
6.00	LAND AQUISITION AND COMPENSATION	LS				0	37,657,047
7.00	ADMINISTRATION EXPENSES	LS				0	7,531,409
8.00	ENGINEERING SERVICES	LS				0	
	and the second s						52,719,866
9.00	PHYSICAL CONTINGENCY	LS	÷ .			0	75,314,094
	GRAND TOTAL					926,363,354	926,363,354

item No.	Work liern	Unit			mount ,C.(US\$)	
.00	PREPARATORY WORKS	IS.	•			46,570,663
	(10 % of Civil Works)					
.00	CIVIL WORKS					
. 01.	DIVERSION TUNNEL					
	Open Excavation of Inlet & Outlet Open excavation, common	m3	20,000	3.50	70,000	
	Open excavation, weathered rock	m3	20,000	6.00	120,000	
	Open excavation, hard rock Concrete of Inlet & Outlet	m3 m3	30,000 10,000	10.00 140.00	300,000 1,400,000	
	Tunnel Excavation	m3	657,200	55.00	36,146,000	
	Tunnel Concrete	m3	191,000	160,00 1,500.00	30,560,000	
	Reinforcement bar Plug Concrete	m3 m3	2,000 17,100	160.00	3,000,000 2,736,000	
	Others (20%)	L.S.			14,866,400	
	Subtoral					89,198,40
20	COFFER DAM					
	Excavation		70.000	2.50	255 150	
	Excavation, common Embankment	m3	72,900	3.50	255,150	
	Embanament core	m3	117,700	5.00	588,500	
	Embankment, filter Embankment, rock	m3 - m3	29,400 679,400	10.00 6.00	294,000 4,076,400	
•	Others (20%)	L.S.	0,7,100	0.00	1,042,810	
	Subtotal					6,256,86
.30	MAIN DAM					
	Excavation	~	mai 200		9 59/ 000	
	Excavation, common  Excavation, weathered rock	m3 m3	724,800 59,000	3.50 6.00	2,536,800 354,000	
	Excavation,hard	m3	191,900	10.00	1,919,000	
	Embankment	2	2061 100	5.00	19,255,500	
	Embankment,core Embankment,filter	m3 m3	3,851,100 846,000	10.00	8,460,000	
	Embankment, rock	m3	26,633,600	6.00	159,801,600	
	Curtain Grouting Consolidation Grouting	m m	75,000 16,000	70.00 90.00	5,250,000 1,440,000	
	Others (10%)	I.S.			19,901,690	**
	Subtotal					218,918,59
.40	SPILLWAY					
	Excavation					
	Excavation,common  Excavation,vez/hered rock	m3 m3	355,100 480,100	3.50 6.00	1,242,850 2,880,600	
	Excavation, hard rock	m3	3,069,100	10.00	30,691,000	
	Concrete	m3	153,800	140.00	21,532,000	
	Reinforcement bars Others (20%)	tom L.S.	4,650	1,500.00	6,975,000 12,664,290	
	Subtotal					75,985,74
50	WATERWAY					
51	INTAKE					
	Excavation					
	Excavation, common	m3	9,800	3.50	34,300	
	Excavation, weathered rock  Excavation, hard rock	m3 m3	9,800 13,100	6.00 10.00	58,800 131,000	•
	Concrete, open structure	m3	14,800	140.00	2,072,000	
	Reinforcement	ton L.\$.	450	1,500.00	675,000 594,220	
	Others (20%)	L.G.			374,420	
	Subtotal				•	3,565,32
52	HEADRACE TUNNEL					
	Excavation, tunnel	m3	247,100	55.00	13,590,500	
	Concrete, tunnel Reinforcement	m3 ton	73,900 740	160.00 1,500.00	11,824,000 1,110,000	
	Consolidation grout	TI3	11,000	90.00	990,000	
	Curtain grout Backfill grout	m m3	1,350 1,100	70.00 200.00	94,500 220,000	
	Others (20%)	L.S.			5,565,800	
	Subtotal			-1		33,394,80
53	PENSTOCK					
	Excavation,turnel	m3	59,600	55.00	3,278,000	
	Concrete,tunnel	m3	6,600	160.00	1,056,000	
	Reinforcement	ton m	130 0	1,500.00	195,000 0	
				200.00	120,000	
	Curtain grout Backfill grout	. m3	600	200.00		
	Curtain grout		600	200.00	929,800	
	Curtain grout Backfill grout	. m3	600	200.00		5,578,80
0	Curtain grout Backfill grout Others (20%)	. m3	600	200.00		5,578,80
50	Curtain grout Backfill grout Others (20%) Subtotal	. m3	600 68,800	3.50		5,578,80

	Excavation, weathered rock	m3	68,800	6.00	412,800	
	Excavation, hard rock	m3	91,700	10.00	917,000	
	Concrete, substructure	m3	65,500	250.00	16,375,000	
	Concrete, second stage	m3	16,400	140.00	2,296,000	
	Reinforcement	ton	4,300	1,500.00	6,450,000	
	Others (20%)	L.S.			5,338,320	
	Subtotal					32,029,920
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	8,000	3.50	28,000	
	Excavation, weathered rock	m3	8,000	6.00	48,000	
	Excavation hard rock	m3	11,000	10.00	110,000	
	Concrete, structure	m3	2,500	140.00	350,000	
	Reinforcement	ton	75	1,500.00	112,500	
	Others (20%)	L.S.			129,760	
	Subtotal					778,200
2.80	ARCHITECTURAL BUILDINGS	m2	5,500	1,100.00	6,050,000	6,050,000
2.90	ACCESS ROAD					÷
2	NO CLOUD NO.					
	New construction	m	80	600,000.00	48,000,000	
	Upgraded	m .	69	50,000.00	3,450,000	
	Subtotal					51,450,000
3.00	METAL WORKS			•		
	Penstock steel pipes	ton	13,200	5,000.00	66,000,000	
	Gates	ton	680	7,000.00	4,760,000	
	Subtotal				.*	70,760,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,500	18,700.00	65,450,000	
	Generators	ton	4,700	20,400.00	95,880,000	
	Transformers	MVA	820	2,700.00	2,214,000	.1
	Subtotal				÷	163,544,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	152	46,000.00	6,992,000	6,992,000
•	Total of Direct Cost					811,073,293
6.00	LAND AQUISITION AND COMPENSATION	LS			0	40,553,665
7.00	ADMINISTRATION EXPENSES	LS			0	8,110,733
8.00	ENGINEERING SERVICES	LS			0	56,775,131
9.00	PHYSICAL CONTINGENCY	LS			0	81,107,329
	GRAND TOTAL				997,620,150	997,620,150

Item No.	Work Item	Unit			Amount F.C.(US\$)	
	ADDID TO ACCUMANCE AND ACCUMAN					******
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				55,849,005
2.00	CIVIL WORKS					
2.10	DIVERSION TUNNEL					
	Open Excavation of Inlet &Outlet					
	Open excavation common Open excavation weathered rock	m3 103	20,000 20,000	3.50 6.00	70,000 120,000	
	Open excavation hard rock	m3	30,000	10.00	300,000	
	Concrete of Inlet & Outlet Tunnel Excavation	m3 m3	10,000	140.00 55.00	1,400,000	
	Tunnel Excavation Tunnel Concrete	m3	687,300 199,800	160.00	37,801,500 31,968,000	
	Reinforcement bar	m3	2,100	1,500.00	3,150,000	
	Plug Concrete Others (20%)	m3 L.S.	17,100	160.00	2,736,000 15,509,100	
	Subtotal				·.	93,054,600
2.20	COFFER DAM					
	Excavation					
	Excavation, common	m3	72,900	3.50	255,150	
	Embankment Embankment,core	m3	117,700	5.00	588,500	
	Embankment, filter	m3	29,400	10.00	294,000	
	Embankment, rock	m3	679,400	6.00	4,076,400	
	Others (20%)	L.S.			1,042,810	
	Subtotal					6,256,860
2.30	MAIN DAM			-		•
	Едсаvation Excavation_common	m3	945,400	3.50	3,308,900	
	Excavation, weathered rock	m3	76,700	6.00	460,200	
	Excavation, hard Embankment	m3	279,800	10.00	2,798,000	
	Embankment,core	m3	5,088,600	5.00	25,443,000	
	Embankment, filter	m3	1,112,400	10.00 6.00	11,124,000 217,998,000	
	Embankment, rock Curtain Grouting	m3 · m	36,333,000 80,000	70.00	5,600,000	
	Consolidation Grouting	m • a	20,000	90.00	1,800,000	
	Others (10%)	L.S.			26,853,210	
	Subtotal					295,385,310
2.40	SPILLWAY			•		4
	Excavation Excavation.common	т3	226,400	3.50	792,400	
	Excavation, common Excavation, weathered rock	m3	288,400	6.00	1,730,400	
	Excavation,hard rock	m3	2,994,500	10.00	29,945,000	
	Concrete Reinforcement bars	m3 tom	163,100 4,900	140.00 1,500.00	22,834,000 7,350,000	
	Others (20%)	L.S.	-		12,530,360	
	Subtotal					75,182,160
2.50	WATERWAY					
2.51	INTAKE		-			
	Excavation	_				
	Excavation, common Excavation, weathered rock	m3 m3	12,400 12,400	3.50 6.00	43,400 74,400	
	Excavation,hard rock	m3	16,500	10.00	165,000	
	Concrete,open structure Reinforcement	m3 ton	18,600 560	140.00 1,500.00	2,604,000 840,000	
	Others (20%)	L.S.	500	1,500.00	745,360	
	Subtotal					4,472,160
2.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	270,800	55.00	14,894,000	
	Concrete, tunnel	m3	80,700	160,001	12,912,000	
	Reinforcement Consolidation grout	ton m	810 11,600	1,509.00 90.00	1,215,000 1,044,000	
	Curtain grout	m	1,400	70.00	98,000	
	Backfill grout Others (20%)	m3 L.S.	1,200	200.00	240,000 6,080,600	
	Subtotal		•			36,483,600
2.53	PENSTOCK					
	·	-3	. 21 000	55.00	3 670 600	
	Excavation,tunnel Concrete,tunnel	m3 m3	66,900 14,400	160.00	3,679,500 2,304,000	
	Reinforcement	ton	300	1,500.00	450,000	
	Curtain grout Backfill grout	m m3	. 0 700	70.00 200.00	0 140,000	
	Others (20%)	L.S.			1,314,700	
	Subtotal				•	7,888,200
2.60	OPEN POWERHOUSE					
	Excavation Excavation, common	m3	83,400	3.50	291,900	
			•			

	Decaustion weathered zook	m3	83,400	6.00	\$(00.400)	
	Excavation, weathered rock				500,400	
	Excavation, hard rock	m3	111,100	10.00	1,111,000	
	Concrete, substructure	m3	79,400	250.00	19,850,000	
	Concrete, second stage	m3	19,900	140.00	2,786,000	
	Reinforcement	ton	5,200	1,500.00	7,800,000	
	Others (20%)	L.S.			6,467,860	
	Subtotal					30 007 160
	ZUXOSH					38,807,160
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	10,000	3.50	35,000	
	Excavation weathered rock	m3	10,000	6.00	60,000	
	Excavation hard rock	m3	15,000	10.00	150,000	
	Concrete, structure	m3	3,000	140.00	420,000	
	Reinforcement	ton	90	1,500.00	135,000	
	Others (20%)	L.S.	70	1,500.00	160,000	
	· ·	D.0.			100,000	
	Subtotal	•				960,000
2.80	ARCHITECTURAL BUILDINGS	m2	6,500	1,100.00	7,150,000	7,150,000
		ME	0,500	1,100.00	7,130,000	7,150,000
2.90	ACCESS ROAD					
	New construction	m	80	600,000.00	48,000,000	
	Upgraded	m	69			
	Ординес	. 14	бу	50,000.00	3,450,000	
	Subtotal					51,450,000
3.00	METAL WORKS					
3.00	MBTAL WORKS					
	Penstock steel pipes	ton	16,100	5,000.00	80,500,000	
	Gates	ton	800	7,000.00	5,600,000	
					-,,	
	Subtotal					86,100,000
4.00	GENERATING EQUIPMENT					
4.00	GEREROTTING EQUITMENT					
	Turbines	ton	4,100	18,700.00	76,670,000	
	Generators	ton	5,400	20,400.00	110,160,000	
	Transformers	MVA	1,020	2,500.00	2,550,000	
		•	-,	2,000	-()	
	Subtotat					189,380,000
	*					
5.00	TRANSMISSION LINES AND	km	152	46,000.00	6,992,000	6,992,000
	SUBSTATIONS					
	Total of Direct Cost					955,411,055
6.00	LAND AQUISITION AND COMPENSATION	LS			0	47,770,553
2.00	ADMINISTED ATTOM EXPENSES	15		٠.		0 554 111
7.00	ADMINISTRATION EXPENSES	LS			0	9,554,111
8.00	ENGINEERING SERVICES	LS			0	66,878,774
9.00	PHYSICAL CONTINGENCY	LS			o	95,541,106
						•
	GRAND TOTAL				1,175,155,598	1,175,155,598
					, , - , - , - , -	,,

				Q of SR-3		
Item No.	Work Item	Unit		uit price C.(USS)	Amount F.C.(US\$)	
1.00	PREPARATORY WORKS	L.S.			•	7,158,41
.00	(10 % of Civil Works)	L3-				1,100,4
.00	CIVIL WORKS					
10	INTAKE DAM					
	Open Excavation					
	Open excavation common	ın3	30,300	3.50	106,050	
	Open excavation weathered rock	m3	30,300	6.00		
	Open excavation hard rock	m3	40,400	10.00	404,000	
	Concrete Mass concrete	m3	47,800	90.00	4,284,000	
	Reinforced concrete	m3	89,100	140.00		
	Reinforcement bar	ton	2,700	1,500.00		
	Cunain grouting	m	3,900	70,00		
	Consolidation grouting	m L.\$.	3,500	90.00	315,000 4,417,570	
	Others (20%)	L.S.			4,417,510	
,	Subroual					26,505,4
40	DESANDING BASIN					
	Excavation,tunnel	m3	107,500	55.00	5,912,500	
	Concrete, lunnel	т3	25,900	160.00	4,144,000	
	Reinforcement bars	ton L.S.	260	1,500.00	390,000 2,089,300	
	Others (20%)	J., Q.			2,007,300	
	Subtotai					12,535,8
50	WATERWAY					
51	INTAKE					
	Excavation					
	Excavation, common	m3	1,700	3.50	5,950	
	Excavation, weathered rock	m3	1,700	6.00	10,200	
	Excavation hard rock	m3	2,200	10.00		
	Concrete, open structure Reinforcement	m3 ten	2,500 75	140.00 1,500.00	350,000 112,500	
	Others (20%)	L.S.	7.0	2,500.00	100,130	
	Subtotal				•	600,7
52	HEADRACE TUNNEL					·
J2	NEADARCE TORREE		٠.			
	Excavation tunnel	m3	156,800	55.00		
	Concrete, tunnel	m3	52,500 530	160.00 1,500.00	8,400,000 795,000	
	Reinforcement  Consolidation grout	ton បា	17,400	90.00		
	Curtain grout	m	250	70.00	17,500	
	Backfill grout	m3	2,100	200.00		
1	Others (20%)	L.S.			3,964,500	
	Subtotal					23,787,0
53	SURGE TANK					
	Excavation, shaft	m3	14,480	55.00	792,000	
	Concrete, shaft	m3	4,200	160.00		
	Reinforcement	ton	125	1,500.00		
	Consolidation grout Others (20%)	m L.S.	400	90.00	36,000 337,500	
		2-0.				2,025,0
-4	Subtotal					2,020,0
54	PENSTOCK					
	Excavation, tunnel	m3	9,000	55.00		
	Concrete, tunnel	m3	4,000 80	160.00 1,500.00	640,000 120,000	
	Reinforcement Curtain grout	ton m	250	70.00		•
	Backfill grout	m3	190	200.00	38,000	
	Others (20%)	L.S.			262,100	
	Subtotal				*	1,572,6
0	OPEN POWERHOUSE			:		
•						
	Excavation			4.50	26.000	
	Excavation common	m3	8,800	3.50	30,800	
	Excavation, common  Excavation, weathered rock	m3	8,800	6.00	52,800	
••	Excavation, common  Excavation, weathered rock  Excavation, hard rock	m3 m3	8,800 11,800	6.00 10.00	52,800 118,000	
••	Excavation, common  Excavation, weathered rock	m3	8,800	6.00	52,800	

	Others (20%)	L.S.			684,120	
	Subspial					4,104,720
2.70	TAILRACE					4
-	Excavation					
	Ехсачаціон, сотпюл	m3	4,000	3.50	14,000	
	Excavation, weathered rock	m3	4,000	6.00	24,000	
	Bacavation,hard rock	m3	5,500	10.00	55,000	
	Concrete, structure	m3	1,500	140.00	210,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Others (20%)	L.S.			75,600	
	Subtotal					453,600
2.80	ARCHITECTURAL BUILDINGS	2911	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	. 5	600,000.00	3,000,000	
	Upgraded	· m	263	50,000.00	13,150,000	
	•:					•
	Subtotal					16,150,000
3.00	METAL WORKS					
	Penstock steel pipes	lan.	2,100	5,000.00	10,500,000	
	Gates	ton ton	150	7,000.00	1,050,000	
	·	NAT.	100	7,000.00	1,030,000	*
	Subtotal					11,550,000
4.00	GENERATING EQUIPMENT					
	Turbines		410	18,700.00	7,667,000	
	Generators	ton ton	830	20,400.00	16,932,000	
	Transformers	MVA	80	4,300.00	344,000	
				.,		
	Subtotal					24,943,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	59	46,000.00	2,714,000	2,714,000
	Total of Direct Cost	-				139,600,412
6.00	LAND AQUISITION AND COMPENSATION	LS		•	0	1,396,004
7.00	Administration expenses	LS			Q	1,396,004
8.00	ENGINEERING SERVICES	LS			0	9,772,029
9.00	PHYSICAL CONTINGENCY	LS			<b>Q</b>	13,960,041
	GRAND TOTAL				166,124,490	166,124,490

Item No.	Work Item	Unit			nount C.(US\$)	
				<u> </u>		
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				5,853,414
2.00	CIVIL WORKS					•
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	<b>m3</b>	27,400	3.50	95,900	
	Open excavation, weathered rock	m3	27,400	6.00	164,400	
	Open excavation, hard rock Concrete	m3	36,500	10.00	365,000	
	Mass concrete	m3	44,300	90.00	3,987,000	
	Reinforced concrete	m3	84,500	140.00	11,830,000	
	Reinforcement bar	ton	2,550	1,500.00	3,825,000	
	Curtain grouting	m	3,600	70.00	252,000	
	Consolidation grouting	m	3,500	90.00	315,000	
	Others (20%)	LS.			4,166,860	
	Subtotal					25,001,160
2.40	DESANDING BASIN					
	Execution tunnel	m3	71,500	55.00	3,932,500	
	Excavation turnel Concrete, turnel	. m3	17,300	160.00	2,768,000	
	Reinforcement bars	ton	180	1,500.00	270,000	
	Others (20%)	L.S.		•	1,394,100	
	Subtotal					8,364,600
2.50	WATERWAY					
2.51	INTAKE					
	Excavation		1,400	3.50	4,900	
	Excavation common	m3 m3	1,400	6.00	8,400	
	Excavation, weathered rock Excavation, hard rock	m3	1,800	10.00	18,000	
	Concrete, open structure	m3	2,000	140.00	280,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	L.S.			80,260	
	Subtotal					481,560
2.52	HEADRACE TUNNEL					
		2	101 000	55.00	6 699 000	
	Excavation mentel	m3	121,600	55.00 160.00	6,688,000 6,672,000	
	Concrete, tennel Reinforcement	m3	41,700 420	1,500.00	630,000	
	Consolidation grout	ton m	15,300	90.00	1,377,000	
	Curtain grout	m	220	70.00	15,400	
	Backfill grout	m3	1,900	200.00	380,000	
	Others (20%)	L.S.	•		3,152,480	
	Subtotal					18,914,880
2.53	SURGE TANK					
	Toronto defe	7	3,600	55.00	528,000	
	Excavation, shaft Concrete, shaft	m3 m3	2,800	160.00	448,000	
	Reinforcement	ton	85	1,500.00	127,500	
	Consolidation grout	m	350	90.00	31,500	
	Others (20%)	L.S.			227,000	-
	Subtotal					1,362,000
2.54	PENSTOCK					
	Excavation,tunnel	m3	6,800	55.00	374,000	
	Concrete,tunnel	m3	3,500	160.00	560,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Curtain grout	m	220	70.00	15,400	
	Backfill grout	m3	170	200.00	34,000	
	Others (20%)	L.S.			217,680	
	Subrotal	٠				1,306,080
2.60	OPEN POWERHOUSE		è			
	Excavation				-	
	Excavation,common	m3	5,900	3.50	20,650	
	Excavation, weathered rock	m3	5,900	6.00	35,400	
		m3	7,800	10.00	78,000	
	Excavation,hard rock	1173	,,,,,,,			
	Excavation,hard rock Concrete, substructure	m3	5,600	250.00	1,400,000	
٠.						

	Others (20%)	L.S.			457,010	
	Subtoral	-				2,742,060
	Subblai					2,142,000
2.70	TAILRACH					
	Excavation	_				
	Excavation, common	m3	3,000	3.50	10,500	
	Excavation, weathered rock	m3	3,000	6.00	18,000	
	Excavation, hard rock	m3	4,500	10.00	45,000	
	Concrete, structure	m3	1,200	140.00	168,000	
	Reinforcement	ton	40	1,500.00	60,000	
•	Others (20%)	18.			60,300	
	Subtotal					361,800
2.80	A DOLLATOVELLE AL DELLE DIVISO	m2	4,500	1 100 00	4,950,000	4,950,000
2.80	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,930,000	4,930,000
2.90	ACCESS ROAD	•				
	New construction	ជា	5	600,000.00	3,000,000	
	Upgraded	m	263	50,000.00	13,150,000	
				•		
	Subtotal					16,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,500	5,000.00	7,500,000	
	Gates	ton	100	7,000.00	700,000	
				•	•	
	Subtotal					8,200,000
	funktion affinker position to and				•	
4.00	GENERATING EQUIPMENT					•
	Turbines	ton	300	18,700.00	5,610,000	
	Generators	ton	650	20,400.00	13,260,000	
	Transformers	MVA	53	4,600.00	243,800	
						•
	Subtotal			•		19,113,800
5.00	TRANSMISSION LINES AND	tan	59	46,000.00	2,714,000	2,714,000
	SUBSTATIONS					
	Total of Direct Cost			•		115,515,354
6.00	LAND AQUISITION AND COMPENSATION	LS			ø	1,155,154
7.00	ADMINISTRATION EXPENSES	LS			0	1,155,154
8.00	ENGINEERING SERVICES	i.s			0	8,086,075
9.00	PHYSICAL CONTINGENCY	LS			0	11,551,535
		**			· ·	• ••
	GRAND TOTAL				137,463,271	137,463,271
	OKAND IOTAL				13,703,271	137,703,271

Item No.	Work frem	Unit Quantity Unit price Amount F.C.(US\$) F.C.(US\$)					
1,60	maten a manay woove	1.8.				4,937,89	
1,00	PREPARATORY WORKS (10 % of Civil Works)	13.			-	4'331'0	
2.00	CIVII. WORKS						
2.10	INTAKE DAM						
	Open Excavation						
	Open excavation, common	m3	24,500	3.50	85,750		
	Open excavation, weathered rock	m3	24,500	6.00	147,000		
	Open excavation hard rock	m3	32,800	10.00	328,000		
	Concrete	m3	41,100	90.00	3 600 000		
	Mass concrete Reinforced concrete	m3	80,200	140.00	3,699,000 11,228,000		
	Reinforcement bar	ton	2,400	1,500.00	3,600,000		
	Curtain grouting	m	3,400	70.00	238,000		
	Consolidation grouting	m	3,400	90.00	306,000		
	Others (20%)	L.S.			3,926,350		
•	Subtotal					23,558,10	
.40	DESANDING BASIN						
	Excavation, tunnel	m3	53,800	55.00	2,959,000		
	Concrete, tunnel	m3	13,000	160.00	2,080,000		
	Reinforcement bars	ton	130	1,500.00	195,000		
	Others (20%)	L.S.			1,046,800		
	Subtotal					6,280,8	
.50	WATERWAY						
51	INTAKE						
	Excavation						
	Excavation, common	Еm	1,200	3.50	4,200		
	Excavation, weathered rock	m3	1,200	6.00	7,200		
	Excavation hard rock	m3	1,600	10.00	16,000		
	Concrete open structure	മ്പ3	1,700	140.00	238,000		
	Reinforcement	ton	50	1,500.00	75,000		
	Others (20%)	L.S.			68,080		
	Subtotal					408,4	
.52	HEADRACE TUNNEL	:					
	Excavation,tunnel	m3	90,700	55.00	4,988,500		
	Concrete, tunnel	m3	32,100	160.00	5,136,000		
	Reinforcement	ton	320	1,500.00	480,000	*	
	Consolidation grout	m	13,100	90.00	1,179,000		
	Curtaîn grout	m	200	70.00	14,000		
	Backfill grout	m3	1,700	200.00	340,000		
	Others (20%)	L.S.			2,427,500		
	Subiotal					14,565,0	
.53	SURGE TANK						
	Excavation, shaft	m3	7,200	55.00	396,000		
	Concrete, shaft	m3	2,100	160.00	336,000		
	Reinforcement	ton	65	1,500.00	97,500		
	Consolidation grout	m - a	300	90.00	27,000		
	Cihers (20%)	L.S.			171,300		
	Subtotal					1,027,8	
.54	PENSTOCK				·.		
	Excavation, tunnel	m3	5,700	55.00	313,500		
	Concrete, tunnel	m3	3,100	160.00	496,000		
	Reinforcement	ton	65	1,500.00	97,500		
	Custain grout	m	200	70.00	14,000		
	Backfill grout	m3	150	200.00	30,000		
	Others (20%)	L.S.			190,200		
	Subtotal			•		1,141,2	
50	OPEN POWERHOUSE				•		
	Excavation		4				
	Ехсачаноп,сополноп	m3	4,480	3.50	15,400		
	Excavation, weathered took	m3	4,400	6.00	26,400		
	Excavation, hard rock	m3	5,900	10.00	59,000		
			4,200	250.00	1,050,000		
	Concrete, substructure	m3					
	Concrete, substructure Concrete, second stage Reinforcement	m3 ton	1,100 280	140.00 1,500.00	154,000 420,000		

					•			
		Orbert (1974)				244.000		
		Others (20%)	L.S.			344,960		
		Subtotal					2,069,760	
	2.70	TAILRACE						
		Excavation						
		Excavation, common	m3	2,800	3.50	9,100		
		Excavation, weathered rock	m3	2,600	6.00	15,600		
		Excavation, hard rock	m3	4,200	10.00	42,000		
		Concrete, structure	m3	1,100	140.00	154,000		
		Reinforcement	ton	- 35	1,500.00	52,500		
		Others (20%)	L.S.			54,640		
		Subtotal					327,840	
		. Sances					227,070	
	2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000	
	2.90	ACCESS ROAD	•					
	2.70	THE STATE OF THE S						
		New construction	т	5	600,000.00	3,000,000		
		Upgraded	m	263	50,000.00	13,150,000		
		Subtotal				+	16,150,000	•
		VALVA LEGIS		*			101.00400	
•	3.00	METAL WORKS						
		Penstock steel pipes	ton.	1,200	5,000.00	6,000,000	-	
		Gates	ton	75	7,000.00	525,000		
		Curo			-1000100	,000		
	•	Subtotal					6,525,000	
		CENER ATING EQUIDATE						
	4.00	GENERATING EQUIPMENT						
•		Turbines	ton	230	18,700.00	4,301,000		
		Generators	ton	530	20,400.00	10,812,000		
		Trazisformers	MVA	40	4,900.00	196,000		
	•	Subtotal					15,309,000	
	5.00	TRANSMISSION LINES AND	kuri	59	46,000.00	2,714,000	2,714,000	
		SUBSTATIONS						
		Total of Direct Cost				4.3	99,414,878	
					•			
	6.00	LAND AQUISITION AND COMPENSATION	LS			0	994,149	
	7.00		LS			0	994,149	
	1300	ADMINISTRATION EXPENSES	Lis .					
	8.00	ENGINEERING SERVICES	LS			0	6,959,041	
:	9.00	PHYSICAL CONTINGENCY	LS			. 0	9,941,488	
			•					•
		GRAND TOTAL				118,303,705	118,303,705	
		MIGING FOLLID						

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Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(USS)	
1.00	PREPARATORY WORKS	L.S.				5,422,074
1.00	(10 % of Civil Works)					5,425,014
2.00	CIVIL WORKS					
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation.common	m3	19,900		.50 69,650	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	19,900 26,500		.00 119,400 .00 265,000	
	Concrete	21.5	20,000	. 10	.00 203,000	
	Mass concrete	m3	34,700	90	.00 3,123,000	
	Reinforced concrete	m3	75,500	140	.00 10,570,000	
	Reinforcement bar	ton	2,300			
	Curtain grouting	nt	3,900		.00 273,000 .00 252,000	
	Consolidation grouting Others (20%)	m L.S.	2,800	90	.00 252,000 3,624,410	
	Subtotal	5.0.			-,,	21,746,460
2.42					•	21,740,400
2.40	DESANDING BASIN					
	Excavation,tunnel Concrete, tunnel	ns3 m3	35,000 89,000		.00 1,925,000 .00 14,240,000	
	Concrete, tunner Reinforcement bars	m3 ten	99,000 09			
	Others (20%)	1.8.			3,260,000	
	Subtotal					19,560,000
2.50	WATERWAY					
2.51	INTAKE					
	Excavation Excavation, common	m3	1,000	. 3	.50 3,500	
	Excavation, weathered rock	m3	1,000		.00 6,000	
	Excavation, hard rock	m3	1,300		.00 13,000	
	Concrete,open structure	m3	1,500	140	210,000	
	Reinforcement	ton	45	1,500		
	Others (20%)	L.S.			60,000	
	Subtota!					360,000
2.52	HEADRACE TUNNEL				A Company	
	Excavation,tumel	m3	48,900	55	.00 2,689,500	
	Concrete, tunnel	m3	18,000			
	Reinforcement	ton	180	1,500	.00 270,000	
	Consolidation grout	m	8,300		.00 747,000	
	Curtain grout Backfill grout	EO .	160		.00 11,200	
	Others (20%)	m3 L.S.	1,700	200	.00 340,000 1,387,540	
	Subtotal					8,325,240
2.53	SURGE TANK					
	Excavation, shaft	m3	5,000		.00 275,000	
	Concrete, shaft Reinforcement	m3 ton	1,500 50		•	
	Consolidation grout	m	300		00 27,000	
	Others (20%)	L.S.			123,400	
	Subtora!			•		740,400
2.54	PENSTOCK					
	Excavation,turnel	m3	3,700	55	.00 203,500	
	Concrete, tunnel	m3	2,200	160		
	Reinforcement	ion	45	1,500	.00 67,500	
	Curtain grout	m	160		00 11,200	
	Backfill grout Others (20%)	m3 L.S.	120	200	.00 24,000 131,640	
	Subtotal					789,840
260						107,010
2.60	OPEN POWERHOUSE		•			
	Excavation  Excavation,common	m3	5,000	1	.50 17,500	
	**************************************		5,000		.00 30,000	
	Excavation weathered rock	m3	3.000			
	Excavation, weathered rock Excavation, hard rock	ma ma	6,700	10.		
	Excavation, hard rock Concrete, substructure	m3 m3	6,700 4,800	10. 250.	00 67,000 00 1,200,000	
	Excavation, hard rock	m3	6,700	10.	00 67,000 00 1,200,000 00 168,000	

	Others (20%)	L.S.			389,500	•
	Subtotal					2,337,000
2.70	TAILRACE				· ·	
	Excession					
	Excavation common	m3	3,000	3.50	10,500	
	Excavation, weathered rock	m3	3,000	6.00	18,000	
	Excavation, hard rock	m3	4,500	10.00	45,000	
	Concrete, structure	m3	1,200	140.00	168,000	
	Reinforcement	ion	40	1,500.00	60,000	
	Others (20%)	L,S,			60,300	
	Subtotal					361,800
÷					•	4
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	35	600,000.00	21,000,000	
	Upgraded	m	. 298	50,000.00	14,900,000	
	Subtotal	•				35,900,000
3.00	METAL WORKS			•		
	Penstock steel pipes	ton	1,150	5,000.00	5,750,000	
	Gates	ton	55	7,000.00	385,000	
	Subtotal					6,135,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	240	18,700.00	4,488,000	
	Generators	ton	660	20,400.00	13,464,000	
	Transformers	MVA	55	4,600.00	253,000	. 1
	Subtotal			·	·	18,205,000
	Gaendiai					10,200,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	87	46,000.00	4,002,000	4,002,000
	Total of Direct Cost					128,284,814
6.00	LAND AQUISITION AND COMPENSATION	LS			0	1,282,848
7.00	ADMINISTRATION EXPENSES	LS		•	0	1,282,848
8.00	ENGINEERING SERVICES	LS			. 0	8,979,937
9.00	PHYSICAL CONTINGENCY	LS			0	12,828,481
	GRAND TOTAL				152,658,929	152,658,929

Item No.	Work Item	Unit		nit price	Amount	
	,		Re	C.(USS)	F.C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				3,225,77
	(10 % of Civil Works)					
2.00	CIVIL WORKS					
1.10	INTAKE DAM				•	
	Open Excavation				•	
	Open excavation, common	m3	17,900	3.5		
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	17,900 23,900	6.0 10.0		
	Concrete		2.010.00		22,1000	
	Mass concrete	m3	32,300	90.0		
	Reinforced concrete	m3	70,900 2,150	140.0		
	Reinforcement bar Curtain grouting	ton m	3,600	1,500.0 70.0		
	Consolidation grouting	m	2,700	90.0		
	Others (20%)	L.S.		•	3,392,410	
	Subtotal					20,354,460
.40	DESANDING BASIN					
	Excavation,tunnel	m3	23,300	55.0	0 1,281,500	
	Concrete, runnel	m3	5,900	160.0	944,000	
	Reinforcement bars	ton L.S.	60	1,500.0	0 90,000 463,100	
	Others (20%)	L.3,			463,100	
	Subtotal					2,778,60
2.50	WATERWAY					
2.51	INTAKE					
	Excavation					
	Excavation, common	m3	800	3.5	0 2,800	
	Excavation, weathered rock	m3	800	6.0		•
	Excavation,hard rock	m3 m3	1,100 1,200	10.0 140.0		
	Concrete, open structure Reinforcement	ten	35	1,500.0		
	Others (20%)	L.S.			47,820	
	Subtotal					286,920
2.52	HEADRACE TUNNEL					
			20.400		0 1 700 000	
	Excavation, unnel Concrete, tunnel	m3 m3	32,400 12,500	55.0 160.0		
	Reinforcement	ton	130	1,500.0		
	Consolidation grout	m	8,800	90.0		
	Curtain grout	m 2	130 1,300	70.0	-	
	Backfill grout Others (20%)	m3 L.S.	1,300	200.0	968,020	
	Subtota!					5,808,120
53	SURGE TANK					
		3	3,400	55.0	0 193.000	
	Excavation, shaft Concrete, shaft	m3 m3	1,000	160.0	-	
	Reinforcement	ton	30	1,500.0		
	Consolidation grout	m L.S.	250	90.0	0 22,500 82,900	
	Others (20%)	L.S.			62,700	
	Subtotal					497,400
.54	PENSTOCK:				•	
	Excavation, lunnel	m3	3,000	55.0		
	Concrete tunnel	m3	1,900	160.0		
	Reinforcement Curtain grout	ten m	40 · 130	1,500.0 70.0		
	Backfill grout	m3	100	200.0		
	Others (20%)	L.S.	•		111,620	
	Subtotal					669,720
.60	OPEN POWERHOUSE				•	
	Excavation					
	Excavation, common	m3	3,300	3.50		
	Excavation, weathered rock	m3 3	3,300	6.00		
	Excavation hard rock	m3 m3	4,500 3,200	10.00 250.00		
	Concrete, substructure Concrete, second stage	m3	800	140.0		

	Others (20%)	L.S.			260,670	
	Subtotal					1,564,020
2.70	TAILRACE			-		
	Excavation					
	Excavation common	т3	2,500	3.50	8,750	
	Excavation, weathered rock	m3	2,500	6.00	15,000	
	Excavation, hard rock	m3	4,000	10.00	40,000	
	Concrete, structure	m3	1,000	140.00	140,000	
	Reinforcement	ton	30	1,500.00	45,000	
	Others (20%)	L.S.			49,750	
	Subtoral					298,500
	•					
2.80	ARCHITECTURAL BUILDINGS	m2	3.000	1,100.00	3,300,000	3,300,000
2.90	ACCESS ROAD					•
	New construction	m	35	600,000.00	21,000,000	1 to 1
	Upgraded	m	298	50,000.00	14,900,000	
	Suban A		-			35,900,000
	Subtotal					33,500,000
3.00	METAL WORKS					
	Penstock steel pipes	ton ·	850	5,000.00	4,250,000	
	Gates	ton	40	7,000.00	280,000	
		****		1,000.00		
	Subtotal					4,530,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	170	18,700.00	3,179,000	
	Generators	ton	510	20,400.00	10,404,000	
	Transformers	MVA	37	5,000.00	185,000	
	Subtotal					13,768,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	87	46,000.00	4,002,000	4,002,000
	Total of Direct Cost					96,983,514
6.00	LAND AQUISITION AND COMPENSATION	LS			0	969,835
7.00	ADMINISTRATION EXPENSES	LS			0	969,835
8.00	ENGINEERING SERVICES	LS			. 0	6,788,846
9,00	PHYSICAL CONTINGENCY	LS			0	9,698,351
	GRAND TOTAL				115,410,382	115,410,382

liem No.	Work Item	Unit			Amouni F.C.(US\$)	
1.00	PREPARATORY WORKS (10 % of Civil Works)	1.8.				2,746,35
2.00	CIVIL WORKS					
			•			
10	INTAKE DAM					
	Open Excavation		16 100	. 2.50	E1 250	
	Open excavation, common Open excavation, weathered rock	m3 m3	16,100 16,100	3.50 6.00	56,350 96,600	
	Open excavation hard rock	m3	21,500	10.00	215,000	
	Concrete		20.000		0 400 000	
	Mass concrete Reinforced concrete	m3 m3	30,000 30,000	90.00 140.00	2,700,000 9,324,000	
	Reinforcement bar	nos	2,000	1,500.00	3,000,000	
	Curtain grouting	m	3,400	70.00	238,000	
	Consolidation grouting Others (20%)	m L.S.	2,700	90.00	243,000 3,174,590	
	Subtotal					19,047,5
.40	DESANDING BASIN					
		,	17 400	ee no	051.000	
	Excavation,tunnel Concrete, tunnel	m3 m3	17,400 4,400	55.00 160.00	957,000 704,000	
	Reinforcement bars	ton	4,400	1,500.00	67,500	
	Others (20%)	L.S.		•	345,700	
	Subtotal					2,074,2
.50	WATERWAY					
.51	INTAKE					
	Excavation					
	Excavation, common	m3 .	700	3.50	2,450	
	Excavation, weathered rock	m3	700	6.00	4,200	
	Excavation hard took Concrete, open structure	m3 m3	900 1,000	10.00	9,000	
	Reinforcement	ton	30	1,500.00	45,000	
	Others (20%)	L.S.			40,130	
	Subtotai					240,7
52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	19,200	\$5.00	1,056,000	
	Concrete, tunnel	m3	8,000	160.00	1,280,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Consolidation grout Curtain grout	m m	5,000 100	90.00 70.00	450,000 7,000	
	Backfill grout	m3	950	200.00	190,000	
	Others (20%)	L.S.			620,600	
	Subtorat					3,723,6
53	SURGE TANK		•			
	Excavation, shaft	m3	2,500	55.60	137,500	
	Concrete, shaft	m3	750 25	160.00 1,500.00	120,000 37,500	
	Reinforcement Consolidation grout	Kon Fa	200	90.00	18,000	
	Others (20%)	L.S.			62,600	
	Subtota)					375,6
54	PENSTOCK					
	Excavation,tunnel	m3	2,300	55.00	126,500	:
	Concrete, tunnel Reinforcement	m3	1,650 35	160.00 1,500.00	264,000 52,500	
	Curtain grout	to <b>n</b> m	100	70.60	7,000	
	Backfill grout	т3	90	200.00	18,000	
	Others (20%)	L.S.			93,600	
	Subtotal		· ·			561,6
60	OPEN POWERHOUSE					
	Excavation  Excavation, common	m3	2,500	3.50	8,750	
	Excavation, weathered rock	m3	2,500	6.00	15,000	
	Excavation hard rock	m3	3,300	10.00 250.00	33,000 600,000	
					en 5111X)	
	Concrete, substructure Concrete, second stage	m3	2,4 <i>00</i> 600	140.00	84,000	

		Others (20%)	L.S.			194,650		
		Subtotal			4		1,167,900	
÷	2.70	TAILRACE		."				
		Excavation						
		Excavation, common	m3	2,200	3.50	7,700		
		Excavation, weathered rock	ın3	2,200	6.00	13,200		
		Excavation hard rock Concrete, structure	m3 m3	3,500 900	10.00 140.00	35,000 126,000		
		Reinforcement	ton	30	1,500.00	45,000		
		Others (20%)	L.S.	-	1,20000	45,380		
		Subtotal		•			272,280	
		Sutxoral					212,200	
	2.80	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000	
	2.90	ACCESS ROAD						
•		New construction	_	35	600,000.00	21,000,000	•	
		Upgraded	m m	298	50,000.00	14,900,000		
	: .	Subtotal	•				35,900,000	•
	3.00	METAL WORKS						
	٠	Penstock steel pipes	tom	580	5,000.00	2,900,000	1	
		Gates	ton ton	30	7,000.00	210,000		
		Subtotal					3,110,000	
	4.00	GENERATING EQUIPMENT						
		Turbines	ton	140	18,700.00	2,618,000	:	
		Generators	ton	420	20,400.00	8,568,000		
	•	Transformers	MVA	28	5,200.00	145,600	•	•
		Subtotal					11,331,600	**
		·						•
	5.00	TRANSMISSION LINES AND SUBSTATIONS	សា	87	46,000.00	4,002,000	4,002,000	
		Total of Direct Cost					87,303,450	
	4.00	LAND ADDICEDON AND COMPENSATION	l e			0	971 ms	
	6.00 7.00	LAND AQUISITION AND COMPENSATION  ADMINISTRATION EXPENSES	LS LS			. 0	873,035 873,035	
٠	8.00	ENGINEERING SERVICES	LS			0	6,111,242	
	9.00	PHYSICAL CONTINGENCY	LS			0	8,730,345	
	,							
		GRAND TOTAL				103,891,106	103,891,106	
								•
		· ·		:				
•								

					mar ware o.s.	
Item No.	Work Item	Unit			mount C.(US\$)	
1.00	PREPARATORY WORKS	1\$.				3,698,460
	(10 % of Civil Works)					
2.00	CIVIE WORKS					
2.10	INTAKE DAM					
	Open Excavation Open excavation, common	คเริ	18,600	3.50	65,100	
	Open excavation, weathered rock	m3	18,600	6.00	111,600	
	Open excavation hard rock	m3	24,700	10.00	247,000	
	Concrete	3	35,000	90.00	3,150,000	
	Mass concrete Reinforced concrete	m3 m3	78,500	140.00	10,990,000	
	Reinforcement bar	ion	2,350	1,500.00	3,525,000	
	Curtain grouting	ធ	3,850	70.00	269,500	
	Consolidation grouting Others (20%)	m L.S.	2,700	90.00	243,000 3,720,240	
		p.o.			5,120,240	22.221.44
	Subtotal					22,321,44
2.40	DESANDING BASIN					
	Excavation,tunnel	m3	43,300	55.00	2,381,500	
	Concrete, tunnel Reinforcement bars	rn3 ton	11,000 110	160.00 1.500.00	1,760,000 165,000	
	Others (20%)	L.S.	110	1,100,000	861,300	
						:
	Subtotal					5,167,80
2.50	WATERWAY				٠	
2.51	INTAKE			-		
	Excavation					
	Excavation, common	m3 -2	1,100	3.50	3,850	
	Excavation, weathered rock  Excavation, hard rock	ள3 ன3	1,100 1,500	6.00 10.00	6,600 15,000	
	Concrete,open structure	m3	1,650	140.00	231,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Others (20%)	L.S.			66,290	
	Subtotal					397,74
2.52	HEADRACE TUNNEL					
	Excavation tunnel	m3	41,500	55.00	2,282,500	
	Concrete, tunnet	m3	14,700	00.081	2,352,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Consolidation grout	m	6,000	90.00	540,000	
	Curtain grout	uz.	200	70.00	14,000	
	Backfill grout Others (20%)	m3 L.S.	750	200.00	1,112,700	
	Subtotal					6,676,20
2.53	SURGE TANK					
,_,	SORGE PAIN					
	Excavation, shaft	m3	5,500 1,600	55.00	302,500 256,000	
	Concrete, shaft Reinforcement	m3 ten	50	160.00 1,500.00	75,000	
	Consolidation grout	10)	200	90.00	18,000	
	Others (20%)	L.S.			130,300	
	Subtotal					781,80
2.54	PENSTOCK					
	Excavation,tunnel	т3	2,200	55.00	121,000	
	Concrete, tunnel	m3	1,200	160.00	192,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Curtain grout  Backfill grout	m m3	200 80	70.00 200.00	14,000 12,000	
	Others (20%)	L.S.			75,300	
	Subtotal					451,80
.60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	2,100	3,50	7,350	
	Excavation, weathered rock	m3	2,100	6.00	12,600	
	O		0.000			
	Excavation hard rock Concrete, substructure	m3 m3	2,800 2,000	10.00 250.00	28,000 500.000	
	Excavation hard rock Concrete, substructure Concrete, second stage	m3 m3 m3	2,800 2,000 500	250.00 140.00	28,000 500,000 70,000	

	O.L. (MAY)	1.0			162,590	
	Others (20%)	18.			102,390	
	Subtoral					975,540
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	1,200	3.50	4,200	
	Excavation, weathered rock	m3	1,200	6.00	7,200	
	Excavasion,hard rock	m3	1,600	10.00	16,000	
	Concrete, structure	Ein.	800	140.00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	13.			35,380	
	Subtotal					212,280
				. •		
2.80	ARCHITECTURAL BUILDINGS	m2	1,000	1,100.00	1,100,000	1,100,000
2.90	ACCESS ROAD			4		
	New construction	m	26	600,000.00	15,600,000	
	Upgraded	·m	263	50,000.00	13,150,000	
	Subtotal					28,750,000
3.00	METAL, WORKS		•			
	Penstock steel pipes	ton	270	5,000.00	1,350,000	
	Gates	ten .	50	7,000.00	350,000	•
			• • • • • • • • • • • • • • • • • • • •	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
	Subtotal					1,700,000
4.00	GENERATING EQUIPMENT					
	m attack		150	10 700 00	2,805,000	
	Turbines	nos	150 300	18,700.00 20,400.00	6,120,000	
	Generators Transformers	ton MVA	14	5,900.00	82,600	
	t at in or the state of the sta	STITE	174	3,700.00	02,000	
	Subtotal					9,007,600
5.00	Transmission lines and substations	kra	43	46,000.00	1,840,000	1,840,000
	Total of Direct Cost					83,080,660
6.00	LAND AQUISITION AND COMPENSATION	LS		·	0	830,807
7.00	ADMINISTRATION EXPENSES	LS			O	830,807
6.00	ENGINEERING SURVICES	LS			Q	5,815,646
9.00	PHYSICAL CONTINGENCY	LS			0	8,308,066
	GRAND TOTAL				98,865,985	98,865,985

iem No.	Work Item	Unit	Quan			nount C.(US\$)	
		<del></del>			(000)	(003)	
00	PREPARATORY WORKS (10 % of Civil Works)	18.					3,064,278
ů.	CIVIL WORKS						
	INTAKE DAM						
0	INTAKEDAM						
	Open Excavation	4		12 000	1.00	'ed 600	
	Open excavation, common Open excavation, weathered rock	ու3 ու3		16,800 16,800	3.50 6.00	58,800 100,800	
	Open excavation hard rock	m3		22,400	10.00	224,000	
	Concrete Mass concrete	m3		31,000	90.00	2,790,000	
	Reinforced concrete	m3		70,500	140.00	9,870,000	
	Reinforcement bar	ton		2,100	1,500.00	3,150,000	
	Curtain growing  Consolidation grouting	m m		3,600 2,600	70,00 90,00	252,000 234,000	
	Others (20%)	L.S.				3,335,920	
	Subtotal						20,015,520
0	DESANDING BASIN						
	Excavation,tuppel	m3		28,800	55.00	1,584,000	4
	Concrete, tunnel	m3		7,300	160.00 1,500.00	1,168,000	
	Reinforcement bars Others (20%)	ton L.S.		75	1,300,00	112,500 572,900	
	Subtotal					-	3,437,400
0	WATERWAY						
51	INTAKE					•	
•							
	Excavation  Excavation, common	m3		900	3.50	3,150	
	Excavation, weathered rock	m3		900	6.00	5,400	:
	Excavation, hard rock Concrete, open structure	Em Em		1,200 1,300	10.00 140.00	12,000 182,000	
	Reinforcement	ton	-	40	1,500.00	60,000	
	Others (20%)	L.S.				52,510	
	Subtotal						315,060
52	HEADRACE TUNNEL						
	Excavation,tunnel	m3		29,500 10,900	55.00 160.00	1,622,500 1,744,000	
	Concrete, tunnel Reinforcement	m3 ton		10,900	1,500.00	165,000	
	Consolidation grout	m		5,000	90.00	450,000	
	Curtain growt  Backfill grout	m3		160 650	70.00 200.00	11,200 130,000	
	Others (20%)	L.S.		000		824,540	
	Subtotal						4,947,240
3	SURGE TANK						
		m3		3,700	55.00	203,500	
	Excavation, shaft Concrete, shaft	ms m3		1,100	160.00	176,000	
	Reinforcement Consolidation growt	ton		30 170	1,500.00 90.00	45,000 15,300	
	Consolidation growt Others (10%)	m L.S.		170	30.00	87,960	
	Subtotal						527,760
4	PENSTOCK			•		21 1	
	Excavation,turnel	m3		2,900	\$5.00	159,500	
	Concrete,tannel	m3		1,400	160.00	224,000	
	Reinforcement Curtain grout	m m		. 30 160	1,500.00 70.00	45,000 11,200	
	Backfill grout	m3		50	200.00	10,000	
	Others (20%)	L.S.				89,940	
	Subtotal						539,640
0	OPEN POWERHOUSE						
	Excavation common	m3		1,400	3.50	4,900	
	Excavation common  Excavation weathered rock	m3 ⋅		1,400	6.00	8,400	
	Excavation, hard rock	m3		1,900	00.01	19,000	
	Concrete, substructure Concrete, second stage	m3 m3		1,400 350	250.00 140.00	350,800 49,000	
	A contract account and	,					

			•			
	Others (20%)	L.S.			113,260	
	Subjetal				•	679,560
	, Sanyaii		•			017000
2.70	TAILRACE	*				•
	Fixcavation					
	Excavation common	m3	000,1	3.50	3,500	
	Excavation, weathered rock	m3	1,000	6.00	6,000	
	Excavation, hard rock	m3	1,300	10.00	13,000	
	Concrete, structure	m3	700	140.00	98,000	
	Reinforcement Others (20%)	ton L.S.	50	1,500.00	30,000 30,100	
	Others (20%)	L.J.			30,100	
	Subtotal	•	•			180,600
		•				
2.80	ARCHITECTURAL BUILDINGS	m2	. 900	1,100.00	990,000	990,000
2.00	ARCHITECTORNE BOLEDINGS		300	1,100.00		330,000
2.90	ACCESS ROAD		-			· .
	New construction	ın	26	600,000.00	15,600,000	
	Upgraded	m.	263	50,000.00	13,150,000	
	-					
	Subtotat					28,750,000
3.00	METAL WORKS					
				A	•	. '
	Penstock steel pipes	ton	200	5,000.00	1,000,000	
	Gates	ton	30	7,000.00	210,000	
	Subtotal				·	1,210,000
4.00	GENERATING EQUIPMENT					•
	Turbines	10n	100	18,700.00	1,870,000	
	Generators	ton	200	20,400.00	4,080,000	• •
	Transformers	MVA	9	6,150.00	55,350	
	Subtoial					6,005,350
5.00	TRANSMISSION LINES AND	km	40	46,000.00	1,840,000	1,840,000
	SUBSTATIONS				,,	
	Total of Direct Cost					72,502,408
6.00	LAND AQUISITION AND COMPENSATION	LS			Ø	725,024
7.00	ADMINISTRATION EXPENSES	LS			0	725,024
8.00	ENGINEERING SERVICES	LS			0	5,075,169
9.00	PHYSICAL CONTINGENCY	LS			0	7,250,241
,,,,,,	THE SECTION OF THE SE	20				· Sec. Obb. LT
	GRAND TOTAL				86,277,866	86,277,866
	· · · · · · · · · · · · · · · · · · ·					

				B/Q of BS	-1 (Draft Rate 0.6	()
Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)	
1.00	PREPARATORY WORKS	1S.				2,634,21
	(10 % of Civil Works)					
.00	CIVIL WORKS				•	
.10	INTAKE DAM					
	Open Excavation	m3	15,100		E0	
	Open excavation common Open excavation, weathered rock	m3	15,100		.50 52,850 .00 90,600	
	Open excavation, hard rock	m3	20,100		.00 201,000	
	Concrete	_				
	Mass concrete  Reinforcest concrete	ന3 ന3	28,900 65,500			
	Reinforcement bar	ion	2,000			
	Curtain grouting	m	3,400			
	Consolidation grouting	m	2,800	90.	_	
	Others (20%)	1. S.			3,117,490	
	Subtotal					18,704,9
.40	DESANDING BASIN					
	Excavation, tunnel	m3	21,700		.00 1,193,500	
	Concrete, tunnel	m3	5,500		-	
	Reinforcement bars	ten	55	1,500.		
	Others (20%)	L.S.			431,200	
	Subtotal					2,587,2
.50	WATERWAY					
51	INTAKE					
	Excavation					
	Excavation common	m3	800		50 2,600	
	Excavation, weathered rock Excavation, hard rock	m3 . m3	800 1,000		.00 4,800 .00 10,000	
	Concrete, open structure	m3	1,100			
	Reinforcement	ion	30	1,500.		
	Others (20%)	L.S.			43,320	
	Subtotal					259,9
.52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	19,500	55.	00 1,072,500	
	Concrete, bunnel	m3	7,500	160.	00 1,200,000	
	Reinforcement	ton	75	1,500.		
	Consolidation growt	m	4,000 125	90. 70.		
	Curtain grout Backfill grown	m m3	520			
	Others (20%)	L.S.	515	240.	571,550	
	Subtotal			÷		3,429,3
53	SURGE TANK					
	Excavation, shaft	m3	2,700	55.	00 148,500	
	Concrete, shaft	m3	800		-	
	Reinforcement	ton	25	-		
	Consolidation grout Others (20%)	m L.S.	130	90.	00 11,700 65,140	
	Subtotal	****				390,8
54	PENSTOCK					
	Excavation,tunnel	m3	1,400	55.	00 77,000	
	Concrete, tunnel	m3	900	160.	00 144,000	
	Reinforcement	ton	20	1,500.		
	Curtain grout  Backfill group	m m3	125 45	70. 200.		
	Backfill grout Others (20%)	m3 L.S.	45	200.	00 9,000 53,750	
	Subtotal					322,5
60	OPEN POWERHOUSE		-			
	Excavation				•	
	Excavation common	m3	1,100		50 3,850	
	Excavation weathered rock	m3	1,100		00 6,600	
	Excavation, hard rock Concrete, substructure	m3 m3	1,400 1,000	10,0 2,50,0		
	Concrete, second stage	m3	250	140.0		

	· ·					
	Others (20%)	L.S.			81,390	
	Subtotal					488,340
2.70	TAILRACE		•			
	Excavation					
	Excavation common	m3	800	3.50	2,800	
	Excavation, weathered rock Excavation, hard rock	m3 m3	800 1,100	6.00 10.00	4,800 11,000	,
	Concrete, structure	m3	600	140.00	84,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.	2.4	1,500,00	25,520	
	Subtotal					159,120
2.80	ARCHITECTURAL BUILDINGS	m2	750	1,100.00	825,000	825,000
2.90	ACCESS ROAD					
	New construction	nı	26	600,000.00	15,600,000	
	Upgraded	m	263	50,000.00	13,150,000	
	Subtotal	•				28,750,000
3.00	METAL WORKS					
	Province do structural community		170	5,000.00	850,000	
	Penstock steel pipes  Oates	ton ton	25	7,000.00	175,000	
	Gales	1011	20	,,000.00	110,000	
	Subtotal					1,025,000
400	CENTER ATTAKE POLITICATE.					-
4.00	GENERATING EQUIPMENT			* .		
	Turbines	เอก	80	18,700.00	1,496,000	
	Generators	ton	170	20,400.00	3,468,000	
	Transformers	MVA	7	6,500.00	45,500	
	Subtotal					5,009,500
5.00	TRANSMISSION LINES AND	km	40	46,000.00	1,840,000	1,840,000
3.00	SUBSTATIONS	Kill	70	40,000.00	1,010,000	1,040,000
	Total of Direct Cost					66,425,876
6.00	LAND AQUISITION AND COMPENSATION	LS			0	664,259
7.00	ADMINISTRATION EXPENSES	LS			0	664,259
8.00	ENGINEERING SERVICES	LS			0	4,649,811
9.00	PHYSICAL CONTINGENCY	LS			0	6,642,588
:	OD AND TOTAL				79,046,792	79,046,792
	GRAND TOTAL				17,010,172	19,010,192

hem No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				2,170,99
1.00	(10 % of Civil Works)	1.3.				2,110,33
2.00	CIVIL WORKS					
2.10	INTAKE DAM		•			
	Open Excavation Open excavation, common	m3	10,800	3.50	37,800	
	Open excavation, weathered rock	m3	10,800	6.00	64,800	
	Open excavation, hard rock	m3	14,300	10.00	143,000	
	Concrete					
	Mass concrete	ın3	19,800	90.00	1,782,000	
	Reinforced concrete	m3	61,500	140.60	8,610,000	
	Reinforcement bar Curtain grouting	ton m	1,850 3,900	1,500.00 70.00	2,775,000 273,000	
	Consolidation groating	m.	2,000	90.00	180,000	
	Others (20%)	L.S.			2,773,120	
	Subtoral			٠		16,638,72
2.40	DESANDING BASIN					
	Excavation,tunnel	m3	6,900	55.00	379,500	
	Concrete, tunnet	m3	1,900	160.00	304,000	
	Reinforcement bars	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			142,700	
	Subtotal					856,20
2.50	WATERWAY					
2.51	INTAKB					
	Excavation					
	Excavation, common	m3	500	3.50	1,750	
	Excavation, weathered rock	m3 3	500 600	6.00 10.00	3,000 6,000	
	Excavation,hard rock Concrete,open structure	ın3 m3	700	140.00	98,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			27,750	
	Subtotal					166,50
2.52	HEADRACE TUNNEL					
	Excavation,turnel	m3	18,500	55.00	1,017,500	
	Concrete, tunnel	m3	7,200	160.00	1,152,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout	m	100	90.00	9,000	
	Curtain grout	m.	130 50	70.00 200.00	9,100 10,000	
	Backfill grout Others (20%)	L.S.	30	200.00	451,520	
	Subtotal					2,709,1
2.53	HEAD POND					
	Excavation					
	Excavation common	m3	900	3.50	3,150	
	Excavation, weathered rock	m3	900	6.00	5,400	
	Excavation hard rock	m3	1,200	10.00	12,000	
	Concrete, open structure Reinforcement	m3 ton	1,100 35	140.00 1,500.00	154,000 52,500	
	Others (20%)	L.S.	35.	1,300.00	45,410	
	Subtotal					272,4
.54	PENSTOCK					
	Excavation		•			
	Excavation, common	m3	2,000	3.50	7,000	
	Excavation, weathered rock	m3	2,000	6.00	12,000	
	Excavation,hard rock	m3	2,700	10.00	27,000	
	Concrete, open structure	m3	2,100 30	140.00 1,500.00	294,000 45,000	
	Reinforcement Others (20%)	ton L.S.	30	4,500,00	77,000	
	Subtotal		·			462,0
60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	900	3.50	3,150	
	Excavation, constiton	1132	. 500		-1	
	Excavation, weathered rock Excavation, hard rock	ni3 m3	900 1,200	6.00	5,400 12,000	•

	:		Concrete, substructure	m3	900	250.00	225,000	
	1		Concrete, second stage	m3	250	140.00	35,000	
			Reinforcement	ton	- 60	1,500,00	90,000	
			Others (20%)	L.S.		·	74,110	
			Subtoral					444,660
	2.70		TAILRACE					
		:	Excavation					•
			Excavation, common	m3	800	3.50	2,800	
			Excavation, weathered rock	m3	800	6.00	4,800	
			Excavation hard rock	m3	1,200	10.00	12,000	
			Concrete, structure	m3	600	140.00	84,000	•
			Reinforcement	ton	20	1,500.00	30,000	
			Others (20%)	1\$.		1,500.00	26,720	
			Outers (2070)	12.0.			20,720	
			Subtotal					160,320
	2.80	•	ARCHITECTURAL BUILDINGS	m2	2,000	1,100.00	2,200,000	2,200,000
	2.90		ACCESS ROAD					
			New construction	m	9	600,000,00	5,400,000	
		. *	Upgraded	m	9	50,000.00	450,000	
			Subtotal					5,850,000
	3.00	METAL V	VORKS					
٠								
			Penstock steel pipes Gates	ion ton	300 15	5,000.00 7,000.00	1,500,000 105,000	•
							-	
			Subtotal					1,605,000
	4.00	GENERA	TING EQUIPMENT			· ·		
			Turbines	ton	60	18,700.00	1,122,000	
			Generators	ton	210	20,400.00	4,284,000	
			Transformers	MVA	9	6,250.00	56,250	
			1 min of the la	MYA	9	0,20.00	30,230	
			Subtotal :		-			5,462,250
	5.00	TRANSM SUBSTA	BSSION LINES AND HONS	km	43	46,000.00	1,978,000	1,978,000
			Total of Direct Cost					40,976,228
	6.00	LAND AC	QUISITION AND COMPENSATION	LS			. 0	409,762
	7.00		STRATION EXPENSES	LS			0	409,762
•	8.00		RING SERVICES	LS			. · · · o	2,868,336
	9.00	PHYSICA	L CONTINGENCY	LS			. 0	4,097,623
			GRAND TOTAL				48,761,711	48,761,711

lem No.	Work Item	Unit			Amount F.C.(US\$)	
.00	PREPARATORY WORKS	L.S.				1,986,9
	(10 % of Civil Works)					
.00	CIVIL WORKS					
.10	INTAKE DAM		•			
	Open Excavation		0.200			
	Open excavation, common Open excavation, weathered rock	m3 m3	9,700 9,700	3.50 6.00	33,950 58,200	
	Open excavation, weather tock	m3	13,000	10.00	130,000	
	Concrete	•			****	
	Mass concrete	m3	18,400	90.00	1,656,000	
	Reinforced concrete	rn3	56,800	140.00	7,952,000	
	Reinforcement bar	ton	1,700	1,500.00	2,550,000	•
	Curtain grouting  Consolidation grouting	₩ m	3,600 2,000	70.00 90.00	252,000 180,000	
	Others (20%)	L.S.		20.00	2,562,430	
	Subtotal	-				15,374,5
40	DESANDING BASIN					
		m23	4,600	55.00	253,000	
	Excavation tunnel Concrete, tunnel	m3	1,300	160.00	208,000	
	Reinforcement bars	ton	15	1,500.00	22,500	
	Others (20%)	L.S.			96,700	
	Subtotel					580,2
50	WATERWAY		•			
51	INTAKE				•	
	Excavation	-				
	Excavation, common	m3	400	3.50	1,400	
	Excavation, weathered rock	m3	400	6.00	2,400	
	Excavation,hard rock Concrete,open structure	m3 m3	500 550	10.00 140.00	5,000 .77,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			23,160	
	Sutional					138,9
52	HEADRACE TUNNEL					
	Excavation,tunnel	m3	18,500	55.00	1,017,500	
	Concrete, tunnel	m3	7,200	160.00	1,152,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout	m	100	90.00	9,000	
	Curtain grout	m 	130	70.00	9,100	
	Backfill grout Others (20%)	m3 L.S.	50	200.00	451,520	
		2.0			131,540	2 700 1
	Subtotal					2,709,1
53	HEAD POND					
	Excavation	3	700	2.50	2.450	
	Excavation, common  Excavation, weathered rock	m3 - m3	700 700	3.50 6.00	2,450 4,200	
	Excavation hard rock	m3	1,000	10.00	10,000	
	Concrete, open structure	m3	850	140.00	119,000	
	Reinforcement	ton t e	25	1,500.00	37,500	
	Others (20%)	L.S.			34,630	_
	Subtotal					207,7
54	PENSTOCK				*.	
	Excavation	e3	1 000	160	6 200	
	Excavation, common  Excavation, weathered rock	Em Em	1,800 1,800	3.50 6.00	6,300 10,800	
	Excavation,hard rock	m3	2,500	10.00	25,000	
	Concrete,open structure	m3	2,000	140.00	280,000	
	Reinforcement	ton	30	1,500.00	45,000 73,420	
	Others (20%)	L.S.			73,420	
	Subtotal					440,5
0	OPEN POWERHOUSE					
o	OPEN POWERHOUSE  Excavation			2.50	2 100	
<b>6</b> 0	OPEN POWERHOUSE	m3 m3	600 600	3,50 6.00	2,100 3,600	

		Concrete, substructure	ın3	580	250.00	145,000		
		Concrete, second stage	m3	150	140.00	21,000		
		Reinforcement	ton	40	1,500.00	60,000		
		Others (20%)	L.S.			47,940		
		Subtotal					287,640	
	2.70	TAILRACE	•					
•		Excavation						•
		Excavation common	m3	700	3.50	2,450		
		Excavation, weathered rock	m3	700	6.00	4,200		
		Excavation,hard rock	m3	1,000	10.00	10,000		•
		Concrete, structure	m3	500	140.00	70,000		
	:	Reinforcement	ton	15	1,500.00	22,500		
		Others (20%)	L.S.	**		21,830		
		Subtotai					130,980	
		•		•		•		
	2.80	ARCHITECTURAL BUILDINGS	m2	1,500	1,100.00	1,650,000	1,650,000	
	2.00	THE THE TENTH OF T		1,000	1,100.00	7,050,000	1,000,000	
	2.90	ACCESS ROAD	•					
				_				
		New construction	m	9	600,000.00	5,400,000		
		Upgraded	m m	9	50,000.00	450,000		
		Subtotal				•	5,850,000	
*								
	3.00	METAL WORKS						
		Penstock steel pipes	ton	240	5,000.00	1,200,000		
		Gates	ton	10	7,000.00	70,000		
					1,001.11	70,000		
		Subtotal					1,270,000	
	4.00	GENERATING EQUIPMENT						,
	4.00	GENERATING EQUIPMENT						
		Turbines	ton	45	18,700.00	841,500		
		Generators	ton	160	20,400.00	3,254,000		•
	:	Transformers	MVA	6	6,250.00	37,500		,
				•				
		Subtotal					4,143,000	
		•						
	5.00	TRANSMISSION LINES AND	km	43	46,000.00	1,978,000	1,978,000	
		SUBSTATIONS						
		Total of Direct Cost					36,747,758	
	6.00	LAND AQUISITION AND COMPENSATION	LS			0	367,478	
	7.00	ADMINISTRATION EXPENSES	LS			0	367,478	
	8.00	ENGINEERING SERVICES	LS			0	2,572,343	•
	9.00	PHYSICAL CONTINGENCY	LS			0	3,674,776	
						•	-,,	
		· ·						
		GRAND TOTAL				43,729,832	43,729,832	

tem No.	Work Item				count C.(US\$)	
1,00 PRI	EPARATORY WORKS	L.S.				1,845,4
	(10 % of Civil Works)					
.00 CIV	/II. WORKS					
.10	INTAKE DAM		•			
	Open Excavation	_				
	Open excavation,common	m3 m3	8,700 8,700	3.50 6.00	30,450 52,200	•
	Open excavation, weathered rock Open excavation hard rock	m3	11,600	10.00	116,000	
	Concrete	****	111444	24.44	(13,000	
	Mass concrete	m3	17,100	90.00	1,539,000	
	Reinforced concrete	m3	52,600	140.00	7,364,000	
	Reinforcement bar	ton	1,600	1,500.00	2,400,000	
	Curtain grouting Consolidation grouting	m m	3,400 1,900	70.00 90.00	238,000 171,000	
	Others (20%)	is.	1,000	70.00	2,382,130	
	Subtoral			•		14,292,7
10	DESANDING BASIN					
	En anyesian tempel	m3	3,600	55.00	198,000	
	Excavation,tunnel Concrete, tunnel	m3	1,000	160.00	160,000	
	Reinforcement bars	ton	10	1,500.00	15,000	
	Others (20%)	L.S.			74,600	
	Subtotal					447,6
10	WATERWAY					
51	INTAKE					
	Excavation		•			
	Excavation, common	m3	350	3.50	1,225	
	Excavation, weathered rock	£m	350	6.00	2,100	
	Excavation, hard rock	m3	450	10.00	4,509	
	Concrete open structure	1713 100	500 15	140.00 1,500.00	70,000 22,500	
	Reinforcement Others (20%)	ton L.S.	,5	1,500.00	20,065	
	Subtotal					120,3
52	HEADRACE TUNNEL		•			
	Excavation,tunnel	m3	18,500	55.00	1,017,500	179
	Concrete, tunnel	m3	7,200	160.00	1,152,000	
	Reinforcement	100	40	1,500.00	60,000	
	Consolidation grout	. <b>m</b>	100	90.00	9,000	
	Curtain grout	m	130	70.00	9,100	
	Backfill grout Others (20%)	m3 L.S.	50	200.00	451,520	
	Subtotal					2,709.
3	HEAD POND					
	Excavation					
	Excavation, common	m3	600	3.50	2,100	
	Excavation, weathered rock	m3	600	6.00	3,600	
	Excavation, hard rock	m3	800	10.00	8,000	
	Concrete, open structure Reinforcement	m3 ton	750 20	140.00 1,500.00	105,000 30,000	
	Others (20%)	L.S.	20	1,300.00	29,740	
	Subtotal				•	178,
4	PENSTOCK					
	Excavation					
	Excavation, common	tn3	1,500	3.50	5,250	
	Excavation weathered rock	m3 .	1,500	6.00	9,000	
	Excavation,hard tock	m3	2,000	10.00	20,000	
	Concrete, open structure	m3	.1,750	140.00	245,000	
	Reinforcement Others (20%)	ion L.S.	25	1,500.00	37,560 63,350	
	Subtotal			. *		380,
1	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	500	3.50	1,750	
	Excavation, weathered took	m3	500	6.00	3,000	
	The state of the s		650	10.00	6,500	

	Concrete, substructure	Em	450	250.00	112,500	
	Concrete, second stage	m3	110	140.00	15,400	
	Reinforcement Others (20%)	ton L.S.	30	1,500.00	45,000 36,830	
	Outers (20%)	tag.			10,000	
	Subrotal					220,980
2.70	TAILRACE					
	Excavation		-			
	Excavation, common	£nı	600	3.50	2,100	
	Excavation, weathered rock	m3	800	6.00	3,600	
	Exervation hard rock	m3	800	10.00	8,000	
	Concrete, structure	m3	400	140.00	56,000	
	Reinforcement	ton	12	1,500.00	18,000	
	Others (20%)	L.S.			17,540	
	Subtoral					105,240
		•				
2.80	ARCHITECTURAL BUILDINGS	m2	1,200	1,100.00	1,320,000	1,320,000
2.90	ACCESS ROAD					
	New construction	m	. 9	600,000.00	5,400,000	
:	Upgraded	tn.	9	50,000.00	450,000	
	Subtotal	•				5,850,000
3.00	METAL WORKS					
	A Comment of the Comm					
	Penstock steel pipes Gates	ton ton	200 5	5,000.00 7,000.00	1,000,000 35,000	
	Value	1012		7,000.00	20,000	
	Subtotal					1,035,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	35	18,700.00	654,500	
	Generators	ton.	135	20,400.00	2,754,000	•
	Transformers	MVA	. 5	6,900.00	34,500	1,1
	Subtotal			• •		3,443,000
5.00	TRANSMISSION LINES AND	kan	43	46,000.00	1,978,000	1,978,000
400	SUBSTATIONS	*co		*otoonion	1,210,000	1,770,000
	Total of Direct Cost				•	33,926,115
6.00	LAND AQUISITION AND COMPENSATION	LS			0	339,261
7.00	ADMINISTRATION EXPENSES	LS			0	339,261
8.00	ENGINEERING SERVICES	LS	i e		. 0	2,374,828
9.00	PHYSICAL CONTINGENCY	LS	•	a - *	0	3,392,612
	GRAND TOTAL				10,372,077	40,372,077

em No.	Work Item	Unit			nount C.(US\$)	
.00	PREPARATORY WORKS	Ls.				2,567,3
	(10 % of Civil Works)					
00	CIVIL WORKS					
to	INTAKE DAM				•	
	Open Excavation		17.400		en ion	
	Open excavation common	n3	17,400	3,50	60,900	
	Open excavation, weathered rock	m3 m3	17,400 23,200	6,00 10.00	104,400 232,000	
	Open excavation,hard rock Concrete	no.	23,200	10.00	232,000	
	Mass concrete	m3	31,000	90.00	2,790,000	
	Reinforced concrete	m3	71,800	140,00	10,024,000	
	Reinforcement bar	ton	2,200	1,500.00	3,300,000	
	Curtain grouting	m.	3,900	70.00	273,000	
	Consolidation growing	m L.S.	2,600	90.00	234,000 3,403,660	
	Others (20%)	£.3.			3,403,007	
	Subtotal					20,421,5
3	DESANDING BASIN					
	Excavation,tumnel	m3	13,300	55.00	731,500	
	Concrete, namel	m3	3,600	160.00	576,000	
	Reinforcement bars Others (20%)	ton L.S.	40	1,500.00	60,000 273,500	
	Subtotal				2.2500	1,641,
						1,0110
)	WATERWAY				÷	
)	INTAKE					
	Excavation		950	2.50	. 2.226	
	Excavation common	m3 m3	650 650	3.50 6.00	2,275 3,900	
	Excavation, weathered rock Excavation, hard rock	m3	850	10.00	8,500	
	Concrete, open structure	m3	950	140.00	133,000	
	Reinforcement	ton	30	1,509.00	45,000	
	Others (20%)	L.S.			38,535	
	Subtotal					231,
2	HEADRACE TUNNEL			-	14.4	
	***************************************	3	13,400	55.00	737,000	
	Excavation,tursiei Concrete, turine!	ra3 m3	5,200	160.00	832,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout	m	100	90.00	9,000	
	Curtain grout	m	130	70.00	9,100	
	Backfill grout	m3	50	200.00	10,000	
	Others (20%)	L.S.			331,420	
	Subtotal					1,988,
	HEAD POND					
	Excavation		* 00B	3.50	4.000	
	Excavation common	m3 m3	1,200 1,200	3.50 6.00	4,200 7,200	
	Excavation, weathered rock Excavation, hard rock	m3	1,600	10.00	16,000	
	Concrete,open structure	m3	1,700	140.00	238,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Others (20%)	L.S.			68,080	
	Subjotal					408,
	PENSTOCK					
	Excavation					
	Excavation, common	m3	1,000	3.50	3,500	
	Excavation, weathered rock	m3	1,000	6.00	6,000	
	Excavation, hard rock	m <sup>3</sup>	1,300	10.00	13,000	
	Concrete, open structure	m3	800	140.00	112,000	
	Reinforcement Others (20%)	tori	25	1,500.00	37,500	
	LERESS (ZUPSA)	L.S.			34,400	
	Subtotal				•	206,
	Subtotal OPEN POWERHOUSE					206,
	Subtotal  OPEN POWERHOUSE  Excavation		1 200	<b>1 e</b> v	- <b>á</b> ၁၈၈	206,
	Subtotal OPEN POWERHOUSE	m3 m3	1,200 1,200	3.50 6.00	4,200 7,200	206,4

		Concrete, substructure	m3	1,150	250.00	287,500	
		Concrete, second stage	m3	300	140.00	42,000	
		Reinforcement	ton	75	1,500.00	112,500	
		Others (20%)	L.S.	73	1,300.00	93,880	
	*	Outers (20%)	17.0.			93,600	
		Subtotal					563,280
	2.70	TAILRACE					
	·	Excavation					
		Excavation, common	m3	1,200	3.50	4,200	
		Excavation weathered rock	m3	1,200	6.00	7,200	
	4.5	Excavation, hard rock	m3	1,600	10,00	16,000	
		Concrete, structure	m3	800	140,00	112,000	
		Reinforcement	ton	25	1,500.00	37,500	
		Others (20%)	L.S.		1,500.00	35,380	
		<b>2.1 (</b> • <b>?</b>	7				
		Subtotal					212,280
		: '					
	2.80	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000
	2.90	ACCESS ROAD					
					504.000.00	A = 000 000	
		New construction	m ·	43	600,000.00	25,800,000	
		Upgraded	m	0	50,000.00	0	
		Subtotal					25,800,000
	3,00	METAL WORKS					
		•					
		Penstock steel pipes	ton	120	5,000.00	600,000	
		Gates	ton	25	7,000.00	175,000	
		Subtotal					775,000
	4.00	GENERATING EQUIPMENT					
		Turbines	ton	85	18,700.00	1,589,500	
		•	ton	220	20,400.00	4,488,000	
		Generators Transformers	MVA	10	6,150.00	61,500	
		1 ransionners	MVA	,0	0,150.00	01,350	
	٠	Subtotal					6,139,000
	5.00	TRANSMISSION LINES AND	ken	74	46,000.00	3,404,000	3,404,000
	3.00	SUBSTATIONS	AZII		40,000.00	2,404,000	3,101,000
		Total of Direct Cost					67,108,443
		•					
	6.00	LAND AQUISITION AND COMPENSATION	LS			. 0	671,084
	7.00	ADMINISTRATION EXPENSES	LS			0	671,084
* .	8.00	ENGINEERING SERVICES	LS		**.	· o	4,697,591
	9.00	PHYSICAL CONTINGENCY	LS			0	6,710,844
		•	*.	•			
		GRAND TOTAL				79,859,047	79,859,047

hem No.	Work Item	Unit			nount C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				2,333,184
	(10 % of Civil Works)		•			· .
2.00	CIVEL WORKS			•		
2.10	INTAKE DAM					
	Open Excavation					
	Open excavation common	m3	15,700	3.50	54,950	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	15,700 21,000	6.00 10.00	94,200 210,000	
	Concrete	10.5	21,000	10.00	210,000	
	Mass concrete	av3	28,900	90,00	2,601,000	
	Reinforced concrete	m3	67,000	140.00	9,380,000	
	Reinforcement bar	ton	2,000	1,500.00	3,000,000	
	Curtain growting	m	3,600	70.00	252,000	
	Consolidation growting Others (20%)	m L.S.	2,500	90.00	225,000 3,163,430	
					2,0,100	18,980,580
	Subtoral		•	-		19,990,380
2.40	DESANDING BASIN					-
	Excavation,tunnel	m3	9,000	55,00	495,000	
	Concrete, tunnel	m3	2,500	160.00	400,000	
	Reinforcement bars	ton	25	1,500.00	37,500	*
	Others (20%)	L.S.			186,500	
	Subtotal					1,119,000
2.50	WATERWAY					
2.51	INTAKE					
	Excavation					
	Excavation common	m3	550	3.50	1,925	
	Excavation weathered rock	m3	550	6.00	3,300	
	Excavation hard rock	m3	700	10.00	7,000	
	Concrete open structure	m3	800	140,00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.			32,345	
	Subtotal					194,070
2.52	HEADRACE TUNNEL		·		•	
	Excavation,turnel	m3	13,400	55.00	737,000	
	Concrete, turnel	m3	5,200	160.00	832,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Consolidation grout	m	100	90.00	9,000	* •
	Christin grout	m	130	70.00	9,100	
	Backfill grout	m3	50	200.00	10,000	
	Others (20%)	L.S.			331,420	-
	Subtotal					1,988,520
2.53	HEAD POND					
	Excavation					
	Excavation common	m3	1,100	3.50	3,850	
	Excavation, weathered rock	m3	1,100	6.00	6,600	
	Excavation hard rock	m3	1,400	00.01	14,000	
	Concrete,open structure	เท3	1,300	140.00	182,000	•
	Reinforcement Others (20%)	ton L.S.	40	1,500.00	60,000 53,290	
						319,740
25.	Subtotal					313,140
2.54	PENSTOCK		-			
	Excavation	3	750	2.50	2 626	
	Excavation, common  Excavation, weathered rock	m3 m3	750 750	3.50 6.00	2,625 4,500	
	Excavation, hard rock	m3	1,000	10.00	10,000	
	Concrete, open structure	m3	750	140.00	105,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			30,425	."
	Subtotal		± 4			182,550
2.60	OPEN POWERHOUSE					
	Excavation					
	Excavation,common	m3	800	3.50	2,800	
	Excavation, weathered rock	m3	800	6.00	4,800	
	Excavation hard rock	m3	1,100	10.00	11,000	
		_				

		Concrete, substructure	m3		008	250.00	200,000	
		Concrete, second stage	m3		200	140.00	28,000	
		, ,						
		Reinforcement	ton		50	1,500.00	75,000	
		Others (20%)	L.S.				61,320	
		Subtotal					-	385,920
		•						
	2.70	TAILRACE						
								•
		Excavation						
		Excavation common	m3		900	3,50	3,150	
		Excavation, weathered rock	m3		900	6.00	5,400	
		Excavation, hard rock	m3		1,200	10.00	12,000	
			m3		600	140,00	84,000	
		Concrete, structure					-	
		Reinforcement	ton		20	1,500.00	30,000	
		Others (20%)	L.S.				26,910	
		•						
		Subtoral						161,460
	2.80	ARCHITECTURAL BUILDINGS	m2		2,000	1,100.00	2,200,000	2,200,000
						.,		
	2.90	ACCESS ROAD			•			
	2.50	ACCESS KOND						
					••	*** *** ***	n n hon ann	
		New construction	т		43	600,000.00	25,800,000	
		Upgraded	a.		0	50,000.00	0	
		•						
		Subtotal						25,800,000
		· · ·						
	3.00	METAL WORKS						
								4.1
		Penstock steel pipes	ton		90	5,000.00	450,000	
		Gates	ton		15	7,000.00	105,000	
		Subtotal						555,000
		Suixotes						333,000
	- 00	device imilia columnita (C						
	4.00	GENERATING EQUIPMENT						
				-				
		Turbines	ton		60	18,700.00	1,122,000	
		Generators	ton		170	20,400.00	3,468,000	
		Transformers	MVA		7	6,550.00	45,850	
*								_
		Subtotal						4,635,850
	£ 00	COLUMN TOPION I INTO AND	<b></b>		74	46,000.00	3,404,000	2.404.000
	5.00	TRANSMISSION LINES AND SUBSTATIONS	km		/4	40,000.00	3,404,000	3,404,000
		SUBSTATIONS						
		Total of Direct Cost						62,259,874
		* *						
	6.00	LAND AQUISITION AND COMPENSATION	LS				0	622,599
		*						
	7.00	ADMINISTRATION EXPENSES	LS				0	622,599
			_					
	8.00	ENGINEERING SERVICES	LS				0	4,358,191
	0.00	DUMORAL COMMERCINOU					•	6 225 022
	9.00	PHYSICAL CONTINGENCY	LS				0	6,225,987
							* *	•
		GRAND TOTAL					74,089,250	74,089,250
		Quant to the					. 1,000,1000	. 1,000,000

Item No.	Work Item	Unit			mount C.(US\$)	
1.00	PREPARATORY WORKS	L.S.				2,169,46
	(10 % of Civil Works)					.,,,,,,
.00	CIVIL WORKS					
.10	INTAKE DAM					
	Open Excavation		44.400			
	Open excavation common	m3 2	14,100 14,100	6.00	49,350 84,600	
	Open excavation, weathered rock Open excavation, hard rock	m3 m3	18,800	10.00	188,000	
	Concrete					
	Mass concrete	m3	26,900	90.00	2,421,000	
	Reinforced concrete	m3	62,900	140.00	8,806,000	
	Reinforcement bar	lon	1,900 3,400	1,500.00 70.00	2,850,000 238,000	
	Curtain grouting Consolidation grouting	m m	2,500	90.00	225,000	
	Others (20%)	L.S.			2,972,390	
	Subtotal					17,834,3
40	DESANDING BASIN					
	Excavation, tunnel	m3	6,700	55.00	368,500	
	Concrete, tunnel	т3	1,800	160.00	288,000	
	Reinforcement bars	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			137,300	
	Subiotal					823.8
.50	WATERWAY					
.51	intake					
	Excavation					
	Excavation, common	m3	450	3.50	1,575	
	Excavation, weathered rock	m3	450	6.00	2,700	
	Excavation hard rock	m3	600	10.00	6,000	
	Concrete, open structure Reinforcement	m3 ton	580 20	140.00 1,500.00	95,200 30,000	
	Others (20%)	L.S.			27,095	
	Subtotal					162,5
.52	HEADRACE TUNNEL		•			
	Excavation.tumeel	m3	13,400	55.00	737,000	
	Concrete, tunnel	m3	5,200	160.00	832,000	
	Reinforcement.	ton	40	1,500.00	60,000	
	Consolidation grout	m	100	90.00	9,000	
	Curtain grout	m m3	130 50	70.00 200.00	9,100 10,000	
	Backtill grout Others (20%)	ms L.S.	00	100.00	331,420	
	Subtotal					1,988,5
.53	HEAD POND					
				•	•	
	Excavation	_^	900	3.50	3,150	
	Excavation, common  Excavation, weathered rock	m3 m3	900	6.00	5,490	
	Excavation hard rock	m3	1,200	10.00	12,000	
	Concrete, open structure	m3	1,100	140.00	154,000	
	Reinforcement	ton	35	1,500.00	52,500	
	Others (20%)	L.\$.			45,410	
	Subtota]					272,4
54	PENSTOCK					
	Excavation		ero.	2 52	1.005	
	Excavation, common  Excavation, weathered rock	m3 m3	550 550	3.50 6.00	1,925 3,300	
	Excavation, hard rock	ന്ദ്	700	10.00	7,000	
	Concrete, open structure	m3	600	140.00	84,000	
	Reinforcement Others (20%)	ton L.S.	20	1,500.00	30,000 25,245	
	Subtotal ·	2-4-				151,4
50	OPEN POWERHOUSE				·	
						i
	Excavation  Excavation.common	£n3	700	3.50	2,450	
	Excavation common  Excavation weathered rock	tn3 m3	700 700	3.50 6.00	2,450 4,200	

	the second section of the second section is a second section of the second section is a second section of the second section is a second section of the second section section is a second section of the second section secti					
	Concrete, substructure	m³	700	250.00	175,000	
	Concrete, second stage	m3	170	140.00	23,800	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.	-70	1,505.00	54,890	
	Charles for the	2.00			21,000	
	Subtotal					329,340
2.70	TAILRACE					
	Excavation					
	Excavation common	m3	800	3.50	2,800	
	Excavation weathered rock	m3	800	6.00	4,800	
	Excavation, hard rock	m3	1,000	10.00	10,000	
	Concrete, structure	m3	500	140.00	70,000	
	Reinforcement	ton	15	1,500.00	22,500	
	Others (20%)	L.S.			22,020	
	Subtotal					132,120
	•					
2.80	ARCHITECTURAL BUILDINGS	m2	1,800	1,100.00	1,980,000	1,980,000
2.90	ACCESS ROAD					
	New construction	m	43	600,000.00	25,800,000	
	Upgraded	7E)	Ü	50,000.00	0	
	· · · · · · · · · · · · · · · · · · ·					
	Subtotal					25,800,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	80	5,000.00	400,000	
	Gales	ton	15	7,000.00	105,000	
	Subtotal					505,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	50	18,700.00	935,000	-
	Generators	ton	150	20,400.00	3,060,000	
	Transformers	MVA	5 .	6,800.00	34,000	
	Subtoral :					4,029,000
5.00	Transmission lines and substations	km	74	46,000.00	3,404,000	3,404,000
	Total of Direct Cost					59,582,082
6.00	LAND AQUISITION AND COMPENSATION	LS			. 0	595,821
7.00	ADMINISTRATION EXPENSES	LS			, 0	595,821
8.00	ENGINEERING SERVICES	LS			0	4,170,746
9.00	PHYSICAL CONTINGENCY	LS			0	5,958,208
	GRAND TOTAL				70,902,678	70,902,678

ltem No.	Work Item	Unit			mount .C.(US\$)	
	· · · · · · · · · · · · · · · · · · ·					
.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				3,535,0
.00	CIVIL WORKS					
.10	INTAKE DAM					•
	Open Excavation					
	Open excavation, common	m3	24,000	3.50	84,000	
	Open excavation, weathered took Open excavation, hard took	т:3 m3	24,000 32,000	6.00 10.00	144,000 320,000	
	Concrete	_				
	Mass concrete	m3	37,900	90.00	3,411,000	
	Reinforced concrete Reinforcement bar	m3 ton	71,000 2,130	140.00 1,500.00	9,940,000 3,195,000	
	Curtain grouting	m	3,150	70.00	220,500	
	Consolidation grouting	m	2,800	90.00	252,000	
	Others (20%)	L.S.			3,513,300	
* .	Subtotal					21,079,8
40	DESANDING BASIN					
	Excavation,turnel	m3	46,500	55.00	2,557,500	
	Concrete, tunnel	m3	11,800	160.00	1,888,000	
	Reinforcement bars Others (20%)	ton L.S.	120	1,500.00	180,000 925,100	
		L.S.			923,100	
	Subtotal					5,550,6
.50	WATERWAY			•		
51	INTAKE					
	Excavation					
	Excavation, common	m3	1,200	3.50	4,200	
	Excavation, weathered rock	m3	1,200 1,600	6.00	7,200	
	Excavation hard rock Concrete, open structure	m3	1,800	10.00 140.00	16,000 252,000	
	Reinforcement	ton	55	1,500.00	82,500	
	Others (20%)	L.S.		·	72,380	
	Subtotal					434,2
.52	HEADRACE TUNNEL					
	77	3	ano na	55.00	1 500 500	
	Excavation,tunnel Concrete, tunnel	m3 m3	28,900 10,200	160.00	1,589,500	
	Reinforcement	ton	100	1,500.00	150,000	
	Consolidation grout	m	4,100	90.00	369,000	
	Curtain grout	m	200	70.00	14,000	
	Backfill grout	m3	530	200.00	106,000	
	Others (20%)	L.S.			772,100	
	Subtotal					4,632,6
53	SURGE TANK					•
	Excavation, shaft	m3	5,000	55.00	275,000	
	Concrete, shaft	m3	1,500	160.00	240,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Consolidation grout Others (20%)	m L.S.	320	90.00	28,800 123,760	
	Subtotal					742,
54	PENSTOCK					
	Excavation		:		.*	
	Excavation, common	m3	7,700	3.50	26,950	
	Excavation, weathered rock	m3	7,700	6.00	46,200	
	Excavation,hard rock	m3	00E,01	10.00	103,000	
	Excavation,tunnel	m3 m3	3,300 500	55.00 140.00	181,500 70,000	
	Concrete, open structure Concrete, turnel	m3 m3	1,200	160.00	70,000 192,000	
	Concrete, turnier  Reinforcement	ton	55	1,500.00	82,500	
	Curtain grout	m	200	70.00	14,000	
	Backfill grout	m3	60	200.00	12,000	
	Others (20%)	L.S.	•		145,630	
	Subtotal	•				873,7
o	OPEN POWERHOUSE					
	Excavation		•			
	Excavation, common	m3	3,000	3.50	10,500	

	Excavation, weathered rock	m3		3,000	6.00	18,000		
	Excavation, hard rock	m3	- 1	4,000	10.00	40,000		
	Concrete, substructure	103		2,900	250.00	725,000		
	Concrete, second stage	m3		800	140.00	112,000		
	Reinforcement	ton		190	1,500.00	285,000		
	Others (20%)	L.S.				238,100		
	Subtotal						1,428,600	
2.70	TAILRACE							
	Excavation							
	Excavation, common	m3		6,000	3,50	21,000		
	Excavation, weathered tock	m3		6,000	6.00	36,000		
	Excavation,hard rock	m3		8,000	10.00	80,000		
	Concrete, structure	m3		2,000	140.00	280,000		
	Reinforcement	ton		80	1,500.00	90,000		
	Others (20%)	L.S.			1,000,00	101,400		
	Subtotal						608,400	
	• .							
400	ADCUITECTION IN BUILDINGS	0		1.000	1 100 00	1 100 000	1 100 000	
2.80	ARCHITECTURAL BUILDINGS	m2		1,000	1,100.00	1,100,000	1,100,000	
2.90	ACCESS ROAD							
	New construction	m		10	600,000.00	6,000,000		
	Upgraded	m		0	50,000.00	0		
	Subtotal						6,000,000	
3.00	METAL WORKS							
	n and a late			400	£ 000 00			
	Penstock steel pipes Gates	ton ton		400 40	5,000.00 7,000.00	2,000,000 280,000		
	Gaids	LOA1		40	2,000.00	200,000		
	Subtotal						2,280,000	
4.00	GENERATING EQUIPMENT							4
	Turbines	ion		130	18,700.00	2,431,000		
	Generators	ton		230	20,400.00	4,692,000		
	Transformers	MVA		22	5,500.00	121,000		
	Subtotal						7,244,000	
	.t							
5.00	TRANSMISSION LINES AND SUBSTATIONS	km		74	25,000.00	1,850,000	1,850,000	
	Total of Direct Cost						57,359,682	
6.00.	LAND AQUISITION AND COMPENSATION	LS				0	573,597	
7.00	ADMINISTRATION EXPENSES	LS	•			0	573,597	
8.00	ENGINEERING SERVICES	LS				0	4,015,178	
9.00	PHYSICAL CONTINGENCY	LS	1.0			0 .	5,735,968	
٠.	GRAND TOTAL					68,258,022	68,258,022	

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)	
.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				2,971,97
00	CIVIL WORKS					
10	INTAKE DAM					
	Open Excavation					
	Open excavation, common	m3	21,600	3.5	0 75,600	
	Open excavation, weathered rock	m3	21,600	6.0	and the second s	
	Open excavation hard rock	m3	28,900	10.0	0 289,000	
	Concrete  Mass concrete	m3	35,200	90.0	0 3,168,000	
	Reinforced concrete	m3	67,300	140.0		
	Reinforcement bar	ton	2,000	1,500.0	0 3,000,000	
	Curtain grouting	m	2,800	70.0		
	Consolidation grouting	m	2,800	90.0	0 252,000 3,306,440	
	Others (20%)	L.S.			3,300,440	
	Subtotal				:	19,838,6
0	DESANDING BASIN				•	
	Excavation, tunnel	m3	31,200	<b>5</b> 5.0		
	Concrete, tunnel	m3	7,000	160.0		
	Reinforcement bars	ton	70	1,500.0		
	Others (20%)	L.S.			588,200	
	Subtotal					3,529,2
0	WATERWAY			٠		
ı	INTAKE					
	Excavation					
	Excavation, common	m3	1,000	. 3.5	0 3,500	
	Excavation, weathered rock	nı3	1,000	6.0	6,000	
	Excavation,hard rock	m3	1,300	10.0		
	Concrete, open structure	m3	1,500			
	Reinforcement Others (20%)	ton L.S.	45	1,500.0	0 67,500 60,000	
	Subtotal	2.01				360,6
	HEADRACE TUNNEL					300,0
· <b>z</b>	TERDARCE TOWNEL					
	Excavation tunnel	m3	20,500	55.0		
	Concrete, tunnel	тЗ	7,500			
	Reinforcement	ton	75 3,500	1,500.0 90.0		
	Consolidation grout Curtain grout	m m	150	70.0		
	Backfill grout	m3	400	200.0		
	Others (20%)	L.S.			569,100	
	Subtotal					3,414,6
3	SURGE TANK					
	Excavation, shaft	m <sup>2</sup>	3,300	55.0	0 181,500	
	Concrete, shaft	m3 m3	1,000	160.0	•	
	Reinforcement	ton	30	1,500.0		
	Consolidation grout	L52	240	90.0	0 21,600	
	Others (20%)	LS.			81,620	:
	Subtotal					489,7
4	PENSTOCK				•	
	Excavation					
	Excavation common	та3-	6,600	3.5		
	Excavation, weathered rock	m3	6,600	6.0		
	Excavation hard rock	m3 3	8,800	10.0	•	
	Excavation,tunnel Concrete,open structure	m3 m3	2,400 400	55.0 140.0		
	Concrete, tunnel	m3	900	160.0		
	Reinforcement	ton	40	1,500.0		
	Curtain grout	m	150	70.0		
	Backfill grout	m3	50	200.0	0 10,000	
	Others (20%)	L.S.			112,640	
	Subtotal	*.				675,8
)	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	ın3	2,000	3.5	0 7,000	

	Excavation, weathered rock	m3	2,000	6.00	12,000	
	Excavation,hard rock	m3	2,700	10.00	27,000	
	Concrete, substructure	m3	1,900	250.00	475,000	
	Concrete, second stage	m3	500	140.00	70,000	
	Reinforcement	ton	130	1,500.00	195,000	
			130	1,300.00	157,200	
	Others (20%)	L.S.			137,200	
	Subtotal					943,200
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	5,000	3.50	17,500	
	Excavation, weathered rock	m3	5,000	6.00	30,000	
	Excavation hard rock	m3	6,500	10.00	65,000	
	-			140.00	210,000	
	Concrete, structure	m3	1,500			
	Reinforcement	ton	45	1,500.00	67,500	*
	Others (20%)	L.S.			78,000	
	Subtotal	•			•	468,000
2.80	ARCHITECTURAL BUILDINGS	m2	800	1,100.00	880,000	880,000
2.90	ACCESS ROAD			:		
	New construction	m .	10	600,000.00	6,000,000	
	Upgraded	m	0	50,000.00	. 0	1.
	Subtosal					6,000,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	325	5,000.00	1,625,000	
	Gates	ton	30	7,000.00	210,000	
	Subtotal					1,835,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	100	18,700.00	1,870,000	
			170			
	Generators	ton		20,400.00	3,468,000	
	Transformers	MVA	. 15	5,850.00	87,750	
	Subtorat					5,425,750
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	74	25,000.00	1,850,000	1,850,000
	Total of Direct Cost					48,681,870
6.00	LAND AQUISITION AND COMPENSATION	LS			0	486,819
7.00	ADMINISTRATION EXPENSES	LS			. 0	486,819
8.00	ENGINEERING SERVICES	LS.		•	. 0	3,407,731
	*					
9.00	PHYSICAL CONTINGENCY	LS				4,863,187
	GRAND TOTAL		•		57,931,425	57,931,425

CIVIL WORKS	tem No.	Work Item	Unit			nount C.(US\$)	
CIVIL WORKS							
O   NTAKE DAM   Open Extraction	00		LS.				2,971,93
Open Execution   Open	90	CIVIL WORKS					
Open Execution   Open	10	INTAKE DAM					
Open exertaline.common							
Cyen execution, reathered rock			m3	21.600	3.50	35 600	
Open execution-paid cock							
Mass centred   Mass		- · · · · · · · · · · · · · · · · · · ·					
Reinforcementa bar   ton   2,000   1,1000   3,0000   1,						ŕ	
Reinforcement by ten 2,000 1,500,000 3,000,000 Christing proving m 2,800 70.00 195,500 Chandidation grounding m 2,800 90.00 125,800 Ober 0,00%) L.S. 3,105,440 Solution (Constitution grounding m 2,800 90.00 125,800 19,838,140 Solution (Constitution of the province of the			m3	35,200	90.00	3,168,000	
Cartais growing		Reinforced concrete	ть3	67,300	140.00	9,422,000	
Consolidation grouning			ton				
Oches (1994)   L.S.   3,995,440   19,838,0							
DESANDING BASIN   Biscarvation, tunnel   m3				2,800	90.00		
DESANDING BASIN   Excavation, tunned			E.a.			2,300,440	
Excavation_numer  m3		Subtotal					19,838,6
Concrete, named   m3   7,000   160.00   1,120.000	0	DESANDING BASIN				-	
Concerts, named   m3   7,000   160,00   1,120,000		Excavation tunnel	m3	31,200	55.00	1,716,000	
Reinforcement has				•			
Subtotal   1,529,						105,000	
Intake			L.S.			588,200	
INTAKE		Subtotal					3,529,2
INTAKE	0						
Excavation   Excavation, common   m3   1,000   3.50   3,500   Excavation, weathered stock   m3   1,000   4.00   6,600   13,000   Excavation, weathered stock   m3   1,300   1,000   13,000   Excavation, weathered stock   m3   1,500   140,00   210,000   Reinforcement   100   145   1,500,00   67,500   60,000							
Biscartion, common   m3   1,000   3.50   3,500     Biscartion, predicted rock   m3   1,300   10.00   13,000     Concrete, open structure   m3   1,500   140,00   210,000     Reinforcement   ton   d5   1,500,000   67,500     Others (20%)   L.S.   d60,000     Subteal	1	INIAKE				,	
Becavation, weathered took   m3		Excavation				÷	
Stavastion_hard rock   m3   1,300   10.00   12,000							
Concrete, open structure   m3   1,500   140,00   210,000     Reinforcement   ton   45   1,500,00   67,500     Others (20%)   L.S.   360,000   360,000     Subtotal							
Reinforcement   100							
Subtotal   Subtotal   360)						•	
Substate				43	1,500.00		
Excavation plannel   m3   20,500   55,00   1,127,500   1,20,000		Callas (2010)	L.G.			00,000	
Excavation,tennet		Subtotal					360,0
Concrete, tunnel	52	HEADRACE TUNNEL					
Concrete, tunnel		Excavation tunnel	ra3	20,500	55,00	1,127,500	
Consolidation great							
Curtain grout m 150 70.00 10,500 Backfill grout m3 400 200.00 80,000 Others (20%) L.S. 569,100  Subtotal 3,414,  Subtotal 4,500 160,000		Reinforcement	ton	<b>75</b>	1,500.00	112,500	
Backfill grout		Consolidation grout	m				
Substate		Curtain grout	m				
Subtotal   Surge Tank   Bacavation, shaft   m3   3,300   55.00   181,500   Concrete, shaft   m3   1,000   160.00   160,000   Reinforcement   ton   30   1,500.00   45,000   Consolidation grout   m   240   90.00   21,600   Consolidation grout   m   240   90.00   21,600   Subtotal   489;   4   PENSTOCK   Bacavation   Excavation   Excavation   Excavation weathered rock   m3   6,600   6.00   39,500   Excavation, weathered rock   m3   6,600   6.00   39,500   Excavation, turnel   m3   8,800   10.00   88,000   Excavation, turnel   m3   2,400   55.00   132,000   Concrete, open structure   m3   400   140.00   56,000   Concrete, turnel   m3   900   160.00   144,000   Reinforcement   ton   40   1,500.00   60,000   Curtain grout   m   150   70.00   60,000   Curtain grout   m3   50   200.00   10,000   Cothers (20%)   L.S.   112,640   Excavation   Cothers (20%)   L.S.   112,640   Excavation   Cothers (20%)   L.S.   112,640   Excavation   Cothers (20%)   L.S.   112,640   Cothers (20%)   L.S.   Cothers (20%)				400	200.00		
3 SURGE TANK  Excavation, shaft m3 3,300 55.00 181,500 Contrete, shaft m3 1,000 160.00 160.000 Reinforcement ton 30 1,500.00 21,600 Consolidation grout m 240 90.00 21,600 Others (20%) L.S. 81,620  Subtotal 4 PENSTOCK  Excavation  Excavation m3 6,600 3.50 23,100 Excavation, weathered took m3 6,800 6.00 39,600 Excavation, furned m3 8,800 10.00 88,000 Excavation, furned m3 8,800 10.00 88,000 Concrete, open structure m3 400 140.00 56,000 Concrete, open structure m3 400 140.00 56,000 Reinforcement ton 40 1,500.00 60,000 Curtain grout m 150 70.00 10,500 Backfill grout m3 50 200.00 10,000 Cothers (20%) L.S. 112,640  Subtotal Excavation  Subtotal Excavation  OPEN POWERHOUSE  Excavation		Others (20%)	L.S.			569,100	
Excavation, shaft		Subtotal			•		3,414,6
Contrete, staft   m3	3	SURGE TANK					
Contrete, shaft   m3		Excavation, shaft	m3	3,300	55.00	181,500	
Consolidation grout							
Subtotal   Subtotal   Subtotal   Subtotal   Subtotal   489,		Reinforcement	ton	30	1,500.00	45,000	
Subtotal   Subtotal   Subtotal		Consolidation grout	m	240	90.00	-	
Excavation  Excavation  Excavation, common m3 6,600 3.50 23,100  Excavation, weathered took m3 6,600 6.00 39,500  Excavation, hard rock m3 8,800 10.00 88,000  Excavation, tunnel m3 2,400 55.00 132,000  Concrete, open structure m3 400 140,000 56,000  Concrete, tunnel m3 900 160,000 144,000  Reinforcement ton 40 1,500,00 60,000  Curtain grout m 150 70.00 10,500  Backfill grout m3 50 200.00 10,000  Others (20%) L.S. 112,640  Subtatal 675,5		Others (20%)	L.S.			81,620	
Excavation  Excavation, common m3 6,600 3.50 23,100  Excavation, weathered rock m3 6,600 6.00 39,500  Excavation, tunnel m3 8,800 10.00 88,000  Excavation, tunnel m3 2,400 55.00 132,000  Concrete, open structure m3 400 140.00 56,000  Concrete, tunnel m3 900 160.00 144,000  Reinforcement ton 40 1,500.00 60,000  Curtain grout m 150 70,00 10,500  Backfill grout m3 50 200.00 10,000  Others (20%) L.S. 112,640  Substate  Excavation		Subtotal				*	489,7
Excavation,common   m3   6,600   3.50   23,100	4	PENSTOCK					
Excavation,common   m3   6,600   3.50   23,100		Excavation					
Egcavation, weathered rock m3 6,600 6.00 39,500 Excavation, hard rock m3 8,800 10.00 88,000 Excavation, tunnel m3 2,400 55.00 132,000 Concrete, open structure m3 400 140,000 56,000 Concrete, tunnel m3 900 160,000 144,000 Reinforcement ton 40 1,500,00 60,000 Curtain grout m 150 70.00 10,500 Backfill grout m3 50 200.00 10,000 Others (20%) E.S. 112,640  Subtatal 675,6			m3	6,600		23,100	
Excavation, tunnel m3 2,400 55.00 132,000  Concrete, open structure m3 400 140.00 56,000  Concrete, tunnel m3 900 160.00 144,000  Reinforcement ton 40 1,500.00 60,000  Curtain grout m 150 70.00 10,500  Backfill grout m3 50 200.00 10,000  Cthers (20%) L.S. 112,640  Subtotal 675,8		Excavation, weathered mck	Em	6,600	6.00	39,600	
Concrete, open structure   m3   400   140.00   56,000     Concrete, tunnel   m3   900   160,00   144,000     Reinforcement   toa   40   1,500,00   60,000     Curtain grout   m   150   70,00   10,500     Backfill grout   m3   50   200,00   10,000     Others (20%)   L.S.   112,640     Substitute   Exeavation   Exeavation   140.00   56,000     144,000   144,000   160,000     150,000   10,000     150,000   10,000     172,640   172,640     173,640   173,640     174,000   174,000     175,100   175,100			т3				
Concrete, tunnel m3 900 160,00 144,000 Reinforcement tos 40 1,500,00 60,000 Curtain grout m 150 70,00 10,500 Backfill grout m3 50 200,00 10,000 Others (20%) L.S. 112,640  Subtotal 675,3  OPEN POWERHOUSE							
Reinforcement (on 40 1,500.00 60,000 Curtain grout m 150 70,00 10,500 Backfill grout m3 50 200.00 10,000 Cthers (20%) E.S. 112,640 Subtotal 675,5		· -					
Curtain grout m 150 70,00 10,500 Backfill grout m3 50 200.00 10,000 Cthers (20%) E.S. 112,640  Subtotal 675,5  OPEN POWERHOUSE  Excavation		•		the state of the s			
Backfill grout m3 50 200.00 10,000     Others (20%)							
Others (20%) L.S. 112,640  Subtotal 675,3  OPEN POWERHOUSE  Excavation							
Subtotal 675 s  OPEN POWERHOUSE  Excavation				50	200.00		
OPEN POWERHOUSE  Excavation						•	675,8
Excavation	n						5.260
	٠.						
		Excavation  Excavation common	m3	2,000	3,50	7,000	

	Excavation, weathered rock	m3	2,000	6.00	12,000	
	Excavation hard tock	m3	2,700	10.00	27,000	
	Concrete, substructure	m3	1,900	250.00	475,000	
	Concrete, second stage	m3	500	140.00	70,000	
	Reinforcement	ton	130	1,500.00	195,000	
	Others (20%)	L.S.			157,200	
	Subtotal				٠	943,200
2.70	TAILRACE					
•	Excavation					
	Excavation, common	m3	5,000	3.50	17,500	
	Excavation, weathered rock	m3	5,000	6.00	30,000	
	Excavation hard rock	m3	6,500	10.00	65,000	
	Concrete, structure	m3	1,500	140,00	210,000	
	Reinforcement	ton	45	1,500.00	67,500	
	Others (20%)	L.S.			78,000	
* *	Subtotal					468,000
2.80	ARCHITECTURAL BUILDINGS	m2	800	1,100.00	880,000	. 880,000
					·	·
2.90	ACCESS ROAD					
	New construction	εητ	10	600,000.00	6,000,000	•
	Upgraded	m	0	50,000.00	0	
	Subtotal				-	6,000,000
3.00	METAL WORKS					
	Penstock steel pipes	toe	325	5,000.00	1,625,000	
	Gates	ton	30	7,000.00	210,000	
•	· ·		0.0	1,000,00	210,000	
	Subrotai				•	1,835,000
4,00	GENERATING EQUIPMENT					
	Turbines	ton	100	18,700.00	1,870,000	
	Generators	ton	170	20,400.00	3,468,000	
	Transformers	MVA	15	5,850.00	87,750	
	Subsotal					5,425,750
5.00	Transmission lines and	km	74	25,000.00	1,850,000	1,850,000
	SUBSTATIONS  Total of Direct Cost					48,681,870
	town of Direct Cost					40,001,010
6.00	LAND AQUISITION AND COMPENSATION	LS			. 0	486,819
7.00	ADMINISTRATION EXPENSES	LS			0	486,819
8.00	ENGINEERING SERVICES	LS			0	3,407,731
9.00	PHYSICAL CONTINGENCY	LS			0	4,868,187
	GRAND TOTAL				57,931,425	57,931,425

tem No.	Work Item	Unit (			nount C.(US\$)	
			<u></u>			
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				2,625,57
2.00	CIVIL WORKS					
.10	INTAKE DAM	•				
	Open Excavation		19,500	2.50	£8.050	
	Open excavation, common Open excavation, weathered rock	m3 m3	19,500	3.50 6.00	68,250 117,000	
	Open excavation, weamered rock	m3	26,000	10.00	260,000	
	Concrete	203	20,000			
	Mass concrete	m3	32,600	90.00	2,934,000	
	Reinforced concrete	m3	63,800	140.00	8,932,000	
	Reinforcement bar	ton	1,900	1,500.00	2,850,000	
	Curtain grouting	m	2,700	70.00	189,600	
	Consolidation grouting	m	2,700	90.00	243,000	
	Others (20%)	L.S.			3,118,650	
	Subtotal					18,711,90
0	DESANDING BASIN			4		
	Excavation,tunnel	m3	22,500	55.00	1,237,500	
	Concrete, tunnel	m3	5,900	160.00	944,000	
	Reinforcement bars	ton	60	1,500.00	90,000	
	Others (20%)	L.S.		·	454,300	
	Subtotal			•		2,725,80
0	WATERWAY					
1	INTAKE					
	Parameter					
	Excavation	m3	900	3.50	3,150	
	Excavation, common  Excavation, weathered rock	m3	900	6.00	5,400	
	Excavation, weathered rock	m3	1,100	10.00	11,000	
	Concrete open structure	m3	1,300	140.00	182,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.			52,310	
•	Subtotal					313,86
2	HEADRACE TUNNEL		•			•
2	TIERDENCE TORNEL					
	Excavation,tunnel	m3	13,600	55.00	748,000	
	Concrete, tunnel	' m3	5,200	160.00	832,000	
	Reinforcement	ton	50	1,500.00	75,000	
	Consolidation grout	rrt	2,800	90.00	252,000	
	Curtain grout	m	120	70.00	8,400	
	Backfill grout	L.S.	320	200.00	64,000 395,880	
	Others (20%)	L.S.			393,000	
	Subtotal					2,375,28
3	SURGE TANK				•	
	Excavation, shaft	m3	2,500	55.00	137,500	
	Concrete, shaft	m3	720	160.00	115,200	
	Reinforcement	lon	20	1,500.00	30,000	
	Consolidation grout	m	200	90.00	18,000	
	Others (20%)	L.S.			60,140	
	Subtotal					360,84
ı	PENSTOCK					
	Excavation					4
	Excavation, common	m3	6,000	3.50	21,000	
	Excavation, weathered rock	m3	8,000	6.00	36,000	
	Excavation,hard rock	m3 2	8,000	10.00	80,000	
	Excavation,tunnel	m3	2,350	55.00	129,250 49,000	
	Concrete transi	m3	350 900	140.00 160.00	49,000 144,000	•
	Concrete, tunnel Reinforcement	m3 ton	. 40	1,500.00	60,000	
	Curtain grout	ron:	120	70.00	8,400	
	Backfill grow	m3	40	200.90	8,000	
	Others (20%)	L.S.	70 ·	200,00	107,130	
	Subtotal					642,78
,	OPEN POWERHOUSE	. • •				
					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Excavation Excavation,common	m3	1,500	3.50	5,250	
	Towest amon's continent	1112	1,500	3,30	June	

	Excavation, weathered took	m3	1,500	6.00	9,000	
	Excavation, weathered rock	m3	2,000	t0.00	20,000	
	Concrete, substructure	TH 3	1,450	250.00	362,500	
	Concrete, second stage	m3	400	140.00	56,000	
	Reinforcement	ton	100	1,500.00	150,000	
	Others (20%)	L.S.		.,	120,550	
					•	
	Subtotal					723,300
	4 · 1					
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	4,000	3.50	14,000	
	Excavation, weathered rock	m3	4,000	6.00	24,000	
	Excavation, hard rock	тъ3	5,500	10.00	55,000	
	Concrete, structure	m3 <sub>.</sub>	1,300	140.00	182,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	1S.			67,000	
	Subtotal					402,000
2.80	ARCHITECTURAL BUILDINGS	m2	700	1,100.00	770,000	770,000
2.00	ARCHITECTURAE BOILDINGS	1112	700	1,100.00	770,000	710,000
2.90	ACCESS ROAD					
2.70	necoob none					
	New construction	m	10	600,000.00	6,000,000	
	Upgraded	ìm	0	50,000.00	0	
	••				-	
	Subtotal					6,000,000
	•				•	-
3.00	METAL WORKS				•	
-	Penstock steel pipes	ton	250	5,000.00	1,250,000	
	Gates	ton	20	7,000.60	140,000	
	Outure A					1,390,000
	Subtorat					1,390,000
4.00	GENERATING EQUIPMENT					
4.00	GENERATINO EQUIPMENT				•	
	Turbines	ton	70	18,700.00	1,309,000	
	Generators	ton	140	20,400.00	2,856,000	
	Transformers	MVA	11	6,100.00	67,100	
				•		
	Subtotal					4,232,100
	TO A MONTH OF CALL IN THE CALL	b	74	25,000.00	1.050.000	1,850,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	/4	23,000.00	1,850,000	1,000,000
	ODD TITLOTTO					
	Total of Direct Cost					43,123,436
6.00	LAND AQUISITION AND COMPENSATION	LS			0	431,234
0.00	LAND AQUISITION AND COMMISSION TON	L.C			· ·	101,001
7.00	ADMINISTRATION EXPENSES	ı,s			0	431,234
	halosattana and Olivania	16			•	2.010 ( )1
8.00	ENGINEERING SERVICES	l.S			0	3,018,641
9.00	PHYSICAL CONTINGENCY	LS			0	4,312,344
- 700					,	
	On the month				£1.31 / 000	61 227 000
	GRAND TOTAL				51,316,889	51,316,889

