

Ref		Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
QUE	B	1956	1	19	19	50	32	29.5	81.5				
BCIS		1956	1	19	19	50	33	30	81.5				
SHL	B	1956	1	19	19	50	40	29	82				
*CGS		1956	7	3	10	17	57	28	84.5				
BCIS		1956	7	3	10	17	56	28.25	85				
*ISS		1956	10	10	15	31	36	28.15	77.67		6.5 TN2		8MM
CGS		1956	10	10	15	31	34	28.5	78				
SHL	B	1956	10	10	15	31	40	28.4	78.5			6.01 KIR	
*BCIS		1957	3	1	15	40	6	29.5	79.75				
QUE	B	1957	3	1	15	40	6	29.5	79.75				
SHL	B	1957	3	1	15	40	9	29.2	80.2				
*ISS		1957	4	14	7	11	52	30.64	84.21				
BCIS		1957	4	14	7	11	50	31	84.5			6.25 PAS	
CGS		1957	4	14	7	11	50	31	84.5				
SHL	B	1957	4	14	7	11	50	31	84.5				
MOS	B	1957	4	14	7	11	53	30	84.5				
*BCIS		1957	4	14	16	36	48	31	84.5				
MOS	B	1957	4	14	16	36	50	30	84.5				
*CGS		1957	4	22	0	18	16	30.5	84.5				
SHL	B	1957	4	22	0	18	20	30	85				
*ISS		1957	4	22	1	42	18	30.85	84.31				
CGS		1957	4	22	1	42	15	30.5	84.5				
*QUE	B	1957	12	9	21	17	30	30	79.75				
*ISS		1958	1	23	5	30	10	30.77	84.16				
CGS		1958	1	23	5	30	10	30.5	84				
SHL	B	1958	1	23	5	30	20	29	84			5.88 KEW	
*BCIS		1958	3	31	3	42	45	29.5	82				
SHL	B	1958	3	31	3	42	45	29.5	82				
*SHL	B	1958	4	30	9	33	35	28.5	82				
*BCIS		1958	8	12	12	23	52	30.5	81.5				
*BCIS		1958	8	12	12	40	2	30.5	81.5				
*QUE	B	1958	8	15	16	0	15	29.75	81.25				
*BCIS		1958	9	1	8	48	36	26.5	75				
*ISS		1958	10	28	10	46	32	30.61	84.47				
SHL	B	1958	10	28	10	46	25	31	85		6.63 SHL		
CGS		1958	10	28	10	46	27	30.5	85				
MOS	B	1958	10	28	10	46	37	30.5	85			6.4 UPP	
*ISS		1958	11	3	14	31	37	30.51	84.5				
MOS	B	1958	11	3	14	31	20	30	84.5				
SHL	B	1958	11	3	14	31	30	31	85				
CGS		1958	11	3	14	31	35	30	84.5				
BCIS		1958	11	3	14	31	37	30	84				
QUE	B	1958	11	3	14	31	39	30.5	84.5				
*ISS		1958	11	23	20	15	48	28.79	86.94				
MOS	B	1958	11	23	20	15	40	29	87				
CGS		1958	11	23	20	15	48	29	87				
*QUE	B	1958	11	25	4	0	12	27	86.5				
SHL	B	1958	11	25	4	0	15	26.5	86.5				F
*CGS		1958	12	3	2	23	40	27	86				F
SHL	B	1958	12	3	2	23	35	27	87.5				F
*ISS		1958	12	28	5	34	38	30.01	79.94		6.3 TN2		
CGS		1958	12	28	5	34	36	29.5	80				
QUE	B	1958	12	28	5	34	40	29.5	80			6.34 MAT	
SHL	B	1958	12	28	5	34	44	29	81				
MOS	B	1958	12	28	5	34	50	31.5	80.5				
*ISS		1958	12	31	3	45	15	30.09	79.86		6 TN2		

Ref		Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
CGS		1958	12	31	3	45	18	30.5	70.5				
QUE	B	1958	12	31	3	45	18	30	80				
SHL	B	1958	12	31	3	45	25	30	79.5				
*ISS		1959	5	12	0	35	47	32.4	78.66				
PEK	B	1959	5	12	0	35	42	32.5	79		6.3 QUE		
CGS		1959	5	12	0	35	46	32.5	79				
MOS	B	1959	5	12	0	35	52	32.5	79			6.3 QUE	
PEK	B	1959	5	24	11	28	7	25.5	90		5 PEK		
MOS	B	1959	5	24	11	28	20	25.5	90			5 PEK	
*BCIS		1959	10	7	13	1	30	35	80				
*PEK	B	1959	10	17	10	46	49	34	79				
*BCIS		1959	10	28	0	0	42	28.5	82.5				
*BCIS		1959	11	3	16	29	30	31	81				
*BCIS		1959	12	15	7	9	45	27	88				5MM
*CGS		1960	1	4	3	57	3	26	90				F
QUE	B	1960	1	4	3	57	14	26	90				F
QUE	B	1960	2	4	10	20	47	35	77				
*ISS		1960	3	5	11	25	3	29.49	81.19	0			
CGS		1960	3	5	11	25		29	81				
QUE	B	1960	3	5	11	25	7	29	81				
MOS	B	1960	3	5	11	25	10	29	82				
SHL	B	1960	3	5	11	25	10	29	82				
*CGS		1960	3	5	23	50	38	29	81				
SHL	B	1960	3	5	23	49	30	29	82				
QUE	B	1960	3	5	23	50	38	29	80.75				
*CGS		1960	5	9	14	36	27	25.5	89.5				
*SHL	B	1960	6	8	1	38	20	35	79				
SHL	B	1960	7	29	10	42	45	26.5	89.9		5.5 MAT		
*CGS		1960	8	21	3	29	4.9	27	88.5	29			
BCIS		1960	8	21	3	29	4.9	27	88.5	29			
SHL	B	1960	8	21	3	29	5	28	87.3		5.5 SHL		
*QUE	B	1960	8	27	12	31	2	27	90				
*CGS		1960	8	27	15	58	59	28.6	76.7	58			
TN2		1960	8	27	15	58	59	28.2	77.4		6		7MM
SHL	B	1960	8	27	15	58	50	28	78				
*BCIS		1960	9	3	19	39	58	29	85.5				
*BCIS		1960	9	5	4	34	48	31	82				
*SHL	B	1961	2	13	16	10	20	28	81.5				
*ISS		1961	2	15	11	28	53	30.83	84.35	41			
BCIS		1961	2	15	11	28	55	30.8	84.4	66			
SHL	B	1961	2	15	11	29		30	84.6				
*BICS		1961	3	26	23	11	38.9	30.6	84.4	24			
*ISS		1961	6	4	7	33	4	34.18	81.93	11			
QUE	B	1961	6	4	7	32	48	34.75	82.25		6.5 PAS		
MOS	B	1961	6	4	7	33	5	34	82			6 MOS	
SHL	B	1961	6	4	7	33	10	33	82				
*ISS		1961	6	4	7	43	40	34.16	82.13	0			
*ISS		1961	6	4	13	51	33	34.23	81.88	40			
*ISS		1961	9	29	22	36	16	28.33	88.05	0			
SHL	B	1961	9	29	22	36	30	28	87				5MM
*ISS		1961	12	8	10	19	50	30.92	87.2	0			
MOS	B	1961	12	8	10	19	40	30.6	87	33			
SHL	B	1961	12	8	10	19	45	31.6	87		4.5 MOS		
EBM	B	1961	12	8	10	19		46	31.6	87		4.5 MOS	
*ISS		1961	12	24	7	13	30	29.43	80.83	59			
QUE	B	1961	12	24	7	13	26	29.5	80.75		5.7 UPP		
MOS	B	1961	12	24	7	13	48	32	81			4.75 MOS	
SHL	B	1961	12	24	7	15	30	28.8	81.5				

Ref		Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISS		1962	1	11	3	1		27	28.05	84.99	0		
MOS	B	1962	1	11	3	1		6	27	85		5 MOS	
EBM	B	1962	1	11	3	1		16	27	85			5 PEK
PEK	B	1962	1	11	3	1		27	28	85			
SHL	B	1962	1	11	3	1		30	27	85			
*MOS	B	1962	1	22	20	22		15	32	82			
PEK	B	1962	1	22	20	22		15	31	80.5			
*ISS		1962	6	17	4	39		39	33.74	75.83	88	5.25 MOS	
PEK	B	1962	6	17	4	39		27	33.5	75.5			
MOS	B	1962	6	17	4	39		30	33.2	75.9		5.25 MOS	
SHL	B	1962	6	17	4	39		30	33.5	76.5			
QUE	B	1962	6	17	4	40		13	33.5	76			
*ISS		1962	7	13	5	1		6	30.64	79.48	0		
TN2		1962	7	13	5	1		9	30.9	79.6		5.5	
SHL	B	1962	7	13	5	1		10	30	80		4.5 MOS	
MOS	B	1962	7	13	5	1		12	30.7	79.3			4.5 MOS
QUE	B	1962	7	13	5	1		12	30	79.5	100	4 PEK	
PEK	B	1962	7	13	5	1		16	31	80.5			4 PEK
*ISS		1962	7	14	15	58		54	30.64	79.32	17		
TN2		1962	7	14	15	58		54	30.4	79.5		5.5	
QUE	B	1962	7	14	15	58		52	30	80		4.5 PEK	
MOS	B	1962	7	14	15	58		55	30.6	79.4			4.75 MOS
SHL	B	1962	7	14	15	58		55	30	80			
PEK	B	1962	7	14	15	58		59	31	80.5			
*QUE	B	1962	7	31	18	43		35	33.5	76			
*QUE	B	1962	8	29	11	30		41	32.75	78			
*IMD		1962	9	29	17	27		46	28.6	77.2		3.5	
*MOS	B	1962	10	29	12	6		48	33	86.5			4 MOS
*SHL	B	1963	1	22	4	55			32	90		4.75 MOS	
MOS	B	1963	1	22	4	55			31	89			4.75 MOS
PEK	B	1963	1	22	4	55		16	31.5	90			
*TN2		1963	1	30	10	33		50	29.4	80.9		5.5	
SHL	B	1963	1	30	10	33		50	29.5	80.9			
*CGS		1963	2	22	1	32	24.1	27.7	87.7	18	4.2		
PEK	B	1963	2	22	1	32	20	27	88				
MOS	B	1963	2	22	1	32	23	27.1	87.7				
SHL	B	1963	2	22	1	32	30	27.2	87.1				
*SHL	B	1963	3	5	2	35	10	28.8	81.1				
MOS	B	1963	3	5	2	35	12	30	81				
*ISS		1963	4	6	17	49			34.28	82.48	59		
EBM	B	1963	4	6	17	48		40	33	83		5 MOS	
PEK	B	1963	4	6	17	48		47	33.3	82.5			5 MOS
PEK	B	1963	4	6	17	48		48	33.5	82.5			
QUE	B	1963	4	6	17	48	51.8	32.8	82.4	30	5.3 QUE		
SHL	B	1963	4	6	17	48	55	33	83				5.3 QUE
*ISS		1963	4	12	0	41	29	32	78.79	36			
EBM	B	1963	4	12	0	41	3	30.2	77.7		5.8 UPP		
PEK	B	1963	4	12	0	41	28	32.25	79.25				4.75 PEK
MOS	B	1963	4	12	0	41	30	32.2	78.9				
SHL	B	1963	4	12	0	41	50	30.2	77.7				
*QUE	B	1963	5	23	17	13	10	33	76				
NDI	B	1963	5	23	17	13	11	33	77				
MOS	B	1963	5	23	17	13	12	32.8	76				
*BCIS		1963	6	5	23	51		30	87				
*ISS		1963	6	11	18	7		19	30.93	87.27	0		
PEK	B	1963	6	11	18	7		13	30.5	87.5		4.75 PEK	
QUE	B	1963	6	11	18	7		15	31.3	88	33	4.7 QUE	
MOS	B	1963	6	11	18	7		19	30.8	87.5			4.75 MOS

Ref		Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*QUE	B	1963	6	19	6	38	3	28.7	76.5	33			F
*QUE	B	1963	7	14	14	48	23	30.7	79.4	33	4.8	CGS	
*QUE	B	1963	9	1	1	34	25	34.4	75.4				
SHL	B	1963	9	2	1	34	30	34	75			5.1 CGS	
*BCIS		1963	9	20	15	1	42	30	80				
*BCIS		1963	10	22	20	43	30	28.5	80.5				
*QUE	B	1963	10	22	21	22	26.2	30.3	79				
*TN2		1963	11	27	21	10	40	30.8	79.1		5.1		
QUE	B	1963	11	27	21	10	25	30.8	80.5				
MOS	B	1963	11	27	21	10	42	31.1	78.9				
*MOS	B	1963	12	3	15	58	16	33.5	75.9				
*SHL	B	1963	12	3	17	8	35	28.8	79.1				
*MOS	B	1963	12	15	7	33	21	34.5	89				
*ISC		1964	1	25	7	13	32.6	28.27	86.64	66			25
MOS		1964	1	25	7	13	30	28.4	87				
USCGS		1964	1	25	7	13	30.8	28.5	86.8	44	4.5	BUSCGS	
*ISC		1964	2	1	11	28	19.2	27.3	87.78	33	4.8	BISC	20
USCGS		1964	2	1	11	28	19.4	27.4	87.8	33	4.8	BUSCGS	
*ISC		1964	2	8	11	54	23.1	29	82.18	33			16
SHL		1964	2	8	11	54	20	29	82				
USCGS		1964	2	8	11	54	23.1	29	82.2	33			
*NDI		1964	2	16	10	6	37	29	75.3				
*ISC		1964	3	27	23	3	41.1	27.3	89.36	29	5	BISC	46
MOS		1964	3	27	23	3	41	26.8	89		4.5	MOS	
USCGS		1964	3	27	23	3	41.7	27.6	89.3	32	6.3	BUSCGS	
*ISC		1964	5	4	19	22	36.5	31.1	80.5	0			6
NDI		1964	5	4	19	22	51	29.4	80.2				
*ISC		1964	5	24	0	0	48.5	30.04	82.18	23	5	BISC	57
NDI		1964	5	24	0	0	47	29.5	82				
USCGS		1964	5	24	0	0	50.2	30.1	82.1	33	5.1	BUSCGS	
MOS		1964	5	24	0	1		30.7	81.8	82			
*SJS		1964	5	27				30.5	78.1				5MM
*ISC		1964	6	16	18	13	10	28	80.5				
*NDI		1964	8	13	11	22	52	29.5	80				
*ISC		1964	8	30	2	35	7.3	27.36	88.21	21	5.1	BISC	78
SHL		1964	8	30	2	35	5	27	88				
MOS		1964	8	30	2	35	6	27.1	88.4			5	MOS
USCGS		1964	8	30	2	35	8.1	27.6	88.3	21	5.2	BUSCGS	
*ISC		1964	8	30	5	12	32.2	27.9	88.52	33			6
*ISC		1964	8	31	17	30	10	29	84				
*ISC		1964	9	11	4	51	49.4	31.35	80.45	36			8
*ISC		1964	9	14	17	21	12	30.2	86.2	39			9
*ISC		1964	9	16	22	37	35	35	76				
*ISC		1964	9	26	0	46	2.6	29.96	80.46	50	5.8	BISC	155
USCGS		1964	9	26	0	46	2.8	30.1	80.7	50	6.2	BUSCGS	
MOS		1964	9	26	0	46	3	30.4	80.3			5.75	MOS
SHL		1964	9	26	0	46	5	29	80				
*ISC		1964	10	2	20	9	30	28.2	77.5				
*ISC		1964	10	4	4	22	44.6	32.48	76.54	33			8
*ISC		1964	10	6	20	19	32.1	29.4	80.98	11	5.3	BISC	87
USCGS		1964	10	6	20	19	34.1	29.3	80.9	27	5.1	BUSCGS	
SHL		1964	10	6	20	19	35	29	81				
MOS		1964	10	6	20	19	38	29.7	80.9			5	MOS
*ISC		1964	10	7	16	8	35	29.3	81.6	129			10
*ISC		1964	10	7	23	4	47.9	32.5	83.8	33			8
USCGS		1964	10	7	23	4	47.9	32.7	83.9	33			
*ISC		1964	10	10	4	47	47.6	32.28	87.9	20			17
NDI		1964	10	10	4	47	43	32.2	87.6				

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
USCGS	1964	10	10	4	47		45.7	32	87.3	20		
*ISC	1964	10	19	2	16		4.6	31.84	78.7	72		9
MOS	1964	10	19	2	15		57	31.2	79			
USCGS	1964	10	19	2	15		58.1	31.4	79	33	4.8 BUSCGS	
*ISC	1964	10	25	15	40		7	27.9	88.6	0		9
NDI	1964	10	25	15	40		9	27.8	88.5			
*ISC	1964	11	9	16	12		51.9	29.53	86.04	33	5 BISC	55
USCGS	1964	11	9	16	12		50.6	29.5	86	33	4.7 BUSCGS	
MOS	1964	11	9	16	12		57	29.9	86.3		4.5 MOS	
*ISC	1964	12	2	8	21		41.7	29.58	81.1	3	5.1 BISC	55
USCGS	1964	12	2	8	21		43.3	29.5	81.3	23	5.1 BUSCGS	
MOS	1964	12	2	8	21		49	30	80.9		4.75 MOS	
*ISC	1964	12	3	9	25		35.6	29.4	81.31	48		8
NDI	1964	12	3	9	25		38	29	81.5			
*ISC	1964	12	3	11	32		40.1	31.49	89.4	33	4.4 BISC	10
*ISC	1964	12	6	16	12			31	77.3			
*ISC	1964	12	15	19	9		14	27.8	76.1	33		5
*ISC	1964	12	20	3	31		32.1	29.35	81.1	9	5.3 BISC	43
USCGS	1964	12	20	3	31		36	29.5	81	33	5.2 BUSCGS	
MOS	1964	12	20	3	31		38	29.7	81		4.5 MOS	
*ISC	1965	1	12	13	32		24.1	27.4	87.84	23	5.8 BISC	151
PEK	1965	1	12	13	32		22	27.25	87.75		5.75 PEK	
QUE	1965	1	12	13	32		23	28	87.7	33	5.5 QUE	
USCGS	1965	1	12	13	32		24	47.6	88	23	6.1 BUSCGS	
SHL	1965	1	12	13	32		25	26.8	87			
MOS	1965	1	12	13	32		26	27.5	88		5.5 MOS	
*ISC	1965	1	12	13	55		18.1	27.31	87.68	18	5.2 BISC	52
PEK	1965	1	12	13	55		17	28	87.75			
USCGS	1965	1	12	13	55		20	27.3	87.7	33	5.3 BUSCGS	
*ISC	1965	1	17	3	58		37.5	30.98	77.2	101		7
*ISC	1965	1	21	13	31		30.8	34.83	86.85	34	4.9 BISC	54
MOS	1965	1	21	13	31		25	34.8	87		5 MOS	
PEK	1965	1	21	13	31		26	35	87			
USCGS	1965	1	21	13	31		29.4	34.6	86.9	33	5 BUSCGS	
*ISC	1965	2	21	3	25		36.7	32.79	76.9	33	4.5 BISC	15
USCGS	1965	2	21	3	25		35.1	32.4	76.9	33	4.5 BUSCGS	
*ISC	1965	3	11	14	57		43	30.2	82.6	184		8
*ISC	1965	3	18	2	41		30.3	29.55	80.26	67	5 BISC	35
USCGS	1965	3	18	2	41		27.6	29.9	80.3	33	5.2 BUSCGS	
PEK	1965	3	18	2	41		32	30.5	81		4.25 PEK	
*ISC	1965	3	27	20	45		51	27.3	89.9	33		7
*ISC	1965	3	30	22	31		13.7	31.76	78.1	0	4.5 BISC	13
NDI	1965	3	30	22	31		27	30.3	79.2			
*ISC	1965	3	31	10	42		6.7	30	80.25	0		6
NDI	1965	3	31	10	42		9	29.8	80.3			
*NDI	1965	4	13	6	34		17	30.1	76.6	33		
*ISC	1965	4	14	22	35		30.6	29.41	81.22	69		11
*NDI	1965	4	14	22	35		30	29.2	81.1			
*ISC	1965	4	20	5	15		19.8	33.86	82.1	89		12
USCGS	1965	4	20	5	15		24.4	34.1	82	33		
*ISC	1965	4	30	9	16		21	28.8	84.3			
*ISC	1965	5	13	10	51		19.4	29.62	80.19	75	4.8 BISC	51
SHL	1965	5	13	10	51		10	30	81			
USCGS	1965	5	13	10	50		15.5	29.8	80.5	33	5.1 BUSCGS	
PEK	1965	5	13	10	51		22	29.75	80			
*NDI	1965	5	25	9	7		16	30.2	90	33		
*ISC	1965	5	30	6	17		15.4	29.3	80.92	91		7
NDI	1965	5	30	6	17		16	29.5	80.5			

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1965	5	31	2	4		42.9	32.65	77.99	28	5.1 BISC	112
USCGS	1965	5	31	2	4		42.9	32.6	78.2	33	5.3 BUSCGS	
MOS	1965	5	31	2	4		44	32.8	78		5.25 MOS	
PEK	1965	5	31	2	4		45	33	78			
*ISC	1965	6	1	2	28		55	32.4	77.3	155	4.3 BISC	12
*ISC	1965	6	1	7	52		25.1	28.59	83.6	20	5.3 BISC	118
USCGS	1965	6	1	7	52		24.2	28.5	83.2	20	5.3 BUSCGS	
PEK	1965	6	1	7	52		25	29	83.25		4.75 PEK	
QUE	1965	6	1	7	52		25	28.9	83.5	33	5.4 QUE	
SHL	1965	6	1	7	52		30	27	83			
*ISC	1965	6	14	13	17		2.4	32.09	87.62	36	5.2 BISC	94
PEK	1965	6	14	13	16		55	32.25	87.75		4.75 PEK	
USCGS	1965	6	14	13	17		1.2	32	87.7	32	5.6 BUSCGS	
MOS	1965	6	14	13	17		2	32.1	87.6		5 MOS	
*ISC	1965	6	16	23	49		8.2	32.04	87.46	69	4.8 BISC	45
PEK	1965	6	16	23	49			32	87.25		4.25 PEK	
USCGS	1965	6	16	23	49		7.4	32.1	87.5	62	5.1 BUSCGS	
*ISC	1965	6	17	20	14		50.1	32.12	87.76	15	5.1	133
PEK	1965	6	17	20	14		49	32.25	87.5		5.5 PEK	
USCGS	1965	6	17	20	14		49.8	32	87.7	16	5.3 BUSCGS	
QUE	1965	6	17	20	14		51	32.1	87.9	33		
MOS	1965	6	17	20	14		53	32.1	87.8		5.75 MOS	
SHL	1965	6	17	20	15		10	30	87			
*ISC	1965	6	18	1	18		39	32.01	87.59	43	5.1 BISC	95
PEK	1965	6	18	1	18		35	32.5	87.5		4.75 PEK	
MOS	1965	6	18	1	18		39	32.3	87.7			
QUE	1965	6	18	1	18		40	31.9	88.1	33		
USCGS	1965	6	18	1	18		41.1	32.2	87.7	60	5.2 BUSCGS	
*USCGS	1965	7	3	17	10		16	32.1	82.8	15	4.4 BUSCGS	
*QUE	1965	10	11	20	15		15	33.8	78.2	33	5.2 QUE	
*NDI	1965	10	23	17	17		54	32	76.4			
QUE	1965	10	23	17	18		10	32.5	76.1	60		
*QUE	1965	11	5	22	18		18	32.7	76.2	160		
*USCGS	1965	11	14	5	13		15.8	34.5	80.2	33	4.8 BUSCGS	
*TN2	1965	11	18	2	41		28	29.9	80.3		5.2	
*NDI	1965	12	29	14	13		57	31.1	77.5			
*ISC	1966	1	11	12	42		8	27.8	85.8	33		8
USCGS	1966	1	11	12	42		6	27.6	85.9	33	4.5 BUSCGS	
*NDI	1966	1	25	15	2		10	31.1	76.9			
*NDI	1966	2	16	3	25		57	28.3	88			
*ISC	1966	3	6	2	10		52	31.51	80.55	5	5.3 BISC	116
USCGS	1966	3	6	2	10		53.6	31.6	80.6	12	5.7 BUSCGS	
QUE	1966	3	6	2	11		3	31.8	80	33	5.4 QUE	
*ISC	1966	3	6	2	15		57.2	31.49	80.5	50	6 BISC	209
MOS	1966	3	6	2	15		56	31.6	80.5		6.5 MOS	
USCGS	1966	3	6	2	15		57.2	31.5	80.5	50	6 BUSCGS	
*ISC	1966	3	6	19	9		25	31.6	80.4	14		9
USCGS	1966	3	6	19	9		24.6	31.5	80.3	14	4.8 BUSCGS	
*ISC	1966	3	9	15	6		28.2	34.61	80.2	33	4.2 BISC	12
USCGS	1966	3	9	15	6		27.5	34.7	80.4	33	4.5 BUSCGS	
*ISC	1966	3	16	0	8		17.3	33.23	75.91	33	4.7 BISC	52
QUE	1966	3	16	0	8		15	33.4	76	160		
USCGS	1966	3	16	0	8		17.9	33.3	76	36	5 BUSCGS	
*ISC	1966	3	17	5	44		47.9	31.6	82.76	11	4.7 BISC	29
USCGS	1966	3	17	5	44		47.7	31.6	82.9	11	4.9 BUSCGS	
USCGS	1966	3	23	22	52		24.2	25.9	90	20	4.4 BUSCGS	
*NDI	1966	4	23	6	3		8	28.4	86.7			
*QUE	1966	6	10	7	27		50	29.8	76	287		

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1966	6	20	13	42	57	28.5	76.98	53	4.7 BISC		15
USCGS	1966	6	20	13	42	56.5	28.7	76.9	34	4.7 BUSCGS		
*ISC	1966	6	25	12	5	4.1	30.47	82.23	45	4.8 BISC		20
USCGS	1966	6	25	12	5	3.8	30.5	82.3	46	5.1 BUSCGS		
*ISC	1966	6	27	10	41	8.1	29.62	80.83	33	6 BISC		239
USCGS	1966	6	27	10	41	7.8	29.6	80.9	33	6 BUSCGS		
MOS	1966	6	27	10	41	8	29.7	80.8			6.25 MOS	
QUE	1966	6	27	10	41	13	30.2	81	100	5.75 QUE		
*ISC	1966	6	27	10	47	45.1	29.55	80.99	43	5.3 BISC		27
USCGS	1966	6	27	10	47	45.2	29.5	80.9	43	5.3 BUSCGS		
*ISC	1966	6	27	10	49	51	29.5	80.9	72	5.4 BISC		99
USCGS	1966	6	27	10	49	46	29.6	80.9	16	5.9 BUSCGS		
MOS	1966	6	27	10	49	49	29.7	80.9			5.63 MOS	
*ISC	1966	6	27	10	59	18.1	29.71	80.89	36	6 BISC		211
USCGS	1966	6	27	10	59	14.1	29.7	81	13	6 BUSCGS		
MOS	1966	6	27	10	59	18	29.9	81			6.5 MOS	
QUE	1966	6	27	10	59	30	29.9	80.2	100	6.5 QUE		
*ISC	1966	6	27	11	21	42	29.57	80.82	26	5.2 BISC		67
USCGS	1966	6	27	11	21	43.3	29.7	80.9	33	5.3 BUSCGS		
*ISC	1966	6	27	13	55	49.3	29.62	80.93	18	5.3 BISC		112
QUE	1966	6	27	13	55	49.2	29	80.9	33			
USCGS	1966	6	27	13	55	49.8	29.7	80.9	19	5.4 BUSCGS		
*ISC	1966	6	28	15	43	38	29.5	81	29	4.9 BIS		24
USCGS	1966	6	28	15	43	40.8	29.6	80.9	48	5.2 BUSCGS		
*ISC	1966	6	29	0	42	10	29.69	80.86	21	5.2 BISC		17
USCGS	1966	6	29	0	42	9.3	29.8	81	15	5.3 BUSCGS		
*ISC	1966	7	13	14	7	21.1	29.4	81.2	0			8
NDI	1966	7	13	14	7	31	29.4	80.3				
*NDI	1966	7	17	0	11	39	27.8	87				
*ISC	1966	7	29	6	38	42	29.5	80.98	17			7
NDI	1966	7	29	6	38	47	28.8	80.7				
*ISC	1966	8	5	1	3	2.1	32.76	79.61	31	5.2 BISC		131
USCGS	1966	8	5	1	3	2.4	32.7	79.5	36	5.2 BUSCGS		
QUE	1966	8	5	1	3	3	32.6	79.7	33			
*ISC	1966	8	15	2	15	28	28.67	78.93	5	5.6 BISC		157
USCGS	1966	8	15	2	15	34.4	28.7	78.9	53	5.6 BUSCGS		
QUE	1966	8	15	2	15	35	29.3	78.8	33	6.2 QUE		
*NDI	1966	9	3	6	40	11	27	85.9				
*ISC	1966	10	5	7	57	20.3	29.3	81.23	33	4.7 BISC		13
USCGS	1966	10	5	7	57	20	29.2	81.1	33			
*ISC	1966	10	13	12	42	42	31.41	80.19	29	4.7 BISC		44
QUE	1966	10	13	12	42	35.7	32.5	81	33	5.3 QUE		
USCGS	1966	10	13	12	42	42	31.4	80.3	29	5.1 BUSCGS		
*ISC	1966	10	20	0	53	38.7	33.55	78.7	28	4.7 BISC		92
USCGS	1966	10	20	0	53	39.8	33.6	78.6	33	5 BUSCGS		
*ISC	1966	11	5	18	53	3.3	28.22	83.87	33	4.8 BISC		43
USCGS	1966	11	5	18	53	3.3	28.2	84	33	5.1 BUSCGS		
*ISC	1966	11	7	4	8	11	33.94	80.89	19	4.7 BISC		43
USCGS	1966	11	7	4	8	14.4	34.1	80.7	45	4.7 BUSCGS		
*ISC	1966	12	15	19	43	52.5	29.88	81.12	0			5
NDI	1966	12	15	19	43	56	29.6	80.8				
*ISC	1966	12	16	20	52	16.3	29.62	80.79	19	5.7 BISC		231
MOS	1966	12	16	20	52	13	29.7	81			6 MOS	
USCGS	1966	12	16	20	52	16	29.7	80.9	15	5.8 BUSCGS		
QUE	1966	12	16	20	52	20	29.7	80.7	33	6.2 QUE		
*ISC	1966	12	16	22	12	49.7	29.61	80.9	7	4.9 BISC		23
USCGS	1966	12	16	22	12	49.1	29.6	80.9	7	5.1 BUCGS		
*ISC	1966	12	18	22	42	37	29.53	80.91	16	4.7 BISC		17

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
USCGS	1966	12	18	22	42		39.3	29.5	80.9	33	4.9	
*ISC	1966	12	21	22	10		59.3	29.65	80.79	21	5.2 BISC	84
USCGS	1966	12	21	22	10		48.8	29.7	80.8	21	5.4 BUSCGS	
QUE	1966	12	21	22	11			29.7	80.8	33	5.6 QUE	
*LAO	1966	12	28	3	59		7	28	89			
*ISC	1967	1	2	22	17		56	30.6	79.13	25	4.7 BISC	23
USCGS	1967	1	2	22	17		56.3	30.64	79.27	25	4.8 BUSCGS	
*LAO	1967	1	5	20	19		4	30	86		5.2 LAO	
*NDI	1967	1	25	0	47		39	29	81			
*ISC	1967	2	10	5	46		29	33.28	75.29	21	4.8 BISC	60
QUE	1967	2	10	5	46		29	33.3	75.4	160	5.5 QUE	
USCGS	1967	2	10	5	46		31.8	33.34	75.29	35	4.8 BUSCGS	
*ISC	1967	2	19	13	58		37	29.7	76.5	191		7
QUE	1967	2	19	13	58		25	31.3	78.4	220		
NDI	1967	2	19	13	58		37	27.6	79.3			
*ISC	1967	2	20	14	23		48.7	33.69	75.42	38	4.7 BISC	32
QUE	1967	2	20	14	23		45	33.4	75.4	96	4.8 QUE	
USCGS	1967	2	20	14	23		48.2	33.68	75.45	34	4.7 BUSCGS	
NDI	1967	2	20	14	23		52	33	76.7			
*ISC	1967	2	20	15	18		39	33.63	75.33	20	5.5 BISC	209
USCGS	1967	2	20	15	18		38.8	33.66	75.33	18	5.6 BUSCGS	
MOS	1967	2	20	15	18		40	33.6	75.2		5.5 MOS	
QUE	1967	2	20	15	18		40	33.7	75.4	100	6 QUE	
QUE	1967	2	20	15	39		48	33.7	75.4	96	4.7 QUE	
USCGS	1967	2	20	15	39		49.5	33.84	75.13	33	4.3 BUSCGS	
*ISC	1967	2	21	1	20		12.5	33.42	75	96		5
QUE	1967	2	21	1	20		9	33.8	75.3	96	4.5 QUE	
*ISC	1967	2	21	11	29		32	33.6	75	150		7
QUE	1967	2	21	11	29		28	33.6	75.2	150	4.6 QUE	
*ISC	1967	2	21	12	37		43	33.65	75.44	20	5 BISC	85
QUE	1967	2	21	12	37		42	33.6	75.6	100	5.5 QUE	
USCGS	1967	2	21	12	37		46.1	33.68	75.41	41	5.1 BUSCGS	
*ISC	1967	2	24	0	17		38.8	33.57	75.39	32	4.9 BISC	32
USCGS	1967	2	24	0	17		39.7	33.62	75.35	39	5 BUSCGS	
*QUE	1967	2	24	10	21		2	33	75.6	90		
*ISC	1967	3	2	11	47		13	28.7	86.38	20	4.8 BISC	15
USCGS	1967	3	2	11	47		12.7	28.72	86.39	23	4.9 BUSCGS	
*ISC	1967	3	11	18	45		44.8	29.32	81.39	33	4.6 BISC	29
USCGS	1967	3	11	18	45		44.5	29.32	81.41	33	4.8 BUSCGS	
*ISC	1967	3	16	17	38		27	29.8	85	17		10
USCGS	1967	3	16	17	38		26.9	29.85	85	15	3.9 BUSCGS	
QUE	1967	3	26	22	38		40	33.7	75.4	96		
*ISC	1967	5	3	4	42		41.3	30.17	81.76	0		5
NDI	1967	5	3	4	42		46	29.2	81.4			
*IMD	1967	5	11	4	22		5	27	75.2			5MM
*ISC	1967	7	2	8	32		39.7	33.21	75.71	42	4.8 BISC	77
USCGS	1967	7	2	8	32		38.5	33.2	75.6	33	4.8 BUSCGS	
QUE	1967	7	2	8	32		41	3.3	75.6		4.5 QUE	
*QUE	1967	7	2	18	29		22	33.2	76	100		
*LAO	1967	7	16	9	38		57	28	82		4.9 LAO	
*ISC	1967	7	22	13	46		57	31.6	75.1	0		6
*NDI	1967	8	3	9	6		26	30.2	79.6			
*LAO	1967	8	14	11	1		13	28	80		5.2 LAO	
*LAO	1967	9	13	19	37		2	27	87		5.2 LAO	
*ISC	1967	9	20	20	25		7	32.9	76.1	58		12
USCGS	1967	9	20	20	25		5.6	32.6	76.1	59		
QUE	1967	9	20	20	25		6	33.2	76	33		
*LAO	1967	11	21	6	17		39	28	79			

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISC	1967	12	18	10	51	36.4	29.46	81.71	42	5 BISC		60
USCGS	1967	12	18	10	51	34.8	29.1	81.9	42	5.2 BUSCGS		
*ISC	1967	12	30	12	36	57	31.67	86.73	29	5 BISC		14
USCGS	1967	12	30	12	36	55.8	31.7	86.8	24	4.9 BUSCGS		
*ISC	1968	1	5	6	42	44.4	30.41	79.25	7	5 BISC		69
USCGS	1968	1	5	6	42	44.7	30.4	79.1	7	5.4 BUSCGS		
*LAO	1968	2	7	1	22	6	30.9	80.3			4.7 LAO	
*QUE	1968	2	8	17	41	35	33.8	75.3	96			
*ISC	1968	2	10	17	3	3	34.12	78.54	29	4.9 BISC		78
USCGS	1968	2	10	17	3	3.8	34.1	78.5	37	5.2 BUSCGS		
*ISC	1968	2	11	2	25	11	33.7	78	142	4.4 BISC		16
USCGS	1968	2	11	2	25	1.2	34.2	78.4	33	4.8 BUSCGS		
*ISC	1968	2	11	20	38	27	34.15	78.7	24	5.1 BISC		127
QUE	1968	2	11	20	38	26	34.7	78.8	96	5.3 QUE		
USCGS	1968	2	11	20	38	29.4	34.2	78.6	44	5.1 BUSCGS		
*ISC	1968	2	11	23	18	18	34	78.5	62			10
USCGS	1968	2	11	23	18	16	34.3	78.2	33	4.5 BUSCGS		
*ISC	1968	5	27	18	35	57.7	29.76	80.51	27	4.9 BISC		40
USCGS	1968	5	27	18	35	57	29.7	80.4	27	5.1 BUSCGS		
*ISC	1968	5	31	3	1	35.7	29.91	79.92	33	5 BISC		32
USCGS	1968	5	31	3	1	35.7	29.9	80	33	5.1 BUSCGS		
USCGS	1968	7	3	19	46	53.7	34.7	75.1	113	4.5 BUSCGS		
*ISC	1968	10	12	19	6	27	31.6	76.1	160			21
QUE	1968	10	12	19	6	21	32.8	76.6	160	5.1 QUE		
*ISC	1968	10	28	17	48	30.1	27.57	86.03	37	4.9 BISC		28
USCGS	1968	10	28	17	48	29.1	27.3	86.1	37	4.8 BUSCGS		
*ISC	1968	11	5	2	2	44.7	32.28	76.48	33	4.8 BISC		91
QUE	1968	11	5	2	2	42	32.1	76.9	33		F	
USCGS	1968	11	5	2	2	44.2	32.4	76.4	33	4.9 BUSCGS		
MOS	1968	11	5	2	2	45	32.5	76.4				
*ISC	1968	11	5	3	7	4	32.25	76.58	4			19
USCGS	1968	11	5	3	7	8.3	32.4	76.6	33			
*ISC	1969	1	5	9	56	39	28.78	85.12	22			13
USCGS	1969	1	5	9	56	41.1	28	85.2	33			
*ISC	1969	1	23	20	1	21	32.19	76	64			7
USCGS	1969	1	23	20	1	19.5	32	76.1	33	4 BUSCGS		
*ISC	1969	1	23	23	46	30	31.9	75.6	96			7
QUE	1969	1	23	23	46	23	32.1	76.3	96			
USCGS	1969	1	23	23	46	26	32.2	76	33			
*LAO	1969	2	4	5	44	2	28.3	81.4		5.1 LAO		
LAO	1969	2	11	22	8	2	27.7	87			6.3 LAO	
*LAO	1969	2	11	22	9	57	28.1	82.7			6.2 LAO	
*LAO	1969	2	13	3	21	30	27.9	85.4			5 LAO	
*LAO	1969	2	13	6	48	36	28.5	75.7		5.1 LAO		
*LAO	1969	2	13	10	23	54	28.2	81.8				
*LAO	1969	2	24	10	37	21	37.9	85.6				
*LAO	1969	2	28	3	45	16	32.3	80			4.6 LAO	
*ISC	1969	3	3	6	20	21	30.04	79.84	18	5 BISC		106
USCGS	1969	3	3	6	20	21.8	30.2	79.9	20	5.3 BUSCGS		
MOS	1969	3	3	6	20	25	30.4	79.8			5 SMOS	
QUE	1969	3	3	6	20	26	30.1	79.8	33			
*ISC	1969	3	5	11	14	58	29.46	81.02	22			21
USCGS	1969	3	5	11	15	0.6	29.2	81.1	63	5.2 BUSCGS		
*LAO	1969	3	7	8	6	23	28.1	83.8			4.8 LAO	
*LAO	1969	4	13	11	57	13	28.1	81.7			4.9 LAO	
*TN2	1969	5	3	6	20	22	30.2	79.9		5.3		
*ISC	1969	6	22	1	33	23	30.5	79.4	15	5.3 BISC		146
USCGS	1969	6	22	1	33	24.1	30.6	79.4	19	5.4 BUSCGS		

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
MOS	1969	6	22	1	33	28	30.8	79.3			5.2 SMOS	
*ISC	1969	8	12	0	53	45.1	32.31	82.99	39	4.5 BISC		32
USCGS	1969	8	12	0	53	45	32.3	83	39	4.7 BUSCGS		
QUE	1969	11	3	17	13	53	34.2	75.5	160			
*ISC	1969	12	3	0	43	14	32	75.4	108			10
QUE	1969	12	3	0	43	10	32.9	76.1	160			
*ISC	1969	12	5	18	45	13.9	29.13	80.95	33	4.9 BISC		29
USCGS	1969	12	5	18	45	17.4	29.7	80.8	33	4.9 BUSCGS		
MOS	1969	12	5	17	45	19	29.9	80.9				
*ISC	1970	1	2	20	1	2	32.5	76	96			15
*ISC	1970	1	17	18	33	2	32.7	76.64	22	4.7 ISC		29
*ISC	1970	1	19	8	34	24.9	33.04	77.03	96			7
*ISC	1970	1	23	12	2	8	32.46	88.5	24	4.6 ISC		28
*ISC	1970	2	12	1	51	48.4	29.24	81.57	25	5.3 ISC		109
*ISC	1970	2	26	19	30	14.5	27.62	85.7	96	5 ISC		127
*ISC	1970	2	26	23	21	20	27.3	85.9	31	4.7 ISC		22
*ISC	1970	3	5	18	34	21.2	32.32	76.61	33	4.7 ISC		55
*ISC	1970	3	16	3	47	7	33.89	86.34	57	4.7 ISC		31
*ISC	1970	3	18	7	40	55	28.95	76.6	18			10
*ISC	1970	6	11	10	30	39.9	33.11	75.72				11
*QUE I	1970	6	26	23	18	57	30.8	75.6	33	4.5 QUE		4
*ISC	1970	7	2	0	29	33.7	33.21	75.13	103			5
*LAO I	1970	7	6	7	0	24	27.9	85.6				1
*ISC	1970	7	21	15	37	44.9	27.94	84.84	40	4.8 ISC		30
*ISC	1970	7	25	1	35	26	25.72	88.58	32	5.1 ISC		103
*ISC	1970	8	11	1	6	15	34.25	79.45	5	4.6 ISC		40
*ISC	1970	9	7	21	19	9	33	75.2	54			14
*QUE I	1971	1	1	1	6	10	30.8	75.6	33	4.9 QUE		
*ISC	1971	1	30	20	15	40.9	30.54	78.97	56	4.7 BISC		36
*ISC	1971	2	6	21	37	21.5	30.18	75.98	281			6
*QUE I	1971	2	25	4	36	24	32.6	76.3	160			
*ISC	1971	5	3	0	33	24.6	30.78	84.32	27	5.3 BISC		154
*ISC	1971	6	6	10	34	49.6	28.04	85.58	42	4.9 BUSGS		15
*QUE I	1971	6	11	1	15	13	30.7	75	33			
*ISC	1971	6	25	1	10	13.6	27.95	83.55	96	4.1 QUE		27
*QUE I	1971	8	16	5	44	53	34.9	81.2	33			
*ISC	1971	9	27	11	20	8.6	32.27	75.62	16			6
*ISC	1971	10	24	8	59	6.3	28.29	87.19	57	4.8 BISC		42
*ISC	1971	10	29	17	16	47.9	34.13	86.43	6	4.9 BISC		63
*ISC	1971	11	22	19	22	54	32.23	77.7	71	4 QUE		6
*QUE I	1971	11	29	7	32	37	33.2	76.2	50	3.6 QUE		
*ISC	1971	12	4	8	38	0.2	27.92	87.94	29	5.2 BISC		46
*HFS1 I	1971	12	19	2	51	2.3	25.5	87.2	0			
*QUE I	1971	12	24	8	50	3	34.6	75.8	100	4.4 QUE		
*ISC	1972	1	29	6	49	9.6	32.91	76.23	47	4.5 BQUE		34
*ISC	1972	2	4	14	8	21.5	30.34	84.46	18	5.1 BISC		81
*ISC	1972	2	20	3	2	13.2	34.47	80.37	33	4.8 BISC		61
*ISC	1972	3	15	6	0	30.2	30.52	84.43	12	5.1 BISC		106
*ISC	1972	4	8	6	42	15.3	29.66	89.41	49	4.8 BUSGS		25
*ISC	1972	4	11	7	50	22.9	33.19	76.3	139	3.9 BQUE		6
*ISC	1972	4	21	21	19	27.8	34.98	81.14	21	4.8 BISC		82
*ISC	1972	4	28	0	52	57.3	31.33	84.92	32	5 BISC		96
*ISC	1972	6	18	4	30	34.4	31.84	83.65	1			17
*ISC	1972	6	20	15	34	30.8	31.79	76.61	58	4.2 BQUE		9
*ISC	1972	8	17	18	14	25.3	30.74	78.42	33	5.2 BISC		32
*ISC	1972	8	21	14	4	34.2	27.33	88.01	33	4.5 BISC		53
*ISC	1972	8	21	18	55	7.2	27.22	88.02	33	5.1 BUSCGS		24
*ISC	1972	9	6	2	51	27.7	32.49	78.51	14	5 BISC		79

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int	N
*ISC	1972	10	26	14	5		55.5 32.04	76.34	82	4.4 BISC		20	
*ISC	1972	11	6	10	56		13.5 26.87	88.42	59	4.4 BISC		61	
*ISC	1972	11	7	6	45		20.9 31.78	77.32	205			7	
*ISC	1972	12	30	13	29		36.4 33.64	87.66	38	4.4 BISC		41	
*ISC	1972	12	30	23	54		6.3 33.6	87.54	33	4.7 BISC		73	
*ISC	1973	1	2	22	25		58.1 31.17	88.08	43	5.1 BISC		123	
*ISC	1973	1	14	11	39		26 32.94	75.5	98	4.4 BQUE		15	
*ISC	1973	1	16	21	31		25.9 33.29	75.83	39	5.1 BISC		180	
*ISC	1973	1	16	23	38		43.2 33.39	75.79	56			11	
*QUE	1	1973	1	17	1	8	16 33.3	76	96				
*ISC	1973	1	23	23	51		14.9 33.7	75.81	33			7	
*ISC	1973	2	10	6	51		20.8 30.5	80.33	0	4.6 BISC		13	
*ISC	1973	2	19	17	34		46 32.57	88.71	29			21	
*ISC	1973	3	22	1	6		57.4 28.11	87.14	33	5 BISC		119	
*ISC	1973	4	1	9	45		27.2 32.12	77.83	90	5.6 BQUE		17	
*ISC	1973	4	4	17	53		8.6 30.78	83.45	48	4.5 BISC		32	
*ISC	1973	4	10	0	10		2.9 33.17	75.74	61	4.4 BISC		16	
*IMD	1973	6	26	18	2		19 27 75.2					4NM	
*ISC	1973	7	13	22	3		38.1 33.17	75.67	48	4.8 BISC		74	
*ISC	1973	7	13	22	54		27.8 33.18	75.7	55	4.4 BISC		25	
*ISC	1973	7	14	9	12		40.2 31.73	83.19	0			17	
*ISC	1973	7	14	17	46		54.7 34.91	86.61	55	4.3 BISC		17	
*ISC	1973	7	18	22	55		13.2 33.1	75.54	63	4.6 BUSGS		14	
*ISC	1973	7	18	23	25		7.1 33.05	75.6	65			11	
*QUE	1	1973	7	20	41		42 33.3	76.2	96				
*ISC	1973	8	1	14	5		15.5 29.58	89.16	6.3	4.9 BISC		89	
*ISC	1973	8	15	17	15		20.8 33.15	86.81	33	4.6 HFS		17	
*ISC	1973	8	16	8	2		49.7 33.24	86.83	0	5.3 BISC		168	
*ISC	1973	9	8	7	25		40.9 33.29	86.82	11	5.5 BISC		247	
*ISC	1973	9	8	7	59		30 33.18	86.88	26	5 BISC		86	
*ISC	1973	9	30	14	26		25.5 33 84.61	45	4.1 BUSGS		16		
*ISC	1973	10	16	9	50		43.7 28.35	82.98	34	5 BISC		114	
*ISC	1973	10	24	5	23		51.3 33.14	75.91	37	5.3 BISC		197	
*ISC	1973	10	24	14	4		36.9 33.29	76.11	142			6	
*ISC	1973	10	24	19	57		17.1 33.11	75.92	48	4.9 BISC		92	
*ISC	1973	10	25	2	52		3.1 32.86	75.56	103	4.1 BUSGS		9	
*ISC	1973	10	30	15	50		45.7 33.14	76.19	64	3.9 BUSGS		10	
*ISC	1973	11	21	19	47		56.4 34.62	81.11	25	5.1 BISC		128	
*ISC	1973	11	27	9	31		11.6 33.18	86.76	33	4.9 BISC		70	
*ISC	1973	12	16	9	16		12.4 32.36	76.18	18	4.8 BISC		71	
*ISC	1973	12	30	9	55		53.2 33.1	86.91	29	4.7 BISC		21	
*ISC	1974	1	2	17	35		15 27.98	75.12	33			7	
*ISC	1974	1	3	7	15		31.6 27.32	75.18	75			10	
*ISC	1974	1	22	10	33		14.7 28.09	88.7	33			9	
*ISC	1974	1	24	8	1		18.1 29.42	89.24	72			8	
*ISC	1974	2	11	16	37		20.8 29.19	85.16	236			5	
*ISC	1974	2	19	20	25		53.4 26.84	89.84	33			6	
*ISC	1974	2	20	22	8		7.3 28.19	76.35	193			10	
*ISC	1974	2	24	21	32		1.8 30.96	78.46	1	4.9 BISC		28	
*ISC	1974	3	3	4	53		17.3 30.74	86.31	29	5.4 BISC		127	
*ISC	1974	3	6	17	36		19.4 32.29	85.59	11	4.7 BUSGS		25	
*ISC	1974	3	13	6	47		51.1 29.37	81.38	45	4.5 BISC		21	
*ISC	1974	3	14	12	29		47.1 34.15	84.46	0	4.4 BISC		8	
*ISC	1974	3	24	14	16		1.1 27.66	86	20	5.4 BISC		299	
*ISC	1974	3	24	16	17		35.3 27.62	86.01	3	4.7 BISC		81	
*ISC	1974	3	26	17	46		0.5 27.86	75.52	33			8	
*ISC	1974	4	13	23	59		54.6 33.1	81.01	40			7	
*ISC	1974	4	20	16	25		52.7 31.42	77.39	62			8	

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1974	5	6	1	7		3.5 29.34	81.64	60	4.5 BISC		24
*ISC	1974	6	10	23	15		42.7 30.63	80.97	33			8
*ISC	1974	6	11	9	17		21.5 34.06	88.56	40	4.1 BISC		8
*ISC	1974	6	22	17	31		3.4 30.77	80.69	33			7
*ISC	1974	6	24	6	8		34.2 30.65	80.98	33			6
*ISC	1974	7	7	20	56		55.3 30.54	78.48	96	4.7 BISC		89
*ISC	1974	9	27	5	26		33.6 28.59	85.51	20	5.5 BISC		219
*ISC	1974	10	4	5	33		7.3 28.58	87.36	33			10
*ISC	1974	10	13	21	29		52.2 34.76	87.22	33	5.1 BISC		87
*ISC	1974	10	31	4	26		26.6 31.6	84.85	33	4.5 BISC		10
*ISC	1974	11	10	6	55		51.8 31.38	86.37	33	4.6 BISC		25
*ISC	1974	11	16	16	18		34.4 33.01	76.22	36	4.8 BISC		59
*ISC	1974	11	16	21	5		9.6 33.08	76.41	42			12
*ISC	1974	11	21	6	16		37.9 28.72	80.82	33			8
*ISC	1974	11	22	6	51		36.3 33.5	76.7	49	4.6 BISC		20
*ISC	1974	11	27	11	57		4.8 34.49	80.02	61			11
*ISC	1974	12	1	10	54		51.3 33.99	76.99	33			11
*ISC	1974	12	23	9	45		42.1 39.32	81.38	45	5.2 BISC		129
*ISC	1974	12	24	0	40		40.8 31.18	86.5	33	4.6 BISC		29
*ISC	1975	1	19	8	0		18 32.3	78.65	12	5.1 BISC		142
*ISC	1975	1	19	8	1		57.7 32.38	78.49	1	6.2 BISC		355
*ISC	1975	1	19	8	12		9.8 31.93	78.52	49	2.8 BISC		95
*ISC	1975	1	19	8	18		23.3 31.98	78.51	33	4.8 BISC		14
*ISC	1975	1	19	9	12		57.8 32.26	78.66	54	4.6 BISC		15
*ISC	1975	1	19	10	39		37.5 32.11	79.12	33	3.8 BUSGS		6
*ISC	1975	1	19	13	4		36.4 32.11	78.66	33	4.9 BISC		81
*ISC	1975	1	19	16	16		6.7 32.25	78.51	0	4.7 BISC		13
*ISC	1975	1	19	17	41		6.8 32.8	79.2	33	4.2 BISC		6
*ISC	1975	1	20	4	37		28.4 32.45	78.76	7	4.5 BISC		16
*ISC	1975	1	20	4	40		30.8 32.25	78.73	0	4.7 BISC		10
*ISC	1975	1	20	11	6		53.1 32.48	78.49	48	4.7 BISC		88
*ISC	1975	1	20	13	24		14.6 32.09	78.47	49	4.6 BISC		17
*ISC	1975	1	22	17	26		37.4 31.92	78.44	51	4.6 BISC		63
*ISC	1975	1	23	0	7		45.1 32.63	77.69	110			7
*ISC	1975	1	23	1	37		42.6 27.44	88.37	33	4.5 BISC		33
*ISC	1975	1	27	8	10		13.6 32.28	78.69	2	4.9 BISC		65
*ISC	1975	1	27	9	23		36.3 32.03	78.69	19	4.7 BISC		37
*ISC	1975	1	27	13	41		35 32.51	78.59	1	4.8 BISC		52
*ISC	1975	1	27	15	58		7.8 32.83	78.46	36	4.5 BISC		13
*ISC	1975	1	29	15	49		25.7 31.95	78.63	33	4.8 BISC		57
*ISC	1975	1	31	12	38		50.8 28.08	84.76	19	5 BISC		137
*ISC	1975	1	31	14	4		11.1 32.31	78.42	51	4.4 BISC		21
*ISC	1975	2	2	19	14		9.7 32.55	78.49	21	5.1 BISC		140
*ISC	1975	2	4	1	11		12 32.63	78.37	33			5
*ISC	1975	2	6	6	39		48.7 27.95	87.67	63	4.7 BISC		17
*ISC	1975	2	6	23	26		23.3 32.01	78.6	33			7
*ISC	1975	2	11	6	43		32.4 32.07	78.66	33	4.6 BISC		18
*ISC	1975	2	19	6	54		21.4 32.45	77.8	33			5
*ISC	1975	2	23	17	41		52.5 32.17	78.01	33			5
*ISC	1975	3	10	3	7		1.9 32.21	78.76	35	4.9 BISC		69
*ISC	1975	3	11	13	39		35.4 32.15	78.54	56	4.7 BISC		19
*ISC	1975	3	12	14	13		32.5 32.15	78.87	33			8
*ISC	1975	3	15	0	10		22.9 32.35	78.57	57			12
*ISC	1975	3	23	14	33		57.2 34.58	81	190			5
*ISC	1975	3	24	20	53		6.1 32.03	78.53	48	4.6 BISC		22
*ISC	1975	3	26	4	47		15.5 31.99	78.4	33	4.5 BISC		13
*ISC	1975	3	29	2	57		46.3 28.5	88.01	35	4.8 HFS		15
*ISC	1975	4	1	16	18		45.1 31.9	78.39	40	4.5 BISC		36

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int	N
*ISC	1975	4	7	17	30	3	33.62	88.71	33			9	
*ISC	1975	4	9	0	32	18.4	33.34	84.08	33			5	
*ISC	1975	4	9	3	28	28.1	30.81	84.79	11	4.7 BISC		67	
*ISC	1975	4	9	21	45	40.6	32.07	78.65	16	4.6 BISC		27	
*ISC	1975	4	12	1	1	36.7	31.57	83.21	0	4.7 HFS		11	
*ISC	1975	4	24	1	35	51.2	27.43	87.04	26	4.9 BISC		94	
*ISC	1975	4	28	4	51	37.2	28.78	83.26	0			5	
*ISC	1975	4	30	3	8	27.8	28.21	78.94	33	4.5 BISC		10	
*ISC	1975	5	8	11	56	2.3	32.31	78.58	2	4.6 BISC		84	
*ISC	1975	5	11	6	48	37.4	31.92	78.67	19	4.7 BISC		45	
*ISC	1975	5	14	12	16	45.1	29.16	80.75	124			7	
*ISC	1975	5	14	17	34	14.6	31.9	78.34	0			8	
*ISC	1975	5	27	22	14	17.6	30.46	84.64	0	4.6 HFS		5	
*ISC	1975	5	28	16	33	54.1	31.57	78.42	114			9	
*ISC	1975	5	29	20	37	37.5	32.01	78.52	50	4.6 BISC		15	
*ISC	1975	6	10	6	44	14.4	32.53	78.67	5	4.9 BISC		73	
*ISC	1975	6	19	2	51	6.7	32.6	78.79	0	4.4 HFS		5	
*ISC	1975	6	24	15	38	28.1	27.74	87.49	33	4.8 BISC		62	
*ISC	1975	7	2	11	6	28.8	32.49	78.59	33	4.9 BISC		81	
*ISC	1975	7	19	6	10	53.9	31.94	78.58	31	5.1 BISC		183	
*ISC	1975	7	19	7	26	31.4	32.16	78.67	58	4.4 BISC		20	
*ISC	1975	7	19	12	1	0.8	31.83	78.53	44	4.1 BQUE		8	
*ISC	1975	7	20	11	31	0.1	31.82	78.36	97			11	
*ISC	1975	7	21	7	26	37.5	32.07	78.57	38	4.6 BISC		44	
*ISC	1975	7	29	2	40	51.2	32.57	78.49	0	5.5 BISC		217	
*ISC	1975	8	14	15	16	37.4	31.86	78.57	19	3.9 BUSGS		30	
*ISC	1975	8	18	19	6	57.8	31.85	88.25	33			7	
*ISC	1975	8	23	3	8	56.9	30.69	79.4	33	4.1 BISC		9	
*ISC	1975	8	27	7	40	17	34.79	80.43	18	4.8 BISC		66	
*ISC	1975	8	28	22	28	18.7	28.18	88.12	0	4.7 HFS		12	
*ISC	1975	9	6	4	44	33.1	29.21	81.94	12	5.1 BISC		86	
*ISC	1975	9	8	22	6	22.8	31.58	84.72	47	4.9 BISC		59	
*ISC	1975	9	16	4	20	26	32.34	76.25	59	4.6 BISC		26	
*ISC	1975	9	19	17	53	17	32.2	78.69	56	4.3 BUSGS		14	
*ISC	1975	9	19	17	59	33.5	32	78.41	38	4.8 BISC		19	
*ISC	1975	9	27	19	46	38.1	30.36	85.78	26	4.4 BISC		14	
*ISC	1975	10	7	5	50	16	31.56	77.27	33			5	
*QUE	1	1975	10	21	13	33	43	30.5	79.3	33			
*ISC	1975	10	23	7	47	13.1	30.66	85.15	33			7	
*ISC	1975	10	24	17	44	16	26.9	86.23	33	4.2 BUSGS		11	
*QUE	1	1975	10	28	2	45	32	32.4	80.8	96			
*QUE	1	1975	10	28	8	11	47	32.4	80.8	96			
*ISC	1975	10	30	14	20	54.4	32.89	75.7	75	4.7 BISC		21	
*ISC	1975	10	30	14	36	44.4	32.97	75.95	45	4.8 BISC		38	
*ISC	1975	11	5	0	35	56.7	32.06	78.74	21	5 BISC		99	
*ISC	1975	11	6	0	11	30.4	29.61	77.86	16	4.8 BISC		80	
*ISC	1975	11	13	14	35	40.6	34.61	82.74	36	4.7 BISC		69	
*ISC	1975	11	16	19	34	51.7	32.57	76.54	96			4	
*ISC	1975	11	17	15	58	29.3	30.01	84.39	33			11	
*ISC	1975	11	21	13	49	27.9	26.95	86.54	0	4.9 BISC		28	
*ISC	1975	11	26	15	2	31.1	28.14	87.8	33	5 BISC		25	
*ISC	1975	11	26	15	30	49	32.39	88.85	33			8	
*ISC	1975	11	29	20	31	24.5	32.79	78.46	96			7	
*ISC	1975	12	5	7	37	10.5	33.09	76.12	24	5.3 BISC		169	
*ISC	1975	12	6	19	7	41.9	31.94	78.24	86			6	
*ISC	1975	12	6	22	46	33.6	32.21	78.09	79			7	
*QUE	1	1975	12	10	6	25	22	32.6	80.6	96			
*ISC	1975	12	10	3	26	5.6	32.95	76.1	5	5.3 BISC		225	

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1975	12	10	5	3		47.3	32.78	78.91	76	4.7 BISC	22
*ISC	1975	12	10	5	8		44.8	32.9	76.06	70	4.6 BISC	23
*ISC	1975	12	11	10	9		50.2	32.99	76.17	42	5 BISC	111
*ISC	1975	12	28	13	49		7.2	32.14	87.67	19	4.9 BISC	54
*ISC	1976	1	7	0	24		52.9	32.97	76.12	40	5.3 BISC	173
*ISC	1976	1	8	22	34		25.5	32.95	76.15	43	4.8 BISC	94
*ISC	1976	1	8	23	48		21.1	33.01	76.16	46		10
*ISC	1976	1	9	23	50		16.5	32.78	75.98	96	4.5 BISC	47
*ISC	1976	1	10	0	45		32.6	33.2	76.09	96		8
*ISC	1976	1	13	10	36		26.5	33.25	76.53	96		5
*ISC	1976	1	16	14	1		10.8	32.91	75.53	96		6
*ISC	1976	1	16	21	20		24.1	28.43	75.6	79		12
*ISC	1976	1	18	5	4		18.5	32.72	76	0		8
*ISC	1976	1	18	11	49		50.9	34.12	76.96	60		7
*QUE	1	1976	1	22	14	38	13	31.6	79.4	96		
*ISC		1976	1	23	17	41	41.5	31.4	76.59	96		6
*ISC		1976	1	23	21	27	25.1	29.04	76.66	127		9
*ISC		1976	1	24	19	41	32.1	32.24	75.46	96		4
*ISC		1976	1	27	19	23	20.8	33.03	76.1	46	4.8 BISC	33
*ISC		1976	2	5	12	4	30.6	31.23	77.03	6	5 BISC	61
*ISC		1976	2	14	18	19	57.5	34.71	82.02	33	4.6 BISC	48
*ISC		1976	2	24	22	26	3.4	32.35	78.62	148	4.9 BQUE	7
*ISC		1976	3	1	15	26	35.4	32.99	76.06	53		11
*ISC		1976	3	4	18	45	44.3	32.58	75.3	121	3.7 BUSGS	12
*ISC		1976	4	10	4	38	38.6	32.7	76.82	96		4
*ISC		1976	4	10	7	9	19.1	32.64	76.38	62	4.3 BISC	20
*ISC		1976	4	10	18	3	5.2	32.9	75.9	96		7
*ISC		1976	4	12	23	16	54.7	33.05	76.03	68	3.7 BUSGS	11
*ISC		1976	4	16	20	15	13.1	32.68	76.21	92	3.9 BISC	10
*ISC		1976	4	20	11	23	54.7	34.78	87.34	33		5
*ISC		1976	4	21	22	8	48.4	32.12	85.48	33	4.2 BUSGS	17
*ISC		1976	5	6	8	21	37.7	31.52	78.59	87	4.5 BISC	17
*ISC		1976	5	7	18	3	4.4	33	77.68	106		9
*ISC		1976	5	10	18	43	52.5	29.32	81.45	22	5.2 BISC	198
*ISC		1976	5	22	18	32	53.6	33.04	75.82	71	4.4 BISC	19
*ISC		1976	5	31	21	38	59.6	33.53	76.36	33		6
*ISC		1976	6	13	11	47	2.4	32.02	85.4	33		4
*ISC		1976	6	14	11	10	10.5	32.99	87.27	0	4.6 BISC	13
*ISC		1976	6	22	20	43	31.9	32.15	76.14	71		8
*ISC		1976	7	6	2	55	48.9	32.43	78.35	25	5.1 BISC	58
*ISC		1976	7	12	3	12	49.7	34.25	85.62	33	4.8 BISC	71
*ISC		1976	7	17	2	2	32.3	34.19	81.86	40	4.2 BISC	7
*ISC		1976	7	18	1	10	16.8	34.63	78.23	33		5
*ISC		1976	7	23	1	56	7.2	31.72	83.68	29	4.8 BISC	30
*ISC		1976	8	1	2	5	26.2	34.56	79.52	15	4.6 BISC	36
*ISC		1976	8	27	6	5	13.1	29.26	81.57	33		5
*ISC		1976	9	8	20	13	1.2	32.03	78.76	9	5.3 BISC	186
*ISC		1976	9	12	15	36	12	27.68	85.94	33	4.5 BISC	38
*ISC		1976	9	14	6	43	51.6	29.8	89.56	75	5.4 BISC	275
*ISC		1976	9	28	22	30	55	31.06	84.64	33		10
*ISC		1976	9	29	2	51	24.9	29.5	81.5	33	4.9 BISC	74
*ISC		1976	9	29	7	47	16.6	31.83	78.39	20	4.9 BISC	108
*ISC		1976	10	3	15	3	43.5	31.92	78.79	16	4.7 BISC	49
*ISC		1976	10	23	16	9	21.2	28.63	86.23	81	5.1 BUSGS	12
*ISC		1976	11	1	5	51	33.6	31.73	78.02	96	4.5 HFS	5
*QUE	1	1976	11	6	13	59	14	32.5	76.3	96		
*ISC		1976	11	24	3	58	48.4	30.33	79.41	61		11
*ISC		1977	1	6	21	50	7.8	31.24	87.97	25	5 BISC	90

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISC	1977	1	6	22	20		14.3	31.16	88.04	33		7
*ISC	1977	1	14	12	9		32.6	34.68	82.82	33	4.7 BISC	60
*ISC	1977	1	19	17	57		22.7	33.39	80.42	33		4
*QUE	1	1977	1	20	14	57	20	34.3	78.7	96		
*ISC	1977	1	21	14	57		46.4	32.76	75.98	51	4.5 BISC	43
*ISC	1977	1	28	3	48		53.2	31.42	78.03	50	4.7 BISC	20
*ISC	1977	2	19	6	15		25.1	31.79	78.43	40	5.4 BISC	209
*ISC	1977	2	19	6	39		42.6	31.71	78.35	33	4.6 BISC	27
*ISC	1977	2	19	23	43		27.1	34.62	81.29	19	5.1 BISC	172
*ISC	1977	2	20	1	45		33.8	34.59	81	33	4.5 BUSGS	13
*ISC	1977	2	20	17	45		59	34.78	81.19	33		5
*QUE	1	1977	3	6	18	39	55	33.5	76.5	96		
*ISC	1977	3	12	0	2		28.8	32.98	75.9	33		12
*ISC	1977	3	15	1	1		3.4	31.4	89.4	19	4.8 BISC	89
*ISC	1977	3	16	12	56		52.4	31.3	89.37	33	5 BISC	63
*ISC	1977	3	20	8	35		50	38.2	87.91	33	5.1 HFC	15
*ISC	1977	3	27	5	36		48.6	32.67	78.66	26	5.1 BISC	93
*ISC	1977	4	14	18	26		50.8	31.99	78.47	33	4.4 BISC	28
*ISC	1977	4	20	4	21		9.3	30.48	79.45	36	4.9 BISC	43
*ISC	1977	4	28	4	37		12.9	30.43	81.53	0	4.6 HFS	7
*QUE	1	1977	5	11	22	24	51	33.2	76.8	96		
*ISC	1977	5	16	22	37		45.4	29.42	81.11	33		10
*ISC	1977	6	5	19	21		37.4	26.07	88.43	17	4.7 BISC	49
*ISC	1977	6	20	22	4		8.7	31.03	83.56	33	4.3 BISC	6
*ISC	1977	6	22	15	53		29	33.18	76.04	47	4.9 BISC	119
*QUE	1	1977	6	22	23	3	14	33.3	76.4	96		
*ISC	1977	7	8	1	58		6.7	32.83	75.82	0		5
*ISC	1977	7	11	13	58		7.8	32.43	75.88	33		7
*ISC	1977	7	24	2	3		30.5	39.96	80.82	33		7
*QUE	1	1977	8	3	19	8	44	33.1	75.6	33		
*QUE	1	1977	8	4	8	5	17	33.9	76.3	96		
*ISC	1977	8	1	12	56		56.8	33.58	76.32	33		8
*QUE	1	1977	9	11	20	39	11	33.4	76.1	96		
*ISC	1977	9	20	5	51		36.2	29.56	81.05	23	4.3 BISC	27
*ISC	1977	9	24	19	34		17.8	32.59	76.76	33		5
*ISC	1977	9	25	2	13		58.5	28.42	87.58	33		8
*ISC	1977	10	6	22	12		29	31.58	79.03	33	4.4 HFS	11
*ISC	1977	10	19	7	14		46.7	32.77	78.48	33	4.4 BISC	20
*QUE	1	1977	10	21	6	20	55	33.6	76.8	96		
*ISC	1977	10	21	12	16		12.5	30	80.07	58		18
*ISC	1977	11	4	23	54		44.7	29.5	81.3	17	4.8 BISC	69
*ISC	1977	11	18	5	20		10.3	32.64	88.38	24	5.7 BISC	334
*ISC	1977	11	18	5	33		20	32.61	88.44	33	4.4 BISC	17
*ISC	1977	11	18	11	27		27.7	32.57	88.33	33	4.6 BISC	41
*ISC	1977	11	18	15	10		42.4	32.65	88.32	33	4.7 BISC	9
*ISC	1977	11	18	17	23		25.3	32.69	88.3	33	4.9 BISC	106
*ISC	1977	11	18	23	12		51.7	32.68	88.34	57	4.6 BISC	38
*ISC	1977	11	20	23	40		35	32.64	88.04	33	4.7 BUSGS	6
*ISC	1977	12	13	22	48		10.7	29.94	81.35	183		8
*ISC	1977	12	18	6	5		33	33.56	75.03	141		6
*ISC	1977	12	20	19	12		35.1	33.43	76.16	32	4.7 BISC	39
*ISC	1977	12	21	2	8		15.3	33.44	76.17	29	4.9 BISC	55
*ISC	1978	1	1	11	25		57.1	30.1	81.4	83	4.3 BISC	8
*ISC	1978	1	7	7	23		20	30.51	79.4	33	4.6 BISC	65
*ISC	1978	1	15	0	17		19	31.06	78.28	33	4.2 BISC	13
*ISC	1978	1	15	1	10		19.7	31.87	77.77	33		7
*ISC	1978	1	15	2	30		30.7	31.84	78.36	60	4.5 BISC	18
*ISC	1978	2	4	21	30		14	29.29	81.39	36	4.4 BISC	21

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1978	2	10	16	53	2.8	27.9	85	33	4.4 BISC		9
*ISC	1978	2	10	17	29	47.1	28.03	84.69	0	5.3 BISC		157
*ISC	1978	2	11	9	26	59.5	34.06	88.11	38	4.3 BISC		14
*ISC	1978	2	12	6	39	11.6	28.47	85.84	33			9
*ISC	1978	2	14	10	5	0.8	34.13	76.17	96			6
*ISC	1978	2	19	4	52	29.1	29.3	84.96	22	4.5 BISC		49
*ISC	1978	2	19	18	56	30.9	31.79	75.27	45	4 BISC		17
*ISC	1978	2	23	2	1	25.7	33.42	76.06	15	4.8 BISC		93
*ISC	1978	2	28	17	26	4.6	29.33	80.69	54	4.7 BISC		22
*ISC	1978	3	3	14	50	11	33.37	75.02	33			7
*ISC	1978	3	7	10	21	59.1	29.29	81.26	33	4.2 BISC		17
*QUE	1	1978	3	7	10	23	23	34.2	75.6	96		
*ISC	1978	3	21	0	5	51.1	30.1	81.34	91			11
*ISC	1978	3	29	9	0	43.1	32.74	88.43	33	4.4 BISC		20
*ISC	1978	3	30	23	44	46.8	32.68	78.46	50	4.2 BISC		8
*ISC	1978	4	4	0	40	29.2	32.98	82.25	19	5.5 BISC		309
*ISC	1978	4	10	12	41	15.8	33.25	82.37	33	4.2 BISC		10
*ISC	1978	4	11	7	55	39.9	32.72	78.72	33	4.5 BISC		25
*ISC	1978	4	12	2	10	16.2	33.71	75.42	33	3.8 BISC		13
*ISC	1978	5	16	6	31	57.1	33.18	75.18	96	4.1 BISC		14
*ISC	1978	5	17	8	39	15.3	32.89	75.73	96	4 BISC		9
*ISC	1978	5	21	23	7	17.5	31.51	77.87	70	4.2 BISC		8
*ISC	1978	6	1	6	23	41.1	34.45	80.44	50	4.4 BISC		28
*ISC	1978	6	14	16	12	4.9	32.23	76.61	7	5 BISC		135
*ISC	1978	6	15	6	18	33.7	34.03	79.66	160	4.1 BISC		16
*ISC	1978	7	14	20	13	9.7	32.31	83.03	33	4.4 BISC		15
*ISC	1978	8	8	10	12	29.1	32.26	83.1	3	5.1 BISC		163
*ISC	1978	8	9	17	4	30.6	32.3	83.17	33	4.8 BISC		27
*ISC	1978	8	13	22	27	59.8	28.07	85.24	1	4.5 BISC		40
*ISC	1978	8	15	12	0	24.7	31.32	84.66	33	4.8 BISC		16
*ISC	1978	8	18	13	26	15.4	27.84	87.76	59			11
*ISC	1978	8	24	7	22	40.3	32.03	78.77	33	4.5 BISC		9
*ISC	1978	8	31	22	11	39.5	34.65	81.42	33	4.3 BISC		6
*ISC	1978	9	3	20	33	44.5	32.33	83.08	40	4.5 BISC		53
*ISC	1978	9	14	22	35	10.8	34.52	80.58	116	4.1 BISC		8
*ISC	1978	9	28	5	32	16.5	33.49	76.04	40	4.8 BISC		45
*ISC	1978	10	4	13	53	50.7	27.82	85.93	19	5.2 BISC		147
*ISC	1978	10	14	18	48	18.9	27.65	87.32	27	4.8 BISC		24
*QUE	1	1978	10	16	3	26	12	28.7	77	33		
*ISC	1978	10	17	20	10	11.5	32.42	76.62	86			11
*ISC	1978	10	19	6	4	56.5	34.55	77.32	33			8
*ISC	1978	10	23	14	36	50.4	28.56	86.77	33	4.4 BISC		20
*ISC	1978	10	26	21	17	58.9	32.59	85.72	33	4.6 BISC		38
*ISC	1978	10	26	22	2	20.6	32.79	85.77	33	4.7 BISC		18
*ISC	1978	10	27	23	23	52.9	29.37	84.36	79			14
*QUE	1	1978	11	25	14	59	33.6	76.3	33			
*ISC	1978	11	29	14	42	12.7	32.64	85.63	33	4.2 BISC		8
*ISC	1978	11	30	6	49	16.8	32.71	85.67	33	4.9 BISC		42
*ISC	1978	12	1	19	22	44.3	32.79	82.8	33	4.8 BISC		45
*ISC	1978	12	7	2	4	22.1	32.68	85.96	39	4.9 BISC		18
*ISC	1978	12	10	23	55	0.3	30.64	83.8	33			8
*ISC	1978	12	12	10	0	52.9	29.2	80.94	56	4.4 BISC		20
*ISC	1978	12	14	20	16	37	29.63	80.39	33	4.1 BISC		13
*QUE	1	1978	12	14	22	41	34	33.7	75.7	33		
*ISC	1978	12	25	20	0	2.2	28.07	84.07	33	4.6 BISC		17
*ISC	1979	1	1	21	52	46.1	28.41	82.92	33	4.3 BISC		19
*ISC	1979	1	24	8	45	12	33.19	88.47	33	4.7 BISC		10
*ISC	1979	3	5	23	54	50	30.32	79.6	8	4.2 BISC		19

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISC	1979	3	27	5	27		55.2	32.2	78.64	33	4.2 BISC	9
*ISC	1979	3	29	1	58		59.9	29.9	80.31	33	4.2 BISC	10
*ISC	1979	3	31	15	58		10.4	32.71	89.24	3	4.6 BISC	64
*ISC	1979	4	11	16	8		12	25.97	88.84	33	4.7 BISC	29
*ISC	1979	4	19	22	0		39.4	32.95	83.39	33	4.4 BISC	60
*ISC	1979	4	22	1	29		20	34.81	76.04	33	4.2 BISC	5
*ISC	1979	4	27	13	56		9.9	34.96	76.82	258	3.3 BISC	5
*ISC	1979	5	5	11	22		48.4	27.26	85.66	33	4.2 BISC	21
*ISC	1979	5	11	21	46		39	32.08	78.87	33	4.4 BISC	19
*ISC	1979	5	20	22	59		11.6	29.93	80.27	16	5.7 BISC	379
*ISC	1979	5	27	6	11		27.2	33.58	76.44	29	4.7 BISC	49
*ISC	1979	6	2	13	5		21.3	33.75	76	33	4.7 BISC	10
*ISC	1979	6	11	15	46		50	34.9	80.87	18	4.7 BISC	126
*ISC	1979	6	11	23	25		35.3	33.13	76.25	41	4.5 BISC	56
*ISC	1979	6	19	16	29		8.4	26.74	87.48	2	5.2 BISC	223
*ISC	1979	6	30	9	18		49.4	33.86	87.81	33	4.4 BISC	14
*ISC	1979	7	3	16	56		53.1	27.77	84.41	33	4.1 BISC	15
*ISC	1979	7	5	11	49		51.1	27.72	86.14	0		7
*ISC	1979	7	16	6	0		13.7	34.56	87.71	44	4.5 BISC	49
*ISC	1979	7	30	6	9		13.6	32.97	87.88	33	4.4 BISC	13
*ISC	1979	9	6	2	53		1.7	32.76	85.65	4	4.7 BISC	117
*ISC	1979	10	17	1	44		22.3	27.97	87.61	33	4.6 BISC	12
*ISC	1979	11	6	6	38		18.4	32.92	85.88	0	4.6 BISC	25
*ISC	1979	11	16	19	17		27.4	27.94	88.68	39	4.6 BISC	20
*ISC	1979	11	30	20	13		35.1	31.42	81.17	33	4 BISC	6
*ISC	1979	12	6	13	40		47.5	34.33	80.35	15	3.8 LPEK	16
*ISC	1979	12	22	22	28		45	33.1	75.89	18	4.8 BISC	90
*ISC	1979	12	28	1	59		18.3	30.82	78.57	23	5 BISC	22
*ISC	1980	1	7	12	45		20.5	33.1	76.01	39	4.7 BISC	36
*ISC	1980	1	9	10	29		20.5	32.7	88.67	33	4.3 BISC	8
*ISC	1980	1	16	20	9		35.2	29.51	79.99	141		10
*ISC	1980	1	27	3	29		26	33.76	82.15	38	4.7 BISC	63
*ISC	1980	1	27	3	37		15.9	33.74	82.3	33	4.4 BISC	21
*ISC	1980	1	27	3	47		12.3	33.64	82.11	33	4.4 BISC	21
*ISC	1980	2	5	20	17		56.9	33.25	75.8	33	4.2 BISC	7
*ISC	1980	2	15	1	15		7.5	29.37	81	33	4 BISC	13
*ISC	1980	2	22	3	2		44.8	30.55	88.64	14	5.7 BISC	378
*ISC	1980	2	22	3	20		56	30.62	88.67	39	4.8 BISC	27
*ISC	1980	2	22	4	16		50.9	30.64	88.73	38	4.7 BISC	24
*ISC	1980	2	22	7	5		44.9	30.55	88.67	41	4.6 BISC	46
*ISC	1980	2	22	11	7		22.2	30.61	88.77	21	4.4 BISC	15
*ISC	1980	2	22	11	58		38.1	30.66	88.73	7	4.7 BISC	51
*ISC	1980	2	22	19	58		39.9	30.61	88.59	33	4 BISC	7
*ISC	1980	2	23	9	5		59.6	30.55	88.77	33	4.2 BISC	6
*ISC	1980	2	27	0	26		2.5	32.91	82.37	33	4.4 BISC	14
*ISC	1980	2	27	0	30		36.3	32.73	82.37	33	4.5 BISC	19
*ISC	1980	2	28	11	36		41.5	30.54	88.71	33	4.3 BISC	17
*ISC	1980	3	4	7	16		49.4	30.53	88.68	49	4.7 BISC	39
*ISC	1980	3	13	13	24		40.6	34.28	87.82	11	4.9 BISC	129
*ISC	1980	3	20	19	9		12	31.07	86.64	33		7
*ISC	1980	4	27	17	0		33.6	28.64	77.88	33	4.7 BISC	67
*ISC	1980	5	1	5	39		4.4	33.1	76.05	36	4.6 BISC	52
*ISC	1980	5	1	5	43		10.7	33.02	75.97	18	4.9 BISC	91
*ISC	1980	5	29	22	40		51.2	31.46	76.45	16	4.2 BUSGS	11
*ISC	1980	6	3	20	32		9.3	30.75	88.65	25	4.8 BISC	143
*ISC	1980	6	10	7	48		40.7	30.42	88.57	64	4.6 BISC	15
*ISC	1980	6	22	14	38		53.2	30.13	81.76	29	5.1 BISC	218
*ISC	1980	6	24	7	35		44.7	32.99	88.54	3	5.1 BISC	205

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISC	1980	6	25	2	53		54.9	32.82	88.45	3	4.7 BISC	119
*ISC	1980	6	25	21	32		49.3	31.56	88.83	33	4.4 BISC	14
*ISC	1980	7	29	12	23		7.7	29.33	81.21	3	5.7 BISC	314
*ISC	1980	7	29	14	58		41.6	29.62	81.09	23	6.1 BISC	451
*ISC	1980	7	29	18	44		22.1	29.42	80.8	19	4.4 BISC	21
*ISC	1980	7	29	21	57		35.8	29.15	81.07	33	4.6 BISC	26
*ISC	1980	7	30	1	0		38.6	29.62	80.8	4	4.9 BISC	96
*ISC	1980	7	30	5	30		51.9	29.63	80.31	33	4.4 BISC	8
*ISC	1980	7	31	14	22		1.4	29.46	80.94	33	4.5 BISC	20
*ISC	1980	8	4	16	52		43.7	29.28	80.99	72	4.3 BISC	16
*ISC	1980	8	14	21	45		2.8	32.99	88.56	33	4.9 BISC	122
*ISC	1980	8	17	14	23		17.6	30.71	80.84	33		5
*ISC	1980	8	20	1	5		54.2	29.46	81.14	50	4.2 BISC	15
*ISC	1980	8	23	21	36		49	32.96	75.75	3	5.2 BISC	261
*ISC	1980	8	23	21	50		1.2	32.9	75.79	13	5.2 BISC	253
*ISC	1980	9	4	1	48		41.8	31.28	75.67	122	4.5 BISC	12
*ISC	1980	9	8	7	42		6.9	29.92	80.35	33	4.4 BISC	14
*ISC	1980	9	22	20	37		53.7	32.56	78.54	65	4.5 BISC	43
*ISC	1980	10	8	16	19		58.2	31.42	87.71	34	5 BISC	68
*ISC	1980	10	10	14	2		26.7	29.27	81.28	33	4.9 BISC	62
*ISC	1980	11	18	13	46		21.1	29.55	85.17	24	5 BISC	67
*ISC	1980	11	19	19	0		44.6	27.4	88.79	1	6 BISC	436
*ISC	1980	11	20	4	3		29.6	29.52	85.23	36	4.8 BISC	55
*ISC	1980	11	25	9	27		5.1	27.87	85.45	33	4.1 BISC	17
*ISC	1980	11	26	7	52		18.1	31.77	75.7	33		6
*ISC	1980	12	21	14	12		25.9	34.68	79.93	33	3.7 BISC	6
*ISC	1980	12	22	4	36		8	26.66	89.59	33	4.4 BISC	15
*ISC	1980	12	26	5	19		44.9	29.08	88.88	67	4.5 BISC	16
*ISC	1981	2	8	2	30		48.4	30.6	88.61	33	4.8 BISC	9
*ISC	1981	2	9	15	49		21.6	27.19	89.76	16	4.9 BISC	101
*ISC	1981	3	6	5	58		47.9	29.79	80.66	24	5.1 BISC	132
*ISC	1981	3	12	20	15		45.6	34.83	77.49	3	4.2 BISC	43
*ISC	1981	4	9	17	19		29.4	28.08	84.67	17	4.5 BISC	59
*ISC	1981	5	11	15	33		48.4	28.32	76.54	33		5
*ISC	1981	5	13	2	7		51.8	32.57	82.35	18	5 BISC	155
*ISC	1981	5	15	17	22		43.4	29.46	81.92	33	5.1 BISC	170
*ISC	1981	5	28	23	14		4.7	31.82	78.43	0	5.2 BISC	196
*ISC	1981	6	10	13	52		39.9	32.6	88.46	21	4.4 BISC	53
*ISC	1981	6	13	0	56		56.6	31.81	78.46	33	5 BISC	184
*ISC	1981	6	19	10	41		45.3	30.44	78.89	64	4.5 BISC	23
*ISC	1981	6	21	9	51		3.2	27.15	87.13	33	4 BISC	7
*ISC	1981	7	1	20	38		11.5	30.76	80.3	33	4.1 BISC	8
*ISC	1981	7	4	3	49		25.8	34.35	75.25	2.9	3.7 BISC	10
*ISC	1981	7	12	8	45		39.2	32.72	76.08	36	4.7 BISC	56
*ISC	1981	7	31	5	49		1.3	30.98	75.08	0	4.1 BISC	11
*ISC	1981	8	2	17	37		45	30.9	86.38	33	4.3 BISC	11
*ISC	1981	8	10	10	58		24.4	31.1	77.81	33	4.6 BISC	26
*ISC	1981	8	17	9	11		15.8	33.41	75.62	6	4.9 BISC	154
*ISC	1981	8	31	12	31		44.8	34.6	78.98	39	4.8 BISC	83
*ISC	1981	9	10	3	47		7.8	29.43	81.13	33	4.8 BISC	96
*ISC	1981	9	15	3	31		56.4	34.82	77.44	23	4.5 BISC	66
*ISC	1981	9	27	11	10		42.5	33.29	75.63	33	4.5 BISC	16
*ISC	1981	10	16	23	1		36	34.95	88.34	33	4 BISC	9
*ISC	1981	10	19	10	46		22.4	31.32	88.11	33	4.5 BUSGS	15
*ISC	1981	11	9	19	31		2.5	33.32	75.85	33	4.5 BISC	17
*ISC	1981	11	21	4	25		5.6	29.52	89.11	50	4.8 BISC	80
*ISC	1981	11	22	18	9		25.7	29.68	81.92	33		7
*ISC	1981	12	2	12	46		54.2	30.67	79.62	0	3.9 BISC	6

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int N
*ISC	1981	12	14	18	25		39.2 33.18	75.72	21	4.5 BISC		28
*ISC	1982	1	22	4	29		55.9 30.89	89.86	3	5.3 BISC		208
NEIS	1982	1	22	4	30		0.3 30.82	89.82	33	5.3 SNEIS	5.3 BNEIS	104
*ISC	1982	1	23	17	37		29.2 31.67	82.28	25	6 BISC		447
NEIS	1982	1	23	17	37		30.3 31.69	82.24	33	6.5 SNEIS	6 BNEIS	217
*ISC	1982	1	23	17	48		1.9 31.56	82.2	31	5.3 BISC		130
NEIS	1982	1	23	17	48		2.1 31.58	82.2	33	6 SNEIS	5.4 BNEIS	86
*ISC	1982	1	23	18	19		41.4 31.53	82.24	7	4.9 BISC		124
NEIS	1982	1	23	18	19		46.4 31.55	82.29	45	5 BNEIS		67
*ISC	1982	1	23	18	58		38.5 31.33	82.3	70	4.4 BISC		14
NEIS	1982	1	23	18	58		36 31.66	82.6	33	4.2 BNEIS		8
*ISC	1982	1	23	19	17		2.9 31.6	82.36	0	4.8 BISC		32
NEIS	1982	1	23	19	17		8.4 31.63	82.44	33	4.7 BNEIS		20
*ISC	1982	1	23	19	52		6.8 31.49	82.26	20	4.9 BISC		112
NEIS	1982	1	23	19	52		8.4 31.53	82.34	33	5 BNEIS		58
*ISC	1982	1	23	20	43		20.9 31.66	82.27	33	4.3 BISC		15
NEIS	1982	1	23	20	43		21.3 31.77	82.35	33	4.4 BNEIS		10
*ISC	1982	1	23	22	44		41.9 32.01	82.99	33	4.3 BISC		7
*ISC	1982	1	24	3	31		52.9 31.48	82.25	23	4.5 BISC		51
NEIS	1982	1	24	3	31		54.1 31.53	82.38	33	4.6 BNEIS		23
*ISC	1982	1	24	3	46		6.9 31.53	82.28	33	4.5 BISC		31
NEIS	1982	1	24	3	46		7 31.58	82.43	33	4.5 BNEIS		17
*ISC	1982	1	24	5	30		16.8 31.71	82.72	33	4.1 BISC		7
*ISC	1982	1	24	10	3		34.9 31.58	82.15	33	4.6 BISC		30
NEIS	1982	1	24	10	3		35.1 31.65	82.17	33	4.6 BNEIS		22
*ISC	1982	1	24	10	46		15.4 31.47	82.3	33	4.3 BISC		23
NEIS	1982	1	24	10	46		15.1 31.46	82.38	33	4.4 BNEIS		15
*ISC	1982	1	24	17	27		47.8 31.48	82.16	25	4.3 BISC		25
NEIS	1982	1	24	17	27		49.1 31.59	82.35	33	4.5 BNEIS		15
*ISC	1982	1	24	17	12		47.9 31.52	82.14	0	4.5 BISC		14
*ISC	1982	1	25	17	26		17.2 31.58	82.25	33	5.1 BISC		132
NEIS	1982	1	25	17	26		17.5 31.64	82.3	33	4.4 SNEIS	5.1 BNEIS	57
*ISC	1982	2	4	6	6		51.2 31.46	82.27	42	4.5 BISC		29
NEIS	1982	2	4	6	6		49.8 31.38	82.19	33	4.6 BNEIS		19
*ISC	1982	2	6	10	43		43.2 31.38	82.27	33	4.3 BISC		9
*ISC	1982	2	19	21	46		51.3 33.61	80.78	33	4.6 BISC		13
NEIS	1982	2	19	21	46		50.9 33.7	80.83	33	4.7 BNEIS		11
*ISC	1982	2	20	13	21		49.3 27.7	85.73	33	4.5 BISC		7
*ISC	1982	2	25	19	11		37.4 31.59	82.38	21	4.3 BISC		13
*ISC	1982	3	1	4	2		3.6 33.29	76.59	33			5
*ISC	1982	3	24	23	17		51.5 30.54	88.7	33	4.6 BISC		18
NEIS	1982	3	24	23	17		50.8 30.56	88.73	33	4.6 BNEIS		12
*QUE	1982	3	28	17	14		42 31.4	75	33			
*ISC	1982	4	5	2	19		43.2 27.38	88.83	9	5 BISC		211
NEIS	1982	4	5	2	19		44.5 27.41	88.86	33	4.7 SNEIS	5.1 BNEIS F	100
*ISC	1982	5	2	11	31		22.8 29.16	81.68	0	4.5 BISC		16
*ISC	1982	5	7	7	44		16.1 32.62	76	40	4.8 BISC		64
NEIS	1982	5	7	7	44		15.3 32.61	75.88	33	4.8 BNEIS		30
*ISC	1982	5	29	20	29		46.4 28.52	83.57	33	4.4 BISC		10
*ISC	1982	6	9	19	25		35.1 34.2	86.28	33			5
*ISC	1982	6	10	21	27		43.2 31.65	82.23	9	4.9 BISC		91
NEIS	1982	6	10	21	27		45.9 31.54	82.11	33	4.6 SNEIS	4.9 BNEIS	42
*ISC	1982	6	20	15	29		19.9 26.24	89.97	33	4.5 BISC		31
*ISC	1982	6	22	2	38		5.1 30.37	78.58	33	4.1 BISC		12
*ISC	1982	7	6	22	9		28.6 31.32	82.31	33			7
*ISC	1982	7	7	22	36		24.8 30.9	78.38	0	4.4 BISC		10
*ISC	1982	7	16	4	15		26.1 30.89	77.68	67	4.1 BISC		14
NEIS	1982	7	16	4	15		29.9 30.71	77.03	103	4.2 BNEIS		8

Ref	Year	mo	d	h	min (GMT)	s	Lat	Long	Depth	Mag. 1	Mag. 2	Int N
*ISC	1982	8	3	8	3		31.5	28.03	85.57	33	4.7 BISC	38
NEIS	1982	8	3	8	3		31	27.89	85.46	33	4.6 BNEIS	26
*ISC	1982	8	18	18	1		7.6	27.03	89.26	51	4.6 BISC	35
NEIS	1982	8	18	18	1		8.3	27.08	89.49	58	4.6 BNEIS	18
*ISC	1982	9	2	6	37		33.4	33.47	82.59	0	4.5 BISC	8
*ISC	1982	9	4	12	33		54.1	32.58	76.14	33	4.3 BISC	18
NEIS	1982	9	4	12	33		56.6	33.01	76.1	33	4.3 BNEIS	10
*ISC	1982	9	8	17	53		18.5	32.92	75.49	33	4.8 BISC	9
*ISC	1982	9	9	12	5		34	28.8	81.35	33	4.4 BISC	44
NEIS	1982	9	9	12	5		30.9	28.63	81.1	33	4.2 SNEIS	14
*ISC	1982	9	9	12	28		58.9	28.67	81.99	33	4.5 BISC	9
*ISC	1982	9	9	19	36		14.5	31.78	84.88	33	4.5 BISC	7
*ISC	1982	10	16	2	22		51.5	30.41	79.24	26	4.6 BISC	20
NEIS	1982	10	16	2	22		56.7	30.32	79.12	71	4.5 BNEIS	F 12
*ISC	1982	10	29	2	26		15.1	32.43	87.04	33	4.5 BISC	12
*ISC	1982	10	30	8	33		44.5	34.5	81.06	33	4.3 BISC	14
NEIS	1982	10	30	8	33		44.6	34.58	81.23	33	4.3 BNEIS	10
*ISC	1982	11	10	16	46		41.5	31.66	88.33	33		6
*NDI	1982	11	21	8	10		21	28.8	81.05	0	4.4 BNDI	
*ISC	1982	11	22	13	57		2	28.01	85.03	64	4.2 BISC	16
NEIS	1982	11	22	13	57		4.2	27.75	84.91	64	4.2 BNEIS	F 8
*ISC	1982	12	6	11	52		14.1	29.84	80.84	0	4.2 BISC	14
*ISC	1982	12	14	23	57		29.6	31.38	78.96	11	4.5 BISC	24
NEIS	1982	12	14	23	57		32.7	31.45	78.91	33	4.6 BNEIS	15
*ISC	1982	12	21	12	8		46.9	29.21	81.48	31	4.8 BISC	49
NEIS	1982	12	21	12	8		46.6	29.19	81.37	33	4.7 BNEIS	30
*ISC	1982	12	21	13	13		46.5	29.27	81.44	33	4.6 BISC	43
NEIS	1982	12	21	13	13		46.2	29.29	81.37	32	4.3 BNEIS	19
*NDI	1982	12	22	14	14		12	29.4	77.3	0		
*ISC	1982	12	29	0	9		17.7	30.04	79.89	22	4.7 BISC	50
NEIS	1982	12	29	0	9		20.2	30.27	79.8	33	4.8 BNEIS	25
*ISC	1983	1	6	20	29		16	31.47	82.17	0	4.9 BISC	43
NEIS	1983	1	6	20	29		20.3	31.3	82.13	33	4.7 BNEIS	23
*ISC	1983	1	12	21	45		33.2	32.38	79.22	33		7
*ISC	1983	1	27	4	45		40.3	29.04	81.34	33	4.9 BISC	24
NEIS	1983	1	27	4	45		40.2	29.05	81.39	33	4.8 BNEIS	F 15
*ISC	1983	1	29	20	31		41.8	33.18	88.1	33	4.2 BISC	17
NEIS	1983	1	29	20	31		40.6	33.17	88.19	33	4.5 BNEIS	13
*ISC	1983	2	20	10	8		39.3	28.85	81.42	33		9
*ISC	1983	2	21	20	7		54.7	34.07	87.43	33	4.2 BISC	7
*ISC	1983	2	25	19	25		21.2	33.34	78.58	33		10
*ISC	1983	2	27	20	33		7	32.6	78.56	40	5.3 BISC	209
NEIS	1983	2	27	20	33		6.5	32.61	78.55	33	4.9 SNEIS	5.3 BNEIS 112
*QUE	1983	2	27	23	9		6.3	33.3	80.2	33		
*ISC	1983	3	14	1	22		27.6	30.66	84.06	0	4.2 BISC	8
*ISC	1983	3	21	7	12		8.2	29.76	79.76	33		12
*ISC	1983	4	8	4	55		16.7	32.71	86.95	33		7
*ISC	1983	5	20	12	52		1.2	30.36	79.76	33	4.2 BISC	13
*ISC	1983	5	30	8	39		49.4	32.71	75.48	41	4.6 BISC	44
*ISC	1983	5	31	21	5		40.5	34.59	79.66	8	5 BISC	142
NEIS	1983	5	31	21	5		45.4	34.53	79.73	47	4.3 SNEIS	5 BNEIS 76
*ISC	1983	7	5	17	26		49.6	29.29	80.86	33	4.5 BISC	14
NEIS	1983	7	5	17	26		49.2	29.49	80.69	33	4.6 BNEIS	6
*ISC	1983	8	10	15	44		46.7	26.8	86.55	33		11
*ISC	1983	8	23	22	43		12.8	27.95	84.95	65	4.5 BISC	34
NEIS	1983	8	23	22	43		12.2	27.96	84.96	61	4.3 BNEIS	F 22
*ISC	1983	9	16	14	16		22	34.73	78.17	33		5
*ISC	1983	10	1	1	24		8.5	28.63	85.64	33		7

Ref	Year	mo	d	h	min(GMT)	s	Lat	Long	Depth	Mag.1	Mag.2	Int	N
*ISC	1983	10	3	12	55		20.7 33.94	76.4	33				10
*ISC	1983	10	12	2	44		42.2 33.76	75.72	33	4.5 BISC			15
NEIS	1983	10	12	2	44		41.2 33.52	75.46	33	4.6 BNEIS		D	13
*ISC	1983	11	5	19	48		24.6 33.92	89.94	33	5.1 BISC			265
NEIS	1983	11	5	19	48		24.5 33.96	89.95	33	5.2 SNEIS	5.1 BNEIS		167
*ISC	1983	11	11	8	32		11.7 34	83.12	33				7
NEIS	1983	11	11	8	32		14.2 33.69	82.72	33				6
*NEIS	1983	11	23	5	5		52.3 30.35	83.1	33	4.6 BNEIS			6
*ISC	1983	12	16	15	15		40.1 28.37	86.65	116	4.2 BISC			21
*ISC	1983	12	23	19	35		44.3 25.86	87.9	33	4.3 BISC			10
NEIS	1983	12	23	19	35		43.2 25.38	87.62	33	4.3 BNEIS		F	5
*ISC	1983	12	24	4	55		12 28.22	79.61	33				5
*ISC	1984	1	6	23	48		10.6 27.83	84.61	49	4.5 BISC			33
*ISC	1984	1	8	1	53		13.3 32.18	79.65	36	4.4 BISC			27
*ISC	1984	1	11	14	2		30.5 28.05	84.63	33				14
*ISC	1984	1	14	6	2		31.4 31.4	88.05	62	4.3 BNEIS			11
*ISC	1984	1	25	23	49		44.6 27.48	86.09	12	4.6 BISC			36
*ISC	1984	2	19	15	46		25.9 29.84	80.54	21	5.1 BISC			166
*ISC	1984	2	23	1	0		13.2 31.43	75.83	20	4 MSPP			15
*ISC	1984	3	14	1	32		11 29.17	81.12	15	5 BISC			82
*ISC	1984	3	14	15	32		32.5 34.23	79.63	22	5.1 BISC			153
*ISC	1984	3	17	6	52		42.8 34.52	89.25	33				9
*ISC	1984	3	23	0	33		32.4 32.93	77.14	33	4.6 BISC			14
*ISC	1984	4	5	14	32		57.6 29.37	81.05	33	4.1 BISC			8
*ISC	1984	4	11	2	58		6.2 32.09	85.82	33	4.7 BISC			7
*ISC	1984	4	11	8	15		29.1 34.75	79.67	40	4.8 BISC			100
*ISC	1984	4	15	4	56		41.7 31.74	82.24	8	5 BISC			118
*ISC	1984	4	22	20	22		37.8 30.56	84.17	33	4.7 BISC			22
*NEIS	1	1984	4	27	23	16	27.1 33.67	89.45	33	4.9 BNEIS			7

NOTES

1. The following abbreviations were used in the reference(Ref) column.

G.R Gutenberg and Richter (1954)
MIL Milne (1911)
OLD Oldham (1883)
SRS Srivastava and Somayaajulu (1966)
TN1 Tandon (1956)
TN2 Tandon (1975)
TR1 Turner et al (1911)

2. An * in column 1 preceding reference indicates the primary estimate of an event. A balnk indicates an alternate estimate.

3. Agency code is given in the Ref column. Data source following reference is indicated by: B - BCIS, I - ISS/ISC, N - NEIS, T - Telex, direct otherwise.

4. Magnitudes 1 and 2 list first and second magnitude, respectively. A letter following the magnitude refers to the following type magnitude estimate.

() - unspecified
B - Body wave magnitude
C - Coda length magnitude
D - Duration magnitude
L - Local (Richter) magnitude
N - Magnitude from Lg phases (Nuttli)
S - Magnitude from surface waves

5. Under the Int column, the following abbreviations apply. D - Damage reported, F - Felt report(s). Intensity Scales are abbreviated as follows:
absent - unspecified

CS - Mercalli - Cancani - Seberg
J - Japanese Meterological Agency
M - Mercalli
MM - Modified Mercalli
RF - Rossi - Forel
SK - Medevcev - Sponheur - Karnik

6. Column N gives the number of stations associated with the determination.

7. The primary sources of data for this catalog are:

1904 - 1952 Gutenberg and Richter - "Seismicity of the Earth"
1913 - 1963 International Seismological Summary (ISS)
1935 Bureau Central International de Seismologie (BCIS)
1950 - 1963 Nov.29 Bureau Central International de Seismologie (BCIS)

1950 - 1963 L.R. Sykes catalogue of ridge events
 1928 - 1960 United States Coast and Geodetic Survey
 1964 - 1983 International Seismological Centre (ISC) prime estimates
 1984 - 1986 Preliminary Determination of Epicentres from United States
 National Earthquake Information Service (NEIS)

8. The following code for data sources were used.

BCIS Bureau Central International de Seismologie, Strasbourg, France
 CGS U.S.Coast and Geodetic Survey, USA
 EBM Esen Boulak, Mongolia
 HFS Hagfors, Sweden
 HFS1 Hagfors, Sweden
 IMD India Meterological Department
 IRK Irkutsk, USSR
 ISC International Seismological Centre, UK
 ISS International Seismological Summary, UK
 KEW Kew, UK
 KIP Kipapa, Oahu
 KIR Kiruna, Sweden
 LAO Large Aperture Seismic Array, Montana, USA
 MAT Matsushiro, Japan
 MOS Moscow, USSR
 NDI Delhi, India
 NEIS National Earthquake Information Service, Colorado, USA
 PAS Pasadena, California, USA
 PDE Preliminary Determination of Epicentres from NEIS/CGS
 PEK Peking, China
 POO Poona, India
 PUL Pulkovo, USSR
 QUE Quetta, Pakistan
 ROM Rome, Italy
 SHI Shillong, India
 SHL Shillong, India
 SJS Instituto Costarricense de Electricidad, Costa Rica
 SPC Skalnaté Pleso, Czechoslovakia
 UPP Uppsala, Sweden
 USCGS United States Coast and Geodetic Survey
 USGS United States Geological Survey

**ANNEX 2 DETAILED BREAKDOWN OF CONSTRUCTION COSTS FOR
HYDROPOWER POTENTIAL SCHEMES**

3. DETAILED BREAKDOWN OF CONSTRUCTION COSTS FOR HYDROPOWER POTENTIAL SCHEMES

In order to select a few to several hydropower priority schemes, a total of 31 hydropower potential schemes have been examined technically and economically as mentioned in Appendix IV of Supporting Report Preliminary cost estimates for these hydropower potential schemes were based on the unit price and the work quantity.

A tentative optimal scale of each scheme was sought by comparing three development alternatives; the run-of-river type schemes selected three peaking operations of 8 hours, 12 hours and 16 hours for firm discharge. On the other hand, draft rates of 0.6, 0.7 and 0.8 were selected as three development alternatives for the reservoir type schemes. It is assumed in this optimization of reservoir type schemes that peaking operation time for a selected draft rate is fixed at 8 hours.

This ANNEX shows the detailed breakdown of construction costs required for the development of the above-mentioned three alternatives of the hydropower potential schemes.

A list of 31 hydropower potential schemes is given below:

Name of Scheme	Tributary	Type of Scheme
<u>Karnali River Basin</u>		
BR-1	Bheri	Run-of-river
BR-3A	Bheri	Reservoir
BR-3B	Bheri	Reservoir
BR-4	Bheri	Reservoir
BR-5	Bheri	Reservoir
BR-6	Bheri	Run-of-river
BR-7	Bheri	Run-of-river
BR-8	Bheri	Run-of-river
HKR-1	Humla	Run-of-river
HKR-2	Humla	Run-of-river
HKR-3	Humla	Run-of-river
HKR-4	Humla	Run-of-river
KR-2	Karnali	Reservoir
KR-3	Karnali	Run-of-river
KR-4	Karnali	Run-of-river
KR-7	Karnali	Run-of-river
LR-1	Lohore	Reservoir
TR-1	Tila	Run-of-river
TR-2	Tila	Run-of-river
TR-3	Tila	Run-of-river
TR-4	Tila	Run-of-river
MKR-1	Mugu	Run-of-river
MKR-2	Mugu	Run-of-river
MKR-3	Mugu	Run-of-river
SR-6	Seti	Reservoir
SR-3	Seti	Run-of-river
SR-7	Seti	Run-of-river
BS-1	Buriganga	Run-of-river
THR-1	Thuli Gad	Run-of-river
<u>Mahakali River Basin</u>		
CR-1	Chamliya	Run-of-river
CR-2	Chamliya	Run-of-river

B/Q of BR-1 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			8,812,140
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	41,700	3.50	145,950
	Open excavation,weathered rock	m3	41,700	6.00	250,200
	Open excavation,hard rock	m3	16,000	10.00	160,000
	Concrete				
	Mass concrete	m3	33,000	90.00	2,970,000
	Reinforced concrete	m3	101,000	140.00	14,140,000
	Reinforcement bar	ton	3,030	1,500.00	4,545,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	4,200	90.00	378,000
	Others (20%)	L.S.			4,572,430
	Subtotal				27,434,580
2.20	DESANDING BASIN				
	Excavation				
	Excavation,common	m3	25,000	3.50	87,500
	Excavation,weathered rock	m3	25,000	6.00	150,000
	Excavation,hard rock	m3	32,000	10.00	320,000
	Concrete	m3	18,000	140.00	2,520,000
	Reinforcement bars	ton	900	1,500.00	1,350,000
	Curtain grouting	m	1,000	70.00	70,000
	Consolidation grouting	m	5,000	90.00	450,000
	Others (20%)	L.S.			989,500
	Subtotal				5,937,000
2.30	WATERWAY				
2.31	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	10.00	26,000
	Concrete,open structure	m3	3,000	140.00	420,000
	Reinforcement	ton	90	1,500.00	135,000
	Others (20%)	L.S.			120,000
	Subtotal				720,000
2.32	HEADRACE TUNNEL				
	Excavation,tunnel	m3	209,100	55.00	11,500,500
	Concrete, tunnel	m3	67,700	160.00	10,832,000
	Reinforcement	ton	700	1,500.00	1,050,000
	Consolidation grout	m	18,900	90.00	1,701,000
	Curtain grout	m	400	70.00	28,000
	Backfill grout	m3	8,700	200.00	1,740,000
	Others (20%)	L.S.			5,370,300
	Subtotal				32,221,800
2.33	SURGE TANK				
	Excavation, shaft	m3	18,500	55.00	1,017,500
	Concrete, shaft	m3	5,400	160.00	864,000
	Reinforcement	ton	200	1,500.00	300,000
	Consolidation grout	m	1,000	90.00	90,000
	Others (20%)	L.S.			454,300
	Subtotal				2,725,800
2.34	PENSTOCK				
	Excavation,tunnel	m3	13,100	55.00	720,500
	Concrete,tunnel	m3	5,400	160.00	864,000
	Reinforcement	ton	110	1,500.00	165,000
	Curtain grout	m	400	70.00	28,000
	Backfill grout	m3	500	200.00	100,000
	Others (20%)	L.S.			375,500
	Subtotal				2,253,000
2.40	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	9,300	3.50	32,550

	Excavation, weathered rock	m3	9,300	6.00	55,800	
	Excavation, hard rock	m3	12,400	10.00	124,000	
	Concrete, substructure	m3	8,900	250.00	2,225,000	
	Concrete, second stage	m3	2,300	140.00	322,000	
	Reinforcement	ton	600	1,500.00	900,000	
	Others (20%)	L.S.			731,870	
	Subtotal					4,391,220
2.50	TAILRACE					
	Excavation					
	Excavation, common	m3	120,000	3.50	420,000	
	Excavation, weathered rock	m3	120,000	6.00	720,000	
	Excavation, hard rock	m3	200,000	10.00	2,000,000	
	Concrete, structure	m3	50,000	140.00	7,000,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Others (20%)	L.S.			2,073,000	
	Subtotal					12,438,000
2.60	ARCHITECTURAL BUILDINGS	m2	3,000	1,100.00	3,300,000	3,300,000
2.70	ACCESS ROAD					
	New construction	m	15	600,000.00	9,000,000	
	Upgraded	m	68	50,000.00	3,450,000	
	Subtotal					12,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	2,000	5,000.00	10,000,000	
	Gates	ton	160	7,000.00	1,120,000	
	Subtotal					11,120,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	410	18,700.00	7,667,000	
	Generators	ton	700	20,400.00	14,280,000	
	Transformers	MVA	90	4,150.00	373,500	
	Subtotal					22,320,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost				0	146,814,040
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,468,140
7.00	ADMINISTRATION EXPENSES	LS			0	1,468,140
8.00	ENGINEERING SERVICES	LS			0	10,276,983
9.00	PHYSICAL CONTINGENCY	LS			0	14,681,404
	GRAND TOTAL				174,708,708	174,708,708

B/Q of BR-1 (Draft Rate 0.50)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,818,862
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	37,700	3.50	131,950
	Open excavation,weathered rock	m3	37,700	6.00	226,200
	Open excavation,hard rock	m3	50,200	10.00	502,000
	Concrete				
	Mass concrete	m3	33,000	90.00	2,970,000
	Reinforced concrete	m3	101,000	140.00	14,140,000
	Reinforcement bar	ton	3,030	1,500.00	4,545,000
	Curtain grouting	m	3,800	70.00	252,000
	Consolidation grouting	m	4,200	90.00	378,000
	Others (20%)	L.S.			4,629,030
	Subtotal				27,774,180
2.40	DESANDING BASIN				
	Excavation				
	Excavation,common	m3	18,000	3.50	63,000
	Excavation,weathered rock	m3	18,000	6.00	108,000
	Excavation,hard rock	m3	24,000	10.00	240,000
	Concrete	m3	8,500	140.00	1,190,000
	Reinforcement bars	ton	250	1,500.00	375,000
	Curtain grouting	m	800	70.00	56,000
	Consolidation grouting	m	4,000	90.00	360,000
	Others (20%)	L.S.			478,400
	Subtotal				2,870,400
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	m3	2,200	10.00	22,000
	Concrete,open structure	m3	2,500	140.00	350,000
	Reinforcement	ton	75	1,500.00	112,500
	Others (20%)	L.S.			100,130
	Subtotal				600,780
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	136,000	55.00	7,480,000
	Concrete,tunnel	m3	45,500	160.00	7,280,000
	Reinforcement	ton	480	1,500.00	690,000
	Consolidation grout	m	5,100	90.00	459,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	7,200	200.00	1,440,000
	Others (20%)	L.S.			3,473,300
	Subtotal				20,839,800
2.53	SURGE TANK				
	Excavation, shaft	m3	13,600	55.00	748,000
	Concrete, shaft	m3	4,000	160.00	640,000
	Reinforcement	ton	120	1,500.00	180,000
	Consolidation grout	m	500	90.00	45,000
	Others (20%)	L.S.			322,600
	Subtotal				1,935,600
2.54	PENSTOCK				
	Excavation,tunnel	m3	10,800	55.00	594,000
	Concrete,tunnel	m3	4,800	160.00	768,000
	Reinforcement	ton	100	1,500.00	150,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	400	200.00	80,000
	Others (20%)	L.S.			321,900
	Subtotal				1,931,400
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	6,900	3.50	24,150

	Excavation, weathered rock	m3	6,900	6.00	41,400	
	Excavation, hard rock	m3	9,100	10.00	91,000	
	Concrete, substructure	m3	6,500	250.00	1,625,000	
	Concrete, second stage	m3	1,700	140.00	238,000	
	Reinforcement	ton	425	1,500.00	637,500	
	Others (20%)	L.S.			531,410	
	Subtotal					3,188,460
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	80,000	3.50	280,000	
	Excavation, weathered rock	m3	80,000	6.00	480,000	
	Excavation, hard rock	m3	100,000	10.00	1,000,000	
	Concrete, structure	m3	40,000	140.00	5,600,000	
	Reinforcement	ton	120	1,500.00	180,000	
	Others (20%)	L.S.			1,508,000	
	Subtotal					9,048,000
2.80	ARCHITECTURAL BUILDINGS	m2	2,800	1,100.00	2,860,000	2,860,000
2.90	ACCESS ROAD					
	New construction	m	15	600,000.00	9,000,000	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					12,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,800	5,000.00	8,000,000	
	Gates	ton	120	7,000.00	840,000	
	Subtotal					8,840,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	300	18,700.00	5,610,000	
	Generators	ton	550	20,400.00	11,220,000	
	Transformers	MVA	58	4,600.00	266,800	
	Subtotal					17,096,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					116,944,282
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,169,443
7.00	ADMINISTRATION EXPENSES	LS			0	1,169,443
8.00	ENGINEERING SERVICES	LS			0	8,186,100
9.00	PHYSICAL CONTINGENCY	LS			0	11,694,428
	GRAND TOTAL				139,163,696	139,163,696

B/Q of BR-1 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,285,636
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	33,800	3.50	118,300
	Open excavation,weathered rock	m3	33,800	6.00	202,800
	Open excavation,hard rock	m3	45,100	10.00	451,000
	Concrete				
	Mass concrete	m3	33,000	90.00	2,970,000
	Reinforced concrete	m3	101,000	140.00	14,140,000
	Reinforcement bar	ton	3,030	1,500.00	4,545,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	4,100	90.00	369,000
	Others (20%)	L.S.			4,606,820
	Subtotal				27,640,920
2.40	DESANDING BASIN				
	Excavation				
	Excavation,common	m3	14,000	3.50	49,000
	Excavation,weathered rock	m3	14,000	6.00	84,000
	Excavation,hard rock	m3	19,000	10.00	190,000
	Concrete	m3	4,000	140.00	560,000
	Reinforcement bars	ton	120	1,500.00	180,000
	Curtain grouting	m	700	70.00	49,000
	Consolidation grouting	m	3,000	90.00	270,000
	Others (20%)	L.S.			276,400
	Subtotal				1,658,400
2.50	WATEAWAY				
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	1,900	10.00	19,000
	Concrete,open structure	m3	2,100	140.00	294,000
	Reinforcement	ton	65	1,500.00	97,500
	Others (20%)	L.S.			84,760
	Subtotal				508,560
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	105,500	55.00	5,802,500
	Concrete, tunnel	m3	38,200	160.00	5,792,000
	Reinforcement	ton	365	1,500.00	547,500
	Consolidation grout	m	4,400	90.00	396,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	6,500	200.00	1,300,000
	Others (20%)	L.S.			2,771,100
	Subtotal				16,626,600
2.53	SURGE TANK				
	Excavation, shaft	m3	10,200	55.00	561,000
	Concrete, shaft	m3	3,000	160.00	480,000
	Reinforcement	ton	100	1,500.00	150,000
	Consolidation grout	m	300	90.00	27,000
	Others (20%)	L.S.			243,600
	Subtotal				1,461,600
2.54	PENSTOCK				
	Excavation,tunnel	m3	8,700	55.00	478,500
	Concrete,tunnel	m3	4,300	160.00	688,000
	Reinforcement	ton	45	1,500.00	67,500
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	500	200.00	100,000
	Others (20%)	L.S.			270,300
	Subtotal				1,621,800
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	5,200	3.50	18,200

	Excavation, weathered rock	m3	5,200	6.00	31,200	
	Excavation, hard rock	m3	8,900	10.00	69,000	
	Concrete, substructure	m3	4,900	250.00	1,225,000	
	Concrete, second stage	m3	1,300	140.00	182,000	
	Reinforcement	ton	350	1,500.00	525,000	
	Others (20%)	L.S.			410,080	
	Subtotal					2,460,480
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	70,000	3.50	245,000	
	Excavation, weathered rock	m3	70,000	6.00	420,000	
	Excavation, hard rock	m3	100,000	10.00	1,000,000	
	Concrete, structure	m3	40,000	140.00	5,600,000	
	Reinforcement	ton	1,200	1,500.00	1,800,000	
	Others (20%)	L.S.			1,813,000	
	Subtotal					10,878,000
2.80	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000
2.90	ACCESS ROAD					
	New construction	m	15	600,000.00	9,000,000	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					12,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,300	5,000.00	6,500,000	
	Gates	ton	90	7,000.00	630,000	
	Subtotal					7,130,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	240	18,700.00	4,488,000	
	Generators	ton	450	20,400.00	9,180,000	
	Transformers	MVA	44	4,800.00	211,200	
	Subtotal					13,879,200
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					106,041,196
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,060,412
7.00	ADMINISTRATION EXPENSES	LS			0	1,060,412
8.00	ENGINEERING SERVICES	LS			0	7,422,884
9.00	PHYSICAL CONTINGENCY	LS			0	10,604,120
	GRAND TOTAL				126,189,023	126,189,023

B/Q of BR-3A (EL. 561.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			42,202,095
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	27,000	3.50	94,500
	Open excavation, weathered rock	m3	28,000	6.00	168,000
	Open excavation, hard rock	m3	36,000	10.00	360,000
	Concrete of Inlet & Outlet	m3	12,000	140.00	1,680,000
	Tunnel Excavation	m3	465,000	55.00	25,575,000
	Tunnel Concrete	m3	136,000	160.00	21,760,000
	Reinforcement bar	m3	3,000	1,500.00	4,500,000
	Plug Concrete	m3	18,000	160.00	2,880,000
	Others (20%)	L.S.			11,403,500
	Subtotal				68,421,000
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	152,000	3.50	532,000
	Embankment				
	Embankment, core	m3	271,000	5.00	1,355,000
	Embankment, filter	m3	66,000	10.00	660,000
	Embankment, rock	m3	1,899,000	6.00	11,394,000
	Others (20%)	L.S.			2,788,200
	Subtotal				16,729,200
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	389,000	3.50	1,361,500
	Excavation, weathered rock	m3	400,000	6.00	2,400,000
	Excavation, hard	m3	250,000	10.00	2,500,000
	Embankment				
	Embankment, core	m3	1,857,000	5.00	9,285,000
	Embankment, filter	m3	412,000	10.00	4,120,000
	Embankment, rock	m3	11,313,000	6.00	67,878,000
	Curtain Grouting	m	72,000	70.00	5,040,000
	Consolidation Grouting	m	14,000	90.00	1,260,000
	Others (10%)	L.S.			9,384,450
	Subtotal				103,228,950
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	228,000	3.50	798,000
	Excavation, weathered rock	m3	319,000	6.00	1,914,000
	Excavation, hard rock	m3	2,922,000	10.00	29,220,000
	Concrete	m3	118,000	140.00	16,520,000
	Reinforcement bars	ton	3,540	1,500.00	5,310,000
	Others (20%)	L.S.			10,752,400
	Subtotal				64,514,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	11,000	3.50	38,500
	Excavation, weathered rock	m3	11,000	6.00	66,000
	Excavation, hard rock	m3	15,000	10.00	150,000
	Concrete, open structure	m3	16,000	140.00	2,240,000
	Reinforcement	ton	490	1,500.00	735,000
	Others (20%)	L.S.			645,900
	Subtotal				3,875,400
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	675,000	55.00	37,125,000
	Concrete, tunnel	m3	200,000	160.00	32,000,000
	Reinforcement	ton	2,000	1,500.00	3,000,000
	Consolidation grout	m	32,000	90.00	2,880,000
	Curtain grout	m	1,800	70.00	126,000
	Backfill grout	m3	4,300	200.00	860,000
	Others (20%)	L.S.			15,198,200
	Subtotal				91,189,200
2.53	PENSTOCK				
	Excavation, tunnel	m3	61,000	55.00	3,355,000
	Concrete, tunnel	m3	13,000	160.00	2,080,000
	Reinforcement	ton	390	1,500.00	585,000
	Curtain grout	m	1,800	70.00	126,000
	Backfill grout	m3	960	200.00	192,000
	Others (20%)	L.S.			1,267,600
	Subtotal				7,605,600
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	138,000	3.50	483,000

	Excavation, weathered rock	m3	138,000	6.00	828,000	
	Excavation, hard rock	m3	184,000	10.00	1,840,000	
	Concrete, substructure	m3	144,000	250.00	36,000,000	
	Concrete, second stage	m3	20,000	140.00	2,800,000	
	Reinforcement	ton	8,500	1,500.00	12,750,000	
	Others (20%)	L.S.			10,940,200	
	Subtotal					65,641,200
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	12,000	10.00	120,000	
	Concrete, structure	m3	2,600	140.00	364,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			136,000	
	Subtotal					816,000
2.80	ARCHITECTURAL BUILDINGS	m2	4,600	1,100.00	5,060,000	5,060,000
2.90	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	4,900	5,000.00	24,500,000	
	Gates	ton	900	7,000.00	6,300,000	
	Subtotal					30,800,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,700	18,700.00	69,190,000	
	Generators	ton	4,500	20,400.00	91,800,000	
	Transformers	MVA	760	2,900.00	2,204,000	
	Subtotal					163,194,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					667,417,045
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	33,370,852
7.00	ADMINISTRATION EXPENSES	LS			0	6,674,170
8.00	ENGINEERING SERVICES	LS			0	46,719,193
9.00	PHYSICAL CONTINGENCY	LS			0	66,741,705
	GRAND TOTAL				820,922,965	820,922,965

B/Q of BR-3A (EL. 568.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			46,548,570
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	27,000	3.50	94,500
	Open excavation, weathered rock	m3	28,000	6.00	168,000
	Open excavation, hard rock	m3	36,000	10.00	360,000
	Concrete of Inlet & Outlet	m3	12,000	140.00	1,680,000
	Tunnel Excavation	m3	490,000	55.00	26,950,000
	Tunnel Concrete	m3	143,000	160.00	22,880,000
	Reinforcement bar	m3	3,100	1,500.00	4,650,000
	Plug Concrete	m3	18,000	160.00	2,880,000
	Others (20%)	L.S.			11,932,500
	Subtotal				71,595,000
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	157,000	3.50	549,500
	Embankment				
	Embankment, core	m3	272,000	5.00	1,360,000
	Embankment, filter	m3	66,000	10.00	660,000
	Embankment, rock	m3	1,990,000	6.00	11,940,000
	Others (20%)	L.S.			2,901,900
	Subtotal				12,411,400
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	552,000	3.50	1,932,000
	Excavation, weathered rock	m3	500,000	6.00	3,000,000
	Excavation, hard	m3	281,000	10.00	2,810,000
	Embankment				
	Embankment, core	m3	2,079,000	5.00	10,395,000
	Embankment, filter	m3	460,000	10.00	4,600,000
	Embankment, rock	m3	13,010,000	6.00	78,060,000
	Curtain Grouting	m	77,000	70.00	5,390,000
	Consolidation Grouting	m	19,000	90.00	1,710,000
	Others (10%)	L.S.			10,789,700
	Subtotal				118,686,700
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	214,000	3.50	749,000
	Excavation, weathered rock	m3	299,000	6.00	1,794,000
	Excavation, hard rock	m3	2,453,000	10.00	24,530,000
	Concrete	m3	120,000	140.00	16,800,000
	Reinforcement bars	ton	3,600	1,500.00	5,400,000
	Others (20%)	L.S.			9,854,600
	Subtotal				59,127,600
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	12,000	3.50	42,000
	Excavation, weathered rock	m3	12,000	6.00	72,000
	Excavation, hard rock	m3	18,000	10.00	180,000
	Concrete, open structure	m3	19,000	140.00	2,660,000
	Reinforcement	ton	570	1,500.00	855,000
	Others (20%)	L.S.			761,800
	Subtotal				4,570,800
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	749,000	55.00	41,195,000
	Concrete, tunnel	m3	221,000	160.00	35,360,000
	Reinforcement	ton	2,210	1,500.00	3,315,000
	Consolidation grout	m	34,000	90.00	3,060,000
	Curtain grout	m	1,900	70.00	133,000
	Backfill grout	m3	4,500	200.00	900,000
	Others (20%)	L.S.			16,792,600
	Subtotal				100,755,600
2.53	PENSTOCK				
	Excavation, tunnel	m3	76,000	55.00	4,180,000
	Concrete, tunnel	m3	15,000	160.00	2,400,000
	Reinforcement	ton	450	1,500.00	675,000
	Curtain grout	m	2,100	70.00	147,000
	Backfill grout	m3	1,100	200.00	220,000
	Others (20%)	L.S.			1,524,400
	Subtotal				9,146,400
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	167,000	3.50	584,500

	Excavation, weathered rock	m3	167,000	6.00	1,002,000	
	Excavation, hard rock	m3	221,000	10.00	2,210,000	
	Concrete, substructure	m3	175,000	250.00	43,750,000	
	Concrete, second stage	m3	25,000	140.00	3,500,000	
	Reinforcement	ton	8,800	1,500.00	13,200,000	
	Others (20%)	L.S.			12,849,300	
	Subtotal					77,095,800
2.70	TAIL RACE					
	Excavation					
	Excavation, common	m3	12,000	3.50	42,000	
	Excavation, weathered rock	m3	12,000	6.00	72,000	
	Excavation, hard rock	m3	16,000	10.00	160,000	
	Concrete, structure	m3	3,200	140.00	448,000	
	Reinforcement	ton	100	1,500.00	150,000	
	Others (20%)	L.S.			174,400	
	Subtotal					1,046,400
2.80	ARCHITECTURAL BUILDINGS	m2	5,500	1,100.00	6,050,000	6,050,000
2.90	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	7,700	5,000.00	38,500,000	
	Gates	ton	1,100	7,000.00	7,700,000	
	Subtotal					46,200,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	4,200	18,700.00	78,540,000	
	Generators	ton	4,900	20,400.00	99,960,000	
	Transformers	MVA	880	2,800.00	2,464,000	
	Subtotal					180,964,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					743,338,270
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	37,166,914
7.00	ADMINISTRATION EXPENSES	LS			0	7,433,383
8.00	ENGINEERING SERVICES	LS			0	52,033,679
9.00	PHYSICAL CONTINGENCY	LS			0	74,333,827
	GRAND TOTAL				914,306,072	914,306,072

B/Q of BR-3A (EL.579.0)

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			53,512,775
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	27,000	3.50	94,500
	Open excavation, weathered rock	m3	28,000	6.00	168,000
	Open excavation, hard rock	m3	36,000	10.00	360,000
	Concrete of Inlet & Outlet	m3	12,000	140.00	1,680,000
	Tunnel Excavation	m3	514,000	55.00	28,270,000
	Tunnel Concrete	m3	151,000	160.00	24,160,000
	Reinforcement bar	m3	3,300	1,500.00	4,950,000
	Plug Concrete	m3	18,000	160.00	2,880,000
	Others (20%)	L.S.			12,512,500
	Subtotal				75,075,000
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	133,000	3.50	465,500
	Embankment				
	Embankment, core	m3	287,000	5.00	1,435,000
	Embankment, filter	m3	71,000	10.00	710,000
	Embankment, rock	m3	2,060,000	6.00	12,360,000
	Others (20%)	L.S.			2,994,100
	Subtotal				17,964,600
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	643,000	3.50	2,250,500
	Excavation, weathered rock	m3	600,000	6.00	3,600,000
	Excavation, hard	m3	350,000	10.00	3,500,000
	Embankment				
	Embankment, core	m3	2,468,000	5.00	12,340,000
	Embankment, filter	m3	544,000	10.00	5,440,000
	Embankment, rock	m3	15,343,000	6.00	95,058,000
	Curtain Grouting	m	82,000	70.00	5,740,000
	Consolidation Grouting	m	20,000	90.00	1,800,000
	Others (10%)	L.S.			12,972,850
	Subtotal				142,701,350
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	211,000	3.50	738,500
	Excavation, weathered rock	m3	294,000	6.00	1,764,000
	Excavation, hard rock	m3	2,281,000	10.00	22,810,000
	Concrete	m3	118,000	140.00	16,520,000
	Reinforcement bars	ton	3,540	1,500.00	5,310,000
	Others (20%)	L.S.			9,428,500
	Subtotal				56,571,000
2.50	INTAKE and INTAKE TUNNEL				
	Excavation				
	Excavation, common	m3	173,000	3.50	605,500
	Excavation, weathered rock	m3	173,000	6.00	1,038,000
	Excavation, hard rock	m3	231,000	10.00	2,310,000
	Concrete, open structure	m3	26,000	140.00	3,640,000
	Reinforcement	ton	780	1,500.00	1,170,000
	Others (20%)	L.S.			1,752,700
	Subtotal				10,516,200
2.60	HEADRACE TUNNEL				
	Excavation, tunnel	m3	892,000	55.00	49,060,000
	Concrete, tunnel	m3	262,000	160.00	41,920,000
	Reinforcement	ton	2,620	1,500.00	3,930,000
	Consolidation grout	m	40,000	90.00	3,600,000
	Curtain grout	m	21,000	70.00	1,470,000
	Backfill grout	m3	4,600	200.00	920,000
	Others (20%)	L.S.			20,180,000
	Subtotal				121,080,000
2.90	PENSTOCK				
	Excavation, tunnel	m3	83,000	55.00	4,565,000
	Concrete, tunnel	m3	16,000	160.00	2,560,000
	Reinforcement	ton	500	1,500.00	750,000
	Curtain grout	m	2,200	70.00	154,000
	Backfill grout	m3	1,200	200.00	240,000
	Others (20%)	L.S.			1,653,800
	Subtotal				9,922,800
2.15	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	197,000	3.50	689,500
	Excavation, weathered rock	m3	197,000	6.00	1,182,000
	Excavation, hard rock	m3	263,000	10.00	2,630,000

	Concrete, substructure	m3	200,000	250.00	50,000,000	
	Concrete, second stage	m3	34,000	140.00	4,760,000	
	Reinforcement	ton	12,000	1,500.00	18,000,000	
	Others (20%)	L.S.			15,452,300	
	Subtotal					92,713,800
2.16	TAILRACE					
	Excavation					
	Excavation, common	m3	15,000	3.50	52,500	
	Excavation, weathered rock	m3	15,000	6.00	90,000	
	Excavation, hard rock	m3	22,000	10.00	220,000	
	Concrete, structure	m3	4,000	140.00	560,000	
	Reinforcement	ton	120	1,500.00	180,000	
	Others (20%)	L.S.			220,500	
	Subtotal					1,323,000
2.17	ARCHITECTURAL BUILDINGS	m2	6,600	1,100.00	7,260,000	7,260,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	10,300	5,000.00	51,500,000	
	Gates	ton	1,800	7,000.00	12,600,000	
	Subtotal					64,100,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	4,700	18,700.00	87,890,000	
	Generators	ton	5,600	20,400.00	114,240,000	
	Transformers	MVA	1,100	2,650.00	2,915,000	
	Subtotal					205,045,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					861,925,525
6.00	LAND ACQUISITION AND COMPENSATION	L.S.			0	43,096,276
7.00	ADMINISTRATION EXPENSES	L.S.			0	8,619,255
8.00	ENGINEERING SERVICES	L.S.			0	60,334,787
9.00	PHYSICAL CONTINGENCY	L.S.			0	86,192,553
	GRAND TOTAL				1,060,168,396	1,060,168,396

B/Q of BR-3B (EL. 687.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			41,808,345
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation,common	m3	15,000	3.50	52,500
	Open excavation,weathered rock	m3	15,000	6.00	90,000
	Open excavation,hard rock	m3	25,000	10.00	250,000
	Concrete of Inlet & Outlet	m3	7,000	140.00	980,000
	Tunnel Excavation	m3	428,500	55.00	23,567,500
	Tunnel Concrete	m3	126,600	160.00	20,256,000
	Reinforcement bar	m3	2,550	1,500.00	3,825,000
	Plug Concrete	m3	9,850	160.00	1,576,000
	Others (20%)	L.S.			10,119,400
	Subtotal				60,716,400
2.20	COFFER DAM				
	Excavation				
	Excavation,common	m3	140,700	3.50	492,450
	Embankment				
	Embankment,core	m3	371,300	5.00	1,856,500
	Embankment,filter	m3	85,600	10.00	856,000
	Embankment,rock	m3	2,093,100	6.00	12,558,600
	Others (20%)	L.S.			3,152,710
	Subtotal				18,916,260
2.30	MAIN DAM				
	Excavation				
	Excavation,common	m3	518,700	3.50	1,815,450
	Excavation,weathered rock	m3	158,700	6.00	952,200
	Excavation,hard rock	m3	1,023,900	10.00	10,239,000
	Embankment				
	Embankment,core	m3	2,782,300	5.00	13,911,500
	Embankment,filter	m3	604,500	10.00	6,045,000
	Embankment,rock	m3	21,640,200	6.00	129,841,200
	Curtain Grouting	m	72,000	70.00	5,040,000
	Consolidation Grouting	m	14,000	90.00	1,260,000
	Others (10%)	L.S.			16,910,435
	Subtotal				186,014,785
2.40	SPILLWAY				
	Excavation				
	Excavation,common	m3	389,600	3.50	1,363,600
	Excavation,weathered rock	m3	569,300	6.00	3,415,800
	Excavation,hard rock	m3	4,656,000	10.00	46,560,000
	Concrete	m3	128,000	140.00	17,920,000
	Reinforcement bars	ton	3,850	1,500.00	5,775,000
	Others (20%)	L.S.			15,006,880
	Subtotal				90,041,280
2.50	INTAKE and INTAKE TUNNEL				
	Excavation				
	Excavation,common	m3	11,500	3.50	40,250
	Excavation,weathered rock	m3	11,500	6.00	69,000
	Excavation,hard rock	m3	15,300	10.00	153,000
	Concrete,open structure	m3	17,200	140.00	2,408,000
	Reinforcement	ton	520	1,500.00	780,000
	Others (20%)	L.S.			690,050
	Subtotal				4,140,300
2.60	HEADRACE TUNNEL				
	Excavation,tunnel	m3	116,500	55.00	6,407,500
	Concrete, tunnel	m3	34,700	160.00	5,552,000
	Reinforcement	ton	350	1,500.00	525,000
	Consolidation grout	m	5,000	90.00	450,000
	Curtain grout	m	1,400	70.00	98,000
	Backfill grout	m3	500	200.00	100,000
	Others (20%)	L.S.			2,626,500
	Subtotal				15,759,000
2.90	PENSTOCK				
	Excavation,tunnel	m3	37,400	55.00	2,057,000
	Concrete,tunnel	m3	8,000	160.00	1,280,000
	Reinforcement	ton	160	1,500.00	240,000
	Curtain grout	m	0	70.00	0
	Backfill grout	m3	250	200.00	50,000
	Others (20%)	L.S.			725,400
	Subtotal				4,352,400
2.15	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	80,300	3.50	281,050
	Excavation,weathered rock	m3	80,300	6.00	481,800
	Excavation,hard rock	m3	107,100	10.00	1,071,000

	Concrete, substructure	m3	76,500	250.00	19,125,000	
	Concrete, second stage	m3	19,200	140.00	2,688,000	
	Reinforcement	ton	5,000	1,500.00	7,500,000	
	Others (20%)	L.S.			6,229,370	
	Subtotal					37,376,220
2.16	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	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.			127,800	
	Subtotal					766,800
2.17	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	4,200	5,000.00	21,000,000	
	Gates	ton	800	7,000.00	5,600,000	
	Subtotal					26,600,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,600	18,700.00	67,320,000	
	Generators	ton	4,800	20,400.00	97,920,000	
	Transformers	MVA	900	2,700.00	2,430,000	
				846.00		
	Subtotal					167,670,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	35	46,000.00	1,610,000	1,610,000
					0	
	Total of Direct Cost					663,621,790
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	33,181,089
7.00	ADMINISTRATION EXPENSES	LS			0	6,636,218
8.00	ENGINEERING SERVICES	LS			0	46,453,525
9.00	PHYSICAL CONTINGENCY	LS			0	66,362,179
	GRAND TOTAL				816,254,801	816,254,801

B/Q of BR-3B (EL. 706.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			43,631,980
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	15,000	3.50	52,500
	Open excavation, weathered rock	m3	15,000	6.00	90,000
	Open excavation, hard rock	m3	25,000	10.00	250,000
	Concrete of Inlet & Outlet	m3	7,000	140.00	980,000
	Tunnel Excavation	m3	459,800	55.00	25,289,000
	Tunnel Concrete	m3	135,800	160.00	21,728,000
	Reinforcement bar	m3	2,850	1,500.00	4,275,000
	Plug Concrete	m3	9,850	160.00	1,576,000
	Others (20%)	L.S.			10,848,100
	Subtotal				65,088,600
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	140,700	3.50	492,450
	Embankment				
	Embankment, core	m3	371,300	5.00	1,856,500
	Embankment, filter	m3	85,800	10.00	856,000
	Embankment, rock	m3	2,093,100	6.00	12,558,600
	Others (20%)	L.S.			3,152,710
	Subtotal				18,916,260
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	829,400	3.50	2,202,900
	Excavation, weathered rock	m3	185,700	6.00	1,114,200
	Excavation, hard rock	m3	1,200,000	10.00	12,000,000
	Embankment				
	Embankment, core	m3	3,459,300	5.00	17,296,500
	Embankment, filter	m3	747,300	10.00	7,473,000
	Embankment, rock	m3	24,823,100	6.00	148,938,600
	Curtain Grouting	m	80,000	70.00	5,600,000
	Consolidation Grouting	m	16,000	90.00	1,440,000
	Others (10%)	L.S.			19,606,520
	Subtotal				215,671,720
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	327,600	3.50	1,146,600
	Excavation, weathered rock	m3	470,400	6.00	2,822,400
	Excavation, hard rock	m3	2,587,400	10.00	25,874,000
	Concrete	m3	133,100	140.00	18,634,000
	Reinforcement bars	ton	4,000	1,500.00	6,000,000
	Others (20%)	L.S.			10,895,400
	Subtotal				65,372,400
2.50	INTAKE and INTAKE TUNNEL				
	Excavation				
	Excavation, common	m3	13,900	3.50	48,650
	Excavation, weathered rock	m3	13,900	6.00	83,400
	Excavation, hard rock	m3	18,500	10.00	185,000
	Concrete, open structure	m3	20,900	140.00	2,926,000
	Reinforcement	ton	825	1,500.00	937,500
	Others (20%)	L.S.			836,110
	Subtotal				5,016,660
2.60	HEADRACE TUNNEL				
	Excavation, tunnel	m3	138,200	55.00	7,601,000
	Concrete, tunnel	m3	41,000	160.00	6,560,000
	Reinforcement	ton	410	1,500.00	615,000
	Consolidation grout	m	5,400	90.00	486,000
	Curtain grout	m	1,500	70.00	105,000
	Backfill grout	m3	600	200.00	120,000
	Others (20%)	L.S.			3,097,400
	Subtotal				18,584,400
2.90	PENSTOCK				
	Excavation, tunnel	m3	42,800	55.00	2,343,000
	Concrete, tunnel	m3	8,500	160.00	1,360,000
	Reinforcement	ton	170	1,500.00	255,000
	Curtain grout	m	0	70.00	0
	Backfill grout	m3	300	200.00	60,000
	Others (20%)	L.S.			803,600
	Subtotal				4,821,600
2.15	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	90,400	3.50	316,400
	Excavation, weathered rock	m3	90,400	6.00	542,400
	Excavation, hard rock	m3	120,500	10.00	1,205,000
	Concrete, substructure	m3	88,100	250.00	21,525,000

	Concrete, second stage	m3	21,600	140.00	3,024,000	
	Reinforcement	ton	5,600	1,500.00	8,400,000	
	Others (20%)	L.S.			7,002,560	
	Subtotal					42,015,360
2.16	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	12,000	10.00	120,000	
	Concrete, structure	m3	2,700	140.00	378,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			138,800	
	Subtotal					832,800
2.17	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,950,000	4,950,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	9,200	5,000.00	46,000,000	
	Gates	ton	960	7,000.00	6,720,000	
	Subtotal					52,720,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	4,450	18,700.00	83,215,000	
	Generators	ton	5,500	20,400.00	112,200,000	
	Transformers	MVA	1,059	2,500.00	2,647,500	
	Subtotal					198,062,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	35	46,000.00	1,610,000	1,610,000
	Total of Direct Cost				0	740,744,280
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	37,037,214
7.00	ADMINISTRATION EXPENSES	LS			0	7,407,443
8.00	ENGINEERING SERVICES	LS			0	51,852,100
9.00	PHYSICAL CONTINGENCY	LS			0	74,074,428
	GRAND TOTAL				911,115,464	911,115,464

B/Q of BR-3B (EL. 717.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			47,357,095
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	17,000	3.50	59,500
	Open excavation, weathered rock	m3	17,000	6.00	102,000
	Open excavation, hard rock	m3	28,000	10.00	280,000
	Concrete of Inlet & Outlet	m3	9,000	140.00	1,260,000
	Tunnel Excavation	m3	477,200	55.00	26,246,000
	Tunnel Concrete	m3	141,000	160.00	22,560,000
	Reinforcement bar	m3	3,000	1,500.00	4,500,000
	Plug Concrete	m3	9,850	160.00	1,576,000
	Others (20%)	L.S.			11,316,700
	Subtotal				67,900,200
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	140,700	3.50	492,450
	Embankment				
	Embankment, core	m3	371,300	5.00	1,856,500
	Embankment, filter	m3	85,600	10.00	856,000
	Embankment, rock	m3	2,093,100	6.00	12,558,600
	Others (20%)	L.S.			3,152,710
	Subtotal				18,916,260
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	698,900	3.50	2,446,150
	Excavation, weathered rock	m3	216,800	6.00	1,300,800
	Excavation, hard rock	m3	1,424,800	10.00	14,248,000
	Embankment				
	Embankment, core	m3	3,900,000	5.00	19,500,000
	Embankment, filter	m3	840,100	10.00	8,401,000
	Embankment, rock	m3	28,514,900	6.00	171,089,400
	Curtain Grouting	m	85,000	70.00	5,950,000
	Consolidation Grouting	m	19,000	90.00	1,710,000
	Others (10%)	L.S.			22,464,535
	Subtotal				247,109,885
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	271,500	3.50	950,250
	Excavation, weathered rock	m3	389,700	6.00	2,338,200
	Excavation, hard rock	m3	1,871,000	10.00	18,710,000
	Concrete	m3	136,000	140.00	19,040,000
	Reinforcement bars	ton	4,100	1,500.00	6,150,000
	Others (20%)	L.S.			9,426,890
	Subtotal				56,561,340
2.50	INTAKE and INTAKE TUNNEL				
	Excavation				
	Excavation, common	m3	15,700	3.50	54,950
	Excavation, weathered rock	m3	15,700	6.00	94,200
	Excavation, hard rock	m3	21,000	10.00	210,000
	Concrete, open structure	m3	23,600	140.00	3,304,000
	Reinforcement	ton	710	1,500.00	1,065,000
	Others (20%)	L.S.			545,630
	Subtotal				5,673,780
2.60	HEADRACE TUNNEL				
	Excavation, tunnel	m3	161,900	55.00	8,904,500
	Concrete, tunnel	m3	47,700	160.00	7,632,000
	Reinforcement	ton	480	1,500.00	720,000
	Consolidation grout	m	5,900	90.00	531,000
	Curtain grout	m	1,700	70.00	119,000
	Backfill grout	m3	700	200.00	140,000
	Others (20%)	L.S.			3,609,300
	Subtotal				21,655,800
2.90	PENSTOCK				
	Excavation, tunnel	m3	48,100	55.00	2,645,500
	Concrete, tunnel	m3	9,100	160.00	1,456,000
	Reinforcement	ton	180	1,500.00	270,000
	Curtain grout	m	0	70.00	0
	Backfill grout	m3	400	200.00	80,000
	Others (20%)	L.S.			890,300
	Subtotal				5,341,800
2.15	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	106,200	3.50	371,700
	Excavation, weathered rock	m3	106,200	6.00	637,200
	Excavation, hard rock	m3	141,600	10.00	1,416,000

	Concrete, substructure	m3	101,200	250.00	25,300,000	
	Concrete, second stage	m3	25,300	140.00	3,542,000	
	Reinforcement	ton	6,800	1,500.00	9,900,000	
	Others (20%)	L.S.			8,233,380	
	Subtotal					49,400,280
2.16	TAIL RACE					
	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	3,200	140.00	448,000	
	Reinforcement	ton	100	1,500.00	150,000	
	Others (20%)	L.S.			168,600	
	Subtotal					1,011,600
2.17	ARCHITECTURAL BUILDINGS	m2	5,500	1,100.00	6,050,000	6,050,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	10,800	5,000.00	54,000,000	
	Gates	ton	1,100	7,000.00	7,700,000	
	Subtotal					61,700,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	5,100	18,700.00	95,370,000	
	Generators	ton	6,150	20,400.00	125,460,000	
	Transformers	MVA	1,259	2,350.00	2,958,650	
	Subtotal					223,788,650
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	35	46,000.00	1,610,000	1,610,000
					0	
	Total of Direct Cost					817,526,690
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	40,876,334
7.00	ADMINISTRATION EXPENSES	LS			0	8,175,267
8.00	ENGINEERING SERVICES	LS			0	57,226,868
9.00	PHYSICAL CONTINGENCY	LS			0	81,752,669
	GRAND TOTAL				1,005,557,828	1,005,557,828

B/Q of BR-4 (BL. 799.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			59,886,385
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	308,600	55.00	16,973,000
	Tunnel Concrete	m3	91,400	160.00	14,624,000
	Reinforcement bar	m3	2,100	1,500.00	3,150,000
	Plug Concrete	m3	9,100	160.00	1,456,000
	Others (20%)	L.S.			7,618,600
	Subtotal				45,711,600
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	479,000	3.50	1,676,500
	Embankment				
	Embankment, core	m3	974,000	5.00	4,870,000
	Embankment, filter	m3	233,000	10.00	2,330,000
	Embankment, rock	m3	6,144,000	6.00	36,864,000
	Others (20%)	L.S.			9,148,100
	Subtotal				54,888,600
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	389,000	3.50	1,361,500
	Excavation, weathered rock	m3	400,000	6.00	2,400,000
	Excavation, hard	m3	250,000	10.00	2,500,000
	Embankment				
	Embankment, core	m3	5,293,000	5.00	26,465,000
	Embankment, filter	m3	1,159,000	10.00	11,590,000
	Embankment, rock	m3	38,372,000	6.00	230,232,000
	Curtain Grouting	m	72,000	70.00	5,040,000
	Consolidation Grouting	m	14,000	90.00	1,260,000
	Others (10%)	L.S.			28,084,850
	Subtotal				308,933,350
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	289,000	3.50	1,011,500
	Excavation, weathered rock	m3	429,000	6.00	2,574,000
	Excavation, hard rock	m3	7,367,000	10.00	73,670,000
	Concrete	m3	98,900	140.00	13,846,000
	Reinforcement bars	ton	3,000	1,500.00	4,500,000
	Others (20%)	L.S.			19,120,300
	Subtotal				114,721,800
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	9,300	3.50	32,550
	Excavation, weathered rock	m3	9,300	6.00	55,800
	Excavation, hard rock	m3	12,400	10.00	124,000
	Concrete, open structure	m3	14,000	140.00	1,960,000
	Reinforcement	ton	420	1,500.00	630,000
	Others (20%)	L.S.			560,470
	Subtotal				3,362,820
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	235,600	55.00	12,958,000
	Concrete, tunnel	m3	70,200	160.00	11,232,000
	Reinforcement	ton	700	1,500.00	1,050,000
	Consolidation grout	m	10,100	90.00	909,000
	Curtain grout	m	1,400	70.00	98,000
	Backfill grout	m3	1,800	200.00	360,000
	Others (20%)	L.S.			5,321,400
	Subtotal				31,928,400
2.53	PENSTOCK				
	Excavation, tunnel	m3	56,800	55.00	3,124,000
	Concrete, tunnel	m3	12,600	160.00	2,016,000
	Reinforcement	ton	250	1,500.00	375,000
	Curtain grout	m	1,400	70.00	98,000
	Backfill grout	m3	800	200.00	160,000
	Others (20%)	L.S.			1,154,600
	Subtotal				6,927,600
2.60	OPEN POWERHOUSE				
	Excavation				

	Excavation, common	m3	68,200	3.50	238,700	
	Excavation, weathered rock	m3	68,200	6.00	409,200	
	Excavation, hard rock	m3	91,000	10.00	910,000	
	Concrete, substructure	m3	65,000	250.00	16,250,000	
	Concrete, second stage	m3	16,300	140.00	2,282,000	
	Reinforcement	ton	4,250	1,500.00	6,375,000	
	Others (20%)	L.S.			5,292,980	
	Subtotal					31,757,880
2.70	TAIL RACE					
	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	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	4,500	5,000.00	22,500,000	
	Gates	ton	750	7,000.00	5,250,000	
	Subtotal					27,750,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,400	18,700.00	63,580,000	
	Generators	ton	4,300	20,400.00	87,720,000	
	Transformers	MVA	704	2,900.00	2,041,600	
	Subtotal					153,341,600
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	65	46,000.00	2,990,000	2,990,000
	Total of Direct Cost					850,681,835
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	42,534,092
7.00	ADMINISTRATION EXPENSES	LS			0	8,506,818
8.00	ENGINEERING SERVICES	LS			0	59,547,728
9.00	PHYSICAL CONTINGENCY	LS			0	85,068,184
	GRAND TOTAL				1,046,338,637	1,046,338,637

B/Q of BR-4 (EL. 807.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			69,766,259
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	321,400	55.00	17,677,000
	Tunnel Concrete	m3	95,200	160.00	15,232,000
	Reinforcement bar	m3	2,100	1,500.00	3,150,000
	Plug Concrete	m3	9,100	160.00	1,456,000
	Others (20%)	L.S.			7,881,000
	Subtotal				47,286,000
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	479,000	3.50	1,676,500
	Embankment				
	Embankment, core	m3	974,000	5.00	4,870,000
	Embankment, filter	m3	233,000	10.00	2,330,000
	Embankment, rock	m3	6,144,000	6.00	36,864,000
	Others (20%)	L.S.			9,148,100
	Subtotal				54,888,600
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	1,295,000	3.50	4,532,500
	Excavation, weathered rock	m3	318,000	6.00	1,908,000
	Excavation, hard	m3	3,781,000	10.00	37,810,000
	Embankment				
	Embankment, core	m3	6,199,000	5.00	30,995,000
	Embankment, filter	m3	1,352,000	10.00	13,520,000
	Embankment, rock	m3	45,584,000	6.00	273,504,000
	Curtain Grouting	m	82,000	70.00	5,740,000
	Consolidation Grouting	m	16,100	90.00	1,449,000
	Others (10%)	L.S.			36,945,850
	Subtotal				406,404,350
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	287,000	3.50	1,004,500
	Excavation, weathered rock	m3	426,000	6.00	2,556,000
	Excavation, hard rock	m3	6,567,000	10.00	65,670,000
	Concrete	m3	100,700	140.00	14,098,000
	Reinforcement bars	ton	3,050	1,500.00	4,575,000
	Others (20%)	L.S.			17,580,700
	Subtotal				105,484,200
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	10,400	3.50	36,400
	Excavation, weathered rock	m3	10,400	6.00	62,400
	Excavation, hard rock	m3	13,900	10.00	139,000
	Concrete, open structure	m3	15,600	140.00	2,184,000
	Reinforcement	ton	470	1,500.00	705,000
	Others (20%)	L.S.			625,360
	Subtotal				3,752,160
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	266,000	55.00	14,630,000
	Concrete, tunnel	m3	79,000	160.00	12,640,000
	Reinforcement	ton	800	1,500.00	1,200,000
	Consolidation grout	m	10,900	90.00	981,000
	Curtain grout	m	1,500	70.00	105,000
	Backfill grout	m3	2,000	200.00	400,000
	Others (20%)	L.S.			5,991,200
	Subtotal				35,947,200
2.53	PENSTOCK				
	Excavation, tunnel	m3	69,000	55.00	3,795,000
	Concrete, tunnel	m3	14,400	160.00	2,304,000
	Reinforcement	ton	300	1,500.00	450,000
	Curtain grout	m	2,000	70.00	140,000
	Backfill grout	m3	900	200.00	180,000
	Others (20%)	L.S.			1,373,800
	Subtotal				8,242,800
2.60	OPEN POWERHOUSE				
	Excavation				

	Excavation, common	m3	75,200	3.50	263,200	
	Excavation, weathered rock	m3	75,200	6.00	451,200	
	Excavation, hard rock	m3	100,200	10.00	1,002,000	
	Concrete, substructure	m3	71,600	250.00	17,900,000	
	Concrete, second stage	m3	17,900	140.00	2,506,000	
	Reinforcement	ton	4,650	1,500.00	6,975,000	
	Others (20%)	L.S.			5,819,480	
	Subtotal					34,916,880
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	10,000	10.00	100,000	
	Concrete, structure	m3	2,400	140.00	336,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Others (20%)	L.S.			123,400	
	Subtotal					740,400
2.80	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,950,000	4,950,000
2.90	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	6,200	5,000.00	31,000,000	
	Gates	ton	820	7,000.00	5,740,000	
	Subtotal					36,740,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,900	18,700.00	72,930,000	
	Generators	ton	4,800	20,400.00	97,920,000	
	Transformers	MVA	850	2,700.00	2,295,000	
	Subtotal					173,145,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	65	46,000.00	2,990,000	2,990,000
	Total of Direct Cost					988,703,849
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	49,435,192
7.00	ADMINISTRATION EXPENSES	LS			0	9,887,038
8.00	ENGINEERING SERVICES	LS			0	69,209,269
9.00	PHYSICAL CONTINGENCY	LS			0	98,870,385
	GRAND TOTAL				1,216,105,734	1,216,105,734

B/Q of BR-4 (EL. 814.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			77,258,951
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	340,700	55.00	18,738,500
	Tunnel Concrete	m3	100,900	160.00	16,144,000
	Reinforcement bar	m3	2,200	1,500.00	3,300,000
	Plug Concrete	m3	9,100	160.00	1,456,000
	Others (20%)	L.S.			8,305,700
	Subtotal				49,834,200
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	479,000	3.50	1,676,500
	Embankment				
	Embankment, core	m3	974,000	5.00	4,870,000
	Embankment, filter	m3	233,000	10.00	2,330,000
	Embankment, rock	m3	6,144,000	6.00	36,864,000
	Others (20%)	L.S.			9,148,100
	Subtotal				54,888,600
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	1,427,000	3.50	4,994,500
	Excavation, weathered rock	m3	352,000	6.00	2,112,000
	Excavation, hard	m3	4,269,000	10.00	42,690,000
	Embankment				
	Embankment, core	m3	7,125,000	5.00	35,625,000
	Embankment, filter	m3	1,549,000	10.00	15,490,000
	Embankment, rock	m3	53,035,000	6.00	318,210,000
	Curtain Grouting	m	98,600	70.00	6,902,000
	Consolidation Grouting	m	19,400	90.00	1,746,000
	Others (10%)	L.S.			42,776,950
	Subtotal				470,546,450
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	279,000	3.50	976,500
	Excavation, weathered rock	m3	410,000	6.00	2,460,000
	Excavation, hard rock	m3	5,880,000	10.00	58,800,000
	Concrete	m3	110,900	140.00	15,526,000
	Reinforcement bars	ton	3,350	1,500.00	5,025,000
	Others (20%)	L.S.			16,557,500
	Subtotal				99,345,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	12,200	3.50	42,700
	Excavation, weathered rock	m3	12,200	6.00	73,200
	Excavation, hard rock	m3	16,300	10.00	163,000
	Concrete, open structure	m3	18,300	140.00	2,562,000
	Reinforcement	ton	550	1,500.00	825,000
	Others (20%)	L.S.			733,180
	Subtotal				4,399,080
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	305,400	55.00	16,797,000
	Concrete, tunnel	m3	90,500	160.00	14,480,000
	Reinforcement	ton	910	1,500.00	1,365,000
	Consolidation grout	m	12,000	90.00	1,080,000
	Curtain grout	m	1,600	70.00	112,000
	Backfill grout	m3	2,500	200.00	500,000
	Others (20%)	L.S.			6,866,800
	Subtotal				41,200,800
2.53	PENSTOCK				
	Excavation, tunnel	m3	86,900	55.00	4,779,500
	Concrete, tunnel	m3	17,200	160.00	2,752,000
	Reinforcement	ton	350	1,500.00	525,000
	Curtain grout	m	1,600	70.00	112,000
	Backfill grout	m3	2,200	200.00	440,000
	Others (20%)	L.S.			1,721,700
	Subtotal				10,330,200
2.60	OPEN POWERHOUSE				
	Excavation				

	Excavation, common	m3	88,700	3.50	310,450	
	Excavation, weathered rock	m3	88,700	6.00	532,200	
	Excavation, hard rock	m3	118,200	10.00	1,182,000	
	Concrete, substructure	m3	84,400	250.00	21,100,000	
	Concrete, second stage	m3	21,100	140.00	2,954,000	
	Reinforcement	ton	5,500	1,500.00	8,250,000	
	Others (20%)	L.S.			6,865,730	
	Subtotal					41,194,380
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	13,000	10.00	130,000	
	Concrete, structure	m3	2,600	140.00	364,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			141,800	
	Subtotal					850,800
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	7,900	5,000.00	39,500,000	
	Gates	ton	950	7,000.00	6,650,000	
	Subtotal					46,150,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	4,700	18,700.00	87,890,000	
	Generators	ton	5,800	20,400.00	118,320,000	
	Transformers	MVA	1,018	2,500.00	2,545,000	
	Subtotal					208,755,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	65	46,000.00	2,990,000	2,990,000
	Total of Direct Cost					1,116,693,461
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	55,834,673
7.00	ADMINISTRATION EXPENSES	LS			0	11,166,935
8.00	ENGINEERING SERVICES	LS			0	78,168,542
9.00	PHYSICAL CONTINGENCY	LS			0	111,669,346
	GRAND TOTAL				1,373,532,957	1,373,532,957

B/Q of BR-5 (EL. 731.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)	L.C.(N.Rps.)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				53,197,946
2.00	CIVIL WORKS					
2.10	DIVERSION TUNNEL					
	Open Excavation of Inlet & Outlet					
	Open excavation,common	m3	15,000	3.50	52,500	
	Open excavation,weathered rock	m3	15,000	6.00	90,000	
	Open excavation,hard rock	m3	25,000	10.00	250,000	
	Concrete of Inlet & Outlet	m3	7,000	140.00	980,000	
	Tunnel Excavation	m3	340,700	55.00	18,738,500	
	Tunnel Concrete	m3	100,900	160.00	16,144,000	
	Reinforcement bar	m3	2,200	1,500.00	3,300,000	
	Plug Concrete	m3	9,100	160.00	1,456,000	
	Others (20%)	L.S.			8,202,200	
	Subtotal					49,213,200
2.20	COFFER DAM					
	Excavation					
	Excavation,common	m3	283,100	3.50	990,850	
	Embankment					
	Embankment,core	m3	536,600	5.00	2,683,000	
	Embankment,filter	m3	130,800	10.00	1,306,000	
	Embankment,rock	m3	3,115,800	6.00	18,693,600	
	Others (20%)	L.S.			4,734,690	
	Subtotal					28,408,140
2.30	MAIN DAM					
	Excavation					
	Excavation,common	m3	1,042,000	3.50	3,647,000	
	Excavation,weathered rock	m3	198,500	6.00	1,191,000	
	Excavation,hard rock	m3	743,800	10.00	7,438,000	
	Embankment					
	Embankment,core	m3	5,808,800	5.00	29,044,000	
	Embankment,filter	m3	1,258,500	10.00	12,585,000	
	Embankment,rock	m3	40,091,000	6.00	240,546,000	
	Curtain Grouting	m	90,000	70.00	6,300,000	
	Consolidation Grouting	m	20,000	90.00	1,800,000	
	Others (10%)	L.S.			30,255,100	
	Subtotal					332,806,100
2.40	SPILLWAY					
	Excavation					
	Excavation,common	m3	293,400	3.50	1,026,900	
	Excavation,weathered rock	m3	385,200	6.00	2,311,200	
	Excavation,hard rock	m3	2,059,500	10.00	20,595,000	
	Concrete	m3	111,400	140.00	15,596,000	
	Reinforcement bars	ton	3,400	1,500.00	5,100,000	
	Others (20%)	L.S.			8,925,820	
	Subtotal					53,554,920
2.50	INTAKE and INTAKE TUNNEL					
	Excavation					
	Excavation,common	m3	9,800	3.50	33,600	
	Excavation,weathered rock	m3	9,800	6.00	57,600	
	Excavation,hard rock	m3	12,700	10.00	127,000	
	Concrete,open structure	m3	14,400	140.00	2,016,000	
	Reinforcement	ton	430	1,500.00	645,000	
	Others (20%)	L.S.			575,840	
	Subtotal					3,455,040
2.60	HEADRACE TUNNEL					
	Excavation,tunnel	m3	162,500	55.00	8,937,500	
	Concrete, tunnel	m3	48,400	160.00	7,744,000	
	Reinforcement	ton	490	1,500.00	735,000	
	Consolidation grout	m	7,000	90.00	630,000	
	Curtain grout	m	1,400	70.00	98,000	
	Backfill grout	m3	800	200.00	120,000	
	Others (20%)	L.S.			3,652,900	
	Subtotal					21,917,400
2.90	PENSTOCK					
	Excavation,tunnel	m3	48,700	55.00	2,678,500	
	Concrete,tunnel	m3	10,500	160.00	1,680,000	
	Reinforcement	ton	210	1,500.00	315,000	
	Curtain grout	m	0	70.00	0	
	Backfill grout	m3	300	200.00	60,000	
	Others (20%)	L.S.			946,700	
	Subtotal					5,680,200
2.15	OPEN POWERHOUSE					
	Excavation					
	Excavation,common	m3	77,900	3.50	272,650	
	Excavation,weathered rock	m3	77,900	6.00	467,400	
	Excavation,hard rock	m3	103,800	10.00	1,038,000	
	Concrete, substructure	m3	74,100	250.00	18,525,000	

	Concrete, second stage	m3	18,500	140.00	2,590,000	
	Reinforcement	ton	4,800	1,500.00	7,200,000	
	Others (20%)	L.S.			6,018,610	
	Subtotal					36,111,660
2.16	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	12,000	10.00	120,000	
	Concrete, structure	m3	2,700	140.00	378,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			138,800	
	Subtotal					832,800
2.17	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	11,000	5,000.00	55,000,000	
	Gates	ton	760	7,000.00	5,320,000	
	Subtotal					60,320,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	3,980	18,700.00	72,930,000	
	Generators	ton	5,100	20,400.00	104,040,000	
	Transformers	MVA	928	2,600.00	2,415,400	
	Subtotal					179,385,400
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	45	46,000.00	2,070,000	2,070,000
	Total of Direct Cost				0	835,902,806
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	41,795,140
7.00	ADMINISTRATION EXPENSES	LS			0	8,359,028
8.00	ENGINEERING SERVICES	LS			0	58,513,196
9.00	PHYSICAL CONTINGENCY	LS			0	83,590,281
	GRAND TOTAL				1,028,160,451	1,028,160,451

Total
amount

B/Q of BR-5 (EL. 737.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)	L.C.(N.Rps.)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				57,145,808
2.00	CIVIL WORKS					
2.10	DIVERSION TUNNEL					
	Open Excavation of Inlet & Outlet					
	Open excavation, common	m3	15,000	3.50	52,500	
	Open excavation, weathered rock	m3	15,000	6.00	90,000	
	Open excavation, hard rock	m3	25,000	10.00	250,000	
	Concrete of Inlet & Outlet	m3	7,000	140.00	980,000	
	Tunnel Excavation	m3	366,400	55.00	20,152,000	
	Tunnel Concrete	m3	108,500	160.00	17,360,000	
	Reinforcement bar	m3	2,300	1,500.00	3,450,000	
	Plug Concrete	m3	9,100	160.00	1,456,000	
	Others (20%)	L.S.			8,758,100	
	Subtotal					52,548,600
2.20	COFFER DAM					
	Excavation					
	Excavation, common	m3	283,100	3.50	990,850	
	Embankment					
	Embankment, core	m3	536,600	5.00	2,683,000	
	Embankment, filter	m3	130,600	10.00	1,306,000	
	Embankment, rock	m3	3,115,600	6.00	18,693,600	
	Others (20%)	L.S.			4,734,690	
	Subtotal					28,408,140
2.30	MAIN DAM					
	Excavation					
	Excavation, common	m3	1,120,100	3.50	3,920,350	
	Excavation, weathered rock	m3	206,600	6.00	1,239,600	
	Excavation, hard rock	m3	773,700	10.00	7,737,000	
	Embankment					
	Embankment, core	m3	6,198,500	5.00	30,992,500	
	Embankment, filter	m3	1,340,700	10.00	13,407,000	
	Embankment, rock	m3	43,467,200	6.00	260,803,200	
	Curtain Grouting	m	100,000	70.00	7,000,000	
	Consolidation Grouting	m	25,000	90.00	2,250,000	
	Others (10%)	L.S.			32,734,965	
	Subtotal					360,084,615
2.40	SPILLWAY					
	Excavation					
	Excavation, common	m3	245,200	3.50	858,200	
	Excavation, weathered rock	m3	326,900	6.00	1,961,400	
	Excavation, hard rock	m3	1,844,500	10.00	18,445,000	
	Concrete	m3	112,600	140.00	15,764,000	
	Reinforcement bars	ton	3,400	1,500.00	5,100,000	
	Others (20%)	L.S.			8,425,720	
	Subtotal					50,554,320
2.50	INTAKE and INTAKE TUNNEL					
	Excavation					
	Excavation, common	m3	11,000	3.50	38,500	
	Excavation, weathered rock	m3	11,000	6.00	66,000	
	Excavation, hard rock	m3	14,600	10.00	146,000	
	Concrete, open structure	m3	16,400	140.00	2,296,000	
	Reinforcement	ton	500	1,500.00	750,000	
	Others (20%)	L.S.			659,300	
	Subtotal					3,955,800
2.60	HEADRACE TUNNEL					
	Excavation, tunnel	m3	192,900	55.00	10,609,500	
	Concrete, tunnel	m3	57,100	160.00	9,136,000	
	Reinforcement	ton	570	1,500.00	855,000	
	Consolidation grout	m	7,600	90.00	684,000	
	Curtain grout	m	1,500	70.00	105,000	
	Backfill grout	m3	720	200.00	144,000	
	Others (20%)	L.S.			4,306,700	
	Subtotal					25,840,200
2.90	PENSTOCK					
	Excavation, tunnel	m3	55,600	55.00	3,058,000	
	Concrete, tunnel	m3	11,200	160.00	1,792,000	
	Reinforcement	ton	240	1,500.00	360,000	
	Curtain grout	m	0	70.00	0	
	Backfill grout	m3	350	200.00	70,000	
	Others (20%)	L.S.			1,056,000	
	Subtotal					6,336,000
2.15	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	92,000	3.50	322,000	
	Excavation, weathered rock	m3	92,000	6.00	552,000	
	Excavation, hard rock	m3	122,700	10.00	1,227,000	
	Concrete, substructure	m3	87,700	250.00	21,925,000	

	Concrete, second stage	m3	21,900	140.00	3,066,000	
	Reinforcement	ton	5,700	1,500.00	8,550,000	
	Others (20%)	L.S.			7,128,400	
	Subtotal					42,770,400
2.16	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.			160,000	
	Subtotal					960,000
2.17	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	12,800	5,000.00	64,000,000	
	Gates	ton	890	7,000.00	6,230,000	
	Subtotal					70,230,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	4,450	18,700.00	83,215,000	
	Generators	ton	5,700	20,400.00	116,280,000	
	Transformers	MVA	1,110	2,440.00	2,708,400	
	Subtotal					202,203,400
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	45	46,000.00	2,070,000	2,070,000
	Total of Direct Cost				0	913,157,283
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	45,657,864
7.00	ADMINISTRATION EXPENSES	LS			0	9,131,573
8.00	ENGINEERING SERVICES	LS			0	63,921,010
9.00	PHYSICAL CONTINGENCY	LS			0	91,315,728
	GRAND TOTAL				1,123,183,457	1,123,183,457

Total
amount

B/Q of BR-5 (EL. 755.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)	L.C.(N.Rpt.)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.				67,274,595
2.00	CIVIL WORKS					
2.10	DIVERSION TUNNEL					
	Open Excavation of Inlet & Outlet					
	Open excavation, common	m3	15,000	3.50	52,500	
	Open excavation, weathered rock	m3	15,000	6.00	90,000	
	Open excavation, hard rock	m3	25,000	10.00	250,000	
	Concrete of Inlet & Outlet	m3	7,000	140.00	980,000	
	Tunnel Excavation	m3	385,700	55.00	21,213,500	
	Tunnel Concrete	m3	114,200	160.00	18,272,000	
	Reinforcement bar	m3	2,450	1,500.00	3,675,000	
	Plug Concrete	m3	9,100	160.00	1,456,000	
	Others (20%)	L.S.			9,197,800	
	Subtotal					55,186,800
2.20	COFFER DAM					
	Excavation					
	Excavation, common	m3	283,100	3.50	990,850	
	Embankment					
	Embankment, core	m3	536,600	5.00	2,683,000	
	Embankment, filter	m3	130,600	10.00	1,306,000	
	Embankment, rock	m3	3,115,600	6.00	18,693,600	
	Others (20%)	L.S.			4,734,690	
	Subtotal					28,408,140
2.30	MAIN DAM					
	Excavation					
	Excavation, common	m3	1,339,900	3.50	4,689,650	
	Excavation, weathered rock	m3	233,300	6.00	1,399,800	
	Excavation, hard	m3	910,100	10.00	9,101,000	
	Embankment					
	Embankment, core	m3	7,463,100	5.00	37,315,500	
	Embankment, filter	m3	1,607,300	10.00	16,073,000	
	Embankment, rock	m3	54,915,900	6.00	329,495,400	
	Curtain Grouting	m	110,000	70.00	7,700,000	
	Consolidation Grouting	m	30,000	90.00	2,700,000	
	Others (10%)	L.S.			40,847,435	
	Subtotal					449,321,785
2.40	SPILLWAY					
	Excavation					
	Excavation, common	m3	165,200	3.50	578,200	
	Excavation, weathered rock	m3	290,000	6.00	1,740,000	
	Excavation, hard rock	m3	1,607,000	10.00	16,070,000	
	Concrete	m3	116,400	140.00	16,296,000	
	Reinforcement bars	ton	3,500	1,500.00	5,250,000	
	Others (20%)	L.S.			7,986,840	
	Subtotal					47,921,040
2.50	INTAKE and INTAKE TUNNEL					
	Excavation					
	Excavation, common	m3	13,300	3.50	46,550	
	Excavation, weathered rock	m3	13,300	6.00	79,800	
	Excavation, hard rock	m3	17,700	10.00	177,000	
	Concrete, open structure	m3	20,000	140.00	2,800,000	
	Reinforcement	ton	600	1,500.00	900,000	
	Others (20%)	L.S.			800,670	
	Subtotal					4,804,020
2.60	HEADRACE TUNNEL					
	Excavation, tunnel	m3	209,000	55.00	11,495,000	
	Concrete, tunnel	m3	61,800	160.00	9,888,000	
	Reinforcement	ton	620	1,500.00	930,000	
	Consolidation grout	m	7,900	90.00	711,000	
	Curtain grout	m	1,600	70.00	112,000	
	Backfill grout	m3	800	200.00	160,000	
	Others (20%)	L.S.			4,659,200	
	Subtotal					27,955,200
2.90	PENSTOCK					
	Excavation, tunnel	m3	62,900	55.00	3,459,500	
	Concrete, tunnel	m3	12,000	160.00	1,920,000	
	Reinforcement	ton	250	1,500.00	375,000	
	Curtain grout	m	0	70.00	0	
	Backfill grout	m3	400	200.00	80,000	
	Others (20%)	L.S.			1,166,900	
	Subtotal					7,001,400
2.15	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	109,400	3.50	382,900	
	Excavation, weathered rock	m3	109,400	6.00	656,400	
	Excavation, hard rock	m3	145,900	10.00	1,459,000	
	Concrete, substructure	m3	104,200	250.00	26,050,000	

	Concrete, second stage	m3	26,100	140.00	3,654,000	
	Reinforcement	ton	6,800	1,500.00	10,200,000	
	Others (20%)	L.S.			8,480,460	
	Subtotal					50,882,760
2.16	TAILRACE					
	Excavation					
	Excavation, common	m3	12,000	3.50	42,000	
	Excavation, weathered rock	m3	12,000	6.00	72,000	
	Excavation, hard rock	m3	20,000	10.00	200,000	
	Concrete, structure	m3	4,000	140.00	560,000	
	Reinforcement	ton	120	1,500.00	180,000	
	Others (20%)	L.S.			210,800	
	Subtotal					1,264,800
2.17	ARCHITECTURAL BUILDINGS	m2	7,000	1,100.00	7,700,000	7,700,000
2.18	ACCESS ROAD					
	New construction	m	0	600,000.00	0	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					3,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	15,300	5,000.00	76,500,000	
	Gates	ton	1,050	7,000.00	7,350,000	
	Subtotal					83,850,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	5,100	18,700.00	95,370,000	
	Generators	ton	6,400	20,400.00	130,560,000	
	Transformers	MVA	1,340	2,440.00	3,269,600	
	Subtotal					229,199,600
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	45	46,000.00	2,070,000	2,070,000
					0	
	Total of Direct Cost					1,066,290,140
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	53,314,507
7.00	ADMINISTRATION EXPENSES	LS			0	10,662,901
8.00	ENGINEERING SERVICES	LS			0	74,640,310
9.00	PHYSICAL CONTINGENCY	LS			0	106,629,014
	GRAND TOTAL				1,311,536,872	1,311,536,872

Total amount

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,085,748
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	18,900	3.50	59,150
	Open excavation, weathered rock	m3	18,900	6.00	101,400
	Open excavation, hard rock	m3	22,500	10.00	225,000
	Concrete				
	Mass concrete	m3	30,400	90.00	2,736,000
	Reinforced concrete	m3	71,900	140.00	10,066,000
	Reinforcement bar	ton	2,200	1,500.00	3,300,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,500	90.00	225,000
	Others (20%)	L.S.			3,397,110
	Subtotal				20,382,660
2.20	DESANDING BASIN				
	Excavation, tunnel	m3	61,700	55.00	3,393,500
	Concrete, tunnel	m3	14,900	160.00	2,384,000
	Reinforcement bars	ton	150	1,500.00	225,000
	Others (20%)	L.S.			1,200,500
	Subtotal				7,203,000
2.30	WATERWAY				
2.31	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	60	1,500.00	90,000
	Others (20%)	L.S.			77,070
	Subtotal				462,420
2.32	HEADRACE TUNNEL				
	Excavation, tunnel	m3	51,400	55.00	2,827,000
	Concrete, tunnel	m3	18,200	160.00	2,912,000
	Reinforcement	ton	200	1,500.00	300,000
	Consolidation grout	m	7,400	90.00	666,000
	Curtain grout	m	200	70.00	14,000
	Backfill grout	m3	940	200.00	188,000
	Others (20%)	L.S.			1,381,400
	Subtotal				8,288,400
2.33	SURGE TANK				
	Excavation, shaft	m3	7,200	55.00	396,000
	Concrete, shaft	m3	2,100	160.00	336,000
	Reinforcement	ton	60	1,500.00	90,000
	Consolidation grout	m	200	90.00	18,000
	Others (20%)	L.S.			168,000
	Subtotal				1,008,000
2.34	PENSTOCK				
	Excavation, tunnel	m3	3,700	55.00	203,500
	Concrete, tunnel	m3	1,900	160.00	304,000
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	200	70.00	14,000
	Backfill grout	m3	90	200.00	18,000
	Others (20%)	L.S.			119,900
	Subtotal				719,400
2.40	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	5,500	3.50	19,250
	Excavation, weathered rock	m3	5,500	6.00	33,000
	Excavation, hard rock	m3	7,400	10.00	74,000
	Concrete, substructure	m3	5,300	250.00	1,325,000
	Concrete, second stage	m3	1,300	140.00	182,000
	Reinforcement	ton	340	1,500.00	510,000

	Others (20%)	L.S.			428,650	
	Subtotal					2,571,900
2.50	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	2,100	10.00	21,000	
	Concrete, structure	m3	800	140.00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.			36,950	
	Subtotal					221,700
2.60	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000
2.70	ACCESS ROAD					
	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	850	5,000.00	4,250,000	
	Gates	ton	100	7,000.00	700,000	
	Subtotal					4,950,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	280	18,700.00	5,236,000	
	Generators	ton	630	20,400.00	12,852,000	
	Transformers	MVA	52	4,600.00	239,200	
	Subtotal					18,327,200
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	152	46,000.00	6,992,000	6,992,000
	Total of Direct Cost					129,412,428
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,294,124
7.00	ADMINISTRATION EXPENSES	LS			0	1,294,124
8.00	ENGINEERING SERVICES	LS			0	9,058,870
9.00	PHYSICAL CONTINGENCY	LS			0	12,941,243
	GRAND TOTAL				154,000,789	154,000,789

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			3,381,714
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	15,300	3.50	53,550
	Open excavation, weathered rock	m3	15,300	6.00	91,800
	Open excavation, hard rock	m3	20,400	10.00	204,000
	Concrete				
	Mass concrete	m3	28,400	90.00	2,556,000
	Reinforced concrete	m3	88,200	140.00	9,548,000
	Reinforcement bar	ton	2,100	1,500.00	3,150,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	2,500	90.00	225,000
	Others (20%)	L.S.			3,216,070
	Subtotal				19,296,420
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	41,300	55.00	2,271,500
	Concrete, tunnel	m3	10,000	160.00	1,600,000
	Reinforcement bars	ton	100	1,500.00	150,000
	Others (20%)	L.S.			804,300
	Subtotal				4,825,800
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	1,000	3.50	3,500
	Excavation, weathered rock	m3	1,000	6.00	6,000
	Excavation, hard rock	m3	1,300	10.00	13,000
	Concrete, open structure	m3	1,500	140.00	210,000
	Reinforcement	ton	50	1,500.00	75,000
	Others (20%)	L.S.			61,500
	Subtotal				369,000
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	36,500	55.00	2,007,500
	Concrete, tunnel	m3	13,400	160.00	2,144,000
	Reinforcement	ton	140	1,500.00	210,000
	Consolidation grout	m	6,200	90.00	558,000
	Curtain grout	m	180	70.00	12,600
	Backfill grout	m3	750	200.00	150,000
	Others (20%)	L.S.			1,016,420
	Subtotal				6,098,520
2.53	SURGE TANK				
	Excavation, shaft	m3	4,800	55.00	264,000
	Concrete, shaft	m3	1,400	160.00	224,000
	Reinforcement	ton	80	1,500.00	90,000
	Consolidation grout	m	150	90.00	13,500
	Others (20%)	L.S.			118,300
	Subtotal				709,800
2.54	PENSTOCK				
	Excavation, tunnel	m3	2,800	55.00	154,000
	Concrete, tunnel	m3	1,850	160.00	264,000
	Reinforcement	ton	30	1,500.00	45,000
	Curtain grout	m	150	70.00	10,500
	Backfill grout	m3	50	200.00	10,000
	Others (20%)	L.S.			96,700
	Subtotal				580,200
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	3,700	3.50	12,950
	Excavation, weathered rock	m3	3,700	6.00	22,200
	Excavation, hard rock	m3	4,900	10.00	49,000
	Concrete, substructure	m3	3,800	250.00	900,000
	Concrete, second stage	m3	900	140.00	126,000
	Reinforcement	ton	230	1,500.00	345,000

	Others (20%)	L.S.			291,030	
	Subtotal					1,746,180
2.70	TAILRACE					
	Excavation					
	Excavation,common	m3	1,300	3.50	4,550	
	Excavation,weathered rock	m3	1,300	6.00	7,800	
	Excavation,hard rock	m3	1,900	10.00	19,000	
	Concrete, structure	m3	700	140.00	98,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			31,870	
	Subtotal					191,220
2.80	ARCHITECTURAL BUILDINGS	m2	2,000	1,100.00	2,200,000	2,200,000
2.90	ACCESS ROAD					
	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	800	5,000.00	3,000,000	
	Gates	ton	70	7,000.00	490,000	
	Subtotal					3,490,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	200	18,700.00	3,740,000	
	Generators	ton	500	20,400.00	10,200,000	
	Transformers	MVA	35	5,000.00	175,000	
	Subtotal					14,115,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	152	46,000.00	6,992,000	6,992,000
	Total of Direct Cost					115,445,854
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,154,459
7.00	ADMINISTRATION EXPENSES	LS			0	1,154,459
8.00	ENGINEERING SERVICES	LS			0	8,081,210
9.00	PHYSICAL CONTINGENCY	LS			0	11,544,585
	GRAND TOTAL				137,380,566	137,380,566

B/Q of BR-6 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			2,849,538
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	13,700	3.50	47,950
	Open excavation, weathered rock	m3	13,700	6.00	82,200
	Open excavation, hard rock	m3	18,300	10.00	183,000
	Concrete				
	Mass concrete	m3	28,300	90.00	2,367,000
	Reinforced concrete	m3	63,000	140.00	8,820,000
	Reinforcement bar	ton	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.			2,962,630
	Subtotal				17,775,780
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	31,000	55.00	1,705,000
	Concrete, tunnel	m3	7,500	160.00	1,200,000
	Reinforcement bars	ton	75	1,500.00	112,500
	Others (20%)	L.S.			603,500
	Subtotal				3,621,000
2.50	WATERWAY				
2.51	INTAKE				
	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	m3	1,300	140.00	182,000
	Reinforcement	ton	40	1,500.00	60,000
	Others (20%)	L.S.			52,510
	Subtotal				315,060
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	24,200	55.00	1,331,000
	Concrete, tunnel	m3	9,300	160.00	1,488,000
	Reinforcement	ton	100	1,500.00	150,000
	Consolidation grout	m	5,000	90.00	450,000
	Curtain grout	m	150	70.00	10,500
	Backfill grout	m3	700	200.00	140,000
	Others (20%)	L.S.			713,900
	Subtotal				4,283,400
2.53	SURGE TANK				
	Excavation, shaft	m3	3,800	55.00	198,000
	Concrete, shaft	m3	1,100	160.00	176,000
	Reinforcement	ton	40	1,500.00	60,000
	Consolidation grout	m	120	90.00	10,800
	Others (20%)	L.S.			88,960
	Subtotal				533,760
2.54	PENSTOCK				
	Excavation, tunnel	m3	2,300	55.00	126,500
	Concrete, tunnel	m3	1,450	160.00	232,000
	Reinforcement	ton	30	1,500.00	45,000
	Curtain grout	m	130	70.00	9,100
	Backfill grout	m3	40	200.00	8,000
	Others (20%)	L.S.			84,120
	Subtotal				504,720
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	2,800	3.50	9,800
	Excavation, weathered rock	m3	2,800	6.00	16,800
	Excavation, hard rock	m3	3,700	10.00	37,000
	Concrete, substructure	m3	2,700	250.00	675,000
	Concrete, second stage	m3	600	140.00	84,000
	Reinforcement	ton	170	1,500.00	255,000

	Others (20%)	L.S.			215,520	
	Subtotal					1,293,120
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	1,100	3.50	3,850	
	Excavation, weathered rock	m3	1,100	6.00	6,600	
	Excavation, hard rock	m3	1,600	10.00	16,000	
	Concrete, structure	m3	600	140.00	84,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			28,090	
	Subtotal					168,540
2.80	ARCHITECTURAL BUILDINGS	m2	1,800	1,100.00	1,980,000	1,980,000
2.90	ACCESS ROAD					
	New construction	m	80	600,000.00	48,000,000	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					51,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	450	5,000.00	2,250,000	
	Gates	ton	60	7,000.00	420,000	
	Subtotal					2,670,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	160	18,700.00	2,992,000	
	Generators	ton	400	20,400.00	8,160,000	
	Transformers	MVA	25	5,300.00	137,800	
	Subtotal					11,289,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	152	46,000.00	6,992,000	6,992,000
	Total of Direct Cost					105,726,718
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,057,267
7.00	ADMINISTRATION EXPENSES	LS			0	1,057,267
8.00	ENGINEERING SERVICES	LS			0	7,400,870
9.00	PHYSICAL CONTINGENCY	LS			0	10,572,672
	GRAND TOTAL				125,814,794	125,814,794

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			2,515,542
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 rock	m3	15,400	10.00	154,000
	Concrete				
	Mass concrete	m3	21,400	90.00	1,926,000
	Reinforced concrete	m3	63,100	140.00	8,834,000
	Reinforcement bar	ton	1,900	1,500.00	2,850,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,100	90.00	189,000
	Others (20%)	L.S.			2,867,050
	Subtotal				17,202,300
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	10,600	55.00	583,000
	Concrete, tunnel	m3	2,900	160.00	464,000
	Reinforcement bars	ton	30	1,500.00	45,000
	Others (20%)	L.S.			218,400
	Subtotal				1,310,400
2.50	WATERWAY				
2.51	INTAKE				
	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	m3	900	140.00	126,000
	Reinforcement	ton	25	1,500.00	37,500
	Others (20%)	L.S.			35,440
	Subtotal				212,640
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	27,200	55.00	1,496,000
	Concrete, tunnel	m3	10,500	160.00	1,680,000
	Reinforcement	ton	50	1,500.00	75,000
	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.			655,820
	Subtotal				3,934,920
2.53	HEAD POND				
	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,open structure	m3	1,400	140.00	196,000
	Reinforcement	ton	40	1,500.00	60,000
	Others (20%)	L.S.			56,680
	Subtotal				340,080
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	3,600	3.50	12,600
	Excavation,weathered rock	m3	3,600	6.00	21,600
	Excavation,hard rock	m3	4,800	10.00	48,000
	Concrete,open structure	m3	3,800	140.00	504,000
	Reinforcement	ton	80	1,500.00	90,000
	Others (20%)	L.S.			135,240
	Subtotal				811,440
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	2,400	3.50	8,400
	Excavation,weathered rock	m3	2,400	6.00	14,400
	Excavation,hard rock	m3	3,200	10.00	32,000

	Concrete, substructure	m3	2,300	250.00	575,000	
	Concrete, second stage	m3	600	140.00	84,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Others (20%)	L.S.			187,760	
	Subtotal					1,126,560
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	2,000	10.00	20,000	
	Concrete, structure	m3	800	140.00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.			36,180	
	Subtotal					217,080
2.80	ARCHITECTURAL BUILDINGS	m2	3,000	1,100.00	3,300,000	3,300,000
2.90	ACCESS ROAD					
	New construction	m	95	600,000.00	57,600,000	
	Upgraded	m	59	50,000.00	3,450,000	
	Subtotal					61,050,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,000	5,000.00	5,000,000	
	Gates	ton	20	7,000.00	140,000	
	Subtotal					5,140,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	120	18,700.00	2,244,000	
	Generators	ton	450	20,400.00	9,180,000	
	Transformers	MVA	32	5,100.00	163,200	
	Subtotal					11,587,200
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	167	46,000.00	7,682,000	7,682,000
	Total of Direct Cost					116,430,162
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,164,302
7.00	ADMINISTRATION EXPENSES	LS			0	1,164,302
8.00	ENGINEERING SERVICES	LS			0	8,150,111
9.00	PHYSICAL CONTINGENCY	LS			0	11,643,016
	GRAND TOTAL				138,551,893	138,551,893

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			2,286,768
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	10,400	3.50	36,400
	Open excavation, weathered rock	m3	10,400	6.00	62,400
	Open excavation, hard rock	m3	13,900	10.00	139,000
	Concrete				
	Mass concrete	m3	19,900	90.00	1,791,000
	Reinforced concrete	m3	58,500	140.00	8,190,000
	Reinforcement bar	ton	1,800	1,500.00	2,700,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	2,000	90.00	180,000
	Others (20%)	L.S.			2,670,160
	Subtotal				16,020,960
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	7,100	55.00	390,500
	Concrete, tunnel	m3	2,000	160.00	320,000
	Reinforcement bars	ton	20	1,500.00	30,000
	Curtain grouting	m		70.00	0
	Consolidation grouting	m		90.00	0
	Others (20%)	L.S.			148,100
	Subtotal				888,600
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	500	3.50	1,750
	Excavation, weathered rock	m3	500	6.00	3,000
	Excavation, hard rock	m3	600	10.00	6,000
	Concrete, open structure	m3	700	140.00	98,000
	Reinforcement	ton	20	1,500.00	30,000
	Others (20%)	L.S.			27,750
	Subtotal				166,500
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	27,200	55.00	1,496,000
	Concrete, tunnel	m3	10,500	160.00	1,680,000
	Reinforcement	ton	50	1,500.00	75,000
	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.			655,820
	Subtotal				3,934,920
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	m3	1,100	140.00	154,000
	Reinforcement	ton	35	1,500.00	52,500
	Others (20%)	L.S.			45,410
	Subtotal				272,460
2.54	PENSTOCK				
	Excavation				
	Excavation, common	m3	3,000	3.50	10,500
	Excavation, weathered rock	m3	3,000	6.00	18,000
	Excavation, hard rock	m3	4,000	10.00	40,000
	Concrete, open structure	m3	3,000	140.00	420,000
	Reinforcement	ton	50	1,500.00	75,000
	Others (20%)	L.S.			112,700
	Subtotal				676,200
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	1,800	3.50	6,300

	Excavation, weathered rock	m3	1,800	6.00	9,600	
	Excavation, hard rock	m3	2,200	10.00	22,000	
	Concrete, substructure	m3	1,500	250.00	375,000	
	Concrete, second stage	m3	400	140.00	56,000	
	Reinforcement	ton	100	1,500.00	150,000	
	Others (20%)	L.S.			123,640	
	Subtotal					741,840
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	1,500	10.00	15,000	
	Concrete, structure	m3	600	140.00	84,000	
	Reinforcement	ton	20	1,500.00	30,000	
	Others (20%)	L.S.			27,700	
	Subtotal					166,200
2.80	ARCHITECTURAL BUILDINGS	m2	2,000	1,100.00	2,200,000	2,200,000
2.90	ACCESS ROAD					
	New construction	m	96	600,000.00	57,600,000	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					61,050,000
3.00	METAL WORKS					
	Paintstock steel pipes	ton	700	5,000.00	3,500,000	
	Gates	ton	15	7,000.00	105,000	
	Subtotal					3,605,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	90	18,700.00	1,683,000	
	Generators	ton	350	20,400.00	7,140,000	
	Transformers	MVA	21	5,500.00	115,500	
	Subtotal					8,938,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	167	46,000.00	7,682,000	7,682,000
	Total of Direct Cost					108,629,948
6.00	LAND AQUISITION AND COMPENSATION	LS			0	1,086,299
7.00	ADMINISTRATION EXPENSES	LS			0	1,086,299
8.00	ENGINEERING SERVICES	LS			0	7,604,096
9.00	PHYSICAL CONTINGENCY	LS			0	10,862,995
	GRAND TOTAL				129,269,638	129,269,638

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			2,107,815
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	9,400	3.50	32,900
	Open excavation,weathered rock	m3	9,400	6.00	56,400
	Open excavation,hard rock	m3	12,500	10.00	125,000
	Concrete				
	Mass concrete	m3	18,500	90.00	1,665,000
	Reinforced concrete	m3	54,200	140.00	7,588,000
	Reinforcement bar	ton	1,850	1,500.00	2,475,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	2,000	90.00	180,000
	Others (20%)	L.S.			2,472,960
	Subtotal				14,832,360
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	5,200	55.00	286,000
	Concrete, tunnel	m3	1,400	160.00	224,000
	Reinforcement bars	ton	15	1,500.00	22,500
	Others (20%)	L.S.			106,500
	Subtotal				639,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	400	3.50	1,400
	Excavation,weathered rock	m3	400	6.00	2,400
	Excavation,hard rock	m3	550	10.00	5,500
	Concrete,open structure	m3	600	140.00	84,000
	Reinforcement	ton	20	1,500.00	30,000
	Others (20%)	L.S.			24,660
	Subtotal				147,960
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	27,200	55.00	1,496,000
	Concrete, tunnel	m3	10,500	160.00	1,680,000
	Reinforcement	ton	50	1,500.00	75,000
	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.			655,820
	Subtotal				3,934,920
2.53	HEAD POND				
	Excavation				
	Excavation,common	m3	750	3.50	2,625
	Excavation,weathered rock	m3	750	6.00	4,500
	Excavation,hard rock	m3	1,000	10.00	10,000
	Concrete,open structure	m3	900	140.00	126,000
	Reinforcement	ton	30	1,500.00	45,000
	Others (20%)	L.S.			37,625
	Subtotal				225,750
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	2,400	3.50	8,400
	Excavation,weathered rock	m3	2,400	6.00	14,400
	Excavation,hard rock	m3	3,200	10.00	32,000
	Concrete,open structure	m3	2,700	140.00	378,000
	Reinforcement	ton	45	1,500.00	67,500
	Others (20%)	L.S.			100,060
	Subtotal				600,360
2.60	OPEN POWERHOUSE				
	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, 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.			93,880	
	Subtotal					563,280
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	15	1,500.00	22,500	
	Others (20%)	L.S.			22,420	
	Subtotal					134,520
2.80	ARCHITECTURAL BUILDINGS	m2	1,500	1,100.00	1,650,000	1,650,000
2.90	ACCESS ROAD					
	New construction	m	98	600,000.00	57,600,000	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					61,050,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	550	5,000.00	2,750,000	
	Gates	ton	15	7,000.00	105,000	
	Subtotal					2,855,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	70	18,700.00	1,309,000	
	Generators	ton	300	20,400.00	6,120,000	
	Transformers	MVA	16	5,750.00	92,000	
	Subtotal					7,521,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	167	46,000.00	7,682,000	7,682,000
	Total of Direct Cost					103,943,965
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,039,440
7.00	ADMINISTRATION EXPENSES	LS			0	1,039,440
8.00	ENGINEERING SERVICES	LS			0	7,276,078
9.00	PHYSICAL CONTINGENCY	LS			0	10,394,397
	GRAND TOTAL				123,693,318	123,693,318

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			3,783,024
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	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	m3	26,300	10.00	263,000
	Concrete				
	Mass concrete	m3	34,300	90.00	3,087,000
	Reinforced concrete	m3	75,100	140.00	10,514,000
	Reinforcement bar	ton	2,300	1,500.00	3,450,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,800	90.00	252,000
	Others (20%)	L.S.			3,605,800
	Subtotal				21,634,800
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	29,800	55.00	1,628,000
	Concrete, tunnel	m3	7,500	160.00	1,200,000
	Reinforcement bars	ton	75	1,500.00	112,500
	Others (20%)	L.S.			588,100
	Subtotal				3,528,600
2.50	WATERWAY				
2.51	INTAKE				
	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	m3	1,400	140.00	196,000
	Reinforcement	ton	40	1,500.00	60,000
	Others (20%)	L.S.			55,310
	Subtotal				331,860
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	30,000	55.00	1,650,000
	Concrete, tunnel	m3	11,000	160.00	1,760,000
	Reinforcement	ton	110	1,500.00	165,000
	Consolidation grout	m	5,000	90.00	450,000
	Curtain grout	m	180	70.00	11,200
	Backfill grout	m3	780	200.00	152,000
	Others (20%)	L.S.			837,640
	Subtotal				5,025,840
2.53	SURGE TANK				
	Excavation, shaft	m3	3,700	55.00	203,500
	Concrete, shaft	m3	1,100	160.00	176,000
	Reinforcement	ton	50	1,500.00	75,000
	Consolidation grout	m	150	90.00	13,500
	Others (20%)	L.S.			93,600
	Subtotal				561,600
2.54	PENSTOCK				
	Excavation, tunnel	m3	2,700	55.00	148,500
	Concrete, tunnel	m3	1,700	160.00	272,000
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	180	70.00	11,200
	Backfill grout	m3	20	200.00	4,000
	Others (20%)	L.S.			99,140
	Subtotal				594,840
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	13,000	3.50	45,500
	Excavation, weathered rock	m3	13,000	6.00	78,000
	Excavation, hard rock	m3	17,000	10.00	170,000
	Concrete, substructure	m3	11,900	250.00	2,975,000
	Concrete, second stage	m3	3,000	140.00	420,000
	Reinforcement	ton	770	1,500.00	1,155,000

	Others (20%)	L.S.			968,700	
	Subtotal					5,812,200
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	2,500	3.50	8,750	
	Excavation, weathered rock	m3	2,500	6.00	15,000	
	Excavation, hard rock	m3	3,200	10.00	32,000	
	Concrete, structure	m3	1,200	140.00	168,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.			56,750	
	Subtotal					340,500
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	120	600,000.00	72,000,000	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					75,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	3,100	5,000.00	15,500,000	
	Gates	ton	200	7,000.00	1,400,000	
	Subtotal					16,900,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	80	18,700.00	1,496,000	
	Generators	ton	470	20,400.00	9,588,000	
	Transformers	MVA	32	5,100.00	163,200	
	Subtotal					11,247,200
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	193	46,000.00	8,878,000	8,878,000
	Total of Direct Cost					159,588,464
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,595,885
7.00	ADMINISTRATION EXPENSES	LS			0	1,595,885
8.00	ENGINEERING SERVICES	LS			0	11,171,192
9.00	PHYSICAL CONTINGENCY	LS			0	15,958,846
	GRAND TOTAL				189,910,272	189,910,272

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			3,147,438
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	17,900	3.50	62,650
	Open excavation, weathered rock	m3	17,900	6.00	107,400
	Open excavation, hard rock	m3	23,800	10.00	238,000
	Concrete				
	Mass concrete	m3	32,000	90.00	2,880,000
	Reinforced concrete	m3	70,500	140.00	9,870,000
	Reinforcement bar	ton	2,200	1,500.00	3,300,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	2,700	90.00	243,000
	Others (20%)	L.S.			3,390,610
	Subtotal				20,343,660
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	19,800	55.00	1,089,000
	Concrete, tunnel	m3	5,000	160.00	800,000
	Reinforcement bars	ton	50	1,500.00	75,000
	Others (20%)	L.S.			392,800
	Subtotal				2,356,800
2.50	WATERWAY				
2.51	INTAKE				
	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, open structure	m3	1,100	140.00	154,000
	Reinforcement	ton	35	1,500.00	52,500
	Others (20%)	L.S.			44,820
	Subtotal				268,920
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	19,500	55.00	1,072,500
	Concrete, tunnel	m3	7,600	160.00	1,216,000
	Reinforcement	ton	80	1,500.00	120,000
	Consolidation grout	m	4,000	90.00	360,000
	Curtain grout	m	150	70.00	10,500
	Backfill grout	m3	600	200.00	120,000
	Others (20%)	L.S.			579,800
	Subtotal				3,478,800
2.53	SURGE TANK				
	Excavation, shaft	m3	2,500	55.00	137,500
	Concrete, shaft	m3	720	160.00	115,200
	Reinforcement	ton	30	1,500.00	45,000
	Consolidation grout	m	120	90.00	10,800
	Others (20%)	L.S.			61,700
	Subtotal				370,200
2.54	PENSTOCK				
	Excavation, tunnel	m3	2,100	55.00	115,500
	Concrete, tunnel	m3	1,400	160.00	224,000
	Reinforcement	ton	30	1,500.00	45,000
	Curtain grout	m	140	70.00	9,800
	Backfill grout	m3	20	200.00	4,000
	Others (20%)	L.S.			79,660
	Subtotal				477,960
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	8,400	3.50	29,400
	Excavation, weathered rock	m3	8,400	6.00	50,400
	Excavation, hard rock	m3	11,000	10.00	110,000
	Concrete, substructure	m3	8,000	250.00	2,000,000
	Concrete, second stage	m3	2,000	140.00	280,000
	Reinforcement	ton	520	1,500.00	780,000

	Others (20%)	L.S.			649,960	
	Subtotal					3,899,760
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	2,200	3.50	7,700	
	Excavation, weathered rock	m3	2,200	6.00	13,200	
	Excavation, hard rock	m3	2,600	10.00	26,000	
	Concrete, structure	m3	1,000	140.00	140,000	
	Reinforcement	ton	30	1,500.00	45,000	
	Others (20%)	L.S.			46,380	
	Subtotal					278,280
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	120	600,000.00	72,000,000	
	Upgraded	m	69	50,000.00	3,450,000	
	Subtotal					75,450,000
3.00	METAL WORKS					
	Prestock steel pipes	ton	2,100	5,000.00	10,500,000	
	Gates	ton	150	7,000.00	1,050,000	
	Subtotal					11,550,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	60	18,700.00	1,122,000	
	Generators	ton	360	20,400.00	7,344,000	
	Transformers	MVA	21	5,500.00	115,500	
	Subtotal					8,581,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	193	46,000.00	8,878,000	8,878,000
	Total of Direct Cost					143,481,318
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,434,813
7.00	ADMINISTRATION EXPENSES	LS			0	1,434,813
8.00	ENGINEERING SERVICES	LS			0	10,043,692
9.00	PHYSICAL CONTINGENCY	LS			0	14,348,132
	GRAND TOTAL				170,742,768	170,742,768

B/Q of BR-8 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			2,710,476
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	18,000	3.50	56,000
	Open excavation,weathered rock	m3	18,000	6.00	96,000
	Open excavation,hard rock	m3	21,400	10.00	214,000
	Concrete				
	Mass concrete	m3	30,000	90.00	2,700,000
	Reinforced concrete	m3	86,200	140.00	9,268,000
	Reinforcement bar	ton	2,000	1,500.00	3,000,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	2,700	90.00	243,000
	Others (20%)	L.S.			3,163,000
	Subtotal				18,978,000
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	14,800	55.00	814,000
	Concrete, tunnel	m3	3,800	160.00	608,000
	Reinforcement bars	ton	40	1,500.00	60,000
	Others (20%)	L.S.			296,400
	Subtotal				1,778,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	800	3.50	2,800
	Excavation,weathered rock	m3	800	6.00	4,800
	Excavation,hard rock	m3	800	10.00	8,000
	Concrete,open structure	m3	920	140.00	128,800
	Reinforcement	ton	30	1,500.00	45,000
	Others (20%)	L.S.			37,500
	Subtotal				225,000
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	11,600	55.00	638,000
	Concrete, tunnel	m3	4,900	160.00	784,000
	Reinforcement	ton	50	1,500.00	75,000
	Consolidation grout	m	3,000	90.00	270,000
	Curtain grout	m	120	70.00	8,400
	Backfill grout	m3	450	200.00	90,000
	Others (20%)	L.S.			373,080
	Subtotal				2,238,480
2.53	SURGE TANK				
	Excavation, shaft	m3	1,800	55.00	104,500
	Concrete, shaft	m3	550	160.00	88,000
	Reinforcement	ton	20	1,500.00	30,000
	Consolidation grout	m	100	90.00	9,000
	Others (20%)	L.S.			46,300
	Subtotal				277,800
2.54	PENSTOCK				
	Excavation,tunnel	m3	1,900	55.00	104,500
	Concrete,tunnel	m3	1,350	160.00	216,000
	Reinforcement	ton	30	1,500.00	45,000
	Curtain grout	m	100	70.00	7,000
	Backfill grout	m3	15	200.00	3,000
	Others (20%)	L.S.			75,100
	Subtotal				450,600
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	6,300	3.50	22,050
	Excavation,weathered rock	m3	6,300	6.00	37,800
	Excavation,hard rock	m3	8,300	10.00	83,000
	Concrete, substructure	m3	8,000	250.00	1,500,000
	Concrete, second stage	m3	1,400	140.00	196,000
	Reinforcement	ton	400	1,500.00	600,000

	Others (20%)	L.S.			487,770	
	Subtotal					2,926,620
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	1,900	3.50	6,650	
	Excavation, weathered rock	m3	1,900	6.00	11,400	
	Excavation, hard rock	m3	2,400	10.00	24,000	
	Concrete, structure	m3	800	140.00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.			38,310	
	Subtotal					229,860
2.80	ARCHITECTURAL BUILDINGS	m2	3,600	1,100.00	3,960,000	3,960,000
2.90	ACCESS ROAD					
	New construction	m	120	600,000.00	72,000,000	
	Upgraded	m	89	50,000.00	3,450,000	
	Subtotal					75,450,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,800	5,000.00	9,000,000	
	Gates	ton	120	7,000.00	840,000	
	Subtotal					9,840,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	55	18,700.00	1,028,500	
	Generators	ton	320	20,400.00	6,528,000	
	Transformers	MVA	18	5,700.00	91,200	
	Subtotal					7,647,700
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	193	46,000.00	8,878,000	8,878,000
	Total of Direct Cost					135,590,936
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	1,355,909
7.00	ADMINISTRATION EXPENSES	LS			0	1,355,909
8.00	ENGINEERING SERVICES	LS			0	9,491,366
9.00	PHYSICAL CONTINGENCY	LS			0	13,559,094
	GRAND TOTAL				161,353,214	161,353,214

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			10,296,324
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	17,900	3.50	62,650
	Open excavation,weathered rock	m3	17,900	6.00	107,400
	Open excavation,hard rock	m3	23,800	10.00	238,000
	Concrete				
	Mass concrete	m3	31,700	90.00	2,853,000
	Reinforced concrete	m3	72,400	140.00	10,136,000
	Reinforcement bar	ton	2,200	1,500.00	3,300,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,600	90.00	234,000
	Others (20%)	L.S.			3,440,810
	Subtotal				20,644,860
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	189,800	55.00	10,439,000
	Concrete, tunnel	m3	45,800	160.00	7,328,000
	Reinforcement bars	n	460	1,500.00	690,000
	Others (20%)	L.S.			3,691,400
	Subtotal				22,148,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	2,300	3.50	8,050
	Excavation,weathered rock	m3	2,300	6.00	13,800
	Excavation,hard rock	m3	3,100	10.00	31,000
	Concrete,open structure	m3	3,500	140.00	490,000
	Reinforcement	ton	110	1,500.00	165,000
	Others (20%)	L.S.			141,570
	Subtotal				849,420
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	307,300	55.00	16,901,500
	Concrete, tunnel	m3	98,200	160.00	15,712,000
	Reinforcement	ton	990	1,500.00	1,485,000
	Consolidation grout	m	25,400	90.00	2,286,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	2,200	200.00	440,000
	Others (20%)	L.S.			7,369,800
	Subtotal				44,218,800
2.53	SURGE TANK				
	Excavation, shaft	m3	25,800	55.00	1,419,000
	Concrete, shaft	m3	7,500	160.00	1,200,000
	Reinforcement	ton	230	1,500.00	345,000
	Consolidation grout	m	500	90.00	45,000
	Others (20%)	L.S.			601,800
	Subtotal				3,610,800
2.54	PENSTOCK				
	Excavation,tunnel	m3	10,400	55.00	572,000
	Concrete,tunnel	m3	3,600	160.00	608,000
	Reinforcement	ton	80	1,500.00	120,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	140	200.00	28,000
	Others (20%)	L.S.			270,500
	Subtotal				1,623,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	19,000	3.50	66,500
	Excavation,weathered rock	m3	19,000	6.00	114,000
	Excavation,hard rock	m3	25,200	10.00	252,000
	Concrete, substructure	m3	18,000	250.00	4,500,000
	Concrete, second stage	m3	4,500	140.00	630,000
	Reinforcement	ton	1,200	1,500.00	1,800,000

	Others (20%)	L.S.			1,472,500	
	Subtotal					8,835,000
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	8,400	3.50	29,400	
	Excavation, weathered rock	m3	8,400	6.00	50,400	
	Excavation, hard rock	m3	12,600	10.00	126,000	
	Concrete, structure	m3	3,500	140.00	490,000	
	Reinforcement	ton	110	1,500.00	165,000	
	Others (20%)	L.S.			172,160	
	Subtotal					1,032,960
2.80	ARCHITECTURAL BUILDINGS	m2	7,000	1,100.00	7,700,000	7,700,000
2.90	ACCESS ROAD					
	New construction	m	252	600,000.00	151,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					155,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	3,300	5,000.00	16,500,000	
	Gates	ton	260	7,000.00	1,820,000	
	Subtotal					18,320,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	750	18,700.00	14,025,000	
	Generators	ton	1,450	20,400.00	29,580,000	
	Transformers	MVA	189	3,500.00	661,500	
	Subtotal					44,266,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	162	46,000.00	7,452,000	7,452,000
	Total of Direct Cost					346,148,064
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	3,461,481
7.00	ADMINISTRATION EXPENSES	LS			0	3,461,481
8.00	ENGINEERING SERVICES	LS			0	24,230,364
9.00	PHYSICAL CONTINGENCY	LS			0	34,614,806
	GRAND TOTAL				411,916,196	411,916,196

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			7,599,030
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	18,100	3.50	56,350
	Open excavation,weathered rock	m3	16,100	6.00	96,600
	Open excavation,hard rock	m3	21,500	10.00	215,000
	Concrete				
	Mass concrete	m3	28,800	90.00	2,664,000
	Reinforced concrete	m3	87,800	140.00	9,492,000
	Reinforcement bar	ton	2,050	1,500.00	3,075,000
	Curtain grouting	m	3,800	70.00	252,000
	Consolidation grouting	m	2,800	90.00	234,000
	Others (20%)	L.S.			3,216,990
	Subtotal				19,301,940
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	126,800	55.00	6,963,000
	Concrete, tunnel	m3	30,500	160.00	4,880,000
	Reinforcement bars	ton	310	1,500.00	465,000
	Others (20%)	L.S.			2,461,600
	Subtotal				14,769,600
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	1,800	3.50	6,300
	Excavation,weathered rock	m3	1,800	6.00	10,800
	Excavation,hard rock	m3	2,500	10.00	25,000
	Concrete,open structure	m3	2,800	140.00	392,000
	Reinforcement	ton	80	1,500.00	120,000
	Others (20%)	L.S.			110,820
	Subtotal				664,920
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	208,500	55.00	11,467,500
	Concrete, tunnel	m3	88,500	160.00	10,960,000
	Reinforcement	ton	700	1,500.00	1,050,000
	Consolidation grout	m	20,800	90.00	1,872,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	2,000	200.00	400,000
	Others (20%)	L.S.			5,154,100
	Subtotal				30,924,600
2.53	SURGE TANK				
	Excavation, shaft	m3	17,200	55.00	946,000
	Concrete, shaft	m3	5,000	160.00	800,000
	Reinforcement	ton	150	1,500.00	225,000
	Consolidation grout	m	400	90.00	36,000
	Others (20%)	L.S.			401,400
	Subtotal				2,408,400
2.54	PENSTOCK				
	Excavation,tunnel	m3	7,300	55.00	401,500
	Concrete,tunnel	m3	3,200	160.00	512,000
	Reinforcement	ton	80	1,500.00	90,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	120	200.00	24,000
	Others (20%)	L.S.			209,700
	Subtotal				1,258,200
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	12,800	3.50	44,100
	Excavation,weathered rock	m3	12,800	6.00	75,600
	Excavation,hard rock	m3	18,800	10.00	168,000
	Concrete, substructure	m3	12,000	250.00	3,000,000
	Concrete, second stage	m3	3,000	140.00	420,000
	Reinforcement	ton	780	1,500.00	1,170,000

	Others (20%)	L.S.			975,540	
	Subtotal					5,853,240
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	11,000	10.00	110,000	
	Concrete, structure	m3	2,700	140.00	378,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			134,900	
	Subtotal					809,400
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	252	600,000.00	151,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					155,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	2,200	5,000.00	11,000,000	
	Gates	ton	170	7,600.00	1,190,000	
	Subtotal					12,190,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	530	18,700.00	9,911,000	
	Generators	ton	1,100	20,400.00	22,440,000	
	Transformers	MVA	128	3,800.00	478,800	
	Subtotal					32,829,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	162	46,000.00	7,452,000	7,452,000
	Total of Direct Cost					297,811,130
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,978,111
7.00	ADMINISTRATION EXPENSES	LS			0	2,978,111
8.00	ENGINEERING SERVICES	LS			0	20,846,779
9.00	PHYSICAL CONTINGENCY	LS			0	29,781,113
	GRAND TOTAL				354,395,245	354,395,245

B/Q of HKR-1 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,242,424
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	19,300	10.00	193,000
	Concrete				
	Mass concrete	m3	27,500	90.00	2,475,000
	Reinforced concrete	m3	63,500	140.00	8,890,000
	Reinforcement bar	ton	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.			3,001,750
	Subtotal				18,010,500
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	94,800	55.00	5,214,000
	Concrete, tunnel	m3	22,900	160.00	3,664,000
	Reinforcement bars	ton		1,500.00	0
	Others (20%)	L.S.			1,775,600
	Subtotal				10,653,600
2.50	WATERWAY				
2.51	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	2,100	10.00	21,000
	Concrete, open structure	m3	2,400	140.00	336,000
	Reinforcement	ton	70	1,500.00	105,000
	Others (20%)	L.S.			95,440
	Subtotal				572,640
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	186,300	55.00	9,146,500
	Concrete, tunnel	m3	55,700	160.00	8,912,000
	Reinforcement	ton	560	1,500.00	840,000
	Consolidation grout	m	18,500	90.00	1,665,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	1,800	200.00	360,000
	Others (20%)	L.S.			4,188,200
	Subtotal				25,129,200
2.53	SURGE TANK				
	Excavation, shaft	m3	12,900	55.00	709,500
	Concrete, shaft	m3	3,800	160.00	608,000
	Reinforcement	ton	120	1,500.00	180,000
	Consolidation grout	m	350	90.00	31,500
	Others (20%)	L.S.			305,800
	Subtotal				1,834,800
2.54	PENSTOCK				
	Excavation, tunnel	m3	6,000	55.00	330,000
	Concrete, tunnel	m3	2,800	160.00	448,000
	Reinforcement	ton	55	1,500.00	82,500
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	110	200.00	22,000
	Others (20%)	L.S.			180,000
	Subtotal				1,080,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	9,500	3.50	33,250
	Excavation, weathered rock	m3	9,500	6.00	57,000
	Excavation, hard rock	m3	12,800	10.00	128,000
	Concrete, substructure	m3	9,000	250.00	2,250,000
	Concrete, second stage	m3	2,300	140.00	322,000
	Reinforcement	ton	800	1,500.00	900,000

	Others (20%)	L.S.			737,650	
	Subtotal					4,425,900
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	6,000	3.50	21,000	
	Excavation, weathered rock	m3	6,000	6.00	36,000	
	Excavation, hard rock	m3	10,000	10.00	100,000	
	Concrete, structure	m3	2,400	140.00	336,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Others (20%)	L.S.			119,600	
	Subtotal					717,600
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	252	600,000.00	151,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					155,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,700	5,000.00	8,500,000	
	Gates	ton	130	7,000.00	910,000	
	Subtotal					9,410,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	420	18,700.00	7,854,000	
	Generators	ton	920	20,400.00	18,768,000	
	Transformers	MVA	95	4,100.00	389,500	
	Subtotal					27,011,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	162	46,000.00	7,452,000	7,452,000
	Total of Direct Cost					273,190,164
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,731,902
7.00	ADMINISTRATION EXPENSES	LS			0	2,731,902
8.00	ENGINEERING SERVICES	LS			0	19,123,311
9.00	PHYSICAL CONTINGENCY	LS			0	27,319,016
	GRAND TOTAL				325,096,295	325,096,295

B/Q of HKR-2 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price P.C. (US\$)	Amount P.C. (US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,508,596
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	17,500	3.50	61,250
	Open excavation, weathered rock	m3	17,500	6.00	105,000
	Open excavation, hard rock	m3	23,400	10.00	234,000
	Concrete				
	Mass concrete	m3	31,200	90.00	2,808,000
	Reinforced concrete	m3	71,900	140.00	10,066,000
	Reinforcement bar	ton	2,200	1,500.00	3,300,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,800	90.00	252,000
	Others (20%)	L.S.			3,416,250
	Subtotal				20,497,500
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	177,800	55.00	9,784,500
	Concrete, tunnel	m3	42,900	160.00	6,864,000
	Reinforcement bars	ton	430	1,500.00	645,000
	Others (20%)	L.S.			3,458,700
	Subtotal				20,752,200
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	2,200	3.50	7,700
	Excavation, weathered rock	m3	2,200	6.00	13,200
	Excavation, hard rock	m3	3,000	10.00	30,000
	Concrete, open structure	m3	3,300	140.00	462,000
	Reinforcement	ton	100	1,500.00	150,000
	Others (20%)	L.S.			132,580
	Subtotal				795,480
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	83,800	55.00	4,609,000
	Concrete, tunnel	m3	28,800	160.00	4,608,000
	Reinforcement	ton	270	1,500.00	405,000
	Consolidation grout	m	7,000	90.00	630,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	480	200.00	96,000
	Others (20%)	L.S.			2,010,500
	Subtotal				12,063,000
2.53	SURGE TANK				
	Excavation, shaft	m3	17,500	55.00	962,500
	Concrete, shaft	m3	5,100	160.00	816,000
	Reinforcement	ton	150	1,500.00	225,000
	Consolidation grout	m	400	90.00	36,000
	Others (20%)	L.S.			407,900
	Subtotal				2,447,400
2.54	PENSTOCK				
	Excavation, tunnel	m3	17,400	55.00	957,000
	Concrete, tunnel	m3	8,800	160.00	1,408,000
	Reinforcement	ton	130	1,500.00	195,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	200	200.00	40,000
	Others (20%)	L.S.			454,500
	Subtotal				2,727,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	10,700	3.50	37,450
	Excavation, weathered rock	m3	10,700	6.00	64,200
	Excavation, hard rock	m3	14,200	10.00	142,000
	Concrete, substructure	m3	10,200	250.00	2,550,000
	Concrete, second stage	m3	2,800	140.00	392,000
	Reinforcement	ton	880	1,500.00	1,320,000

	Others (20%)	L.S.			829,530	
	Subtotal					4,977,180
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	9,500	10.00	95,000	
	Concrete, structure	m3	2,800	140.00	392,000	
	Reinforcement	ton	90	1,500.00	135,000	
	Others (20%)	L.S.			137,700	
	Subtotal					826,200
2.80	ARCHITECTURAL BUILDINGS	m2	8,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	272	600,000.00	163,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					167,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	3,000	5,000.00	15,000,000	
	Gates	ton	250	7,000.00	1,750,000	
	Subtotal					16,750,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	520	18,700.00	9,724,000	
	Generators	ton	840	20,400.00	17,136,000	
	Transformers	MVA	82	3,500.00	287,000	
	Subtotal					27,147,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	191	46,000.00	8,786,000	8,786,000
	Total of Direct Cost					298,027,556
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,980,276
7.00	ADMINISTRATION EXPENSES	LS			0	2,980,276
8.00	ENGINEERING SERVICES	LS			0	20,861,929
9.00	PHYSICAL CONTINGENCY	LS			0	29,802,756
	GRAND TOTAL				354,652,792	354,652,792

B/Q of HKR-2 (Draft Rate 0.50)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,981,638
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	15,800	3.50	55,300
	Open excavation,weathered rock	m3	15,800	6.00	94,800
	Open excavation,hard rock	m3	21,100	10.00	211,000
	Concrete				
	Mass concrete	m3	29,100	90.00	2,619,000
	Reinforced concrete	m3	67,200	140.00	9,408,000
	Reinforcement bar	ton	2,050	1,500.00	3,075,000
	Curtain grouting	m	3,800	70.00	252,000
	Consolidation grouting	m	2,600	90.00	234,000
	Others (20%)	L.S.			3,189,820
	Subtotal				19,138,920
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	118,700	55.00	6,528,500
	Concrete, tunnel	m3	28,800	160.00	4,576,000
	Reinforcement bars	ton	290	1,500.00	435,000
	Others (20%)	L.S.			2,307,900
	Subtotal				13,847,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	1,800	3.50	6,300
	Excavation,weathered rock	m3	1,800	6.00	10,800
	Excavation,hard rock	m3	2,400	10.00	24,000
	Concrete,open structure	m3	2,700	140.00	378,000
	Reinforcement	ton	80	1,500.00	120,000
	Others (20%)	L.S.			107,820
	Subtotal				646,920
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	58,900	55.00	3,129,500
	Concrete, tunnel	m3	18,700	160.00	2,992,000
	Reinforcement	ton	190	1,500.00	285,000
	Consolidation grout	m	5,700	90.00	513,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	430	200.00	86,000
	Others (20%)	L.S.			1,405,300
	Subtotal				8,431,800
2.53	SURGE TANK				
	Excavation, shaft	m3	11,700	55.00	643,500
	Concrete, shaft	m3	3,400	160.00	544,000
	Reinforcement	ton	100	1,500.00	150,000
	Consolidation grout	m	300	90.00	27,000
	Others (20%)	L.S.			272,900
	Subtotal				1,637,400
2.54	PENSTOCK				
	Excavation,tunnel	m3	12,600	55.00	693,000
	Concrete,tunnel	m3	5,500	160.00	880,000
	Reinforcement	ton	110	1,500.00	165,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	180	200.00	36,000
	Others (20%)	L.S.			359,000
	Subtotal				2,154,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	7,100	3.50	24,850
	Excavation,weathered rock	m3	7,100	6.00	42,600
	Excavation,hard rock	m3	9,500	10.00	95,000
	Concrete, substructure	m3	8,800	250.00	1,700,000
	Concrete, second stage	m3	1,700	140.00	238,000
	Reinforcement	ton	440	1,500.00	660,000

	Others (20%)	L.S.			552,090	
	Subtotal					3,312,540
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	2,300	140.00	322,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Others (20%)	L.S.			107,900	
	Subtotal					647,400
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	272	600,000.00	163,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					167,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	2,200	5,000.00	11,000,000	
	Gates	ton	160	7,000.00	1,120,000	
	Subtotal					12,120,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	370	18,700.00	6,919,000	
	Generators	ton	850	20,400.00	13,260,000	
	Transformers	MVA	55	4,600.00	253,000	
	Subtotal					20,432,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	191	46,000.00	8,786,000	8,786,000
	Total of Direct Cost					268,786,018
6.00	LAND AQUISION AND COMPENSATION	LS			0	2,687,860
7.00	ADMINISTRATION EXPENSES	LS			0	2,687,860
8.00	ENGINEERING SERVICES	LS			0	18,815,021
9.00	PHYSICAL CONTINGENCY	LS			0	26,878,602
	GRAND TOTAL				319,855,361	319,855,361

B/Q of HKR-2 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,036,440
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	6.00	85,200
	Open excavation,hard rock	m3	18,900	10.00	189,000
	Concrete				
	Mass concrete	m3	27,000	90.00	2,430,000
	Reinforced concrete	m3	82,900	140.00	8,806,000
	Reinforcement bar	ton	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.			2,974,580
	Subtotal				17,847,480
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	88,800	55.00	4,884,000
	Concrete, tunnel	m3	21,400	160.00	3,424,000
	Reinforcement bars	ton	220	1,500.00	330,000
	Others (20%)	L.S.			1,727,600
	Subtotal				10,365,600
2.50	WATERWAY				
2.51	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	10.00	20,000
	Concrete,open structure	m3	2,300	140.00	322,000
	Reinforcement	ton	70	1,500.00	105,000
	Others (20%)	L.S.			92,250
	Subtotal				553,500
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	35,200	55.00	1,936,000
	Concrete, tunnel	m3	12,100	160.00	1,936,000
	Reinforcement	ton	120	1,500.00	180,000
	Consolidation grout	m	4,400	90.00	396,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	380	200.00	76,000
	Others (20%)	L.S.			908,300
	Subtotal				5,449,800
2.53	SURGE TANK				
	Excavation, shaft	m3	8,800	55.00	484,000
	Concrete, shaft	m3	2,800	160.00	448,000
	Reinforcement	ton	80	1,500.00	120,000
	Consolidation grout	m	250	90.00	22,500
	Others (20%)	L.S.			208,500
	Subtotal				1,281,000
2.54	PENSTOCK				
	Excavation,tunnel	m3	10,200	55.00	561,000
	Concrete,tunnel	m3	4,900	160.00	784,000
	Reinforcement	ton	100	1,500.00	150,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	180	200.00	36,000
	Others (20%)	L.S.			308,900
	Subtotal				1,853,400
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	5,300	3.50	18,550
	Excavation,weathered rock	m3	5,300	6.00	31,800
	Excavation,hard rock	m3	7,100	10.00	71,000
	Concrete, substructure	m3	5,100	250.00	1,275,000
	Concrete, second stage	m3	1,300	140.00	182,000
	Reinforcement	ton	330	1,500.00	495,000

	Others (20%)	L.S.			414,670	
	Subtotal					2,488,020
2.70	TAILRACH					
	Excavation					
	Excavation, common	m3	4,000	3.50	14,000	
	Excavation, weathered rock	m3	4,000	6.00	24,000	
	Excavation, hard rock	m3	5,500	10.00	55,000	
	Concrete, structure	m3	2,000	140.00	280,000	
	Reinforcement	ton	80	1,500.00	90,000	
	Others (20%)	L.S.			92,600	
	Subtotal					555,600
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	272	600,000.00	163,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					167,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,700	5,000.00	8,500,000	
	Gates	ton	120	7,000.00	840,000	
	Subtotal					9,340,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	290	18,700.00	5,423,000	
	Generators	ton	540	20,400.00	11,016,000	
	Transformers	MVA	41	4,900.00	200,900	
	Subtotal					16,639,900
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	191	46,000.00	8,786,000	8,786,000
	Total of Direct Cost					250,716,740
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,507,167
7.00	ADMINISTRATION EXPENSES	LS			0	2,507,167
8.00	ENGINEERING SERVICES	LS			0	17,550,172
9.00	PHYSICAL CONTINGENCY	LS			0	25,071,674
	GRAND TOTAL				298,352,921	298,352,921

B/Q of HKR-3 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,999,486
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	15,700	3.50	54,950
	Open excavation,weathered rock	m3	15,700	6.00	94,200
	Open excavation,hard rock	m3	21,000	10.00	210,000
	Concrete				
	Mass concrete	m3	28,700	90.00	2,583,000
	Reinforced concrete	m3	89,200	140.00	9,688,000
	Reinforcement bar	ton	2,100	1,500.00	3,150,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,400	90.00	216,000
	Others (20%)	L.S.			3,253,830
	Subtotal				19,522,980
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	139,800	55.00	7,678,000
	Concrete, tunnel	m3	33,700	160.00	5,392,000
	Reinforcement bars	ton	340	1,500.00	510,000
	Others (20%)	L.S.			2,716,000
	Subtotal				16,296,000
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 rock	m3	2,800	10.00	26,000
	Concrete,open structure	m3	2,900	140.00	406,000
	Reinforcement	ton	85	1,500.00	127,500
	Others (20%)	L.S.			115,510
	Subtotal				693,060
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	168,200	55.00	9,251,000
	Concrete, tunnel	m3	55,300	160.00	8,848,000
	Reinforcement	ton	560	1,500.00	840,000
	Consolidation grout	m	16,800	90.00	1,512,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	1,450	200.00	290,000
	Others (20%)	L.S.			4,153,100
	Subtotal				24,918,600
2.53	SURGE TANK				
	Excavation, shaft	m3	18,000	55.00	990,000
	Concrete, shaft	m3	5,200	160.00	832,000
	Reinforcement	ton	160	1,500.00	240,000
	Consolidation grout	m	400	90.00	36,000
	Others (20%)	L.S.			419,600
	Subtotal				2,517,600
2.54	PENSTOCK				
	Excavation,tunnel	m3	5,900	55.00	324,500
	Concrete,tunnel	m3	2,400	160.00	384,000
	Reinforcement	ton	50	1,500.00	75,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	80	200.00	16,000
	Others (20%)	L.S.			164,800
	Subtotal				988,800
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	9,300	3.50	32,550
	Excavation,weathered rock	m3	9,300	6.00	55,800
	Excavation,hard rock	m3	12,400	10.00	124,000
	Concrete, substructure	m3	8,900	250.00	2,225,000
	Concrete, second stage	m3	2,200	140.00	308,000
	Reinforcement	ton	580	1,500.00	870,000

	Others (20%)	L.S.			723,070	
	Subtotal					4,338,420
2.70	TAILRACE					
	Excavation					
	Excavation,common	m3	6,000	3.50	21,000	
	Excavation,weathered rock	m3	6,000	6.00	36,000	
	Excavation,hard rock	m3	8,000	10.00	80,000	
	Concrete, structure	m3	2,500	140.00	350,000	
	Reinforcement	ton	75	1,500.00	112,500	
	Others (20%)	L.S.			119,900	
	Subtotal					719,400
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	280	600,000.00	174,000,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					177,950,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,100	5,000.00	5,500,000	
	Gates	ton	190	7,000.00	1,330,000	
	Subtotal					6,830,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	450	18,700.00	8,415,000	
	Generators	ton	800	20,400.00	16,320,000	
	Transformers	MVA	76	4,300.00	326,800	
	Subtotal					25,061,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	210	46,000.00	9,660,000	9,660,000
	Total of Direct Cost					303,096,146
6.00	LAND AQUISITION AND COMPENSATION	LS			0	3,030,961
7.00	ADMINISTRATION EXPENSES	LS			0	3,030,961
8.00	ENGINEERING SERVICES	LS			0	21,216,730
9.00	PHYSICAL CONTINGENCY	LS			0	30,309,615
	GRAND TOTAL				360,684,414	360,684,414

B/Q of HKR-3 (Draft Rate 0.50)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			5,586,780
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	6.00	85,200
	Open excavation, hard rock	m3	18,800	10.00	189,000
	Concrete				
	Mass concrete	m3	28,700	90.00	2,403,000
	Reinforced concrete	m3	64,500	140.00	9,030,000
	Reinforcement bar	ton	1,950	1,500.00	2,925,000
	Curtain grouting	m	3,800	70.00	252,000
	Consolidation grouting	m	2,400	90.00	216,000
	Others (20%)	L.S.			3,029,980
	Subtotal				18,179,880
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	93,200	55.00	5,126,000
	Concrete, tunnel	m3	22,400	160.00	3,584,000
	Reinforcement bars	ton	230	1,500.00	345,000
	Others (20%)	L.S.			1,811,000
	Subtotal				10,866,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	1,800	3.50	5,600
	Excavation, weathered rock	m3	1,800	6.00	9,600
	Excavation, hard rock	m3	2,100	10.00	21,000
	Concrete, open structure	m3	2,300	140.00	322,000
	Reinforcement	ton	70	1,500.00	105,000
	Others (20%)	L.S.			92,640
	Subtotal				555,840
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	134,200	55.00	7,381,000
	Concrete, tunnel	m3	44,900	160.00	7,184,000
	Reinforcement	ton	450	1,500.00	675,000
	Consolidation grout	m	14,900	90.00	1,341,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	1,300	200.00	260,000
	Others (20%)	L.S.			3,372,400
	Subtotal				20,234,400
2.53	SURGE TANK				
	Excavation, shaft	m3	12,000	55.00	660,000
	Concrete, shaft	m3	3,500	160.00	560,000
	Reinforcement	ton	110	1,500.00	165,000
	Consolidation grout	m	350	90.00	31,500
	Others (20%)	L.S.			283,300
	Subtotal				1,699,800
2.54	PENSTOCK				
	Excavation, tunnel	m3	4,300	55.00	236,500
	Concrete, tunnel	m3	2,100	160.00	336,000
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	70	200.00	14,000
	Others (20%)	L.S.			133,500
	Subtotal				801,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	8,200	3.50	21,700
	Excavation, weathered rock	m3	8,200	6.00	37,200
	Excavation, hard rock	m3	8,300	10.00	83,000
	Concrete, substructure	m3	5,900	250.00	1,475,000
	Concrete, second stage	m3	1,500	140.00	210,000
	Reinforcement	ton	390	1,500.00	585,000

	Others (20%)	L.S.			482,380	
	Subtotal					2,894,280
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	7,000	10.00	70,000	
	Concrete, structure	m3	2,200	140.00	308,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Others (20%)	L.S.			106,100	
	Subtotal					636,600
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	290	600,000.00	174,000,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					177,950,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	790	5,000.00	3,950,000	
	Gates	ton	125	7,000.00	875,000	
	Subtotal					4,825,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	320	18,700.00	5,984,000	
	Generators	ton	620	20,400.00	12,648,000	
	Transformers	MVA	51	4,690.00	237,150	
	Subtotal					18,869,150
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	210	46,000.00	9,660,000	9,660,000
	Total of Direct Cost					278,258,730
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,782,587
7.00	ADMINISTRATION EXPENSES	LS			0	2,782,587
8.00	ENGINEERING SERVICES	LS			0	19,478,111
9.00	PHYSICAL CONTINGENCY	LS			0	27,825,873
	GRAND TOTAL				331,127,889	331,127,889

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,655,436
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	12,800	3.50	44,800
	Open excavation,weathered rock	m3	12,800	6.00	76,800
	Open excavation,hard rock	m3	17,000	10.00	170,000
	Concrete				
	Mass concrete	m3	24,900	90.00	2,241,000
	Reinforced concrete	m3	60,200	140.00	8,428,000
	Reinforcement bar	ton	1,850	1,500.00	2,775,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	2,400	90.00	216,000
	Others (20%)	L.S.			2,837,920
	Subtotal				17,027,520
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	69,800	55.00	3,839,000
	Concrete, tunnel	m3	18,900	160.00	2,704,000
	Reinforcement bars	ton	170	1,500.00	255,000
	Others (20%)	L.S.			1,359,600
	Subtotal				8,157,600
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	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				
	Excavation,tunnel	m3	104,000	55.00	5,720,000
	Concrete, tunnel	m3	35,700	160.00	5,712,000
	Reinforcement	ton	380	1,500.00	540,000
	Consolidation grout	m	13,100	90.00	1,179,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	1,200	200.00	240,000
	Others (20%)	L.S.			2,681,700
	Subtotal				16,090,200
2.53	SURGE TANK				
	Excavation, shaft	m3	9,000	55.00	495,000
	Concrete, shaft	m3	2,600	160.00	416,000
	Reinforcement	ton	80	1,500.00	120,000
	Consolidation grout	m	300	90.00	27,000
	Others (20%)	L.S.			211,600
	Subtotal				1,269,600
2.54	PENSTOCK				
	Excavation,tunnel	m3	3,500	55.00	192,500
	Concrete,tunnel	m3	1,800	160.00	288,000
	Reinforcement	ton	35	1,500.00	52,500
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	60	200.00	12,000
	Others (20%)	L.S.			112,500
	Subtotal				675,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	4,700	3.50	16,450
	Excavation,weathered rock	m3	4,700	6.00	28,200
	Excavation,hard rock	m3	8,200	10.00	62,000
	Concrete, substructure	m3	4,500	250.00	1,125,000
	Concrete, second stage	m3	1,800	140.00	252,000
	Reinforcement	ton	290	1,500.00	435,000

	Others (20%)	L.S.			383,730	
	Subtotal					2,302,380
2.70	TAIL RACE					
	Excavation					
	Excavation, common	m3	4,500	3.50	15,750	
	Excavation, weathered rock	m3	4,500	6.00	27,000	
	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.			91,750	
	Subtotal					550,500
2.80	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,950,000	4,950,000
2.90	ACCESS ROAD					
	New construction	m	290	600,000.00	174,000,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					177,950,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	610	5,000.00	3,050,000	
	Gates	ton	100	7,000.00	700,000	
	Subtotal					3,750,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	260	18,700.00	4,862,000	
	Generators	ton	520	20,400.00	10,608,000	
	Transformers	MVA	38	5,000.00	190,000	
	Subtotal					15,660,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	210	46,000.00	9,660,000	9,660,000
	Total of Direct Cost					263,179,796
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,631,798
7.00	ADMINISTRATION EXPENSES	LS			0	2,631,798
8.00	ENGINEERING SERVICES	LS			0	18,422,586
9.00	PHYSICAL CONTINGENCY	LS			0	26,317,980
	GRAND TOTAL				313,183,957	313,183,957

B/Q of HKR-4 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,505,170
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	15,300	3.50	53,550
	Open excavation, weathered rock	m3	15,300	6.00	91,800
	Open excavation, hard rock	m3	20,300	10.00	203,000
	Concrete				
	Mass concrete	m3	27,900	90.00	2,511,000
	Reinforced concrete	m3	88,400	140.00	9,576,000
	Reinforcement bar	ton	2,050	1,500.00	3,075,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	2,400	90.00	216,000
	Others (20%)	L.S.			3,199,870
	Subtotal				19,199,220
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	128,700	55.00	7,078,500
	Concrete, tunnel	m3	31,000	160.00	4,960,000
	Reinforcement bars	ton	310	1,500.00	465,000
	Others (20%)	L.S.			2,500,700
	Subtotal				15,004,200
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 rock	m3	2,500	10.00	25,000
	Concrete, open structure	m3	2,800	140.00	392,000
	Reinforcement	ton	85	1,500.00	127,500
	Others (20%)	L.S.			112,510
	Subtotal				675,060
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	125,800	55.00	6,908,000
	Concrete, tunnel	m3	41,300	160.00	6,608,000
	Reinforcement	ton	420	1,500.00	630,000
	Consolidation grout	m	12,500	90.00	1,125,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	1,100	200.00	220,000
	Others (20%)	L.S.			3,103,100
	Subtotal				18,618,600
2.53	SURGE TANK				
	Excavation, shaft	m3	16,000	55.00	880,000
	Concrete, shaft	m3	4,500	160.00	720,000
	Reinforcement	ton	140	1,500.00	210,000
	Consolidation grout	m	500	90.00	45,000
	Others (20%)	L.S.			371,000
	Subtotal				2,226,000
2.54	PENSTOCK				
	Excavation				
	Excavation, common	m3	55,200	3.50	193,200
	Excavation, weathered rock	m3	55,200	6.00	331,200
	Excavation, hard rock	m3	73,800	10.00	736,000
	Excavation, tunnel	m3	4,800	55.00	264,000
	Concrete, open structure	m3	800	140.00	112,000
	Concrete, tunnel	m3	1,800	160.00	288,000
	Reinforcement	ton	70	1,500.00	105,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	40	200.00	8,000
	Others (20%)	L.S.			405,980
	Subtotal				2,435,880
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	12,100	3.50	42,350

	Excavation, weathered rock	m3	12,100	6.00	72,600	
	Excavation, hard rock	m3	18,200	10.00	182,000	
	Concrete, substructure	m3	11,800	250.00	2,950,000	
	Concrete, second stage	m3	2,900	140.00	406,000	
	Reinforcement	ton	750	1,500.00	1,125,000	
	Others (20%)	L.S.			941,590	
	Subtotal					5,649,540
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	12,000	10.00	120,000	
	Concrete, structure	m3	4,500	140.00	630,000	
	Reinforcement	ton	140	1,500.00	210,000	
	Others (20%)	L.S.			207,200	
	Subtotal					1,243,200
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	302	600,000.00	181,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					185,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	6,400	5,000.00	32,000,000	
	Gates	ton	180	7,000.00	1,260,000	
	Subtotal					43,260,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	520	18,700.00	9,724,000	
	Generators	ton	1,100	20,400.00	22,440,000	
	Transformers	MVA	120	3,900.00	468,000	
	Subtotal					32,632,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	221	46,000.00	10,166,000	10,166,000
	Total of Direct Cost					349,364,870
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	3,493,649
7.00	ADMINISTRATION EXPENSES	LS			0	3,493,649
8.00	ENGINEERING SERVICES	LS			0	24,455,541
9.00	PHYSICAL CONTINGENCY	LS			0	34,936,487
	GRAND TOTAL				415,744,195	415,744,195

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,865,124
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	13,800	3.50	48,300
	Open excavation,weathered rock	m3	13,800	6.00	82,800
	Open excavation,hard rock	m3	18,400	10.00	184,000
	Concrete				
	Mass concrete	m3	26,100	90.00	2,349,000
	Reinforced concrete	m3	83,800	140.00	8,932,000
	Reinforcement bar	ton	1,950	1,500.00	2,925,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	2,400	90.00	216,000
	Others (20%)	L.S.			2,997,820
	Subtotal				17,986,920
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	85,900	55.00	4,724,500
	Concrete, tunnel	m3	20,800	160.00	3,328,000
	Reinforcement bars	ton	210	1,500.00	315,000
	Others (20%)	L.S.			1,673,500
	Subtotal				10,041,000
2.50	WATERWAY				
2.51	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	10.00	20,000
	Concrete,open structure	m3	2,200	140.00	308,000
	Reinforcement	ton	65	1,500.00	97,500
	Others (20%)	L.S.			87,950
	Subtotal				527,700
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	77,600	55.00	4,268,000
	Concrete, tunnel	m3	26,700	160.00	4,272,000
	Reinforcement	ton	270	1,500.00	405,000
	Consolidation grout	m	9,800	90.00	882,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	1,000	200.00	200,000
	Others (20%)	L.S.			2,009,600
	Subtotal				12,057,600
2.53	SURGE TANK				
	Excavation, shaft	m3	10,300	55.00	566,500
	Concrete, shaft	m3	3,000	160.00	480,000
	Reinforcement	ton	90	1,500.00	135,000
	Consolidation grout	m	400	90.00	36,000
	Others (20%)	L.S.			243,500
	Subtotal				1,461,000
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	44,200	3.50	154,700
	Excavation,weathered rock	m3	44,200	6.00	265,200
	Excavation,hard rock	m3	58,900	10.00	589,000
	Excavation,tunnel	m3	3,000	55.00	165,000
	Concrete,open structure	m3	600	140.00	84,000
	Concrete,tunnel	m3	1,000	160.00	160,000
	Reinforcement	ton	50	1,500.00	75,000
	Curtain grout	m	300	70.00	21,000
	Backfill grout	m3	30	200.00	6,000
	Others (20%)	L.S.			303,980
	Subtotal				1,823,880
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	8,100	3.50	28,350

	Excavation, weathered rock	m3	8,100	6.00	48,600	
	Excavation, hard rock	m3	10,800	10.00	108,000	
	Concrete, substructure	m3	7,700	250.00	1,925,000	
	Concrete, second stage	m3	2,000	140.00	280,000	
	Reinforcement	ton	500	1,500.00	750,000	
	Others (20%)	L.S.			627,990	
	Subtotal					3,767,940
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	6,000	3.50	21,000	
	Excavation, weathered rock	m3	6,000	6.00	36,000	
	Excavation, hard rock	m3	9,500	10.00	95,000	
	Concrete, structure	m3	3,600	140.00	504,000	
	Reinforcement	ton	110	1,500.00	165,000	
	Others (20%)	L.S.			164,200	
	Subtotal					985,200
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	302	600,000.00	181,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					185,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	5,900	5,000.00	29,500,000	
	Gates	ton	120	7,000.00	840,000	
	Subtotal					30,340,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	380	18,700.00	7,106,000	
	Generators	ton	820	20,400.00	16,728,000	
	Transformers	MVA	80	4,300.00	344,000	
	Subtotal					24,178,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	221	46,000.00	10,166,000	10,166,000
	Total of Direct Cost					308,850,364
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	3,088,504
7.00	ADMINISTRATION EXPENSES	LS			0	3,088,504
8.00	ENGINEERING SERVICES	LS			0	21,619,525
9.00	PHYSICAL CONTINGENCY	LS			0	30,885,036
	GRAND TOTAL				367,531,933	367,531,933

B/Q of HKR-4 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			4,029,954
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	12,400	3.50	43,400
	Open excavation, weathered rock	m3	12,400	6.00	74,400
	Open excavation, hard rock	m3	16,500	10.00	165,000
	Concrete				
	Mass concrete	m3	24,200	90.00	2,178,000
	Reinforced concrete	m3	59,500	140.00	8,330,000
	Reinforcement bar	ton	1,800	1,500.00	2,700,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	2,300	90.00	207,000
	Others (20%)	L.S.			2,787,160
	Subtotal				16,722,960
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	64,400	55.00	3,542,000
	Concrete, tunnel	m3	15,500	160.00	2,480,000
	Reinforcement bars	ton	155	1,500.00	232,500
	Others (20%)	L.S.			1,250,900
	Subtotal				7,505,400
2.50	WATERWAY				
2.51	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	80	1,500.00	90,000
	Others (20%)	L.S.			77,070
	Subtotal				462,420
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	57,900	55.00	3,184,500
	Concrete, tunnel	m3	20,500	160.00	3,280,000
	Reinforcement	ton	210	1,500.00	315,000
	Consolidation grout	m	8,400	90.00	756,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	900	200.00	180,000
	Others (20%)	L.S.			1,546,600
	Subtotal				9,279,600
2.53	SURGE TANK				
	Excavation, shaft	m3	7,700	55.00	423,500
	Concrete, shaft	m3	2,300	160.00	368,000
	Reinforcement	ton	70	1,500.00	105,000
	Consolidation grout	m	350	90.00	31,500
	Others (20%)	L.S.			185,600
	Subtotal				1,113,600
2.54	PENSTOCK				
	Excavation				
	Excavation, common	m3	39,800	3.50	139,300
	Excavation, weathered rock	m3	39,800	6.00	238,800
	Excavation, hard rock	m3	53,100	10.00	531,000
	Excavation, tunnel	m3	2,200	55.00	121,000
	Concrete, open structure	m3	500	140.00	70,000
	Concrete, tunnel	m3	800	160.00	128,000
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	250	70.00	17,500
	Backfill grout	m3	20	200.00	4,000
	Others (20%)	L.S.			261,920
	Subtotal				1,571,520
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	6,100	3.50	21,350

	Excavation, weathered rock	m3	8,100	6.00	36,600	
	Excavation, hard rock	m3	8,100	10.00	81,000	
	Concrete, substructure	m3	5,800	250.00	1,450,000	
	Concrete, second stage	m3	1,500	140.00	210,000	
	Reinforcement	ton	380	1,500.00	570,000	
	Others (20%)	L.S.			473,790	
	Subtotal					2,842,740
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	4,500	3.50	15,750	
	Excavation, weathered rock	m3	4,500	6.00	27,000	
	Excavation, hard rock	m3	7,000	10.00	70,000	
	Concrete, structure	m3	3,000	140.00	420,000	
	Reinforcement	ton	80	1,500.00	135,000	
	Others (20%)	L.S.			133,550	
	Subtotal					801,300
2.80	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,950,000	4,950,000
2.90	ACCESS ROAD					
	New construction	m	302	600,000.00	181,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					185,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	4,400	5,000.00	22,000,000	
	Gates	ton	90	7,000.00	630,000	
	Subtotal					22,630,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	300	18,700.00	5,610,000	
	Generators	ton	680	20,400.00	13,872,000	
	Transformers	MVA	60	4,500.00	270,000	
	Subtotal					19,752,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	221	46,000.00	10,166,000	10,166,000
	Total of Direct Cost					286,977,494
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,869,775
7.00	ADMINISTRATION EXPENSES	LS			0	2,869,775
8.00	ENGINEERING SERVICES	LS			0	20,088,425
9.00	PHYSICAL CONTINGENCY	LS			0	28,697,749
	GRAND TOTAL				341,503,218	341,503,218

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			35,910,846
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	246,900	55.00	13,579,500
	Tunnel Concrete	m3	74,200	160.00	11,872,000
	Reinforcement bar	m3	1,700	1,500.00	2,550,000
	Plug Concrete	m3	6,300	160.00	1,008,000
	Others (20%)	L.S.			6,179,900
	Subtotal				37,079,400
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	66,400	3.50	232,400
	Embankment				
	Embankment, core	m3	152,500	5.00	762,500
	Embankment, filter	m3	36,800	10.00	368,000
	Embankment, rock	m3	676,400	6.00	4,058,400
	Others (20%)	L.S.			1,084,260
	Subtotal				6,505,560
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	439,300	3.50	1,537,550
	Excavation, weathered rock	m3	126,100	6.00	756,600
	Excavation, hard rock	m3	1,262,300	10.00	12,623,000
	Embankment				
	Embankment, core	m3	1,910,100	5.00	9,550,500
	Embankment, filter	m3	434,800	10.00	4,348,000
	Embankment, rock	m3	15,299,800	6.00	91,798,800
	Curtain Grouting	m	60,000	70.00	4,200,000
	Consolidation Grouting	m	10,000	90.00	900,000
	Others (10%)	L.S.			12,571,445
	Subtotal				138,285,895
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	523,500	3.50	1,832,250
	Excavation, weathered rock	m3	754,100	6.00	4,524,600
	Excavation, hard rock	m3	8,874,600	10.00	88,746,000
	Concrete	m3	97,600	140.00	13,664,000
	Reinforcement bars	ton	2,950	1,500.00	4,425,000
	Others (20%)	L.S.			22,638,370
	Subtotal				135,830,220
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	3,100	3.50	10,850
	Excavation, weathered rock	m3	3,100	6.00	18,600
	Excavation, hard rock	m3	4,200	10.00	42,000
	Concrete, open structure	m3	4,650	140.00	651,000
	Reinforcement	ton	140	1,500.00	210,000
	Others (20%)	L.S.			186,490
	Subtotal				1,118,940
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	156,300	55.00	8,596,500
	Concrete, tunnel	m3	48,500	160.00	7,760,000
	Reinforcement	ton	500	1,500.00	750,000
	Consolidation grout	m	10,300	90.00	927,000
	Curtain grout	m	600	70.00	42,000
	Backfill grout	m3	2,300	200.00	460,000
	Others (20%)	L.S.			3,707,100
	Subtotal				22,242,600
2.53	SURGE TANK				
	Excavation, shaft	m3	33,400	55.00	1,837,000
	Concrete, shaft	m3	9,700	160.00	1,552,000
	Reinforcement	ton	300	1,500.00	450,000
	Consolidation grout	m	1,200	90.00	108,000
	Others (20%)	L.S.			789,400
	Subtotal				4,736,400
2.53	PENSTOCK				

	Excavation,tunnel	m3	9,100	55.00	500,500	
	Concrete,tunnel	m3	2,700	160.00	432,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Curtain grout	m	600	70.00	42,000	
	Backfill grout	m3	250	200.00	50,000	
	Others (20%)	L.S.			222,900	
	Subtotal					1,337,400
2.60	OPEN POWERHOUSE					
	Excavation					
	Excavation,common	m3	24,600	3.50	86,100	
	Excavation,weathered rock	m3	24,600	6.00	147,600	
	Excavation,hard rock	m3	32,700	10.00	327,000	
	Concrete, substructure	m3	23,400	250.00	5,850,000	
	Concrete, second stage	m3	5,900	140.00	826,000	
	Reinforcement	ton	1,550	1,500.00	2,325,000	
	Others (20%)	L.S.			1,912,340	
	Subtotal					11,474,040
2.70	TAILRACE					
	Excavation					
	Excavation,common	m3	6,000	3.50	21,000	
	Excavation,weathered rock	m3	6,000	6.00	36,000	
	Excavation,hard rock	m3	13,000	10.00	130,000	
	Concrete, structure	m3	1,200	140.00	168,000	
	Reinforcement	ton	40	1,500.00	60,000	
	Others (20%)	L.S.			83,000	
	Subtotal					498,000
2.80	ARCHITECTURAL BUILDINGS	m2	3,000	1,100.00	3,300,000	3,300,000
2.90	ACCESS ROAD					
	New construction	m	99	600,000.00	59,400,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					63,350,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	2,100	5,000.00	10,500,000	
	Gates	ton	300	7,000.00	2,100,000	
	Subtotal					12,600,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	1,300	18,700.00	24,310,000	
	Generators	ton	1,900	20,400.00	38,760,000	
	Transformers	MVA	250	3,100.00	899,000	
	Subtotal					63,969,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	79	46,000.00	3,634,000	3,634,000
	Total of Direct Cost					541,872,301
6.00	LAND AQUISITION AND COMPENSATION	L.S.			0	27,093,615
7.00	ADMINISTRATION EXPENSES	L.S.			0	5,418,723
8.00	ENGINEERING SERVICES	L.S.			0	37,931,061
9.00	PHYSICAL CONTINGENCY	L.S.			0	54,187,230
	GRAND TOTAL				666,502,930	666,502,930

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			31,967,147
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	222,000	55.00	12,210,000
	Tunnel Concrete	m3	66,700	160.00	10,672,000
	Reinforcement bar	m3	1,550	1,500.00	2,325,000
	Plug Concrete	m3	6,300	160.00	1,008,000
	Others (20%)	L.S.			5,621,000
	Subtotal				33,726,000
2.20	COFFER DAM				
	Excavation				
	Excavation,common	m3	59,800	3.50	209,300
	Embankment				
	Embankment,core	m3	138,000	5.00	690,000
	Embankment,filter	m3	33,200	10.00	332,000
	Embankment,rock	m3	608,800	6.00	3,652,800
	Others (20%)	L.S.			976,820
	Subtotal				5,860,920
2.30	MAIN DAM				
	Excavation				
	Excavation,common	m3	395,400	3.50	1,383,900
	Excavation,weathered rock	m3	113,500	6.00	681,000
	Excavation,hard rock	m3	1,136,000	10.00	11,360,000
	Embankment				
	Embankment,core	m3	1,719,000	5.00	8,595,000
	Embankment,filter	m3	391,000	10.00	3,910,000
	Embankment,rock	m3	13,769,000	6.00	82,614,000
	Curtain Grouting	m	55,000	70.00	3,850,000
	Consolidation Grouting	m	9,000	90.00	810,000
	Others (10%)	L.S.			11,320,390
	Subtotal				124,524,290
2.40	SPILLWAY				
	Excavation				
	Excavation,common	m3	470,000	3.50	1,645,000
	Excavation,weathered rock	m3	678,600	6.00	4,071,600
	Excavation,hard rock	m3	7,987,000	10.00	79,870,000
	Concrete	m3	96,000	140.00	13,440,000
	Reinforcement bars	ton	2,900	1,500.00	4,350,000
	Others (20%)	L.S.			20,675,320
	Subtotal				124,051,920
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	2,700	3.50	9,450
	Excavation,weathered rock	m3	2,700	6.00	16,200
	Excavation,hard rock	m3	3,500	10.00	35,000
	Concrete,open structure	m3	4,000	140.00	560,000
	Reinforcement	ton	120	1,500.00	180,000
	Others (20%)	L.S.			160,130
	Subtotal				960,780
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	115,800	55.00	6,369,000
	Concrete, tunnel	m3	36,600	160.00	5,856,000
	Reinforcement	ton	370	1,500.00	555,000
	Consolidation grout	m	8,800	90.00	792,000
	Curtain grout	m	500	70.00	35,000
	Backfill grout	m3	2,000	200.00	400,000
	Others (20%)	L.S.			2,801,400
	Subtotal				16,808,400
2.53	SURGE TANK				
	Excavation, shaft	m3	25,100	55.00	1,380,500
	Concrete, shaft	m3	7,300	160.00	1,168,000
	Reinforcement	ton	220	1,500.00	330,000
	Consolidation grout	m	1,000	90.00	90,000
	Others (20%)	L.S.			593,700
	Subtotal				3,562,200
2.53	PENSTOCK				
	Excavation,tunnel	m3	6,900	55.00	379,500
	Concrete,tunnel	m3	2,300	160.00	368,000
	Reinforcement	ton	50	1,500.00	75,000

	Curtain grout	m	500	70.00	35,000	
	Backfill grout	m3	220	200.00	44,000	
	Others (20%)	L.S.			180,300	
	Subtotal					1,081,800
2.60	OPEN POWERHOUSE					
	Excavation					
	Excavation, common	m3	18,400	3.50	64,400	
	Excavation, weathered rock	m3	18,400	6.00	110,400	
	Excavation, hard rock	m3	24,600	10.00	246,000	
	Concrete, substructure	m3	17,600	250.00	4,400,000	
	Concrete, second stage	m3	4,400	140.00	616,000	
	Reinforcement	ton	1,200	1,500.00	1,800,000	
	Others (20%)	L.S.			1,447,360	
	Subtotal					8,684,160
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	11,000	10.00	110,000	
	Concrete, structure	m3	1,000	140.00	140,000	
	Reinforcement	ton	30	1,500.00	45,000	
	Others (20%)	L.S.			68,500	
	Subtotal					411,000
2.80	ARCHITECTURAL BUILDINGS	m2	2,500	1,100.00	2,750,000	2,750,000
2.90	ACCESS ROAD					
	New construction	m	99	600,000.00	59,400,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					63,350,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,600	5,000.00	8,000,000	
	Gates	ton	240	7,000.00	1,680,000	
	Subtotal					9,680,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	1,000	18,700.00	18,700,000	
	Generators	ton	1,600	20,400.00	32,640,000	
	Transformers	MVA	220	3,300.00	726,000	
	Subtotal					52,066,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	79	46,000.00	3,634,000	3,634,000
	Total of Direct Cost					483,118,617
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	24,155,931
7.00	ADMINISTRATION EXPENSES	LS			0	4,831,186
8.00	ENGINEERING SERVICES	LS			0	33,818,303
9.00	PHYSICAL CONTINGENCY	LS			0	48,311,862
	GRAND TOTAL				594,235,899	594,235,899

B/Q of KR-2 (EL. 1,057.0)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			43,971,405
2.00	CIVIL WORKS				
2.10	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	m3	30,000	10.00	300,000
	Concrete of Inlet & Outlet	m3	10,000	140.00	1,400,000
	Tunnel Excavation	m3	296,000	55.00	16,280,000
	Tunnel Concrete	m3	89,000	160.00	14,240,000
	Reinforcement bar	m3	2,050	1,500.00	3,075,000
	Plug Concrete	m3	6,300	160.00	1,008,000
	Others (20%)	L.S.			7,298,600
	Subtotal				43,791,600
2.20	COFFER DAM				
	Excavation				
	Excavation,common	m3	79,760	3.50	278,950
	Embankment				
	Embankment,core	m3	183,000	5.00	915,000
	Embankment,filter	m3	44,500	10.00	445,000
	Embankment,rock	m3	811,700	6.00	4,870,200
	Others (20%)	L.S.			1,301,830
	Subtotal				7,810,980
2.30	MAIN DAM				
	Excavation				
	Excavation,common	m3	527,000	3.50	1,844,500
	Excavation,weathered rock	m3	151,000	6.00	906,000
	Excavation,hard	m3	1,514,000	10.00	15,140,000
	Embankment				
	Embankment,core	m3	2,290,000	5.00	11,450,000
	Embankment,filter	m3	522,000	10.00	5,220,000
	Embankment,rock	m3	18,358,000	5.00	110,148,000
	Curtain Grouting	m	70,000	70.00	4,900,000
	Consolidation Grouting	m	12,000	90.00	1,080,000
	Others (10%)	L.S.			15,068,850
	Subtotal				165,757,350
2.40	SPILLWAY				
	Excavation				
	Excavation,common	m3	628,000	3.50	2,198,000
	Excavation,weathered rock	m3	904,000	6.00	5,424,000
	Excavation,hard rock	m3	10,649,000	10.00	106,490,000
	Concrete	m3	98,500	140.00	13,790,000
	Reinforcement bars	ton	3,100	1,500.00	4,650,000
	Others (20%)	L.S.			26,510,400
	Subtotal				159,062,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	4,000	3.50	14,000
	Excavation,weathered rock	m3	4,000	6.00	24,000
	Excavation,hard rock	m3	5,300	10.00	53,000
	Concrete,open structure	m3	6,000	140.00	840,000
	Reinforcement	ton	180	1,500.00	270,000
	Others (20%)	L.S.			240,200
	Subtotal				1,441,200
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	255,500	55.00	14,052,500
	Concrete, tunnel	m3	77,400	160.00	12,384,000
	Reinforcement	ton	780	1,500.00	1,170,000
	Consolidation grout	m	13,200	90.00	1,188,000
	Curtain grout	m	800	70.00	56,000
	Backfill grout	m3	2,800	200.00	560,000
	Others (20%)	L.S.			5,882,100
	Subtotal				35,292,600
2.53	SURGE TANK				
	Excavation, shaft	m3	50,200	55.00	2,761,000
	Concrete, shaft	m3	14,500	160.00	2,320,000
	Reinforcement	ton	450	1,500.00	675,000
	Consolidation grout	m	1,500	90.00	135,000
	Others (20%)	L.S.			1,178,200
	Subtotal				7,069,200
2.53	PENSTOCK				

	Excavation,tunnel	m3	12,300	55.00	676,500	
	Concrete,tunnel	m3	3,200	160.00	512,000	
	Reinforcement	ton	70	1,500.00	105,000	
	Curtain grout	m	800	70.00	56,000	
	Backfill grout	m3	300	200.00	60,000	
	Others (20%)	L.S.			281,900	
	Subtotal					1,691,400
2.60	OPEN POWERHOUSE					
	Excavation					
	Excavation,common	m3	36,800	3.50	128,800	
	Excavation,weathered rock	m3	36,800	6.00	220,800	
	Excavation,hard rock	m3	49,100	10.00	491,000	
	Concrete, substructure	m3	35,000	250.00	8,750,000	
	Concrete, second stage	m3	8,800	140.00	1,232,000	
	Reinforcement	ton	2,300	1,500.00	3,450,000	
	Others (20%)	L.S.			2,854,520	
	Subtotal					17,127,120
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	15,000	10.00	150,000	
	Concrete, structure	m3	1,800	140.00	252,000	
	Reinforcement	ton	60	1,500.00	90,000	
	Others (20%)	L.S.			111,700	
	Subtotal					670,200
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	99	600,000.00	59,400,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					63,350,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	2,900	5,000.00	14,500,000	
	Gates	ton	450	7,000.00	3,150,000	
	Subtotal					17,650,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	1,800	18,700.00	33,660,000	
	Generators	ton	2,500	20,400.00	51,000,000	
	Transformers	MVA	450	2,650.00	1,192,500	
	Subtotal					85,852,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	79	46,000.00	3,634,000	3,634,000
	Total of Direct Cost					658,571,955
6.00	LAND AQUISITION AND COMPENSATION	LS			0	32,928,598
7.00	ADMINISTRATION EXPENSES	LS			0	6,585,720
8.00	ENGINEERING SERVICES	LS			0	46,100,037
9.00	PHYSICAL CONTINGENCY	LS			0	65,857,196
	GRAND TOTAL				810,043,505	810,043,505

B/Q of KR-3 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			34,769,952
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	27,700	3.50	96,950
	Open excavation,weathered rock	m3	27,700	6.00	166,200
	Open excavation,hard rock	m3	38,900	10.00	389,000
	Concrete				
	Mass concrete	m3	44,500	90.00	4,005,000
	Reinforced concrete	m3	85,900	140.00	12,026,000
	Reinforcement bar	ton	2,600	1,500.00	3,900,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	3,400	90.00	306,000
	Others (20%)	L.S.			4,228,430
	Subtotal				25,370,580
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	800,700	55.00	44,038,500
	Concrete, tunnel	m3	192,900	160.00	30,864,000
	Reinforcement bars	ton	1,930	1,500.00	2,895,000
	Others (20%)	L.S.			15,559,500
	Subtotal				93,357,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	5,300	3.50	18,550
	Excavation,weathered rock	m3	5,300	6.00	31,800
	Excavation,hard rock	m3	7,100	10.00	71,000
	Concrete,open structure	m3	7,900	140.00	1,106,000
	Reinforcement	ton	240	1,500.00	360,000
	Others (20%)	L.S.			317,470
	Subtotal				1,904,820
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	1,340,200	55.00	73,711,000
	Concrete, tunnel	m3	399,400	160.00	63,904,000
	Reinforcement	ton	4,000	1,500.00	6,000,000
	Consolidation grout	m	57,100	90.00	5,139,000
	Curtain grout	m	700	70.00	49,000
	Backfill grout	m3	5,000	200.00	1,000,000
	Others (20%)	L.S.			29,960,600
	Subtotal				179,763,600
2.53	SURGE TANK				
	Excavation, shaft	m3	111,900	55.00	6,154,500
	Concrete, shaft	m3	32,400	160.00	5,184,000
	Reinforcement	ton	980	1,500.00	1,470,000
	Consolidation grout	m	1,200	90.00	108,000
	Others (20%)	L.S.			2,583,300
	Subtotal				15,499,800
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	37,600	3.50	131,600
	Excavation,weathered rock	m3	37,600	6.00	225,600
	Excavation,hard rock	m3	50,100	10.00	501,000
	Excavation,tunnel	m3	18,300	55.00	1,006,500
	Concrete,open structure	m3	1,500	140.00	210,000
	Concrete,tunnel	m3	5,800	160.00	896,000
	Reinforcement	ton	220	1,500.00	330,000
	Curtain grout	m	700	70.00	49,000
	Backfill grout	m3	100	200.00	20,000
	Others (20%)	L.S.			673,940
	Subtotal				4,043,640
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	55,200	3.50	193,200

	Excavation, weathered rock	m3	55,200	6.00	331,200	
	Excavation, hard rock	m3	73,600	10.00	736,000	
	Concrete, substructure	m3	52,600	250.00	13,150,000	
	Concrete, second stage	m3	13,200	140.00	1,848,000	
	Reinforcement	ton	3,450	1,500.00	5,175,000	
	Others (20%)	L.S.			4,286,680	
	Subtotal					25,720,080
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	20,000	3.50	70,000	
	Excavation, weathered rock	m3	20,000	6.00	120,000	
	Excavation, hard rock	m3	30,000	10.00	300,000	
	Concrete, structure	m3	8,500	140.00	910,000	
	Reinforcement	ton	200	1,500.00	300,000	
	Others (20%)	L.S.			340,000	
	Subtotal					2,040,000
2.80	ARCHITECTURAL BUILDINGS	m2	7,000	1,100.00	7,700,000	7,700,000
2.90	ACCESS ROAD					
	New construction	m	41	600,000.00	24,600,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					28,550,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	12,100	5,000.00	60,500,000	
	Gates	ton	1,100	7,000.00	7,700,000	
	Subtotal					68,200,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	2,000	18,700.00	37,400,000	
	Generators	ton	2,600	20,400.00	53,040,000	
	Transformers	MVA	459	2,600.00	1,193,400	
	Subtotal					91,633,400
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					579,242,872
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	5,792,429
7.00	ADMINISTRATION EXPENSES	LS			0	5,792,429
8.00	ENGINEERING SERVICES	LS			0	40,547,001
9.00	PHYSICAL CONTINGENCY	LS			0	57,924,287
	GRAND TOTAL				689,299,018	689,299,018

B/Q of KR-3 (Draft Rate 0.50)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			25,613,928
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	25,100	3.50	87,850
	Open excavation,weathered rock	m3	25,100	6.00	150,600
	Open excavation,hard rock	m3	33,400	10.00	334,000
	Concrete				
	Mass concrete	m3	41,500	90.00	3,735,000
	Reinforced concrete	m3	81,200	140.00	11,368,000
	Reinforcement bar	ton	2,450	1,500.00	3,675,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	3,300	90.00	297,000
	Others (20%)	L.S.			3,979,890
	Subtotal				23,879,340
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	533,800	55.00	29,359,000
	Concrete, tunnel	m3	128,800	160.00	20,576,000
	Reinforcement bars	ton	1,300	1,500.00	1,950,000
	Others (20%)	L.S.			10,377,000
	Subtotal				62,262,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	4,200	3.50	14,700
	Excavation,weathered rock	m3	4,200	6.00	25,200
	Excavation,hard rock	m3	5,800	10.00	58,000
	Concrete,open structure	m3	6,300	140.00	882,000
	Reinforcement	ton	190	1,500.00	285,000
	Others (20%)	L.S.			252,580
	Subtotal				1,515,480
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	1,004,600	55.00	55,253,000
	Concrete, tunnel	m3	302,900	160.00	48,464,000
	Reinforcement	ton	3,100	1,500.00	4,650,000
	Consolidation grout	m	49,300	90.00	4,437,000
	Curtain grout	m	600	70.00	42,000
	Backfill grout	m3	4,200	200.00	840,000
	Others (20%)	L.S.			22,737,200
	Subtotal				136,423,200
2.53	SURGE TANK				
	Excavation, shaft	m3	74,600	55.00	4,103,000
	Concrete, shaft	m3	21,600	160.00	3,456,000
	Reinforcement	ton	650	1,500.00	975,000
	Consolidation grout	m	1,000	90.00	90,000
	Others (20%)	L.S.			1,724,800
	Subtotal				10,348,800
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	30,100	3.50	105,350
	Excavation,weathered rock	m3	30,100	6.00	180,600
	Excavation,hard rock	m3	40,100	10.00	401,000
	Excavation,tunnel	m3	12,800	55.00	704,000
	Concrete,open structure	m3	1,200	140.00	168,000
	Concrete,tunnel	m3	4,000	160.00	640,000
	Reinforcement	ton	180	1,500.00	240,000
	Curtain grout	m	800	70.00	42,000
	Backfill grout	m3	80	200.00	16,000
	Others (20%)	L.S.			499,390
	Subtotal				2,996,340
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	38,800	3.50	128,800

	Excavation, weathered rock	m3	36,800	6.00	220,800	
	Excavation, hard rock	m3	49,100	10.00	491,000	
	Concrete, substructure	m3	35,100	250.00	8,775,000	
	Concrete, second stage	m3	8,800	140.00	1,232,000	
	Reinforcement	ton	2,300	1,500.00	3,450,000	
	Others (20%)	L.S.			2,859,520	
	Subtotal					17,157,120
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	15,000	3.50	52,500	
	Excavation, weathered rock	m3	15,000	6.00	90,000	
	Excavation, hard rock	m3	23,000	10.00	230,000	
	Concrete, structure	m3	5,000	140.00	700,000	
	Reinforcement	ton	150	1,500.00	225,000	
	Others (20%)	L.S.			259,500	
	Subtotal					1,557,000
2.80	ARCHITECTURAL BUILDINGS	m2	6,000	1,100.00	6,600,000	6,600,000
2.90	ACCESS ROAD					
	New construction	m	41	600,000.00	24,600,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					28,550,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	8,500	5,000.00	42,500,000	
	Gates	ton	730	7,000.00	5,110,000	
	Subtotal					47,610,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	1,400	18,700.00	26,180,000	
	Generators	ton	2,000	20,400.00	40,800,000	
	Transformers	MVA	305	3,000.00	915,000	
	Subtotal					67,895,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					433,098,208
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	4,330,982
7.00	ADMINISTRATION EXPENSES	LS			0	4,330,982
8.00	ENGINEERING SERVICES	LS			0	30,316,875
9.00	PHYSICAL CONTINGENCY	LS			0	43,309,821
	GRAND TOTAL				515,386,868	515,386,868

B/Q of KR-3 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			19,391,838
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	22,500	3.50	78,750
	Open excavation,weathered rock	m3	22,500	6.00	135,000
	Open excavation,hard rock	m3	30,000	10.00	300,000
	Concrete				
	Mass concrete	m3	38,500	90.00	3,465,000
	Reinforced concrete	m3	77,000	140.00	10,780,000
	Reinforcement bar	ton	2,300	1,500.00	3,450,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	3,300	90.00	297,000
	Others (20%)	L.S.			3,748,750
	Subtotal				22,492,500
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	400,500	55.00	22,027,500
	Concrete, tunnel	m3	97,500	160.00	15,600,000
	Reinforcement bars	ton	970	1,500.00	1,455,000
	Others (20%)	L.S.			7,816,500
	Subtotal				46,899,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	3,500	3.50	12,250
	Excavation,weathered rock	m3	3,500	6.00	21,000
	Excavation,hard rock	m3	4,700	10.00	47,000
	Concrete,open structure	m3	5,300	140.00	742,000
	Reinforcement	ton	160	1,500.00	240,000
	Others (20%)	L.S.			212,450
	Subtotal				1,274,700
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	717,200	55.00	39,446,000
	Concrete, tunnel	m3	219,600	160.00	35,136,000
	Reinforcement	ton	2,200	1,500.00	3,300,000
	Consolidation grout	m	41,500	90.00	3,735,000
	Curtain grout	m	500	70.00	35,000
	Backfill grout	m3	3,500	200.00	700,000
	Others (20%)	L.S.			16,470,400
	Subtotal				98,822,400
2.53	SURGE TANK				
	Excavation, shaft	m3	58,000	55.00	3,080,000
	Concrete, shaft	m3	16,200	160.00	2,592,000
	Reinforcement	ton	500	1,500.00	750,000
	Consolidation grout	m	850	90.00	76,500
	Others (20%)	L.S.			1,299,700
	Subtotal				7,798,200
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	27,100	3.50	94,850
	Excavation,weathered rock	m3	27,100	6.00	162,600
	Excavation,hard rock	m3	36,100	10.00	361,000
	Excavation,tunnel	m3	8,700	55.00	533,500
	Concrete,open structure	m3	1,000	140.00	140,000
	Concrete,tunnel	m3	3,100	160.00	496,000
	Reinforcement	ton	120	1,500.00	180,000
	Curtain grout	m	500	70.00	35,000
	Backfill grout	m3	70	200.00	14,000
	Others (20%)	L.S.			403,390
	Subtotal				2,420,340
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	27,600	3.50	96,600

	Excavation, weathered rock	m3	27,600	6.00	165,600	
	Excavation, hard rock	m3	38,800	10.00	388,000	
	Concrete, substructure	m3	26,300	250.00	6,575,000	
	Concrete, second stage	m3	6,600	140.00	924,000	
	Reinforcement	ton	1,700	1,500.00	2,550,000	
	Others (20%)	L.S.			2,135,840	
	Subtotal					12,815,040
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	13,000	3.50	45,500	
	Excavation, weathered rock	m3	13,000	6.00	78,000	
	Excavation, hard rock	m3	20,000	10.00	200,000	
	Concrete, structure	m3	4,500	140.00	630,000	
	Reinforcement	ton	140	1,500.00	210,000	
	Others (20%)	L.S.			232,700	
	Subtotal					1,396,200
2.80	ARCHITECTURAL BUILDINGS	m2	5,500	1,100.00	6,050,000	6,050,000
2.90	ACCESS ROAD					
	New construction	m	41	600,000.00	24,600,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					28,550,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	6,500	5,000.00	32,500,000	
	Gates	ton	550	7,000.00	3,850,000	
	Subtotal					36,350,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	1,100	18,700.00	20,570,000	
	Generators	ton	1,650	20,400.00	33,660,000	
	Transformers	MVA	229	3,300.00	755,700	
	Subtotal					54,985,700
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	15	46,000.00	690,000	690,000
	Total of Direct Cost					339,935,918
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	3,399,359
7.00	ADMINISTRATION EXPENSES	LS			0	3,399,359
8.00	ENGINEERING SERVICES	LS			0	23,795,514
9.00	PHYSICAL CONTINGENCY	LS			0	33,993,592
	GRAND TOTAL				404,523,742	404,523,742

B/Q of KR-4 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price B.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			10,901,544
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	23,600	3.50	82,600
	Open excavation,weathered rock	m3	23,600	6.00	141,600
	Open excavation,hard rock	m3	31,400	10.00	314,000
	Concrete				
	Mass concrete	m3	39,500	90.00	3,555,000
	Reinforced concrete	m3	80,500	140.00	11,270,000
	Reinforcement bar	ton	2,450	1,500.00	3,675,000
	Curtain grouting	m	3,900	70.00	273,000
	Consolidation grouting	m	3,100	90.00	279,000
	Others (20%)	L.S.			3,918,940
	Subtotal				23,508,240
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	366,300	55.00	20,146,500
	Concrete, tunnel	m3	88,300	160.00	14,128,000
	Reinforcement bars	ton	890	1,500.00	1,335,000
	Others (20%)	L.S.			7,121,900
	Subtotal				42,731,400
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	3,400	3.50	11,900
	Excavation,weathered rock	m3	3,400	6.00	20,400
	Excavation,hard rock	m3	4,500	10.00	45,000
	Concrete,open structure	m3	4,500	140.00	630,000
	Reinforcement	ton	150	1,500.00	225,000
	Others (20%)	L.S.			186,460
	Subtotal				1,118,760
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	198,000	55.00	10,890,000
	Concrete, tunnel	m3	61,000	160.00	9,760,000
	Reinforcement	ton	610	1,500.00	915,000
	Consolidation grout	m	12,200	90.00	1,098,000
	Curtain grout	m	480	70.00	33,600
	Backfill grout	m3	780	200.00	156,000
	Others (20%)	L.S.			4,570,520
	Subtotal				27,423,120
2.53	SURGE TANK				
	Excavation, shaft	m3	38,300	55.00	2,106,500
	Concrete, shaft	m3	11,100	160.00	1,776,000
	Reinforcement	ton	340	1,500.00	510,000
	Consolidation grout	m	500	90.00	45,000
	Others (20%)	L.S.			887,500
	Subtotal				5,325,000
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	6,300	3.50	22,050
	Excavation,weathered rock	m3	6,300	6.00	37,800
	Excavation,hard rock	m3	8,400	10.00	84,000
	Excavation,tunnel	m3	4,900	55.00	269,500
	Concrete,open structure	m3	400	140.00	56,000
	Concrete,tunnel	m3	1,800	160.00	288,000
	Reinforcement	ton	80	1,500.00	120,000
	Curtain grout	m	480	70.00	33,600
	Backfill grout	m3	25	200.00	5,000
	Others (20%)	L.S.			170,790
	Subtotal				1,024,740
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	14,700	3.50	51,450

	Excavation, weathered rock	m3	14,700	6.00	88,200	
	Excavation, hard rock	m3	19,600	10.00	196,000	
	Concrete, substructure	m3	14,000	250.00	3,500,000	
	Concrete, second stage	m3	3,500	140.00	490,000	
	Reinforcement	ton	910	1,500.00	1,365,000	
	Others (20%)	L.S.			1,138,130	
	Subtotal					6,828,780
2.70	TAILRACE					
	Excavation					
	Excavation, common	m3	9,000	3.50	31,500	
	Excavation, weathered rock	m3	9,000	6.00	54,000	
	Excavation, hard rock	m3	12,500	10.00	125,000	
	Concrete, structure	m3	3,600	140.00	504,000	
	Reinforcement	ton	110	1,500.00	165,000	
	Others (20%)	L.S.			175,900	
	Subtotal					1,055,400
2.80	ARCHITECTURAL BUILDINGS	m2	5,000	1,100.00	5,500,000	5,500,000
2.90	ACCESS ROAD					
	New construction	m	167	600,000.00	100,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					104,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	1,350	5,000.00	6,750,000	
	Gates	ton	497	7,000.00	3,479,000	
	Subtotal					10,229,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	730	18,700.00	13,651,000	
	Generators	ton	910	20,400.00	18,564,000	
	Transformers	MVA	93	4,100.00	381,300	
	Subtotal					32,596,300
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	154	46,000.00	7,084,000	7,084,000
	Total of Direct Cost					279,476,284
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,794,763
7.00	ADMINISTRATION EXPENSES	LS			0	2,794,763
8.00	ENGINEERING SERVICES	LS			0	19,563,340
9.00	PHYSICAL CONTINGENCY	LS			0	27,947,628
	GRAND TOTAL				332,576,778	332,576,778

B/Q of KR-4 (Draft Rate 0.50)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			7,939,086
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation, common	m3	21,300	3.50	74,550
	Open excavation, weathered rock	m3	21,300	6.00	127,800
	Open excavation, hard rock	m3	28,400	10.00	284,000
	Concrete				
	Mass concrete	m3	36,700	90.00	3,303,000
	Reinforced concrete	m3	75,900	140.00	10,626,000
	Reinforcement bar	ton	2,300	1,500.00	3,450,000
	Curtain grouting	m	3,600	70.00	252,000
	Consolidation grouting	m	3,000	90.00	270,000
	Others (20%)	L.S.			3,677,470
	Subtotal				22,064,820
2.40	DESANDING BASIN				
	Excavation, tunnel	m3	244,100	55.00	13,425,500
	Concrete, tunnel	m3	58,800	160.00	9,408,000
	Reinforcement bars	ton	590	1,500.00	885,000
	Others (20%)	L.S.			4,743,700
	Subtotal				28,462,200
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	2,600	3.50	9,100
	Excavation, weathered rock	m3	2,600	6.00	15,600
	Excavation, hard rock	m3	3,500	10.00	35,000
	Concrete, open structure	m3	4,000	140.00	560,000
	Reinforcement	ton	120	1,500.00	180,000
	Others (20%)	L.S.			159,940
	Subtotal				959,640
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	128,200	55.00	7,051,000
	Concrete, tunnel	m3	40,500	160.00	6,480,000
	Reinforcement	ton	410	1,500.00	615,000
	Consolidation grout	m	9,800	90.00	882,000
	Curtain grout	m	400	70.00	28,000
	Backfill grout	m3	820	200.00	124,000
	Others (20%)	L.S.			3,036,000
	Subtotal				18,216,000
2.53	SURGE TANK				
	Excavation, shaft	m3	25,600	55.00	1,408,000
	Concrete, shaft	m3	7,400	160.00	1,184,000
	Reinforcement	ton	230	1,500.00	345,000
	Consolidation grout	m	400	90.00	36,000
	Others (20%)	L.S.			594,600
	Subtotal				3,567,600
2.54	PENSTOCK				
	Excavation				
	Excavation, common	m3	5,000	3.50	17,500
	Excavation, weathered rock	m3	5,000	6.00	30,000
	Excavation, hard rock	m3	8,800	10.00	68,000
	Excavation, tunnel	m3	3,000	55.00	165,000
	Concrete, open structure	m3	300	140.00	42,000
	Concrete, tunnel	m3	940	160.00	150,400
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	400	70.00	28,000
	Backfill grout	m3	20	200.00	4,000
	Others (20%)	L.S.			112,980
	Subtotal				677,880
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	9,800	3.50	34,300

	Excavation, weathered rock	m3	9,800	6.00	58,800	
	Excavation, hard rock	m3	13,000	10.00	130,000	
	Concrete, substructure	m3	9,300	250.00	2,325,000	
	Concrete, second stage	m3	2,400	140.00	336,000	
	Reinforcement	ton	610	1,500.00	915,000	
	Others (20%)	L.S.			759,820	
	Subtotal					4,558,920
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	10,000	10.00	100,000	
	Concrete, structure	m3	3,000	140.00	420,000	
	Reinforcement	ton	100	1,500.00	150,000	
	Others (20%)	L.S.			147,300	
	Subtotal					883,800
2.80	ARCHITECTURAL BUILDINGS	m2	4,000	1,100.00	4,400,000	4,400,000
2.90	ACCESS ROAD					
	New construction	m	167	600,000.00	100,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					104,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	950	5,000.00	4,750,000	
	Gates	ton	330	7,000.00	2,310,000	
	Subtotal					7,060,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	520	18,700.00	9,724,000	
	Generators	ton	700	20,400.00	14,280,000	
	Transformers	MVA	62	4,500.00	279,000	
	Subtotal					24,283,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	154	46,000.00	7,084,000	7,084,000
	Total of Direct Cost					234,306,946
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	2,343,069
7.00	ADMINISTRATION EXPENSES	LS			0	2,343,069
8.00	ENGINEERING SERVICES	LS			0	16,401,486
9.00	PHYSICAL CONTINGENCY	LS			0	23,430,695
	GRAND TOTAL				278,825,266	278,825,266

B/Q of KR-4 (Draft Rate 0.67)

Item No.	Work Item	Unit	Quantity	Unit price P.C.(US\$)	Amount P.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,662,154
2.00	CIVIL WORKS				
2.10	INTAKE DAM				
	Open Excavation				
	Open excavation,common	m3	21,300	3.50	74,550
	Open excavation,weathered rock	m3	21,300	6.00	127,800
	Open excavation,hard rock	m3	28,400	10.00	284,000
	Concrete				
	Mass concrete	m3	34,100	90.00	3,069,000
	Reinforced concrete	m3	71,600	140.00	10,024,000
	Reinforcement bar	ton	2,150	1,500.00	3,225,000
	Curtain grouting	m	3,400	70.00	238,000
	Consolidation grouting	m	3,000	90.00	270,000
	Others (20%)	L.S.			3,462,470
	Subtotal				20,774,820
2.40	DESANDING BASIN				
	Excavation,tunnel	m3	183,000	55.00	10,065,000
	Concrete, tunnel	m3	44,100	160.00	7,056,000
	Reinforcement bars	ton	440	1,500.00	660,000
	Others (20%)	L.S.			3,556,200
	Subtotal				21,337,200
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	2,300	3.50	8,050
	Excavation,weathered rock	m3	2,300	6.00	13,800
	Excavation,hard rock	m3	3,000	10.00	30,000
	Concrete,open structure	m3	3,400	140.00	476,000
	Reinforcement	ton	100	1,500.00	150,000
	Others (20%)	L.S.			135,570
	Subtotal				813,420
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	108,300	55.00	5,956,500
	Concrete, tunnel	m3	34,600	160.00	5,536,000
	Reinforcement	ton	350	1,500.00	525,000
	Consolidation grout	m	9,000	90.00	810,000
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	560	200.00	112,000
	Others (20%)	L.S.			2,592,800
	Subtotal				15,556,800
2.53	SURGE TANK				
	Excavation, shaft	m3	20,000	55.00	1,100,000
	Concrete, shaft	m3	5,600	160.00	896,000
	Reinforcement	ton	170	1,500.00	255,000
	Consolidation grout	m	350	90.00	31,500
	Others (20%)	L.S.			456,500
	Subtotal				2,739,000
2.54	PENSTOCK				
	Excavation				
	Excavation,common	m3	4,500	3.50	15,750
	Excavation,weathered rock	m3	4,500	6.00	27,000
	Excavation,hard rock	m3	61,200	10.00	612,000
	Excavation,tunnel	m3	2,400	55.00	132,000
	Concrete,open structure	m3	280	140.00	39,200
	Concrete,tunnel	m3	780	160.00	124,800
	Reinforcement	ton	35	1,500.00	52,500
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	15	200.00	3,000
	Others (20%)	L.S.			205,590
	Subtotal				1,233,540
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	7,400	3.50	25,900

	Excavation, weathered rock	m3	7,400	6.00	44,400	
	Excavation, hard rock	m3	9,800	10.00	98,000	
	Concrete, substructure	m3	7,000	250.00	1,750,000	
	Concrete, second stage	m3	1,700	140.00	238,000	
	Reinforcement	ton	460	1,500.00	690,000	
	Others (20%)	L.S.			569,260	
	Subtotal					3,415,560
2.70	TAH RACE					
	Excavation					
	Excavation, common	m3	6,000	3.50	21,000	
	Excavation, weathered rock	m3	6,000	6.00	36,000	
	Excavation, hard rock	m3	8,500	10.00	85,000	
	Concrete, structure	m3	2,800	140.00	364,000	
	Reinforcement	ton	80	1,500.00	120,000	
	Others (20%)	L.S.			125,200	
	Subtotal					751,200
2.80	ARCHITECTURAL BUILDINGS	m2	3,500	1,100.00	3,850,000	3,850,000
2.90	ACCESS ROAD					
	New construction	m	167	600,000.00	100,200,000	
	Upgraded	m	79	50,000.00	3,950,000	
	Subtotal					104,150,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	780	5,000.00	3,800,000	
	Gates	ton	250	7,000.00	1,750,000	
	Subtotal					5,550,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	410	18,700.00	7,667,000	
	Generators	ton	590	20,400.00	12,036,000	
	Transformers	MVA	48	4,800.00	220,800	
	Subtotal					19,923,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	154	46,000.00	7,084,000	7,084,000
	Total of Direct Cost					213,841,494
6.00	LAND AQUISITION AND COMPENSATION	LS			0	2,138,415
7.00	ADMINISTRATION EXPENSES	LS			0	2,138,415
8.00	ENGINEERING SERVICES	LS			0	14,968,905
9.00	PHYSICAL CONTINGENCY	LS			0	21,384,149
	GRAND TOTAL				254,471,378	254,471,378

B/Q of KR-7 (Draft Rate 0.33)

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			15,512,744
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	3,000	3.50	10,500
	Open excavation, weathered rock	m3	3,000	6.00	18,000
	Open excavation, hard rock	m3	6,000	10.00	60,000
	Concrete of Inlet & Outlet	m3	2,000	140.00	280,000
	Tunnel Excavation	m3	48,000	55.00	2,640,000
	Tunnel Concrete	m3	16,000	160.00	2,560,000
	Reinforcement bar	m3	350	1,500.00	525,000
	Plug Concrete	m3	2,300	160.00	368,000
	Others (20%)	L.S.			1,292,300
	Subtotal				7,753,800
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	150,000	3.50	525,000
	Embankment				
	Embankment, core	m3	350,000	5.00	1,750,000
	Embankment, filter	m3	70,000	10.00	700,000
	Embankment, rock	m3	1,930,000	6.00	11,580,000
	Others (20%)	L.S.			2,911,000
	Subtotal				17,466,000
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	156,000	3.50	546,000
	Excavation, weathered rock	m3	66,000	6.00	396,000
	Excavation, hard	m3	472,000	10.00	4,720,000
	Embankment				
	Embankment, core	m3	1,210,000	5.00	6,050,000
	Embankment, filter	m3	280,000	10.00	2,800,000
	Embankment, rock	m3	4,216,000	6.00	25,296,000
	Curtain Grouting	m	90,000	70.00	6,300,000
	Consolidation Grouting	m	36,000	90.00	3,240,000
	Others (10%)	L.S.			4,934,800
	Subtotal				54,282,800
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	620,000	3.50	2,170,000
	Excavation, weathered rock	m3	880,000	6.00	5,280,000
	Excavation, hard rock	m3	1,153,000	10.00	11,530,000
	Concrete	m3	85,000	140.00	11,900,000
	Reinforcement bars	ton	2,700	1,500.00	4,050,000
	Others (20%)	L.S.			6,986,000
	Subtotal				41,916,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	5,300	3.50	18,550
	Excavation, weathered rock	m3	5,300	6.00	31,800
	Excavation, hard rock	m3	7,100	10.00	71,000
	Concrete, open structure	m3	7,900	140.00	1,106,000
	Reinforcement	ton	240	1,500.00	360,000
	Others (20%)	L.S.			317,470
	Subtotal				1,904,820
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	135,400	55.00	7,447,000
	Concrete, tunnel	m3	40,400	160.00	6,464,000
	Reinforcement	ton	410	1,500.00	615,000
	Consolidation grout	m	5,200	90.00	468,000
	Curtain grout	m	800	70.00	42,000
	Backfill grout	m3	650	200.00	130,000
	Others (20%)	L.S.			3,033,200
	Subtotal				18,199,200
2.53	PENSTOCK				
	Excavation, tunnel	m3	43,800	55.00	2,398,000
	Concrete, tunnel	m3	9,300	160.00	1,488,000
	Reinforcement	ton	190	1,500.00	285,000
	Curtain grout	m	600	70.00	42,000
	Backfill grout	m3	420	200.00	84,000
	Others (20%)	L.S.			859,400

		Subtotal			5,156,400
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation,common	m3	31,300	3.50	109,550
	Excavation,weathered rock	m3	31,300	6.00	187,800
	Excavation,hard rock	m3	41,700	10.00	417,000
	Concrete, substructure	m3	29,800	250.00	7,450,000
	Concrete, second stage	m3	7,500	140.00	1,050,000
	Reinforcement	ton	2,000	1,500.00	3,000,000
	Others (20%)	L.S.			2,442,870
	Subtotal				14,657,220
2.70	TAILRACE				
	Excavation				
	Excavation,common	m3	15,000	3.50	52,500
	Excavation,weathered rock	m3	15,000	6.00	90,000
	Excavation,hard rock	m3	22,000	10.00	220,000
	Concrete, structure	m3	5,000	140.00	700,000
	Reinforcement	ton	150	1,500.00	225,000
	Others (20%)	L.S.			257,500
	Subtotal				1,545,000
2.80	ARCHITECTURAL BUILDINGS	m2	7,000	1,100.00	7,700,000
2.90	ACCESS ROAD				
	New construction	m	55	600,000.00	33,000,000
	Upgraded	m	79	50,000.00	3,950,000
	Subtotal				36,950,000
3.00	METAL WORKS				
	Penstock steel pipes	ton	4,900	5,000.00	24,500,000
	Gates	ton	1,100	7,000.00	7,700,000
	Subtotal				32,200,000
4.00	GENERATING EQUIPMENT				
	Turbines	ton	1,400	18,700.00	26,180,000
	Generators	ton	1,500	20,400.00	30,600,000
	Transformers	MVA	195	3,400.00	663,000
	Subtotal				57,443,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	41	46,000.00	1,886,000
	Total of Direct Cost				314,572,984
6.00	LAND ACQUISITION AND COMPENSATION	LS			0
7.00	ADMINISTRATION EXPENSES	LS			0
8.00	ENGINEERING SERVICES	LS			0
9.00	PHYSICAL CONTINGENCY	LS			0
	GRAND TOTAL				386,924,770
					386,924,770

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			13,340,003
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	2,400	3.50	8,400
	Open excavation, weathered rock	m3	2,400	6.00	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	m3	43,700	55.00	2,403,500
	Tunnel Concrete	m3	13,800	160.00	2,208,000
	Reinforcement bar	m3	300	1,500.00	450,000
	Plug Concrete	m3	2,300	160.00	368,000
	Others (20%)	L.S.			1,143,260
	Subtotal				6,859,560
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	113,200	3.50	396,200
	Embankment				
	Embankment, core	m3	315,500	5.00	1,577,500
	Embankment, filter	m3	64,300	10.00	643,000
	Embankment, rock	m3	1,731,300	6.00	10,387,800
	Others (20%)	L.S.			2,600,900
	Subtotal				15,605,400
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	143,000	3.50	500,500
	Excavation, weathered rock	m3	57,600	6.00	345,600
	Excavation, hard rock	m3	419,800	10.00	4,198,000
	Embankment				
	Embankment, core	m3	1,113,400	5.00	5,567,000
	Embankment, filter	m3	256,000	10.00	2,560,000
	Embankment, rock	m3	3,943,000	6.00	23,658,000
	Curtain Grouting	m	80,000	70.00	5,600,000
	Consolidation Grouting	m	30,000	90.00	2,700,000
	Others (10%)	L.S.			4,512,910
	Subtotal				49,642,010
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	609,000	3.50	2,131,500
	Excavation, weathered rock	m3	839,900	6.00	5,039,400
	Excavation, hard rock	m3	1,023,300	10.00	10,233,000
	Concrete	m3	79,800	140.00	11,172,000
	Reinforcement bars	ton	2,400	1,500.00	3,600,000
	Others (20%)	L.S.			6,435,180
	Subtotal				38,611,080
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	4,200	3.50	14,700
	Excavation, weathered rock	m3	4,200	6.00	25,200
	Excavation, hard rock	m3	6,500	10.00	55,000
	Concrete, open structure	m3	8,200	140.00	868,000
	Reinforcement	ton	190	1,500.00	285,000
	Others (20%)	L.S.			249,580
	Subtotal				1,497,480
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	91,250	55.00	5,018,750
	Concrete, tunnel	m3	27,700	160.00	4,432,000
	Reinforcement	ton	870	1,500.00	1,005,000
	Consolidation grout	m	4,700	90.00	423,000
	Curtain grout	m	570	70.00	39,900
	Backfill grout	m3	500	200.00	100,000
	Others (20%)	L.S.			2,203,730
	Subtotal				13,222,380
2.53	PENSTOCK				
	Excavation, tunnel	m3	31,000	55.00	1,705,000
	Concrete, tunnel	m3	7,700	160.00	1,232,000
	Reinforcement	ton	180	1,500.00	240,000
	Curtain grout	m	570	70.00	39,900
	Backfill grout	m3	350	200.00	70,000
	Others (20%)	L.S.			657,380

						Subtotal	3,944,280
2.60	OPEN POWERHOUSE						
	Excavation						
	Excavation, common	m3	21,000	3.50	73,500		
	Excavation, weathered rock	m3	21,000	6.00	126,000		
	Excavation, hard rock	m3	27,800	10.00	278,000		
	Concrete, substructure	m3	19,800	250.00	4,950,000		
	Concrete, second stage	m3	4,950	140.00	693,000		
	Reinforcement	ton	1,300	1,500.00	1,950,000		
	Others (20%)	L.S.			1,614,100		
	Subtotal						9,684,600
2.70	TAILRACE						
	Excavation						
	Excavation, common	m3	12,000	3.50	42,000		
	Excavation, weathered rock	m3	12,000	6.00	72,000		
	Excavation, hard rock	m3	14,000	10.00	140,000		
	Concrete, structure	m3	4,000	140.00	560,000		
	Reinforcement	ton	120	1,500.00	180,000		
	Others (20%)	L.S.			198,800		
	Subtotal						1,192,800
2.80	ARCHITECTURAL BUILDINGS	m2	8,000	1,100.00	6,600,000		6,600,000
2.90	ACCESS ROAD						
	New construction	m	55	600,000.00	33,000,000		
	Upgraded	m	79	50,000.00	3,950,000		
	Subtotal						36,950,000
3.00	METAL WORKS						
	Penstock steel pipes	ton	3,500	5,000.00	17,500,000		
	Gates	ton	730	7,000.00	5,110,000		
	Subtotal						22,610,000
4.00	GENERATING EQUIPMENT						
	Turbines	ton	1,000	18,700.00	18,700,000		
	Generators	ton	1,150	20,400.00	23,460,000		
	Transformers	MVA	130	3,550.00	461,500		
	Subtotal						42,621,500
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	41	46,000.00	1,886,000		1,886,000
	Total of Direct Cost						264,267,093
6.00	LAND AQUISITION AND COMPENSATION	LS			0		13,213,355
7.00	ADMINISTRATION EXPENSES	LS			0		2,642,671
8.00	ENGINEERING SERVICES	LS			0		18,498,697
9.00	PHYSICAL CONTINGENCY	LS			0		26,426,709
	GRAND TOTAL				325,048,524		325,048,524

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			12,106,172
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation,common	m3	2,000	3.50	7,000
	Open excavation,weathered rock	m3	2,000	6.00	12,000
	Open excavation,hard rock	m3	3,500	10.00	35,000
	Concrete of Inlet & Outlet	m3	1,400	140.00	196,000
	Tunnel Excavation	m3	42,000	55.00	2,310,000
	Tunnel Concrete	m3	12,000	160.00	1,920,000
	Reinforcement bar	m3	260	1,500.00	390,000
	Plug Concrete	m3	2,300	160.00	368,000
	Others (20%)	L.S.			1,047,600
	Subtotal				6,285,600
2.20	COFFER DAM				
	Excavation				
	Excavation,common	m3	105,000	3.50	367,500
	Embankment				
	Embankment,core	m3	278,000	5.00	1,390,000
	Embankment,filter	m3	58,000	10.00	580,000
	Embankment,rock	m3	1,652,000	6.00	9,912,000
	Others (20%)	L.S.			2,449,900
	Subtotal				14,699,400
2.30	MAIN DAM				
	Excavation				
	Excavation,common	m3	134,000	3.50	469,000
	Excavation,weathered rock	m3	53,000	6.00	318,000
	Excavation,hard	m3	396,000	10.00	3,960,000
	Embankment				
	Embankment,core	m3	1,064,000	5.00	5,320,000
	Embankment,filter	m3	230,000	10.00	2,300,000
	Embankment,rock	m3	3,744,000	6.00	22,464,000
	Curtain Grouting	m	72,000	70.00	5,040,000
	Consolidation Grouting	m	26,000	90.00	2,340,000
	Others (10%)	L.S.			4,221,100
	Subtotal				46,432,100
2.40	SPILLWAY				
	Excavation				
	Excavation,common	m3	550,000	3.50	1,925,000
	Excavation,weathered rock	m3	780,000	6.00	4,680,000
	Excavation,hard rock	m3	985,000	10.00	9,850,000
	Concrete	m3	77,000	140.00	10,780,000
	Reinforcement bars	ton	2,200	1,500.00	3,300,000
	Others (20%)	L.S.			6,107,000
	Subtotal				36,642,000
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation,common	m3	3,500	3.50	12,250
	Excavation,weathered rock	m3	3,500	6.00	21,000
	Excavation,hard rock	m3	4,700	10.00	47,000
	Concrete,open structure	m3	5,200	140.00	728,000
	Reinforcement	ton	160	1,500.00	240,000
	Others (20%)	L.S.			209,650
	Subtotal				1,257,900
2.52	HEADRACE TUNNEL				
	Excavation,tunnel	m3	72,500	55.00	3,987,500
	Concrete, tunnel	m3	22,200	160.00	3,552,000
	Reinforcement	ton	450	1,500.00	675,000
	Consolidation grout	m	4,200	90.00	378,000
	Curtain grout	m	500	70.00	35,000
	Backfill grout	m3	420	200.00	84,000
	Others (20%)	L.S.			1,742,300
	Subtotal				10,453,800
2.53	PENSTOCK				
	Excavation,tunnel	m3	24,000	55.00	1,320,000
	Concrete,tunnel	m3	6,700	160.00	1,072,000
	Reinforcement	ton	140	1,500.00	210,000
	Curtain grout	m	520	70.00	36,400
	Backfill grout	m3	300	200.00	60,000
	Others (20%)	L.S.			539,680

						Subtotal	3,238,060
2.60	OPEN POWERHOUSE						
	Excavation						
	Excavation, common	m3	15,800	3.50	54,600		
	Excavation, weathered rock	m3	15,800	6.00	93,600		
	Excavation, hard rock	m3	20,800	10.00	208,000		
	Concrete, substructure	m3	14,900	230.00	3,725,000		
	Concrete, second stage	m3	3,800	140.00	532,000		
	Reinforcement	ton	1,000	1,500.00	1,500,000		
	Others (20%)	L.S.			1,222,640		
	Subtotal						7,335,840
2.70	TAILRACE						
	Excavation						
	Excavation, common	m3	9,000	3.50	31,500		
	Excavation, weathered rock	m3	9,000	6.00	54,000		
	Excavation, hard rock	m3	11,000	10.00	110,000		
	Concrete, structure	m3	3,500	140.00	490,000		
	Reinforcement	ton	100	1,500.00	150,000		
	Others (20%)	L.S.			167,100		
	Subtotal						1,002,600
2.80	ARCHITECTURAL BUILDINGS	m2	4,500	1,100.00	4,950,000		4,950,000
2.90	ACCESS ROAD						
	New construction	m	55	600,000.00	33,000,000		
	Upgraded	m	79	50,000.00	3,950,000		
	Subtotal						36,950,000
3.00	METAL WORKS						
	Penstock steel pipes	ton	2,700	5,000.00	13,500,000		
	Gates	ton	550	7,000.00	3,850,000		
	Subtotal						17,350,000
4.00	GENERATING EQUIPMENT						
	Turbines	ton	780	18,700.00	14,586,000		
	Generators	ton	940	20,400.00	19,176,000		
	Transformers	MVA	98	4,100.00	401,800		
	Subtotal						34,163,800
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	41	46,000.00	1,886,000		1,886,000
	Total of Direct Cost						234,753,292
6.00	LAND ACQUISITION AND COMPENSATION	LS			0		11,737,665
7.00	ADMINISTRATION EXPENSES	LS			0		2,347,533
8.00	ENGINEERING SERVICES	LS			0		16,432,730
9.00	PHYSICAL CONTINGENCY	LS			0		23,475,329
	GRAND TOTAL				288,746,549		288,746,549

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			6,231,498
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	2,400	3.50	8,400
	Open excavation, weathered rock	m3	2,400	6.00	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	m3	43,700	55.00	2,403,500
	Tunnel Concrete	m3	13,800	160.00	2,208,000
	Reinforcement bar	m3	300	1,500.00	450,000
	Plug Concrete	m3	2,300	160.00	368,000
	Others (20%)	L.S.			1,143,260
	Subtotal				6,859,560
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	47,900	3.50	167,650
	Embankment				
	Embankment, core	m3	73,400	5.00	367,000
	Embankment, filter	m3	18,700	10.00	187,000
	Embankment, rock	m3	383,900	6.00	2,303,400
	Others (20%)	L.S.			605,010
	Subtotal				3,630,060
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	155,400	3.50	543,900
	Excavation, weathered rock	m3	74,900	6.00	449,400
	Excavation, hard rock	m3	155,800	10.00	1,558,000
	Embankment				
	Embankment, core	m3	548,700	5.00	2,743,500
	Embankment, filter	m3	127,500	10.00	1,275,000
	Embankment, rock	m3	3,050,000	6.00	18,300,000
	Curtain Grouting	m	19,400	70.00	1,358,000
	Consolidation Grouting	m	4,500	90.00	405,000
	Others (10%)	L.S.			2,663,280
	Subtotal				29,296,080
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	116,300	3.50	407,050
	Excavation, weathered rock	m3	168,300	6.00	1,009,800
	Excavation, hard rock	m3	581,200	10.00	5,812,000
	Concrete	m3	29,100	140.00	4,074,000
	Reinforcement bars	ton	870	1,500.00	1,305,000
	Others (20%)	L.S.			2,521,570
	Subtotal				15,129,420
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	3,200	3.50	11,200
	Excavation, weathered rock	m3	3,200	6.00	19,200
	Excavation, hard rock	m3	4,300	10.00	43,000
	Concrete, open structure	m3	4,800	140.00	672,000
	Reinforcement	ton	150	1,500.00	225,000
	Others (20%)	L.S.			194,080
	Subtotal				1,164,480
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	11,600	55.00	638,000
	Concrete, tunnel	m3	3,800	160.00	608,000
	Reinforcement	ton	40	1,500.00	60,000
	Consolidation grout	m	1,050	90.00	94,500
	Curtain grout	m	320	70.00	22,400
	Backfill grout	m3	80	200.00	16,000
	Others (20%)	L.S.			287,780
	Subtotal				1,726,680
2.53	PENSTOCK				
	Excavation, tunnel	m3	5,200	55.00	286,000
	Concrete, tunnel	m3	2,000	160.00	320,000
	Reinforcement	ton	40	1,500.00	60,000
	Curtain grout	m	0	70.00	0
	Backfill grout	m3	70	200.00	14,000
	Others (20%)	L.S.			136,000
	Subtotal				816,000
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	7,500	3.50	26,250

	Excavation, weathered rock	m3	7,500	6.00	45,000	
	Excavation, hard rock	m3	10,000	10.00	100,000	
	Concrete, substructure	m3	7,100	250.00	1,775,000	
	Concrete, second stage	m3	1,800	140.00	252,000	
	Reinforcement	ton	470	1,500.00	705,000	
	Others (20%)	L.S.			580,650	
	Subtotal					3,483,900
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	1,500	10.00	15,000	
	Concrete, structure	m3	800	140.00	112,000	
	Reinforcement	ton	25	1,500.00	37,500	
	Others (20%)	L.S.			34,800	
	Subtotal					208,800
2.80	ARCHITECTURAL BUILDINGS	m2	1,000	1,100.00	1,100,000	1,100,000
2.90	ACCESS ROAD					
	New construction	km	0	600,000.00	0	
	Upgraded	km	79	50,000.00	3,950,000	
	Subtotal					3,950,000
3.00	METAL WORKS					
	Penstock steel pipes	ton	300	5,000.00	1,500,000	
	Gates	ton	50	7,000.00	350,000	
	Subtotal					1,850,000
4.00	GENERATING EQUIPMENT					
	Turbines	ton	200	18,700.00	3,740,000	
	Generators	ton	290	20,400.00	5,916,000	
	Transformers	MVA	50	4,700.00	235,000	
	Subtotal					9,891,000
5.00	TRANSMISSION LINES AND SUBSTATIONS	km	2	46,000.00	92,000	92,000
	Total of Direct Cost					85,429,478
6.00	LAND ACQUISITION AND COMPENSATION	LS			0	4,271,474
7.00	ADMINISTRATION EXPENSES	LS			0	854,295
8.00	ENGINEERING SERVICES	LS			0	5,980,063
9.00	PHYSICAL CONTINGENCY	LS			0	8,542,948
	GRAND TOTAL				105,078,258	105,078,258

Item No.	Work Item	Unit	Quantity	Unit price F.C.(US\$)	Amount F.C.(US\$)
1.00	PREPARATORY WORKS (10 % of Civil Works)	L.S.			7,004,694
2.00	CIVIL WORKS				
2.10	DIVERSION TUNNEL				
	Open Excavation of Inlet & Outlet				
	Open excavation, common	m3	2,400	3.50	8,400
	Open excavation, weathered rock	m3	2,400	6.00	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	m3	46,300	55.00	2,546,500
	Tunnel Concrete	m3	14,600	160.00	2,336,000
	Reinforcement bar	m3	320	1,500.00	480,000
	Plug Concrete	m3	2,300	160.00	368,000
	Others (20%)	L.S.			1,203,460
	Subtotal				7,220,760
2.20	COFFER DAM				
	Excavation				
	Excavation, common	m3	47,900	3.50	167,650
	Embankment				
	Embankment, core	m3	73,400	5.00	367,000
	Embankment, filter	m3	18,700	10.00	187,000
	Embankment, rock	m3	383,900	6.00	2,303,400
	Others (20%)	L.S.			605,010
	Subtotal				3,630,060
2.30	MAIN DAM				
	Excavation				
	Excavation, common	m3	180,900	3.50	633,150
	Excavation, weathered rock	m3	81,600	6.00	489,600
	Excavation, hard	m3	168,600	10.00	1,686,000
	Embankment				
	Embankment, core	m3	654,300	5.00	3,271,500
	Embankment, filter	m3	151,000	10.00	1,510,000
	Embankment, rock	m3	3,743,000	6.00	22,458,000
	Curtain Grouting	m	21,400	70.00	1,498,000
	Consolidation Grouting	m	4,800	90.00	432,000
	Others (10%)	L.S.			3,197,825
	Subtotal				35,176,075
2.40	SPILLWAY				
	Excavation				
	Excavation, common	m3	111,300	3.50	389,550
	Excavation, weathered rock	m3	159,900	6.00	959,400
	Excavation, hard rock	m3	578,700	10.00	5,787,000
	Concrete	m3	30,000	140.00	4,200,000
	Reinforcement bars	ton	900	1,500.00	1,350,000
	Others (20%)	L.S.			2,537,190
	Subtotal				15,223,140
2.50	WATERWAY				
2.51	INTAKE				
	Excavation				
	Excavation, common	m3	3,800	3.50	13,300
	Excavation, weathered rock	m3	3,800	6.00	22,800
	Excavation, hard rock	m3	5,000	10.00	50,000
	Concrete, open structure	m3	5,600	140.00	784,000
	Reinforcement	ton	170	1,500.00	255,000
	Others (20%)	L.S.			225,020
	Subtotal				1,350,120
2.52	HEADRACE TUNNEL				
	Excavation, tunnel	m3	14,000	55.00	770,000
	Concrete, tunnel	m3	4,500	160.00	720,000
	Reinforcement	ton	45	1,500.00	67,500
	Consolidation grout	m	1,150	90.00	103,500
	Curtain grout	m	350	70.00	24,500
	Backfill grout	m3	100	200.00	20,000
	Others (20%)	L.S.			341,100
	Subtotal				2,046,600
2.53	PENSTOCK				
	Excavation, tunnel	m3	6,250	55.00	343,750
	Concrete, tunnel	m3	2,300	160.00	368,000
	Reinforcement	ton	45	1,500.00	67,500
	Curtain grout	m	0	70.00	0
	Backfill grout	m3	85	200.00	17,000
	Others (20%)	L.S.			159,250
	Subtotal				955,500
2.60	OPEN POWERHOUSE				
	Excavation				
	Excavation, common	m3	9,000	3.50	31,500