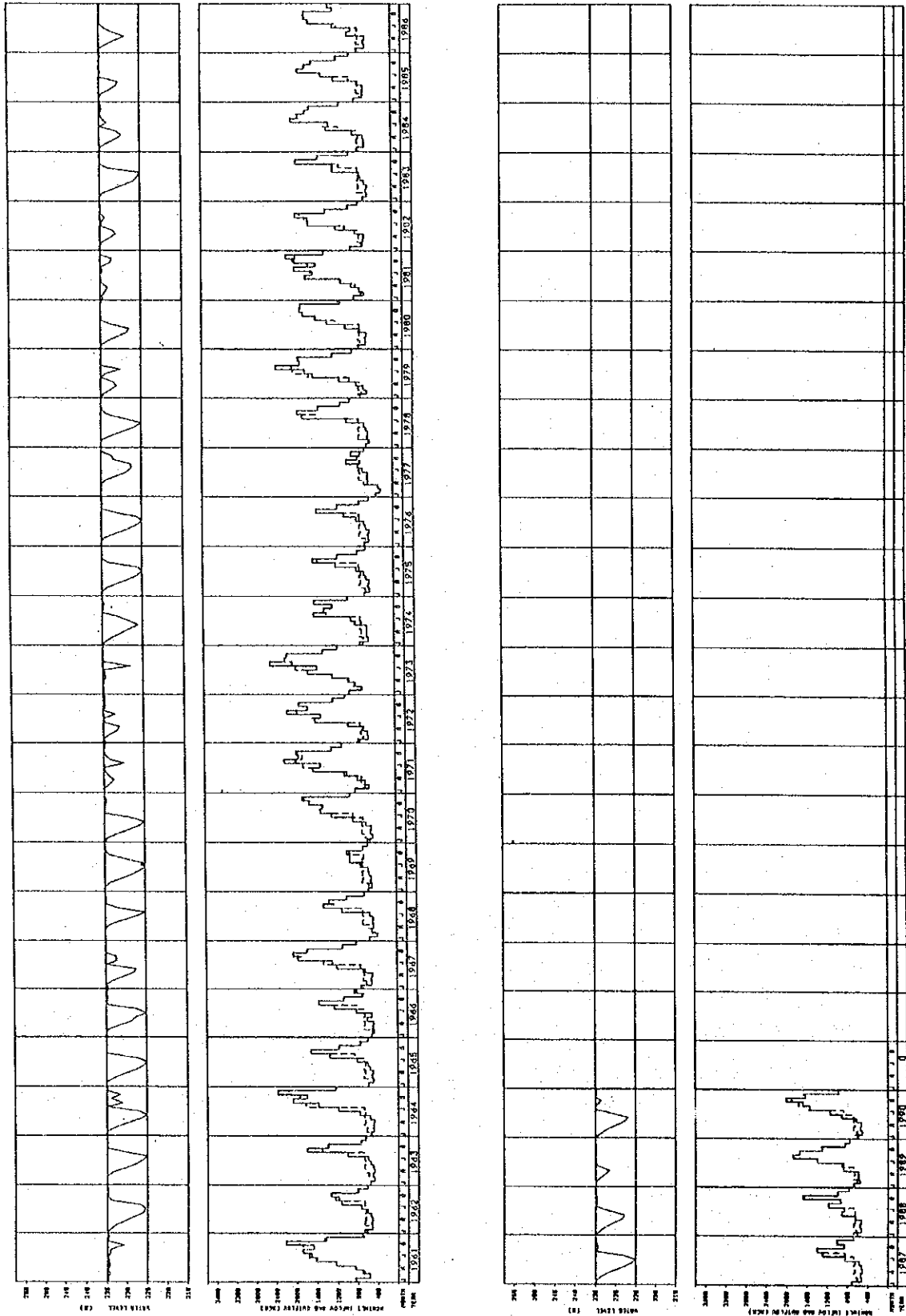


Result of Reservoir Operation
 (The Sesan river system case-5 Sesan4 - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-1 Nhim - project)

* MONTHLY TOTAL ENERGY (GWH) *

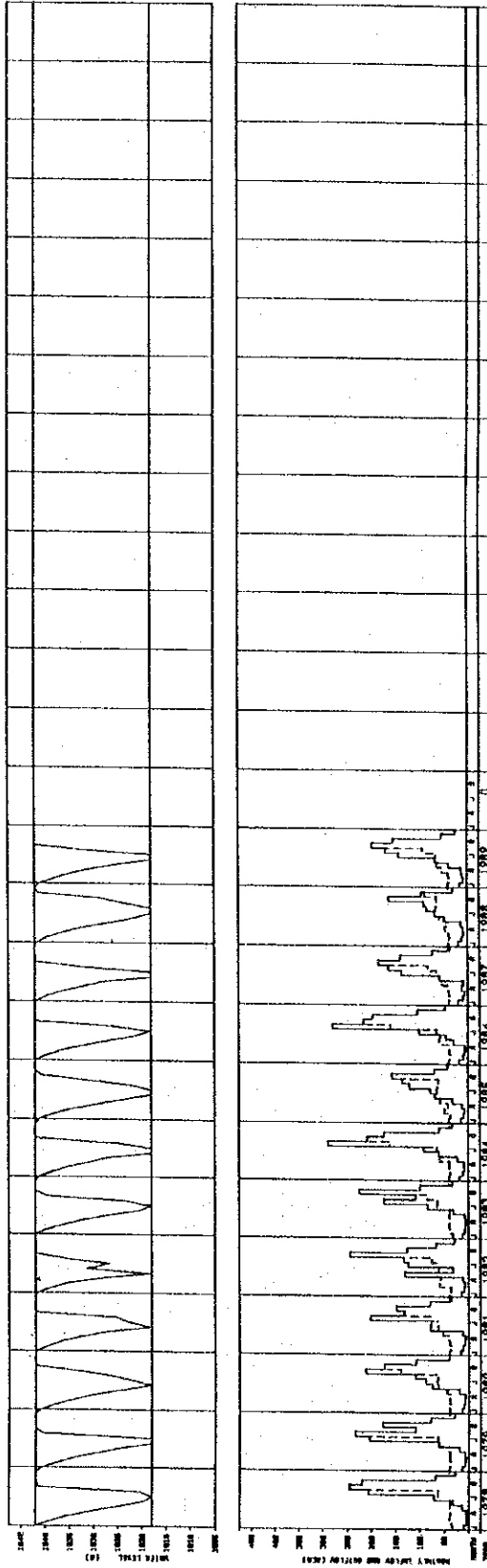
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1 1978	63.94	67.41	74.25	71.40	73.28	70.57	119.04	119.04	115.20	119.04	115.20	74.98	1083.35
2 1979	74.78	67.27	74.11	71.27	80.33	113.93	119.04	119.04	115.20	119.04	115.20	74.99	1144.19
3 1980	74.80	69.70	74.14	71.31	82.44	115.20	119.04	119.04	115.20	119.04	115.20	75.04	1150.15
4 1981	74.92	67.45	74.36	77.86	97.84	115.20	119.04	119.04	115.20	119.04	115.20	75.02	1170.17
5 1982	74.87	67.37	110.85	106.40	119.04	115.20	119.04	119.04	115.20	119.04	115.20	53.91	1233.13
6 1983	60.79	67.46	74.34	71.52	73.37	70.60	119.04	119.04	115.20	119.04	115.20	75.01	1080.62
7 1984	74.86	69.79	74.25	71.46	110.03	110.27	119.04	119.04	115.20	119.04	115.20	75.00	1173.17
8 1985	74.84	67.34	90.77	77.56	106.21	115.20	119.04	119.04	115.20	119.04	115.20	81.67	1201.10
9 1986	74.92	67.45	74.33	71.52	109.83	105.03	119.04	119.04	115.20	119.04	115.20	91.86	1192.46
10 1987	74.92	67.45	74.35	77.89	98.01	106.85	119.04	119.04	115.20	119.04	115.20	73.02	1162.02
11 1988	74.90	69.84	74.33	87.53	73.37	106.22	119.04	119.04	115.20	119.04	115.20	74.99	1148.71
12 1989	74.81	67.32	74.20	97.03	115.81	115.20	119.04	119.04	115.20	119.04	100.02	45.32	1162.04
TOTAL	873.4	815.9	964.3	952.8	1139.6	1259.5	1428.5	1428.5	1382.4	1428.5	1367.2	872.8	11893.1
AVE	72.78	67.99	78.69	79.40	94.96	104.96	119.04	119.04	115.20	119.04	113.94	72.73	1157.76
MAX	74.92	69.84	110.85	106.40	119.04	115.20	119.04	119.04	115.20	119.04	115.20	91.86	1233.13
MIN	60.79	67.27	74.11	71.27	73.28	70.57	119.04	119.04	115.20	119.04	100.02	45.32	1080.62

Result of Monthly Capacity
(The Dong Nai river system case-1 Nhim - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG. >	< SEP >	< OCT >	< NOV >	< DEC >	<TOTAL>
1 1978	85.94	100.31	99.79	99.17	98.49	98.02	160.00	160.00	160.00	160.00	160.00	100.78	1482.51
2 1979	100.51	100.11	99.61	98.99	107.97	158.23	160.00	160.00	160.00	160.00	160.00	100.79	1566.21
3 1980	100.54	100.14	99.65	99.04	110.81	160.00	160.00	160.00	160.00	160.00	160.00	100.86	1571.05
4 1981	100.70	100.37	99.64	108.14	131.51	160.00	160.00	160.00	160.00	160.00	160.00	100.83	1601.49
5 1982	100.63	100.25	148.99	147.77	160.00	160.00	160.00	160.00	160.00	160.00	160.00	72.47	1690.11
6 1983	81.71	100.39	99.92	99.34	98.62	98.05	160.00	160.00	160.00	160.00	160.00	100.82	1478.85
7 1984	100.62	100.27	99.80	99.25	117.89	153.15	160.00	160.00	160.00	160.00	160.00	109.77	1643.04
8 1985	100.59	100.21	122.00	107.72	142.75	160.00	160.00	160.00	160.00	160.00	160.00	109.77	1643.04
9 1986	100.70	100.37	99.91	99.34	117.62	145.87	160.00	160.00	160.00	160.00	160.00	100.84	1590.17
10 1987	100.70	100.38	99.93	108.18	131.74	148.40	160.00	160.00	160.00	160.00	160.00	100.84	1590.17
11 1988	100.68	100.35	99.91	121.58	98.62	147.53	160.00	160.00	160.00	160.00	160.00	100.80	1569.45
12 1989	100.56	100.18	99.73	134.77	155.66	160.00	160.00	160.00	160.00	160.00	138.92	60.92	1590.72
TOTAL	1173.87	1203.33	1269.18	1323.29	1531.67	1749.25	1920.00	1920.00	1920.00	1920.00	1998.92	1173.13	19002.62
AVE	97.82	100.28	105.77	110.27	127.64	145.77	160.00	160.00	160.00	160.00	158.24	97.76	1583.55
MAX	100.70	100.39	148.99	147.77	160.00	160.00	160.00	160.00	160.00	160.00	160.00	123.47	1690.11
MIN	81.71	100.11	99.61	98.99	98.49	98.02	160.00	160.00	160.00	160.00	138.92	60.92	1478.85

Result of Reservoir Operation
 (The Dong Nai river system case-1 Nhim - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-2 Tri Anh - project)

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	190.36	76.46	81.60	76.00	73.36	67.22	134.11	275.17	284.10	293.57	188.73	108.83	1849.53
2 1979	95.98	76.43	80.58	75.36	73.13	119.14	256.95	290.52	286.10	293.57	208.99	119.76	1974.51
3 1980	96.04	78.93	80.75	75.48	73.16	144.52	174.56	250.40	269.62	293.57	284.10	141.18	1962.32
4 1981	103.87	75.83	81.41	76.04	73.41	132.52	165.24	274.37	284.10	293.57	209.02	140.99	1930.29
5 1982	93.90	83.92	117.36	71.02	218.69	67.37	233.61	264.65	279.32	293.57	174.62	88.54	1978.58
6 1983	87.38	77.00	82.42	76.86	74.43	67.93	159.65	266.01	269.22	293.57	266.64	130.12	1851.24
7 1984	95.98	96.55	82.98	75.04	73.01	111.70	197.74	274.78	284.10	293.57	158.46	130.46	1874.37
8 1985	96.10	84.17	108.92	80.79	75.98	128.26	77.48	234.56	281.44	293.57	188.92	151.64	1801.84
9 1986	106.62	93.17	90.53	72.94	71.07	83.90	210.96	271.91	284.10	293.57	275.96	161.91	2018.66
10 1987	100.86	75.88	81.33	76.18	73.62	111.01	248.18	271.58	284.10	293.57	198.78	130.35	1945.45
11 1988	106.75	86.82	80.90	75.80	73.38	86.43	76.90	82.12	236.15	293.57	247.42	119.51	1565.75
12 1989	93.96	84.02	108.90	81.92	92.55	127.65	249.75	275.61	284.10	293.57	87.68	65.32	1847.02
TOTAL	1271.8	989.2	1077.7	913.4	1045.8	1249.7	2185.1	3021.6	3324.5	3522.9	2489.3	1488.6	22599.5
AVE	105.98	82.43	89.81	76.12	87.15	105.80	182.10	251.80	277.04	293.57	207.44	124.05	1883.29
MAX	190.36	96.55	117.36	81.92	218.69	152.52	256.95	290.52	284.10	293.57	284.10	161.91	2018.66
MIN	87.38	75.83	80.58	71.02	71.07	67.22	76.90	82.12	236.15	293.57	87.68	65.32	1565.75

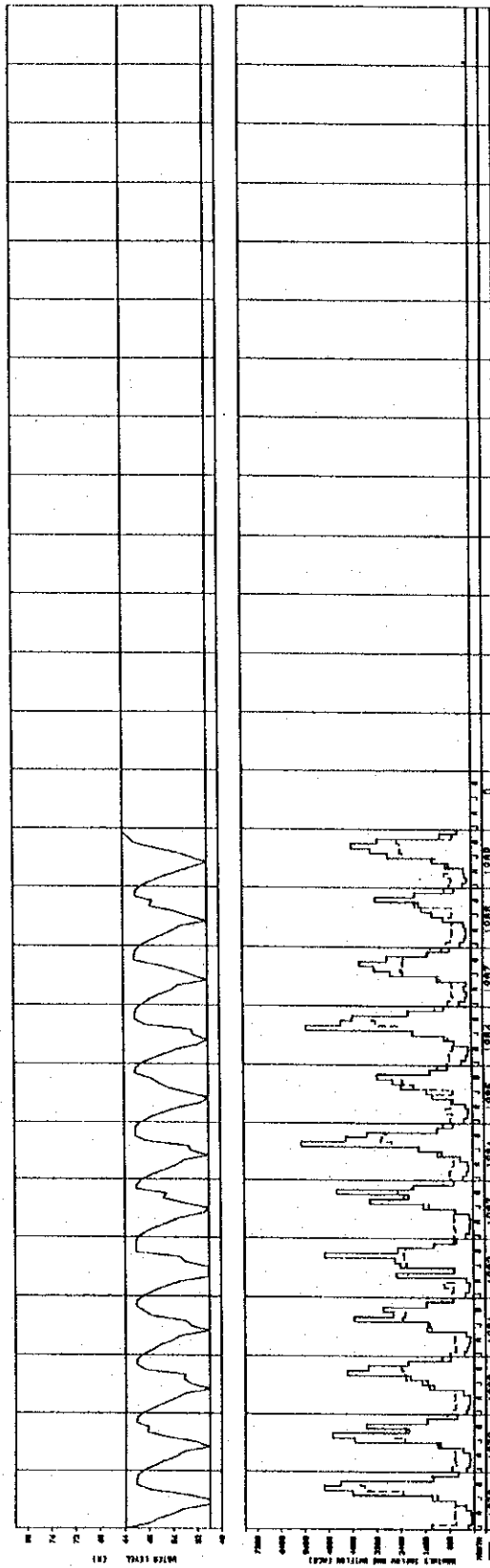
* MONTHLY TOTAL ENERGY (GWH) *

Result of Monthly Capacity
(The Dong Nai river system case-2 Tri Anh - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	255.87	113.79	109.68	105.55	98.60	93.36	180.26	369.86	394.59	394.59	262.12	146.27	2524.54
2 1979	129.00	113.74	108.30	104.67	98.29	165.67	345.37	390.48	394.59	394.59	290.26	160.96	2695.73
3 1980	129.09	113.40	108.54	104.83	98.34	200.72	284.63	336.56	374.67	394.59	290.30	189.76	2679.51
4 1981	139.62	113.85	109.42	105.61	98.67	211.83	222.10	368.64	394.59	394.59	290.30	189.51	2657.76
5 1982	128.89	124.88	157.74	98.85	293.94	93.57	314.00	342.27	387.94	394.59	242.33	119.00	2898.00
6 1983	117.45	114.58	110.77	106.75	100.05	94.35	214.59	357.55	373.91	394.59	370.34	174.89	2529.81
7 1984	129.00	158.73	111.53	104.22	98.13	155.14	265.78	369.33	394.59	394.59	220.08	175.36	2556.47
8 1985	129.17	123.25	146.40	112.50	102.13	178.14	184.14	315.27	390.89	394.59	262.39	203.82	2484.39
9 1986	143.31	135.64	121.68	104.30	93.53	119.51	283.36	363.67	394.59	394.59	383.28	217.82	2758.88
10 1987	135.56	112.92	109.31	105.81	98.95	154.18	333.57	365.03	394.59	394.59	276.08	175.20	2655.80
11 1988	143.49	124.75	108.74	105.87	98.62	120.04	103.35	110.37	327.99	394.59	343.64	160.63	2441.48
12 1989	128.97	125.03	146.37	113.78	124.39	177.29	335.68	370.44	394.59	394.59	121.77	87.79	2520.70
TOTAL	1709.42	1458.55	1448.49	1288.84	1405.64	1763.61	2937.02	4061.27	4617.34	4735.08	3457.38	2000.81	30863.02
AVE	142.45	121.55	120.71	105.72	117.14	146.95	244.75	338.44	384.78	394.59	288.11	166.73	2371.92
MAX	255.87	138.73	157.74	113.78	293.94	211.83	345.37	390.48	394.59	394.59	394.59	217.82	2758.88
MIN	117.45	112.85	108.30	98.65	93.53	93.36	103.35	110.37	327.99	394.59	121.77	87.79	2141.48

Result of Reservoir Operation
 (The Dong Nai river system case-2 Tri Anh - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-3 Ham Thuan - project)

* MONTHLY TOTAL ENERGY (GWH) *

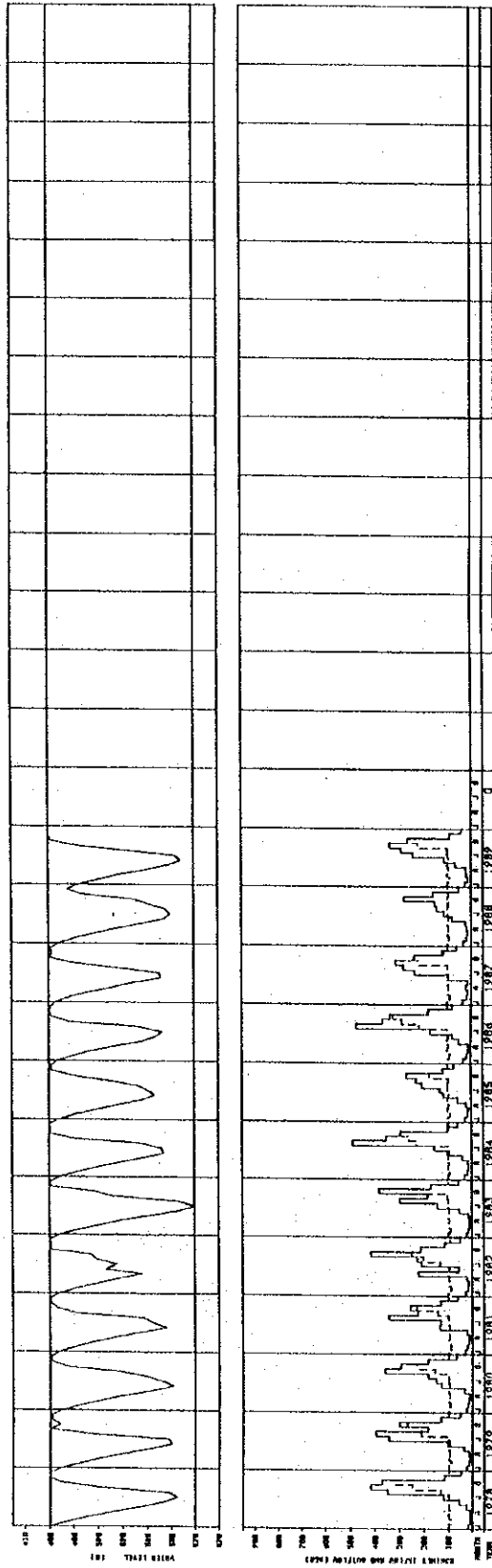
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1 1978	64.77	57.70	62.85	59.70	60.51	57.67	59.44	82.73	154.23	200.84	76.94	64.91	1062.27
2 1979	64.23	57.22	62.32	59.18	60.03	57.65	61.39	136.61	141.84	170.42	85.23	64.87	1020.98
3 1980	64.21	56.24	62.30	59.15	59.96	57.76	60.35	61.35	98.78	146.10	118.22	64.94	912.35
4 1981	64.41	57.46	62.67	59.55	60.34	58.12	60.61	62.43	92.59	146.69	85.28	64.96	875.12
5 1982	64.37	57.37	62.51	59.45	61.74	60.50	60.55	126.65	135.53	138.85	70.43	61.08	1002.62
6 1983	64.32	57.31	62.41	59.25	59.89	60.50	58.79	60.70	85.87	128.56	110.14	64.92	849.03
7 1984	64.33	59.41	62.51	59.41	60.35	57.98	60.41	140.88	164.21	186.52	63.06	64.97	1044.06
8 1985	64.36	57.36	62.51	59.45	60.59	58.47	60.82	61.79	61.27	112.81	76.82	64.95	801.21
9 1986	64.46	57.51	62.68	59.55	60.57	58.11	60.45	133.31	179.07	201.46	118.39	65.00	1120.46
10 1987	64.56	57.63	62.84	59.79	60.63	58.06	60.99	63.06	141.12	154.98	76.81	64.92	935.39
11 1988	64.37	59.48	62.61	59.53	60.37	57.73	59.65	60.13	58.93	62.46	61.90	64.05	731.21
12 1989	63.34	56.37	61.35	58.26	59.31	57.25	60.40	62.68	140.74	159.55	58.90	26.77	864.90
TOTAL	771.7	694.1	749.6	712.3	724.3	696.0	747.8	1052.1	1454.2	1809.2	1002.0	736.3	11149.6
AVE	64.31	57.84	62.46	59.36	60.36	58.00	62.32	87.68	141.18	150.77	83.50	61.36	939.13
MAX	64.77	56.48	62.85	59.79	61.74	60.50	64.55	140.88	179.07	201.46	118.39	65.00	1120.46
MIN	63.34	56.37	61.35	58.26	59.31	56.88	58.79	60.13	58.93	62.46	58.90	26.77	731.21

Result of Monthly Capacity
(The Dong Nai river system case-3 Ham Thuan - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	87.05	85.87	84.48	82.91	81.33	80.09	79.89	111.19	214.21	269.94	106.86	87.24	1371.06
2 1979	86.33	85.15	83.77	82.30	80.68	80.07	82.51	183.61	197.00	239.04	118.37	87.19	1395.93
3 1980	96.30	85.11	83.73	82.15	80.59	80.22	81.12	82.46	137.19	196.57	164.20	87.29	1246.73
4 1981	86.57	85.51	84.23	82.71	81.11	80.72	81.47	83.91	128.60	197.17	118.44	87.31	1197.75
5 1982	86.52	85.37	84.02	82.57	80.98	83.75	113.64	169.96	216.02	186.62	97.82	82.10	1371.36
6 1983	86.46	85.28	83.89	82.39	80.30	79.00	79.02	81.58	91.49	172.79	152.97	87.26	1162.50
7 1984	86.47	85.37	84.02	82.54	81.11	80.53	81.19	189.36	228.08	250.70	87.58	87.32	1424.25
8 1985	86.51	85.36	84.02	82.58	81.44	81.21	81.75	83.05	85.09	131.62	106.69	87.30	1096.63
9 1986	86.64	85.58	84.25	82.71	81.41	80.71	81.25	179.18	248.70	270.78	164.29	87.36	1332.87
10 1987	86.77	85.75	84.46	83.04	81.49	80.65	81.98	84.76	196.00	208.31	106.68	87.25	1267.15
11 1988	86.52	85.45	84.15	82.68	81.15	80.18	80.17	80.82	81.85	83.95	85.97	86.09	998.99
12 1989	85.13	83.89	82.46	80.91	79.72	79.52	81.18	84.24	195.47	214.42	81.80	35.98	1184.73
TOTAL	1037.26	1023.68	1007.49	989.26	973.50	966.64	1005.17	1414.14	2019.70	2431.72	1391.68	989.70	15249.93
AVE	86.44	85.31	83.96	82.44	81.13	80.55	83.76	117.85	168.31	202.64	115.97	82.47	1370.83
MAX	97.05	85.87	84.48	83.04	82.98	83.75	113.64	189.36	248.70	270.78	164.29	87.36	1532.87
MIN	85.13	83.89	82.46	80.91	79.72	79.00	79.02	80.82	81.85	83.95	81.80	35.98	998.99

Result of Reservoir Operation
 (The Dong Nai river system case-3 Ham Thuan - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-3 Da Mi - project)

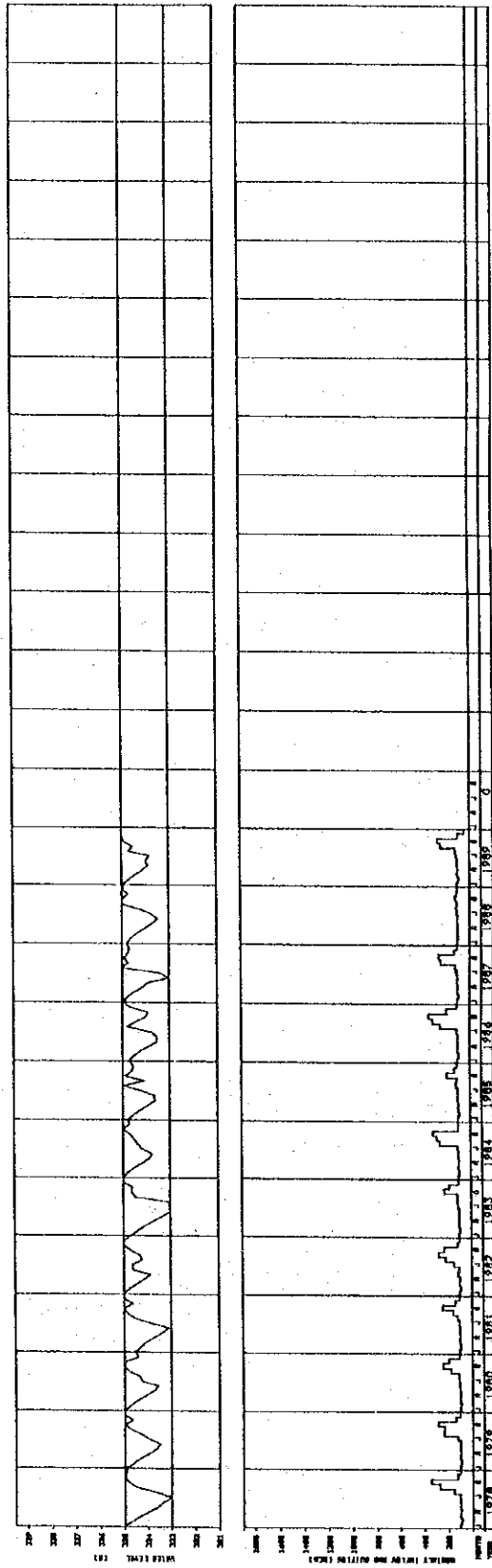
* MONTHLY TOTAL ENERGY (GWH) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	36.47	32.87	36.31	35.05	36.14	33.86	36.11	53.18	93.61	117.11	44.49	36.48	593.68
2 1979	36.45	32.86	36.30	35.05	36.16	35.03	41.96	82.59	80.12	100.29	48.09	36.50	601.42
3 1980	36.47	34.06	36.33	35.08	36.19	35.08	38.24	38.30	62.54	86.21	69.54	36.37	544.61
4 1981	36.36	32.80	36.24	34.99	36.09	34.98	36.32	42.12	55.37	86.31	48.09	36.51	516.18
5 1982	36.48	32.89	36.34	35.10	36.22	35.24	33.31	75.29	93.52	79.19	40.74	35.13	591.44
6 1983	36.40	32.81	36.25	34.99	36.08	34.87	37.92	38.11	40.73	79.07	62.50	36.50	506.23
7 1984	36.48	34.08	36.36	35.11	36.23	35.10	38.23	42.07	96.92	107.11	37.14	36.44	618.83
8 1985	36.42	32.84	36.28	35.04	36.16	35.02	36.41	86.22	37.04	68.24	44.38	36.42	476.41
9 1986	36.47	32.90	36.35	35.11	37.50	34.92	36.32	42.17	106.44	116.33	65.84	36.48	659.40
10 1987	36.44	34.04	36.32	35.07	36.18	35.01	36.27	42.17	83.54	89.86	44.22	36.45	546.00
11 1988	36.44	34.04	36.32	35.07	36.18	35.01	36.27	42.17	37.17	42.17	37.13	36.49	438.70
12 1989	36.46	32.89	36.33	35.10	36.25	36.90	38.22	42.10	83.47	92.17	33.93	15.42	519.24
TOTAL	437.3	397.9	435.7	420.7	437.4	423.1	465.7	668.2	870.5	1064.3	576.3	415.2	6612.1
AVE	36.44	33.16	36.31	35.06	36.45	35.26	38.80	55.68	72.54	88.69	48.02	34.60	551.01
MAX	36.48	34.08	36.36	35.11	38.22	36.90	53.31	89.64	106.44	117.11	69.54	36.51	659.40
MIN	36.36	32.80	36.24	34.99	36.08	34.87	36.11	36.42	37.04	42.17	33.93	15.42	438.70

Result of Monthly Capacity
(The Dong Nai river system case-3 Da Mi - project)

NO. YEAR	MONTHLY PEAK POWER (MW)												<TOTAL>
	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	
1 1978	49.02	48.92	48.80	48.68	48.58	49.80	48.53	71.47	130.01	157.41	61.80	49.03	812.05
2 1979	48.99	48.90	48.79	48.59	48.61	48.66	56.40	111.01	111.28	134.80	66.80	49.06	821.97
3 1980	49.02	48.93	48.83	48.72	48.64	48.72	51.39	51.48	86.86	116.15	96.58	48.89	744.22
4 1981	48.88	48.81	48.71	48.60	48.50	48.58	48.81	56.62	76.91	116.91	66.79	49.07	706.28
5 1982	49.03	48.94	48.84	48.73	48.63	48.95	71.66	101.20	129.89	106.44	56.58	47.22	808.85
6 1983	48.92	48.83	48.72	48.60	48.49	48.43	50.97	51.22	56.57	106.28	86.80	49.06	692.89
7 1984	49.04	48.96	48.86	48.76	48.69	48.74	48.94	120.48	134.61	143.97	51.58	48.98	844.07
8 1985	48.95	48.87	48.77	48.67	48.64	48.74	48.84	56.54	51.44	91.71	61.64	48.95	651.86
9 1986	48.95	48.87	48.77	48.66	48.60	48.64	48.84	115.88	147.84	156.36	91.45	49.01	901.87
10 1987	49.02	48.95	48.86	48.76	48.50	48.50	48.82	56.88	116.03	120.78	61.70	48.99	747.48
11 1988	48.97	48.81	48.81	48.71	48.62	48.62	48.75	48.95	51.62	56.88	51.57	49.05	599.27
12 1989	49.01	48.93	48.84	48.75	48.73	51.26	51.37	56.58	115.94	123.88	47.12	20.72	711.13
TOTAL	587.79	586.82	585.62	584.35	587.86	587.64	625.88	898.12	1209.01	1430.45	800.39	558.04	9041.95
AVE	48.98	48.90	48.80	48.70	48.99	48.97	52.16	74.81	100.75	119.20	66.70	46.50	753.50
MAX	49.04	48.96	48.86	48.76	48.76	51.26	71.66	120.48	147.84	157.41	96.58	49.07	901.87
MIN	48.88	48.81	48.71	48.60	48.49	48.43	48.53	48.95	51.44	56.88	47.12	20.72	599.27

Result of Reservoir Operation
 (The Dong Nai river system case-3 Da Mi - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-3 Tri Anh - project)

* MONTHLY TOTAL ENERGY (GMH) *

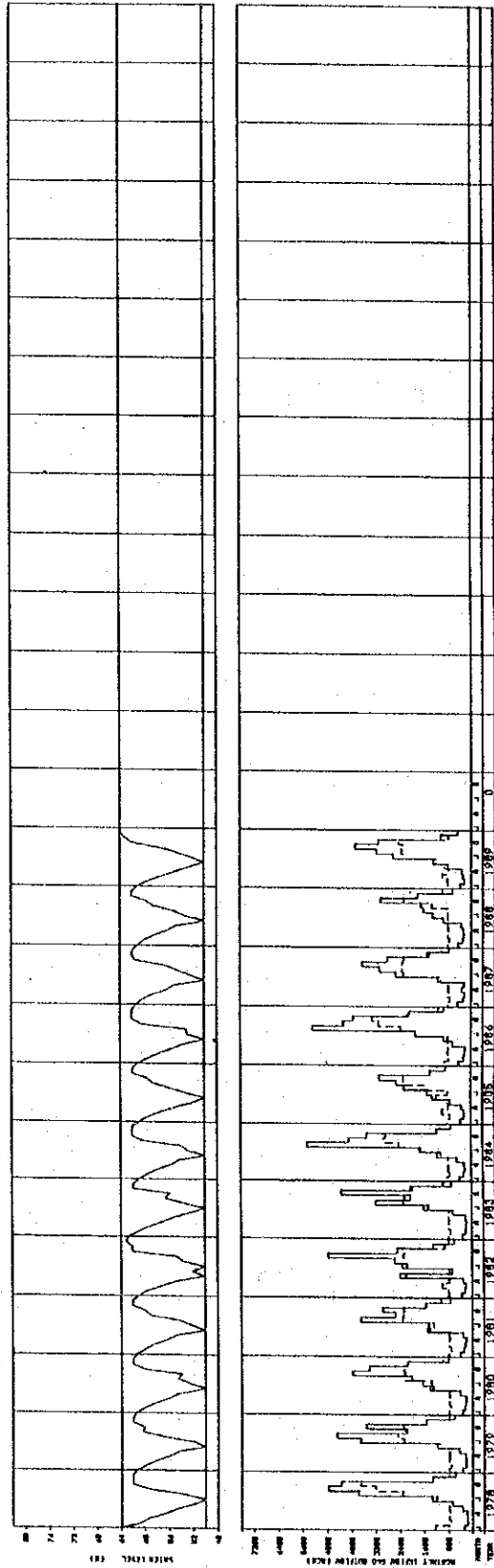
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1 1978	170.77	92.96	99.08	92.07	90.20	82.50	133.23	269.23	284.10	293.37	180.28	105.84	1893.83
2 1979	103.98	91.33	97.50	90.81	87.80	118.72	255.81	290.52	284.10	293.57	208.64	105.83	2028.62
3 1980	104.08	94.72	97.68	90.95	87.84	143.26	156.37	250.39	266.09	293.57	284.10	132.91	2001.86
4 1981	104.10	91.83	98.34	91.59	88.11	150.85	146.63	272.76	284.10	293.57	208.98	141.10	1971.97
5 1982	103.19	102.43	120.84	85.24	224.51	83.74	238.49	252.04	278.74	293.57	125.61	107.89	2007.26
6 1983	106.23	93.33	100.05	93.09	91.44	83.26	158.49	259.31	260.96	293.01	266.63	130.26	1936.26
7 1984	107.25	93.96	96.96	90.44	87.67	111.70	190.48	276.80	284.10	293.57	158.45	140.95	1932.33
8 1985	102.96	90.32	118.74	87.71	86.28	128.23	92.25	188.70	279.01	288.36	188.91	151.74	1803.18
9 1986	117.26	95.37	94.47	89.52	86.97	86.26	204.86	273.61	284.10	293.57	275.97	148.94	2053.12
10 1987	104.07	91.86	98.22	91.72	88.33	110.84	246.30	244.17	284.10	293.57	198.75	131.28	2003.22
11 1988	103.68	94.70	97.83	91.30	88.08	86.43	91.70	98.97	169.53	288.80	238.43	130.45	1577.89
12 1989	103.18	102.46	118.37	87.86	96.33	127.09	246.84	288.00	284.10	293.57	103.46	65.32	1898.60
TOTAL	1330.8	1135.7	1240.1	1082.3	1205.6	1311.8	2151.4	2942.5	3243.1	3512.3	2440.2	1492.5	23108.1
AVE	110.90	94.64	103.34	90.19	100.46	109.32	179.28	246.87	270.25	292.69	203.35	124.38	1925.68
MAX	170.77	102.56	120.84	93.09	224.51	150.85	255.81	290.52	284.10	293.57	284.10	151.74	2053.12
MIN	102.96	90.32	96.47	85.24	86.28	82.50	91.70	96.97	169.53	288.36	103.46	65.32	1577.89

Result of Monthly Capacity
(The Dong Nai river system case-3 Tri. Anh - project)

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	229.53	138.34	133.18	127.68	121.23	114.58	179.07	361.86	394.59	394.59	142.26	2387.49
2 1979	139.74	135.91	131.05	126.13	118.01	164.89	343.83	390.48	394.59	289.78	142.24	2771.26
3 1980	139.89	138.09	131.29	126.31	118.04	198.98	210.04	316.54	394.59	394.59	178.64	2734.60
4 1981	139.92	136.65	132.17	127.21	118.45	209.52	197.08	368.61	394.59	290.25	189.65	2696.67
5 1982	138.69	132.43	128.42	118.40	304.45	114.87	307.11	338.76	394.59	174.66	145.82	2738.33
6 1983	142.78	139.19	134.47	129.29	122.91	115.64	243.92	348.54	393.83	370.31	175.08	2647.51
7 1984	144.16	135.01	130.32	125.61	117.84	178.09	256.93	373.04	394.59	220.06	189.44	2634.82
8 1985	138.59	134.40	129.59	121.81	115.96	178.09	233.99	253.63	387.52	262.37	203.95	2467.28
9 1986	137.61	132.21	129.66	124.34	116.90	119.80	275.35	367.76	394.59	383.29	200.19	2806.30
10 1987	139.88	136.70	132.02	127.38	118.73	153.95	351.93	393.07	394.59	276.04	176.45	2736.44
11 1988	139.36	136.96	131.50	126.81	118.38	120.04	223.25	330.34	335.45	388.17	173.54	2135.85
12 1989	138.68	132.47	129.10	122.03	139.47	176.52	331.77	360.22	394.59	146.48	87.79	2593.72
TOTAL	1788.65	1675.44	1666.77	1503.20	1620.38	1822.01	2891.60	3981.85	4504.25	4720.89	2006.05	31570.25
AVE	149.05	139.62	138.90	125.27	135.03	151.83	240.97	331.82	375.35	393.41	167.17	2630.85
MAX	229.53	132.47	128.42	129.29	304.45	209.52	343.93	390.48	394.59	394.59	203.95	2806.30
MIN	138.39	134.40	129.66	118.40	115.96	114.58	123.25	130.34	235.45	146.48	87.79	2155.85

* MONTHLY PEAK POWER (MW) *

Result of Reservoir Operation
 (The Dong Nai river system case-3 Tri Anh - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-4 Dai Ninh - project)

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	24.69	82.31	100.35	96.39	98.82	95.13	165.42	220.08	215.27	222.44	173.94	66.31	1561.14
2 1979	74.62	90.91	100.82	96.04	98.52	143.93	219.99	222.44	215.27	222.44	208.41	71.32	1763.93
3 1980	72.24	94.18	100.86	96.09	98.53	113.02	199.55	216.32	215.38	222.44	215.27	95.47	1797.54
4 1981	76.31	90.99	100.17	96.23	98.61	188.51	189.99	220.24	215.27	222.44	214.46	101.11	1794.33
5 1982	100.82	97.87	107.54	99.97	182.37	191.15	217.04	220.18	215.27	222.44	168.52	69.99	1892.96
6 1983	31.50	71.71	100.50	96.57	98.95	95.16	192.86	219.08	215.27	222.44	215.27	80.30	1639.60
7 1984	98.99	94.07	99.93	95.97	98.48	139.61	206.63	220.88	215.27	222.44	144.38	101.13	1737.76
8 1985	100.83	90.60	99.84	95.68	101.66	158.12	178.23	216.91	215.27	222.44	180.79	109.35	1766.99
9 1986	100.96	90.78	99.87	95.85	100.87	188.53	215.86	221.06	215.27	222.44	215.27	112.40	1799.15
10 1987	80.69	91.00	100.16	96.28	98.67	135.54	217.62	222.31	215.27	222.44	188.16	88.90	1757.03
11 1988	88.11	94.18	100.08	96.18	98.60	111.54	144.78	187.40	167.70	198.56	200.94	101.11	1571.18
12 1989	100.78	90.55	99.62	95.71	115.24	153.62	217.81	222.44	215.27	222.44	127.65	58.94	1720.07
TOTAL	950.5	1079.1	1207.9	1157.0	1289.3	1673.9	2365.8	2589.3	2534.2	2645.4	2252.8	1056.3	20801.7
AVE	79.21	89.93	100.66	96.41	107.44	139.49	197.15	215.78	211.18	220.45	187.74	88.03	1733.47
MAX	100.96	97.87	107.54	99.97	182.37	191.15	219.99	222.44	215.27	222.44	215.27	112.40	1892.96
MIN	24.69	71.71	99.62	95.68	98.48	95.13	144.78	167.40	169.70	198.56	127.65	58.94	1561.14

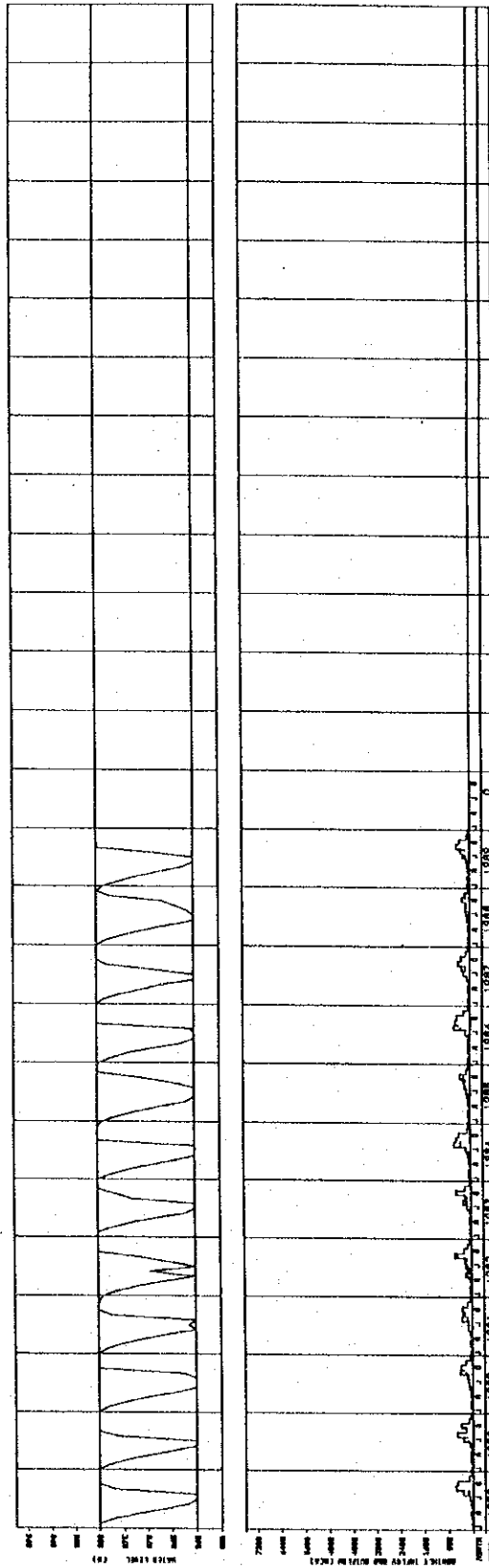
* MONTHLY TOTAL ENERGY (GMH) *

Result of Monthly Capacity
(The Dong Nai river system case-4 Dai Ninh - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	33.18	122.48	134.89	133.87	132.82	132.13	222.34	295.80	298.98	298.98	241.58	89.13	2136.18
2 1979	100.49	135.29	134.44	133.41	132.42	199.91	295.69	298.98	298.98	298.98	289.45	95.86	2413.70
3 1980	97.10	135.32	134.48	133.46	132.43	240.31	288.21	290.75	297.75	298.98	298.98	128.32	2456.09
4 1981	102.86	135.40	134.64	133.68	132.54	234.05	285.36	296.02	298.98	298.98	297.86	135.91	2855.96
5 1982	135.52	145.65	144.54	138.85	145.15	265.48	291.73	295.93	298.98	298.98	233.77	94.07	2888.63
6 1983	42.34	106.71	135.08	134.13	133.00	132.17	299.22	294.44	298.98	298.98	298.98	107.93	2241.97
7 1984	133.05	135.15	134.31	133.30	132.36	193.90	277.73	296.88	298.98	298.98	200.52	135.93	2371.09
8 1985	135.52	134.82	133.93	132.89	134.64	219.62	239.55	291.55	295.45	298.98	251.10	146.98	2417.03
9 1986	135.70	135.09	134.23	133.12	135.57	150.74	280.13	297.12	298.98	298.98	298.98	131.08	2159.73
10 1987	108.45	133.42	134.62	133.72	132.62	188.25	292.50	298.80	298.98	298.98	261.34	134.49	2403.16
11 1988	118.43	135.31	134.52	133.58	132.52	154.92	194.59	225.00	235.69	268.88	279.08	135.90	2146.44
12 1989	135.45	134.75	133.90	132.93	154.90	213.36	292.75	298.98	298.98	298.98	177.29	79.42	2351.50
TOTAL	1277.60	1591.38	1623.58	1606.91	1732.94	2324.83	3179.80	3480.27	3519.74	3555.69	3128.95	1419.82	28441.48
AVE	106.47	132.62	135.30	133.91	144.41	193.74	264.98	290.02	293.51	296.51	260.75	118.32	2370.12
MAX	135.70	145.65	144.54	138.85	145.15	265.48	295.69	298.98	298.98	298.98	298.98	131.08	2588.63
MIN	33.18	106.71	133.90	132.89	132.36	132.13	194.59	225.00	235.69	268.88	177.29	79.42	2136.18

Result of Reservoir Operation
 (The Dong Nai river system case-4 Dai Ninh - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-4 Tri Anh - project)

* MONTHLY TOTAL ENERGY (GWH) *

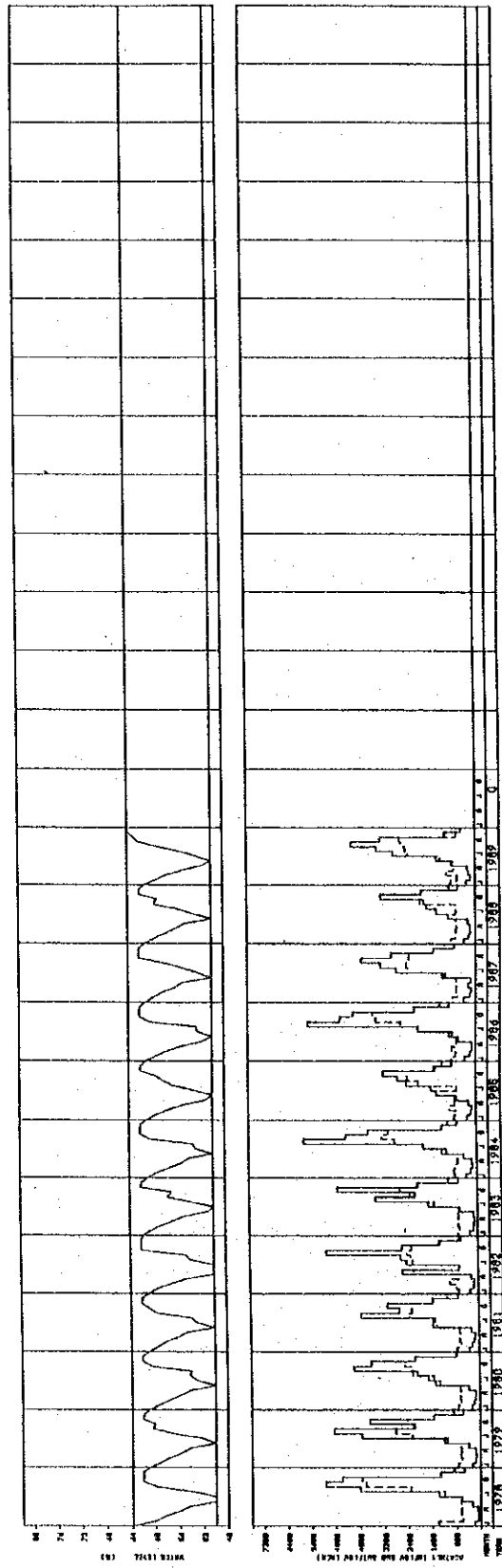
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1 1978	190.36	76.46	81.60	76.00	73.36	67.82	136.11	275.17	284.10	293.57	178.96	119.73	1850.66
2 1979	95.51	75.28	80.58	75.36	73.13	119.14	256.93	290.52	284.10	293.57	208.89	119.64	1972.68
3 1980	94.45	78.10	80.75	75.48	73.46	144.52	174.96	250.40	289.46	293.57	284.10	151.64	1970.20
4 1981	96.07	76.16	81.61	76.04	73.41	152.52	165.24	274.06	284.10	293.57	208.92	140.85	1922.35
5 1982	85.94	93.25	115.59	71.02	218.69	67.37	233.61	254.50	279.17	293.57	173.81	86.54	1975.07
6 1983	87.38	77.00	82.42	76.86	74.43	67.93	159.65	266.01	248.82	293.57	266.71	150.18	1850.97
7 1984	96.03	96.62	84.11	75.04	73.01	111.70	197.74	274.78	284.10	293.57	158.46	130.46	1875.62
8 1985	96.10	84.17	108.92	80.79	75.98	128.26	177.48	234.56	281.44	293.57	188.78	151.49	1801.54
9 1986	108.51	84.09	97.30	72.94	71.07	85.90	210.96	271.91	284.10	293.57	276.07	162.04	2016.48
10 1987	102.86	73.88	81.33	76.18	73.62	111.01	248.18	271.23	284.10	293.57	189.07	141.15	1948.20
11 1988	106.64	84.51	80.90	75.80	73.58	86.43	76.90	82.12	236.15	293.57	238.15	119.84	1554.38
12 1989	106.54	75.25	118.67	80.98	87.14	127.63	249.75	275.19	284.10	293.57	87.68	61.32	1851.85
TOTAL	1264.4	976.8	1093.6	912.5	1040.4	1269.7	2185.1	3020.5	3323.8	3523.9	2459.6	1520.9	22890.0
AVE	105.37	81.40	91.13	76.04	86.70	105.80	182.10	251.70	276.98	293.57	204.97	126.74	1882.50
MAX	190.36	96.62	118.67	80.98	218.69	152.52	256.95	290.52	284.10	293.57	284.10	162.04	2016.48
MIN	85.94	75.25	80.58	71.02	71.07	67.82	76.90	82.12	236.15	293.57	87.68	61.32	1554.38

Result of Monthly Capacity
(The Dong Nai river system case-4 Tri Anh - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	255.87	113.79	109.68	105.55	98.60	93.36	100.26	369.86	394.59	394.59	248.55	140.93	2525.63
2 1979	128.38	112.03	108.30	104.67	98.29	165.47	345.37	390.48	394.59	394.59	290.12	160.81	2693.10
3 1980	126.95	112.21	108.54	104.83	98.34	200.72	254.83	336.56	374.26	394.59	394.59	203.81	2690.02
4 1981	129.12	113.33	109.42	105.61	98.67	211.83	222.10	368.35	394.59	394.59	290.16	189.32	2627.10
5 1982	115.51	138.77	155.36	98.95	293.94	93.57	314.00	342.08	387.74	394.59	241.41	119.00	2694.60
6 1983	117.45	114.58	110.77	106.75	100.05	94.35	214.59	357.55	373.36	394.59	370.43	174.98	2599.44
7 1984	129.07	138.82	113.05	104.82	98.13	155.14	265.78	369.33	394.59	394.59	220.08	175.36	2598.14
8 1985	129.17	135.25	146.40	112.20	102.13	178.14	104.14	315.27	390.89	394.59	262.19	203.61	2463.98
9 1986	163.15	135.13	130.79	101.30	95.53	119.31	283.56	365.47	394.59	394.59	383.43	217.80	2754.65
10 1987	138.26	142.92	109.31	105.81	98.95	154.18	333.57	364.56	394.59	394.59	262.60	189.72	2659.07
11 1988	143.54	121.42	108.74	105.57	98.62	120.04	103.58	110.37	327.99	394.59	330.76	161.07	2125.57
12 1989	145.20	111.98	159.50	112.47	117.13	177.29	335.88	369.89	394.59	394.59	121.77	87.79	2525.89
TOTAL	1699.46	1440.21	1469.86	1267.33	1398.38	1763.41	2937.02	4059.76	4616.37	4735.08	3416.10	2044.19	30847.16
AVE	141.62	120.02	122.49	105.61	116.53	146.95	244.75	338.31	384.70	394.59	284.68	170.35	2570.60
MAX	255.87	138.82	159.50	112.47	293.94	211.83	345.37	390.48	394.59	394.59	394.59	217.80	2754.65
MIN	115.51	111.98	108.30	98.65	95.53	93.36	103.55	110.37	327.99	394.59	121.77	87.79	2125.57

Result of Reservoir Operation
 (The Dong Nai river system case-4 Tri Anh - project)



Result of Monthly Energy Calculation
 (The Dong Nai river system case-5 Dong Nai4 - project)

* MONTHLY TOTAL ENERGY (GWH) *

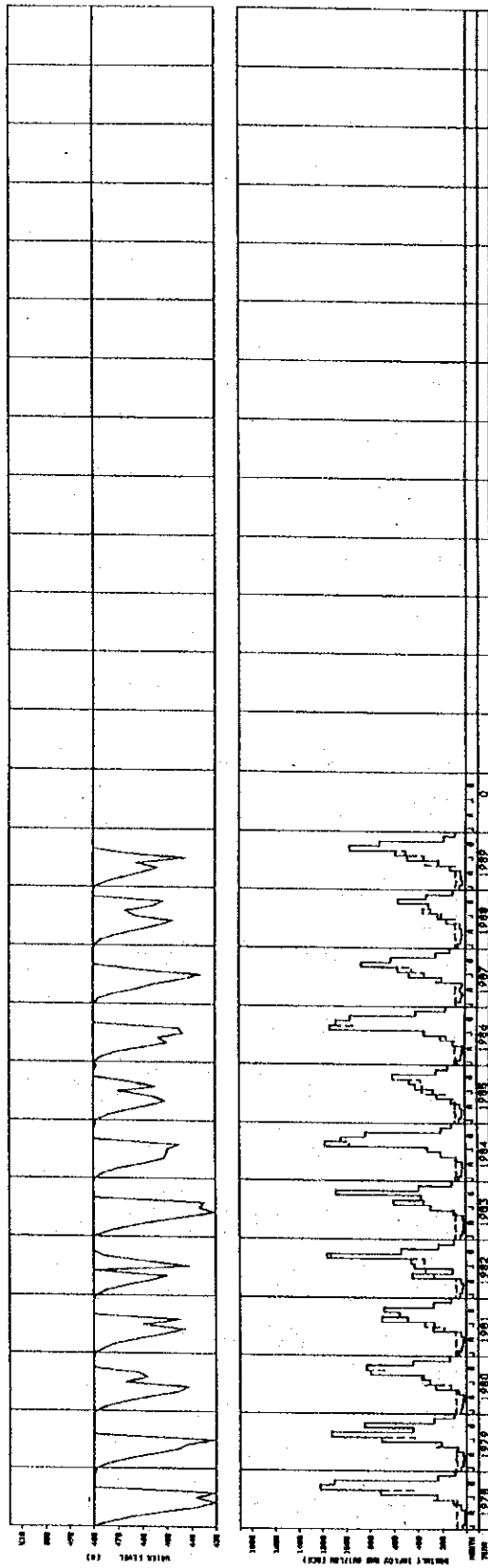
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1 1978	36.80	31.99	33.41	29.84	28.47	27.47	91.81	130.92	136.66	141.22	106.82	44.02	839.42
2 1979	36.81	32.21	33.99	30.94	30.46	87.65	130.92	141.22	136.66	141.22	120.04	48.93	971.03
3 1980	36.81	33.41	34.13	31.06	30.46	49.56	130.92	137.12	136.66	141.22	136.66	63.44	971.04
4 1981	37.03	32.75	34.94	32.02	31.17	72.06	130.92	140.36	136.66	141.22	120.04	58.59	963.87
5 1982	36.85	32.31	34.17	31.50	110.24	130.03	134.06	141.22	136.66	141.22	102.53	44.80	1065.59
6 1983	36.98	32.34	34.09	30.83	29.04	27.30	99.52	133.72	136.66	141.22	136.66	53.80	892.15
7 1984	37.05	33.87	34.74	31.93	31.97	78.84	121.22	140.59	136.66	141.22	93.49	53.71	935.28
8 1985	36.86	32.34	34.24	31.60	32.56	64.89	120.32	137.53	136.66	141.22	111.05	63.34	962.60
9 1986	37.17	32.84	34.87	31.84	32.19	78.07	117.36	140.75	136.66	141.22	136.66	73.08	972.69
10 1987	37.25	33.01	35.14	32.54	31.91	83.94	123.20	141.22	136.66	141.22	111.35	58.65	966.08
11 1988	37.15	34.06	35.10	32.42	31.99	51.77	85.07	139.28	124.69	141.22	136.66	48.94	878.36
12 1989	36.95	32.43	34.53	32.14	33.42	122.89	130.89	141.22	136.66	141.22	81.91	37.48	961.72
TOTAL	443.7	393.5	413.3	378.6	453.9	854.5	1431.9	1665.1	1628.0	1694.6	1393.9	648.8	11399.8
AVE	36.97	32.80	34.44	31.55	37.82	71.21	119.33	138.76	135.66	141.22	116.15	54.07	949.99
MAX	37.25	34.06	35.14	32.54	110.24	130.03	140.52	141.22	136.66	141.22	136.66	73.08	1065.59
MIN	36.80	31.99	33.41	29.84	28.47	27.30	85.07	130.92	124.69	141.22	81.91	37.48	839.42

Result of Monthly Capacity
(The Dong Nai river system case-5 Dong Nai4 - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	49.46	47.60	44.91	41.45	38.26	38.15	123.41	175.97	189.81	189.81	148.36	59.16	1146.33
2 1979	49.48	47.94	45.69	42.97	40.94	121.74	175.97	189.81	189.81	189.81	166.72	65.76	1326.61
3 1980	49.48	48.01	45.87	43.14	40.94	68.83	188.87	184.30	189.81	189.81	189.81	85.27	1324.12
4 1981	49.77	48.73	46.96	44.47	41.90	100.09	170.74	188.66	189.81	189.81	166.72	78.75	1316.40
5 1982	49.53	48.08	45.93	43.75	41.81	180.59	166.73	189.81	189.81	189.81	142.40	60.21	1454.85
6 1983	49.70	48.12	45.82	42.82	39.03	37.92	133.76	179.73	189.81	189.81	189.81	72.51	1218.63
7 1984	49.80	48.46	46.69	44.34	42.97	109.51	162.93	188.97	189.81	189.81	129.85	72.19	1275.51
8 1985	49.54	48.32	46.02	43.89	43.77	90.12	188.60	184.85	189.81	189.81	154.23	85.13	1313.89
9 1986	49.96	48.87	46.86	44.82	43.27	108.43	157.74	189.18	189.81	189.81	189.81	98.22	1356.17
10 1987	50.07	49.12	47.23	45.19	42.89	116.59	165.59	189.81	189.81	189.81	154.65	78.84	1319.58
11 1988	49.93	48.94	47.17	45.02	43.00	144.34	114.34	187.20	173.18	189.81	189.81	65.81	1198.33
12 1989	49.66	48.25	46.41	44.64	44.92	170.68	175.92	189.81	189.81	189.81	113.77	50.38	1314.03
TOTAL	596.37	580.44	555.56	525.90	610.06	1186.77	1924.61	2238.09	2261.05	2277.67	1935.91	872.04	18564.46
AVE	49.70	48.37	46.30	43.83	50.84	98.90	160.58	186.51	188.42	189.81	161.33	72.67	1297.04
MAX	50.07	49.12	47.23	45.19	48.18	180.59	188.87	189.81	189.81	189.81	189.81	98.22	1454.85
MIN	49.46	47.60	44.91	41.45	38.26	37.92	114.34	175.97	173.18	189.81	113.77	50.38	1146.33

Result of Reservoir Operation
 (The Dong Nai river system case-5 Dong Nai4 - project)



Result of Monthly Energy Calculation
(The Dong Nai river system case-6 Dong Nai8 - project)

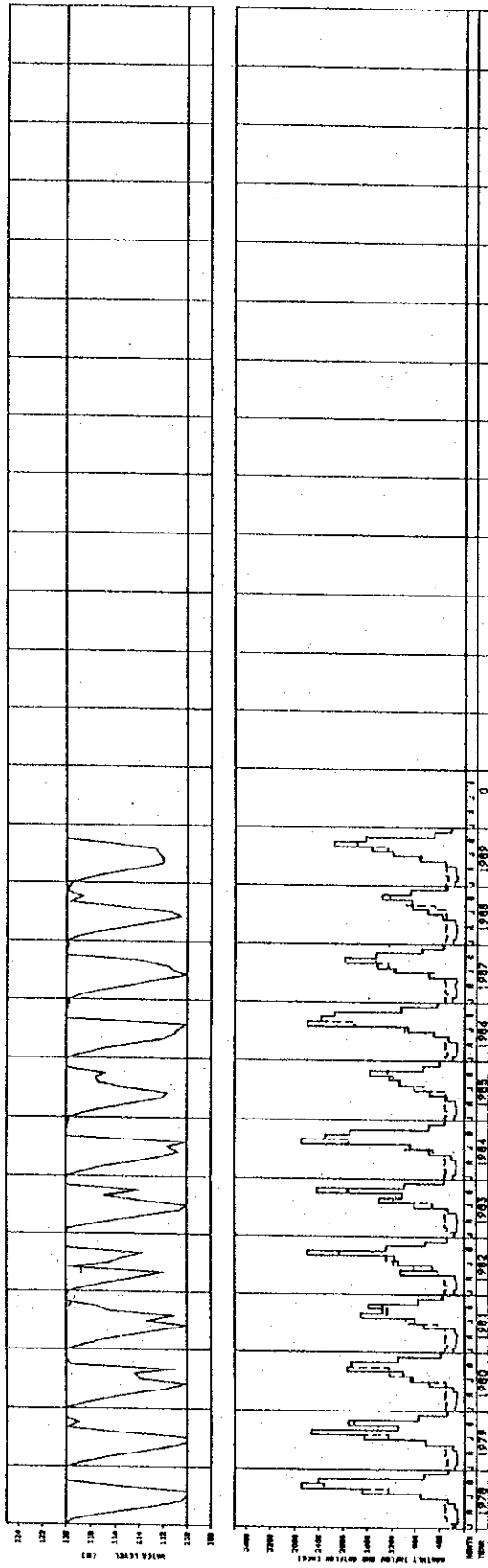
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1 1978	25.71	38.40	41.01	38.02	37.60	35.48	79.62	135.04	148.42	153.37	88.33	36.01	857.02
2 1979	42.91	37.72	40.32	37.38	37.13	71.57	134.41	153.37	148.42	153.37	99.90	39.20	993.70
3 1980	42.21	39.12	40.40	37.45	37.13	36.70	101.90	133.80	141.27	153.37	139.67	52.32	953.35
4 1981	43.00	37.93	40.69	37.79	37.33	51.53	109.53	139.63	148.42	153.37	99.89	50.42	949.53
5 1982	42.80	37.60	40.30	37.39	52.39	106.06	137.58	142.64	147.70	153.37	85.35	37.45	1021.10
6 1983	24.39	38.63	41.38	38.48	37.92	35.54	62.91	136.20	141.59	153.30	127.24	44.95	882.34
7 1984	42.97	39.21	40.53	37.67	37.60	59.94	108.94	144.48	148.42	153.37	80.01	43.34	936.48
8 1985	42.85	37.66	40.28	37.50	37.86	37.72	82.73	129.92	148.42	153.37	90.11	55.96	892.56
9 1986	42.97	37.88	40.55	37.58	37.64	59.66	106.64	144.68	148.42	153.37	135.37	59.44	1004.01
10 1987	42.99	37.93	40.65	37.89	37.48	59.19	120.81	134.97	148.42	153.37	94.91	44.92	953.55
11 1988	43.06	39.36	40.75	37.97	37.67	36.01	38.96	64.30	145.42	153.37	118.15	43.24	778.26
12 1989	42.64	37.46	40.13	37.44	37.96	82.67	127.26	141.16	148.42	153.37	68.50	31.45	948.45
TOTAL	478.5	458.9	486.9	452.6	465.7	672.1	1211.3	1600.0	1741.5	1840.4	1228.0	538.7	11174.5
AVE	39.87	38.24	40.57	37.71	38.81	56.01	100.94	133.33	145.13	153.36	102.33	44.89	931.21
MAX	43.06	39.36	41.38	38.48	52.39	106.06	137.58	153.37	148.42	153.37	139.67	59.44	1031.10
MIN	24.39	37.46	40.13	37.38	37.13	35.48	38.96	64.30	135.42	153.30	68.50	31.45	778.26

Result of Monthly Capacity
(The Dong Nai river system case-6 Dong Nai8 - project)

* MONTHLY PEAK POWER (MW) *

NO. YEAR	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< TOTAL >
1 1978	34.56	37.14	55.11	52.81	50.54	49.28	107.02	181.51	206.14	206.14	122.68	48.40	1171.34
2 1979	57.67	56.13	54.19	51.92	49.91	99.40	180.66	204.14	206.14	206.14	138.75	52.69	1359.74
3 1980	56.73	56.21	54.30	52.01	49.94	50.98	136.98	179.84	196.20	206.14	193.99	70.32	1303.61
4 1981	57.79	56.44	54.69	52.48	50.18	71.57	147.82	187.68	206.14	206.14	138.74	67.77	1366.84
5 1982	57.52	55.95	54.03	51.93	70.42	147.30	184.92	191.72	205.14	206.14	119.35	50.35	1394.75
6 1983	32.79	57.49	55.62	53.44	50.94	49.37	84.56	183.07	196.65	206.09	176.73	60.42	1207.14
7 1984	57.76	56.34	54.48	52.82	50.53	83.25	146.42	194.20	206.14	206.14	111.13	58.26	1276.96
8 1985	57.59	56.05	54.14	52.09	50.89	52.39	111.99	174.62	203.61	206.14	125.15	75.21	1319.07
9 1986	57.76	56.38	54.50	52.19	50.59	82.86	143.34	194.20	206.14	206.14	188.01	79.89	1372.00
10 1987	57.78	56.47	54.64	52.63	50.37	82.86	162.38	181.41	206.14	206.14	131.81	60.38	1302.37
11 1988	57.88	56.55	54.78	52.74	50.63	50.01	52.37	86.42	174.20	206.14	164.10	58.12	1063.93
12 1989	57.31	55.75	53.93	52.00	51.02	114.82	171.05	189.73	206.14	206.14	93.13	42.28	1295.29
TOTAL	643.14	676.89	654.40	628.55	635.98	933.44	1428.08	2150.53	2418.79	2473.60	1705.57	724.06	15263.03
AVE	53.59	56.41	54.53	52.38	52.16	77.79	135.67	179.21	201.57	206.13	142.13	60.34	1271.92
MAX	57.88	57.49	55.62	53.44	70.42	147.30	184.92	206.14	206.14	206.14	193.99	79.89	1394.75
MIN	32.79	55.75	53.93	51.92	49.91	49.28	52.37	86.42	174.20	206.05	93.13	42.28	1063.93

Result of Reservoir Operation
 (The Dong Nai river system case-6 Dong Nai8 - project)



Result of Monthly Energy Calculation
(The Dong Nai river system case-6 Tri Anh - project)

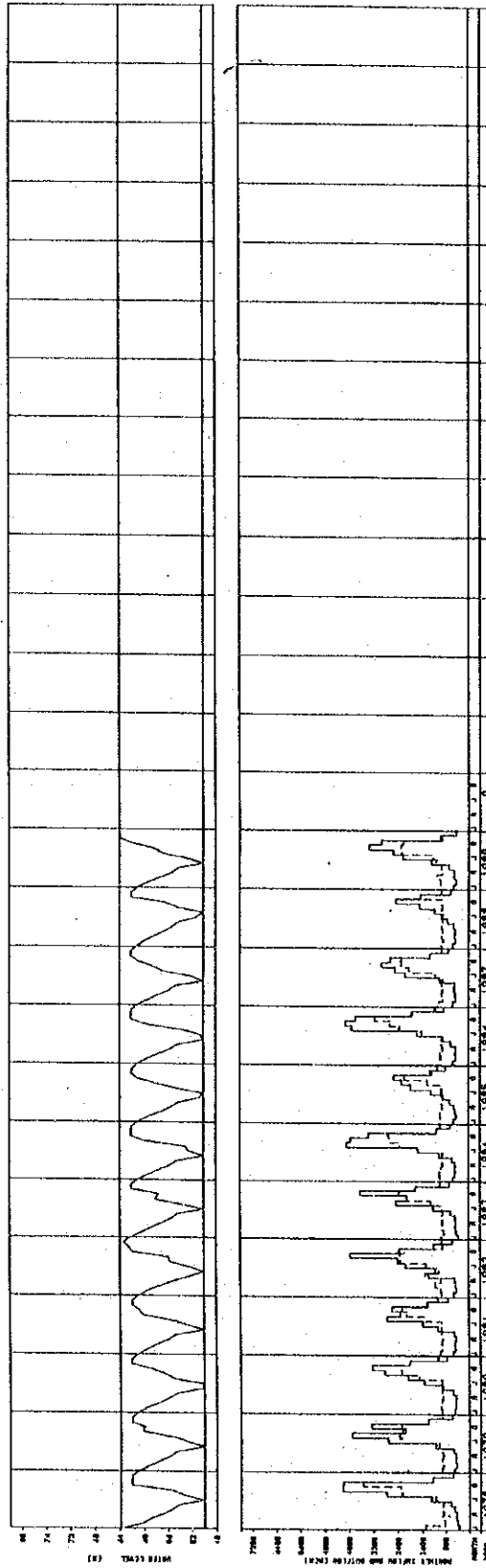
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1 1978	203.10	108.43	116.37	108.94	109.33	99.58	124.68	253.99	281.06	293.57	168.68	123.67	1991.42
2 1979	120.89	112.52	113.68	106.59	103.22	111.41	250.34	282.16	284.10	293.57	189.04	123.90	2091.43
3 1980	121.24	120.58	113.76	106.65	103.24	94.87	104.39	201.14	272.09	286.63	246.92	141.12	1932.63
4 1981	127.70	115.90	114.08	106.92	103.36	102.90	107.78	191.25	289.17	291.87	188.70	140.84	1860.49
5 1982	121.01	120.67	137.76	108.70	159.81	111.15	167.68	266.09	283.53	286.21	122.73	126.62	2011.97
6 1983	123.72	128.70	116.82	109.42	109.59	99.62	102.92	156.86	271.69	291.85	238.37	130.57	1860.14
7 1984	127.77	125.25	115.42	106.43	103.16	97.64	187.97	271.91	284.10	293.57	148.17	130.48	1991.88
8 1985	127.56	120.64	118.99	106.10	104.01	95.33	103.12	112.82	181.01	283.08	178.62	140.93	1672.40
9 1986	127.72	120.98	119.57	106.18	103.02	95.13	176.32	271.63	284.10	293.57	257.46	151.76	2107.45
10 1987	137.99	109.50	114.01	106.96	103.45	97.33	132.93	246.08	284.10	293.57	176.35	124.24	1926.54
11 1988	122.12	111.59	115.76	108.53	109.10	101.03	99.40	102.77	166.93	119.13	119.72	123.88	1638.96
12 1989	127.63	120.73	131.00	105.65	102.85	120.01	143.42	270.71	284.10	293.57	124.38	60.07	1884.32
TOTAL	1588.4	1395.5	1427.2	1287.1	1314.1	1226.2	1700.9	2627.4	3086.0	3320.2	2278.3	1518.1	22769.6
AVE	132.37	116.29	118.94	107.26	109.51	102.19	141.75	218.95	257.17	276.69	189.86	126.51	1897.47
MAX	203.10	125.25	137.76	109.42	159.81	120.01	250.34	282.16	284.10	293.57	266.92	151.76	2107.45
MIN	120.89	108.43	113.68	105.65	102.85	94.87	99.40	102.77	106.93	119.13	122.73	60.07	1438.96

Result of Monthly Capacity
(The Dong Nai river system case-6 Tri Anh - project)

* MONTHLY PEAK POWER (MW) *

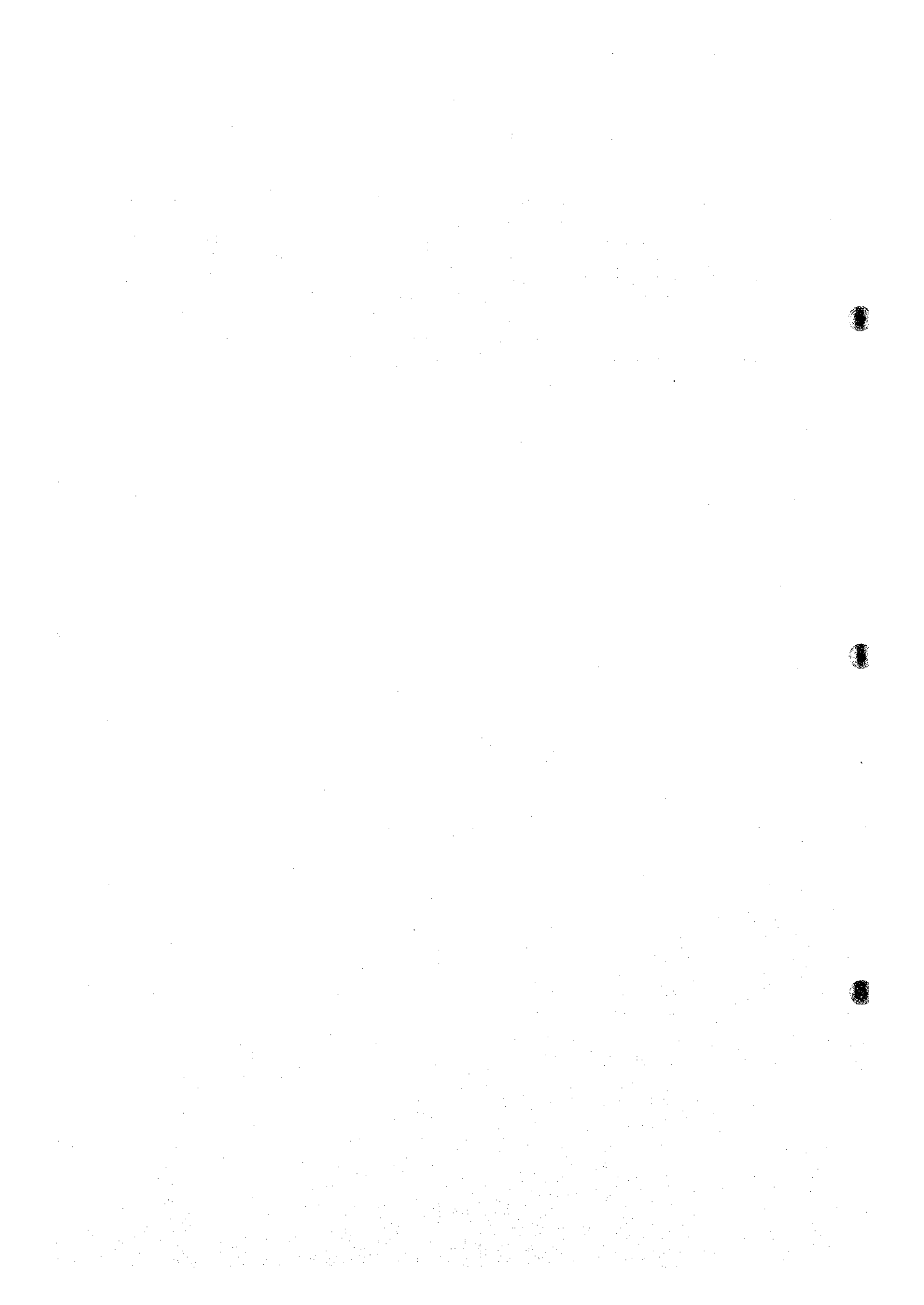
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1 1978	272.99	161.35	156.42	151.31	146.95	138.31	167.58	341.39	390.37	394.59	234.28	166.23	2721.74
2 1979	162.48	167.45	152.79	148.04	138.74	154.74	336.48	379.25	394.59	394.59	262.55	166.53	2858.24
3 1980	162.95	173.25	152.91	148.12	138.76	131.77	140.31	270.35	377.90	385.24	370.72	189.67	2641.98
4 1981	171.84	172.47	153.24	148.50	138.93	142.92	144.86	237.06	373.85	392.30	262.09	189.31	2547.27
5 1982	162.65	179.57	153.16	150.97	144.80	154.38	225.38	337.85	393.79	384.59	170.46	170.19	2749.69
6 1983	166.29	161.76	157.02	151.97	147.30	138.37	138.33	210.84	377.35	392.37	331.08	175.49	2548.06
7 1984	171.73	179.96	155.13	147.82	138.66	135.61	252.65	345.46	394.59	394.59	203.79	175.37	2717.38
8 1985	171.45	179.53	159.93	147.36	139.80	132.68	138.60	151.44	251.40	380.48	248.09	189.42	2290.37
9 1986	171.47	180.02	160.72	147.47	138.44	132.13	236.98	365.10	394.59	394.59	357.58	203.98	2883.30
10 1987	165.47	162.95	153.24	148.56	139.05	135.18	178.67	330.75	394.59	394.59	244.92	167.02	2634.99
11 1988	164.13	160.32	155.59	150.74	146.64	140.35	133.60	138.13	148.51	160.12	303.77	166.50	1968.41
12 1989	171.54	179.65	176.08	146.74	138.23	166.68	192.77	363.86	394.59	394.59	173.03	80.74	2578.50
TOTAL	2135.00	2058.29	1918.32	1787.61	1766.33	1703.09	2286.22	3531.47	4286.13	4462.66	3164.36	2040.44	31139.90
AVE	177.92	171.52	159.86	148.97	147.19	141.92	190.52	294.29	357.18	371.89	263.70	170.04	2594.99
MAX	272.99	180.02	185.16	151.97	144.80	166.68	336.48	379.25	394.59	394.59	370.72	203.98	2883.30
MIN	162.48	160.32	152.79	146.74	138.23	131.77	133.60	138.13	148.51	160.12	170.46	80.74	1968.41

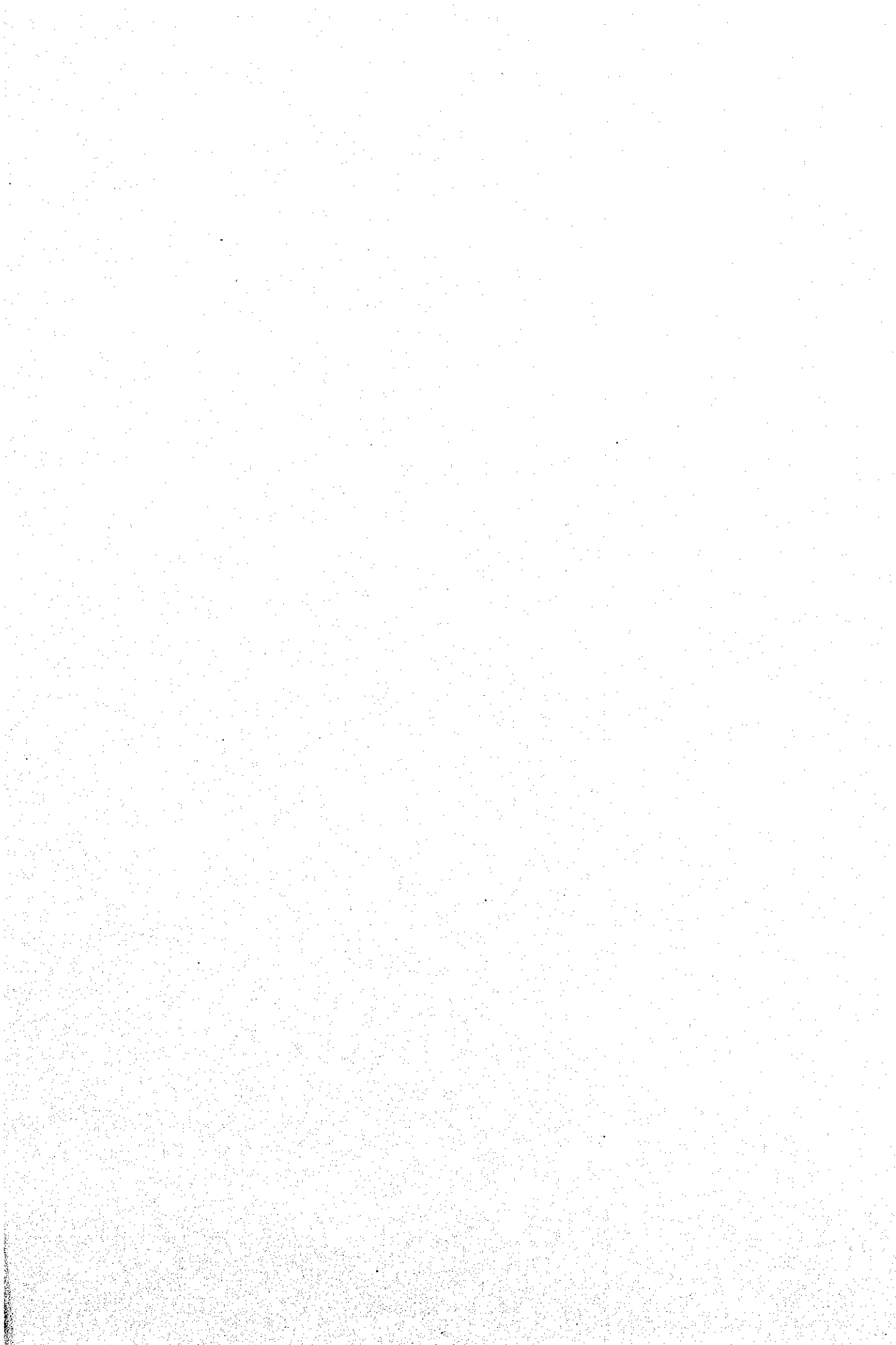
Result of Reservoir Operation
 (The Dong Nai river system case-6 Tri Anh - project)



6.2.3 Back Ground of Civil Work Cost Review

The main work is composed of the items of the civil works for dam, water way, and power plant. The items are open excavation of soil and rocks, tunnel excavation, embankment of impervious core, filter, and rocks, which are especially for dam embankment, concrete for open and tunnel structure, reinforce bar, and access road for the project site. For the cost estimation of the civil work, diversion system during dam construction and service facilities for the site installing are also necessary besides the main work cost. These are estimated by applying ratio with total cost of main structure for each item, referring to "Pre-F/S Report of Son La hydropower project" by PIDC1 and past records of other hydropower projects in the Southeast Asian area. The unit price of access road per km is applied from "Pre-F/S Report of Son La project" by PIDC1.

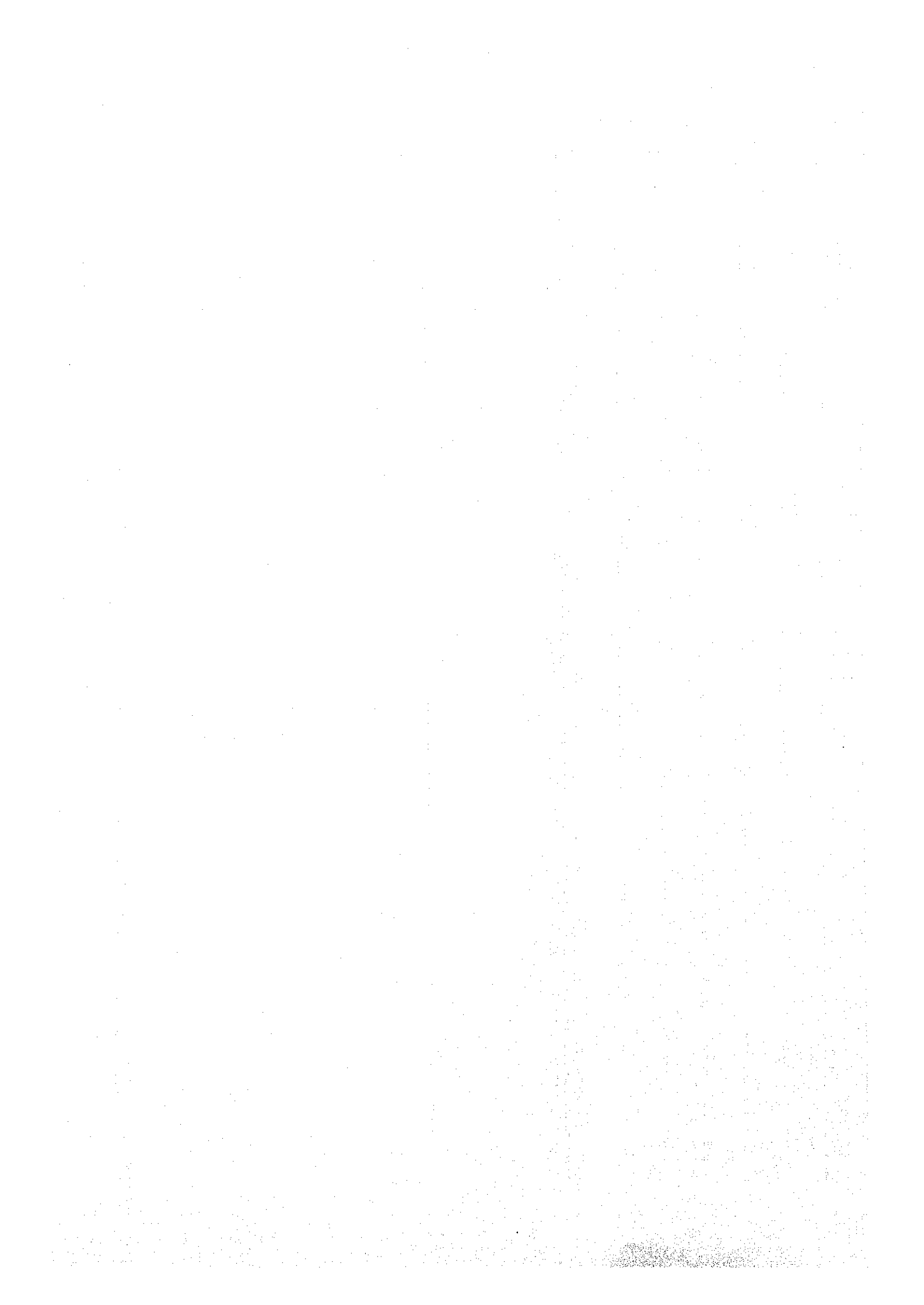




Appendix 6.2-4 Result of the Review of Civil Work Cost 1

Unit: 1,000US\$

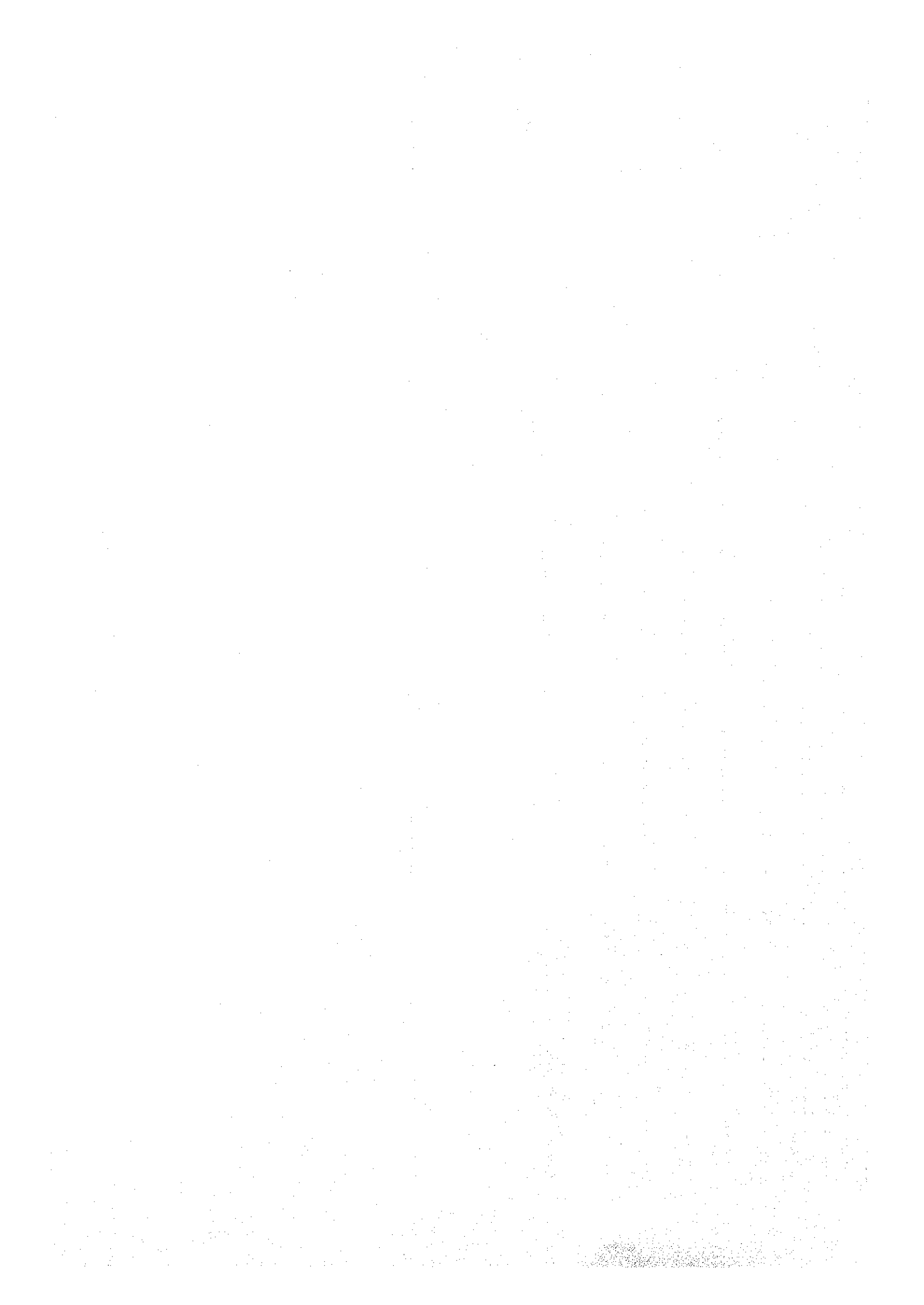
	Unit	Son La (S)		Son La (L)		Hanoi Quan		Dai Thi		Ban Mai		Son Con 2	
		Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Investment Cost													
A.Civil Work			2,050,309		3,486,228		735,128		301,485		413,322		100,143
1.Excavation	1000m3	4,612	13,836	7,380	22,140	624	1,871	2,973	8,919	857	2,571	564	1,692
Earth	1000m3	25,322	177,254	42,860	300,020	2,392	16,743	2,065	14,455	4,371	30,597	807	5,649
Rock	1000m3	490	52,920	870	93,960	608	65,686	118	12,744	309	33,372	190	20,520
Underground	1000m3												
2.Embankment	1000m3	2,110	6,330	5,160	15,480	0	0	575	1,725	690	2,070	150	450
Earth	1000m3	24,038	144,228	57,380	344,280	0	0	4,302	25,812	5,779	34,674	100	600
Rock	1000m3	1,517	22,755	3,860	57,900	0	0	250	3,750	332	4,980	980	14,700
Sand and gravel	1000m3												
3.Concrete	1000m3	1,970	256,100	2,841	369,330	1,661	215,956	235	30,498	233	30,297	47	6,123
Open	1000m3	179	35,800	303	60,600	218	43,660	52	10,380	112	22,480	66	13,120
Underground	t	64,442	48,718	96,300	72,803	32,482	24,556	9,209	6,962	111,370	84,196	4,825	3,648
Re-Bars	km	40	50,120	40	50,120	15	18,795	0	0	10	12,530	20	25,060
4.Access Road													
Sub Total			808,061		1,386,633		387,267		115,245		257,767		91,562
General Site													
Installation	10%		80,806		138,663		38,727		11,525		25,777		9,156
Diversion	15%		121,209		207,995		58,090		17,287		38,665		13,734
Others	10%		80,806		138,663		38,727		11,525		25,777		9,156
Total			1,090,882		1,871,954		522,811		155,582		347,986		123,608
Cost by PIDC-1			1,133,957		2,043,412		423,047		132,779		208,924		59,137
Difference/Investment cost			-2.00%		-5.00%		14.00%		8.00%		34.00%		64.00%
B.Hydro-Mechanical equipment													
Metal Structure	ton	19,070	133,490	20,810	145,670	11,420	79,940	1,844	12,908	3,589	25,123	1,466	10,262
Lifting Machine	ton	2,910	23,280	3,160	25,280	1,160	9,280	610	4,880	1,001	8,008	375	3,000
Total			156,770		170,950		89,220		17,788		33,131		13,262
Cost by PIDC-1			82,353		89,734		22,152		13,095		50,960		6,583
Difference/Investment cost			4.00%		2.00%		9.00%		2.00%		-4.00%		7.00%
C.Electro-mechanical Equipment													
Installed Capacity	MW	2400	-	3600	-	800	-	250	-	375	-	60	-
Number of Unit	MW/Unit	10	-	12	-	4	-	3	-	3	-	2	-
Unit Capacity	1,000US\$	240	-	300	-	200	-	83	-	125	-	30	-
Unit Cost		34,400	-	51,443	-	31,000	-	19,000	-	23,000	-	11,000	-
Cost	1,000US\$	-	344,000	-	617,320	-	124,000	-	57,000	-	69,000	-	22,000
Cost by PIDC-1	1,000US\$	-	424,320	-	636,480	-	149,760	-	50,185	-	32,172	-	9,947
Difference/Investment cost	%		-4.00%		-1.00%		-4.00%		2.00%		9.00%		12.00%
D.Transmission Lines													
Cost by PIDC-1	1,000US\$	-	0	-	0	-	22,080	-	12,075	-	33,120	-	4,140
E.Contingency	1,000US\$	-	76,413	-	128,356	-	27,652	-	9,092	-	12,854	-	3,490
Cost by PIDC-1	1,000US\$	-	0	-	0	-	0	-	0	-	0	-	0
F.Land	1,000US\$	-	0	-	0	-	0	-	0	-	0	-	0
G.Administration and Engineering Fee	1,000US\$	-	171,704	-	289,798	-	62,261	-	20,516	-	30,491	-	7,916
Cost by PIDC-1	1,000US\$	-	161,562	-	298,448	-	28,176	-	63,743	-	44,800	-	8,930
H.Compensation	1,000US\$	-	0	-	0	-	0	-	0	-	0	-	0
TOTAL			2,050,309		3,486,228		735,128		301,485		413,322		100,143
Cost by JICA Team	1,000US\$		2,001,331		3,376,826		876,200		335,796		626,582		183,346
Cost by PIDC-1	1,000US\$		2,050,309		3,486,228		735,128		301,485		413,321		100,143
Difference of the review	1,000US\$		-48,978		-109,402		141,072		34,311		213,261		83,203
Total Difference Ratio	%		-2.00%		-4.00%		19.00%		12.00%		52.00%		83.00%

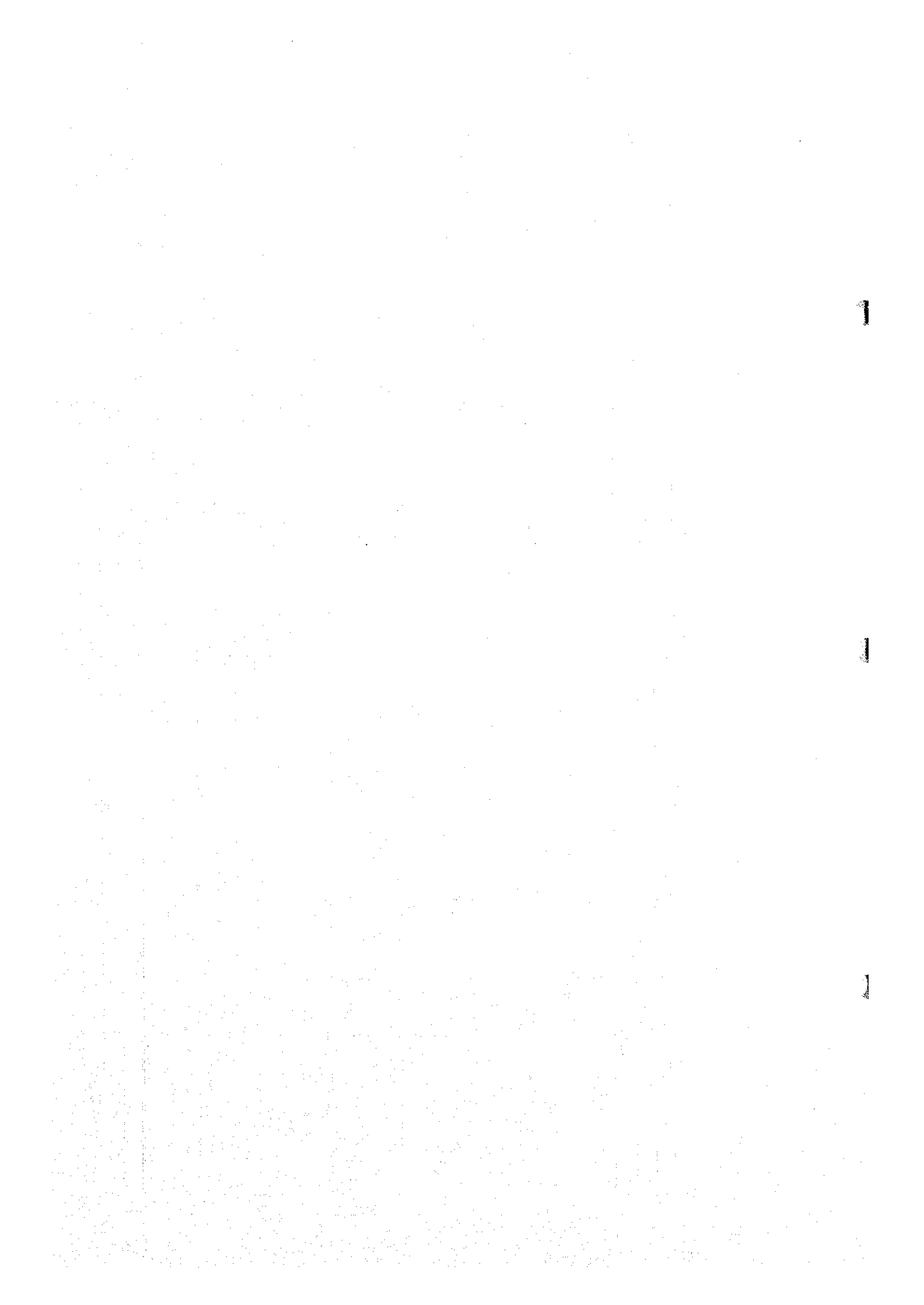


Appendix 6.2-4 Result of the Review of Civil Work Cost 2

Unit: 1,000US\$

Project Name		Cua Dat		An Khe		Plei Krong		Sesan 3		Sesan 4		Thuong Kontum	
Unit	Unit Price	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Investment Cost													
A.Civil Work			200,000		171,397		250,913		188,152		514,532		275,526
1.Excavation													
1000m3	3.00 (US\$)	1,800	5,400	1,310	3,930	4,171	12,513	388	1,165	1,335	4,005	1,062	3,186
1000m3	7.00	540	3,780	461	3,227	2,066	14,461	986	6,904	580	4,057	2,892	20,241
1000m3	108.00	0	0	50	5,400	27	2,873	49	5,270	129	13,975	149	16,092
2.Embankment													
1000m3	3.00	500	1,500	4,703	14,109	1,385	4,156	420	1,260	1,742	5,226	1,020	3,060
1000m3	6.00	0	0	364	2,184	3,199	19,196	2,280	13,679	9,456	56,736	2,680	16,080
1000m3	15.00	0	0	156	2,340	533	7,992	300	4,493	1,244	18,663	470	7,050
3.Concrete													
Open	130.00	600	78,000	114	14,872	91	11,804	102	13,260	167	21,723	64	8,307
1000m3	200.00	0	0	14	2,800	10	2,020	18	3,620	49	9,860	49	9,840
Underground	756.00	6,032	4,560	4,392	3,320	4,717	3,566	6,007	4,541	10,807	8,170	4,189	3,167
Re-Bars	1253.00	16	20,048	15	18,795	10	12,530	0	0	0	0	40	50,120
4.Access Road													
Sub Total			113,288		70,977		91,111		54,192		142,415		137,143
General Site													
Installation	10%		11,329		7,098		9,111		5,419		14,242		13,714
Diversion	15%		16,993		10,647		13,667		8,129		21,362		20,571
Others	10%		11,329		7,098		9,111		5,419		14,242		13,714
Total			152,939		95,820		123,000		73,159		192,261		185,142
Cost by PIDC-1			115,909		70,797		146,788		92,500		260,988		151,710
Difference/Investment Cost			19.00%		15.00%		-9.00%		-10.00%		-13.00%		12.00%
B.Hydro-Mechanical equipment													
Metal Structure	7,000.00	1,680	11,760	5,041	35,287	1,849	12,943	2,514	17,598	4,111	28,780	9,621	67,347
Lifting Machine	8,000.00	470	3,760	255	2,040	395	3,160	450	3,600	1,035	8,280	200	1,600
Total			15,520		37,327		16,103		21,198		37,060		68,947
Cost by PIDC-1			12,089		16,645		9,669		13,246		20,939		26,439
Error Ratio			2.00%		12.00%		3.00%		4.00%		3.00%		15.00%
C.Electro-mechanical Equipment													
Installed Capacity	MW	105	-	116	-	120	-	220	-	366	-	260	-
Number of Unit		3	-	3	-	2	-	2	-	3	-	4	-
Unit Capacity	MW/Unit	35	-	39	-	60	-	110	-	122	-	65	-
Unit Cost	1,000US\$	13,000	-	9,000	-	13,000	-	22,000	-	21,000	-	16,000	-
Cost	1,000US\$	-	39,000	-	27,000	-	26,000	-	44,000	-	63,000	-	64,000
Cost by PIDC-1	1,000US\$	-	18,892	-	20,509	-	21,590	-	45,760	-	76,127	-	45,967
Difference/Investment Cost	%		10.00%		4.00%		2.00%		-1.00%		-3.00%		7.00%
D.Transmission Lines													
Cost by PIDC-1	1,000US\$	-	5,175	-	10,263	-	10,120	-	7,245	-	10,867	-	8,452
E.Contingency	1,000US\$	-	6,724	-	5,047	-	8,175	-	7,080	-	16,505	-	10,454
F.Land	1,000US\$	-	0	-	0	-	0	-	0	-	0	-	0
G.Administration and Engineering Fee	1,000US\$	-	15,361	-	11,300	-	18,623	-	15,859	-	37,456	-	23,457
H.Compensation	1,000US\$	-	25,850	-	36,836	-	35,948	-	6,462	-	91,650	-	9,047
TOTAL													
Cost by JICA Team	1,000US\$		260,569		223,593		237,969		175,003		448,799		369,499
Cost by PIDC-1	1,000US\$		200,000		171,397		250,913		188,152		514,532		275,526
Difference of the review	1,000US\$		60,569		52,196		-12,944		-13,149		-65,733		93,973
Total Difference Ratio	%		31.00%		31.00%		-4.00%		-7.00%		-13.00%		34.00%

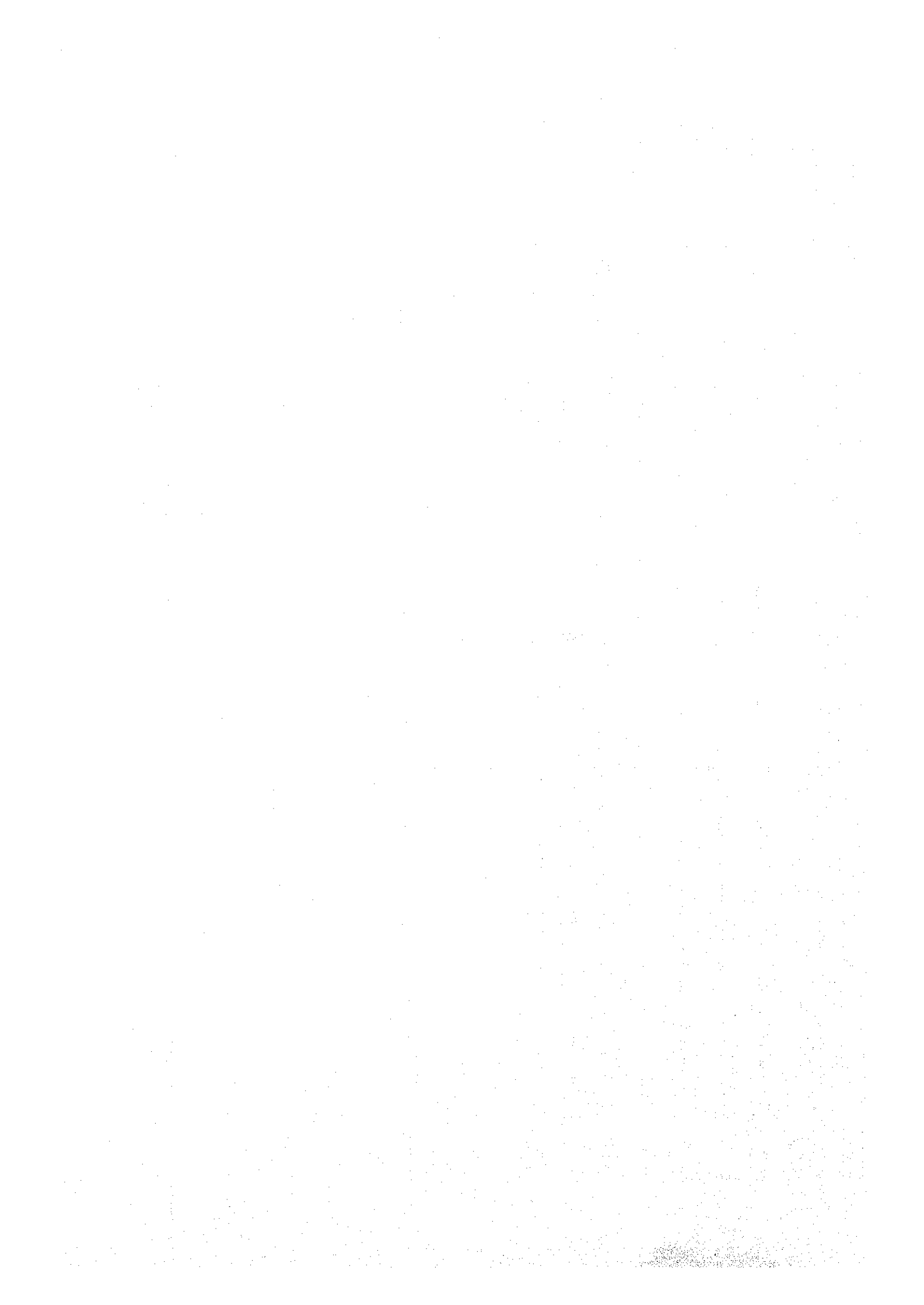




Appendix 6.2-4 Result of the Review of Civil Work Cost 3

Unit: 1,000US\$

Project Name	Buon Cuop		Rao Quan		Dong Nai 8		Dong Nai 4		Cau Don		Dai Ninh	
	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
Investment Cost		114,419		138,398		472,774		392,486		116,916		408,535
A. Civil Work												
1. Excavation												
Earth	1000m3	379	1,137	878	2,634	7,020	21,060	5,204	15,612	2,065	6,194	18,756
Rock	1000m3	1,361	9,527	303	2,121	6	39	3,619	25,333	1,332	9,324	15,743
Underground	1000m3	0	0	245	26,492	0	0	241	26,028	0	0	34,452
2. Embankment												
Earth	1000m3	160	480	1,296	3,889	13,248	39,744	2,071	6,213	536	1,607	26,049
Rock	1000m3	1,068	6,408	1,701	10,203	5,319	31,914	3,937	23,622	505	3,031	1,332
Sand and gravel	1000m3	107	1,605	111	1,661	1,373	20,595	454	6,810	63	938	2,355
3. Concrete												
Open	1000m3	120	15,600	65	8,437	350	45,513	358	46,527	129	16,705	41,730
Underground	1000m3	0	0	44	8,700	0	0	80	16,080	0	0	23,700
Re-Bars	t	4,718	3,567	5,369	4,059	11,182	8,454	6,370	4,816	4,361	3,297	23,232
4. Access Road	km	20	25,060	0	0	20	25,060	60	75,180	10	12,530	50,120
Sub Total			63,384		68,196		192,379		246,221		53,626	237,469
General Site												
Installation	10%		6,338		6,820		19,238		24,622		5,363	23,747
Diversion	15%		9,508		10,229		28,857		36,933		8,044	35,620
Others	10%		6,338		6,820		19,238		24,622		5,363	23,747
Total			85,568		92,065		259,712		332,398		72,396	320,583
Cost by PIDC-1			67,436		85,104		280,202		252,922		54,790	225,292
Difference/Investment Cost			16.00%		5.00%		-4.00%		20.00%		15.00%	23.00%
B. Hydro-Mechanical equipment												
Metal Structure	ton	1,899	13,293	894	6,255	7,990	55,930	3,668	25,676	1,200	8,400	53,070
Lifting Machine	ton	500	4,000	180	1,440	670	5,360	1,286	10,288	470	3,760	3,404
Total			17,293		7,695		61,290		35,964		12,160	56,474
Cost by PIDC-1			9,017		4,153		25,232		21,099		10,274	27,777
Error Ratio			7.00%		3.00%		8.00%		4.00%		2.00%	7.00%
C. Electro-mechanical Equipment												
Installed Capacity	MW	81	-	80	-	192	-	200	-	50	-	300
Number of Unit		3	-	3	-	3	-	3	-	2	-	2
Unit Capacity	MW/Unit	27	-	27	-	64	-	67	-	25	-	150
Unit Cost	1,000US\$	8,000	-	8,000	-	16,000	-	16,000	-	6,000	-	28,000
Cost	1,000US\$	-	24,000	-	24,000	-	48,000	-	48,000	-	12,000	56,000
Cost by PIDC-1	1,000US\$	-	14,321	-	15,066	-	33,945	-	35,360	-	8,996	61,864
Difference/Investment Cost	%		8%		6%		3%		3%		3%	-1%
D. Transmission Lines												
Cost by PIDC-1	1,000US\$	-	2,070	-	8,970	-	10,350	-	31,271	-	11,730	34,914
E. Contingency												
Cost by PIDC-1	1,000US\$	-	4,205	-	4,794	-	15,581	-	14,216	-	3,432	14,630
F. Land												
Cost by PIDC-1	1,000US\$	-	0	-	0	-	0	-	0	-	0	0
G. Administration and Engineering Fee												
Cost by PIDC-1	1,000US\$	-	9,498	-	10,911	-	35,496	-	32,360	-	7,749	32,956
H. Compensation												
Cost by PIDC-1	1,000US\$	-	7,872	-	9,400	-	71,968	-	5,258	-	19,945	11,102
TOTAL												
Cost by JICA Team	1,000US\$		150,506		157,835		502,397		499,467		139,412	526,659
Cost by PIDC-1	1,000US\$		114,419		138,398		472,774		392,486		116,916	408,535
Difference of the review	1,000US\$		36,087		19,437		29,623		106,981		22,496	118,124
Total Difference Ratio	%		31.00%		14.00%		7.00%		27.00%		20.00%	29.00%



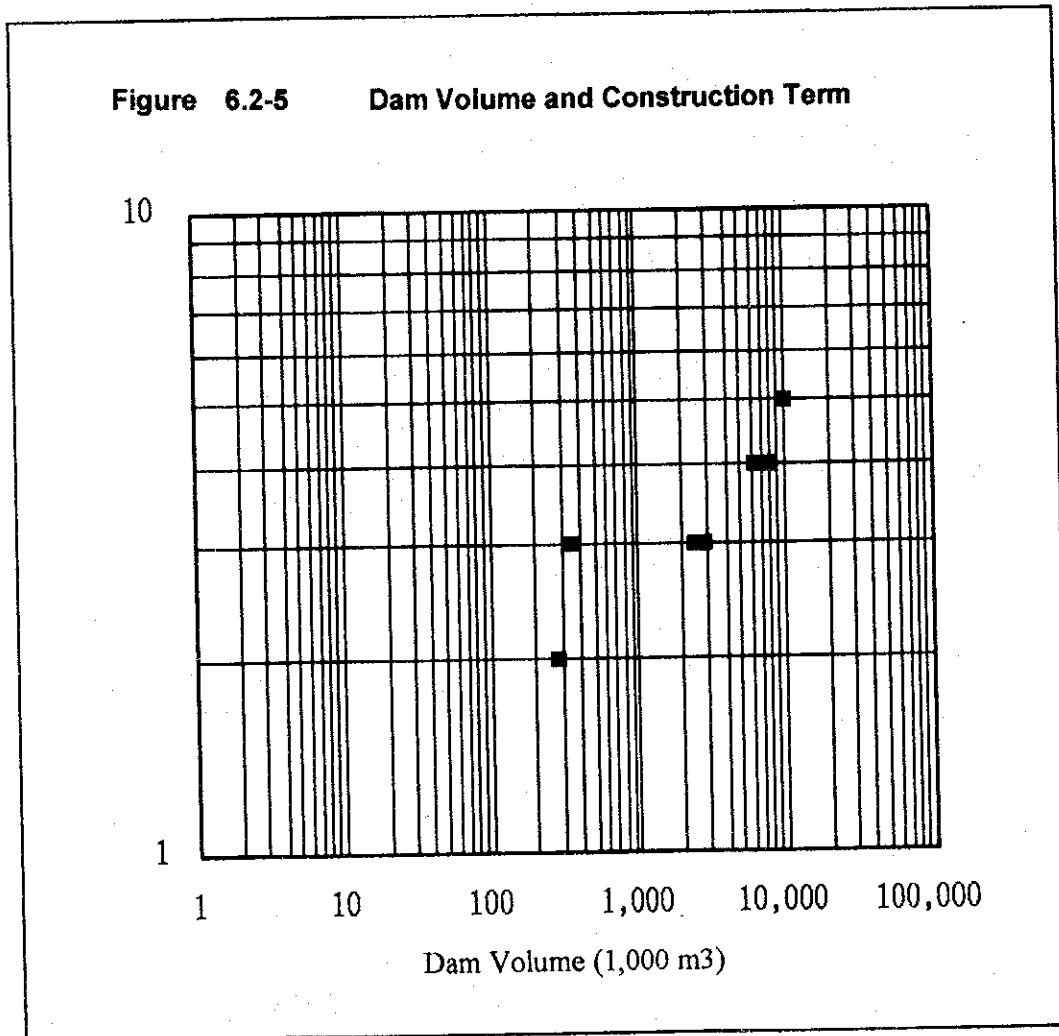
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6.2.5 Concept of Construction Term Review

Below figure shows the past records of construction term and dam embankment volume in Japan. At first, construction term of each project is considered, suppose that it is developed in Japan. At second, a lag of road construction work is taken into consideration as 1~2 years. At third, a lag of hydropower project construction work is taken into consideration as 1~2 years, it often happens in developing countries.



6.2.6 Method of Equalized Annual Cost Calculation

The equalized annual cost of a hydropower project consists of depreciation and operation-maintenance (OM) cost. This is estimated by multiplying the annual cost factor by the investment cost assuming a discount rate of 10%. The method of calculation of equalized annual cost is as follows;

- Equalized Annual Cost = Annual Cost Factor x Investment Cost
= Depreciation + Interest + OM cost

- Depreciation+Interest = Investment Cost x Capital Recovery Factor

- Capital Recovery Factor (CRF) = $(i(1+i)^n) / ((1+i)^n - 1)$

here n: Service Life

Civil Facility 50 years

Hydro-mechanical Facility 25 years

Electro-mechanical Facility 25 years

i: Discount Rate 10.0%

CRF for Civil Facility 10.1%

CRF for Hydro-mechanical Facility 11.0%

CRF for Electro-mechanical Facility 11.0%

- Rate of Operation and Maintenance Cost to Direct Project Cost

Civil Facility 1.5%

Hydro-mechanical Facility 1.5%

Electro-mechanical Facility 1.5%

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Appendix 6.2-7 Result of assesment about the projects (under varying Peak Operation Time)

Project	Unit	Son La (S)	Son La (L)	Huoi Quan	Dai Thi*	Cua Dat*	Ban Mai*	Song Con2*	Song Hinh*	An Khe*	Plei Krung	Sesan 3	Sesan 4	Thuong Kontum	Buon Cuop*	Rao Quan*	Ham Thuan	Da Mi	Dong Nai 8	Dong Nai 4	Cau Don	Dai Ninh**
Installed Capacity	MW	2400	3600	800	250	105	350	60	70	116	120	220	366	260	81	80	300	172	192	200	50	300
Firm Power	MW	729	1747	247	86	35	151	17	26.2	41.7	108	77	124	82	23	30.2	100	49	90	42	23.7	81
Annual Output	GWh	10,804	17,396	2,984	1,300	507	1,777	271	253	482	785	1,079	1,810	736	479	286	972	551	946	950	200	1,175
Annual Benefit by Peak Operation Time																						
T=24 hr	1000US\$	358,500	713,006	109,829	42,730	17,011	66,330	8,688	10,557	18,167	39,083	36,797	60,503	32,082	13,687	12,072	40,404	21,083	37,589	26,288	9,054	39,396
T=12 hr	1000US\$	531,171	1,126,800	168,334	63,100	25,301	102,096	12,714	16,763	28,045	41,925	55,035	89,873	51,504	19,134	19,226	64,090	32,689	58,906	36,236	14,667	58,581
T=10 hr	1000US\$	600,239	1,151,907	191,735	71,248	28,617	113,465	14,325	19,245	31,995	41,925	62,331	101,622	59,273	21,313	22,087	73,565	37,332	61,748	40,215	15,283	66,256
T=8 hr	1000US\$	703,842	1,151,907	226,838	81,575	33,591	113,465	16,741	20,932	35,766	41,925	70,668	117,823	70,927	24,582	23,868	87,776	44,296	61,748	46,184	15,283	77,767
T=6 hr	1000US\$	754,293	1,151,907	240,813	81,575	33,591	113,465	18,873	20,932	35,766	41,925	70,668	117,823	74,243	27,424	23,868	87,776	50,217	61,748	56,132	15,283	91,268
Annual Cost with IDC																				***		
CRF	1000US\$	313,229	573,832	97,018	38,464	33,242	70,416	23,356	22,643	28,721	31,773	24,223	65,523	47,760	19,310	17,547	45,643	23,996	59,871	31,711	14,858	47,879
OMC	1000US\$	45,517	83,669	14,114	5,608	4,847	10,350	3,410	3,319	4,159	4,667	3,500	9,570	6,873	2,799	2,574	6,657	3,479	8,794	4,650	2,175	6,962
Total Annual Cost	1000US\$	358,746	657,501	111,132	44,072	38,089	80,766	26,766	25,962	32,880	36,440	27,723	75,093	54,633	22,109	20,121	52,300	27,475	68,665	46,178	17,033	70,745
B/C																						
T=24		1.00	1.08	0.99	0.97	0.45	0.82	0.32	0.41	0.55	1.07	1.33	0.81	0.59	0.62	0.60	0.77	0.55	0.57	0.53	0.56	
T=12		1.48	1.71	1.51	1.43	0.66	1.26	0.48	0.65	0.85	1.15	1.99	1.20	0.94	0.87	0.96	1.21	0.86	0.78	0.86	0.83	
T=10		1.67	1.75	1.73	1.62	0.75	1.40	0.54	0.74	0.97	1.15	2.25	1.35	1.08	0.96	1.10	1.39	0.90	0.87	0.90	0.94	
T=8		1.96	1.75	2.04	1.85	0.88	1.40	0.63	0.81	1.09	1.15	2.55	1.57	1.30	1.11	1.19	1.66	0.90	1.00	0.90	1.10	
T=6		2.10	1.75	2.17	1.85	0.88	1.40	0.71	0.81	1.09	1.15	2.55	1.57	1.36	1.24	1.19	1.73	0.90	1.22	0.90	1.29	
Economicity																						
Investment Cost per installed Capacity	US\$/kW	854	968	919	1,206	2,482	1,590	3,056	2,549	1,928	2,091	855	1,406	1,421	1,858	1,730	1,193	1,087	2,462	1,250	2,338	1,248
Levelized Unit Cost	US\$/kWh	0.0332	0.0378	0.0372	0.0339	0.0751	0.0455	0.0988	0.1026	0.0682	0.0464	0.0257	0.0415	0.0742	0.0462	0.0704	0.0538	0.0499	0.0726	0.0486	0.0852	0.0602

* Projects with "*" are not reviewed for electricity. Therefore, electricity values are quoted from those offered by PIDC-1./** Electricity is quoted from the value of IEV./***This investment cost is ordered to use for asse



Appendix 6.2-7 Result of the Ranking Study of the new hydropower projects in Vietnam

RANK	Levelized Unit Cost Project Name (\$/kWh)		Compared by "B/C"								Remarks		
			T=24		T=12		T=10		T=8			T=6	
			Project Name	B/C	Project Name	B/C	Project Name	B/C	Project Name	B/C		Project Name	B/C
1	Sesan 3	0.0257	Sesan 3	1.33	Sesan 3	1.99	Sesan 3	2.25	Sesan 3	2.55	Sesan 3	2.55	B/C better than "Ham Thuan & Da Mi" ↑
2	Son La (S)	0.0332	Son La (L)	1.08	Son La (L)	1.71	Son La (L)	1.75	Huoi Quan	2.04	Huoi Quan	2.17	
3	Dai Thi*	0.0339	Plei Krung	1.07	Huoi Quan	1.51	Huoi Quan	1.73	Son La (S)	1.96	Son La (S)	2.10	
4	Huoi Quan	0.0372	Son La (S)	1.00	Son La (S)	1.48	Son La (S)	1.67	Dai Thi*	1.85	Dai Thi*	1.85	
5	Son La (L)	0.0378	Huoi Quan	0.99	Dai Thi*	1.43	Dai Thi*	1.62	Son La (L)	1.75	Son La (L)	1.75	
6	Sesan 4	0.0415	Dai Thi*	0.97	Ban Mai*	1.26	Ban Mai*	1.40	Sesan 4	1.57	Sesan 4	1.57	
7	Ban Mai*	0.0455	Ban Mai*	0.82	Sesan 4	1.20	Sesan 4	1.35	Ban Mai*	1.40	Ban Mai*	1.40	
8	Buon Cuop*	0.0462	Sesan 4	0.81	Plei Krung	1.15	Plei Krung	1.15	Thuong Kontum	1.30	Thuong Kontum	1.36	
9	Plei Krung	0.0464	Buon Cuop*	0.62	Rao Quan*	0.96	Rao Quan*	1.10	Rao Quan*	1.19	Dai Ninh**	1.29	
10	Dong Nai 4	0.0486	Rao Quan*	0.60	Thuong Kontum	0.94	Thuong Kontum	1.08	Plei Krung	1.15	Buon Cuop*	1.24	
11	Dai Ninh**	0.0602	Thuong Kontum	0.59	Buon Cuop*	0.87	An Khe*	0.97	Buon Cuop*	1.11	Dong Nai 4	1.22	B/C > 1 ↑
12	An Khe*	0.0682	Dong Nai 4	0.57	Dong Nai 8	0.86	Buon Cuop*	0.96	Dai Ninh**	1.10	Rao Quan*	1.19	
13	Rao Quan*	0.0704	Dai Ninh**	0.56	Cau Don	0.86	Dai Ninh**	0.94	An Khe*	1.09	Plei Krung	1.15	
14	Dong Nai 8	0.0726	An Khe*	0.55	An Khe*	0.85	Dong Nai 8	0.90	Dong Nai 4	1.00	An Khe*	1.09	
15	Thuong Kontum	0.0742	Dong Nai 8	0.55	Dai Ninh**	0.83	Cau Don	0.90	Dong Nai 8	0.90	Dong Nai 8	0.90	
16	Cua Dat*	0.0751	Cau Don	0.53	Dong Nai 4	0.78	Dong Nai 4	0.87	Cau Don	0.90	Cau Don	0.90	
17	Cau Don	0.0852	Cua Dat*	0.45	Cua Dat*	0.66	Cua Dat*	0.75	Cua Dat*	0.88	Cua Dat*	0.88	
18	Song Con2*	0.0988	Song Con2*	0.32	Song Con2*	0.48	Song Con2*	0.54	Song Con2*	0.63	Song Con2*	0.71	

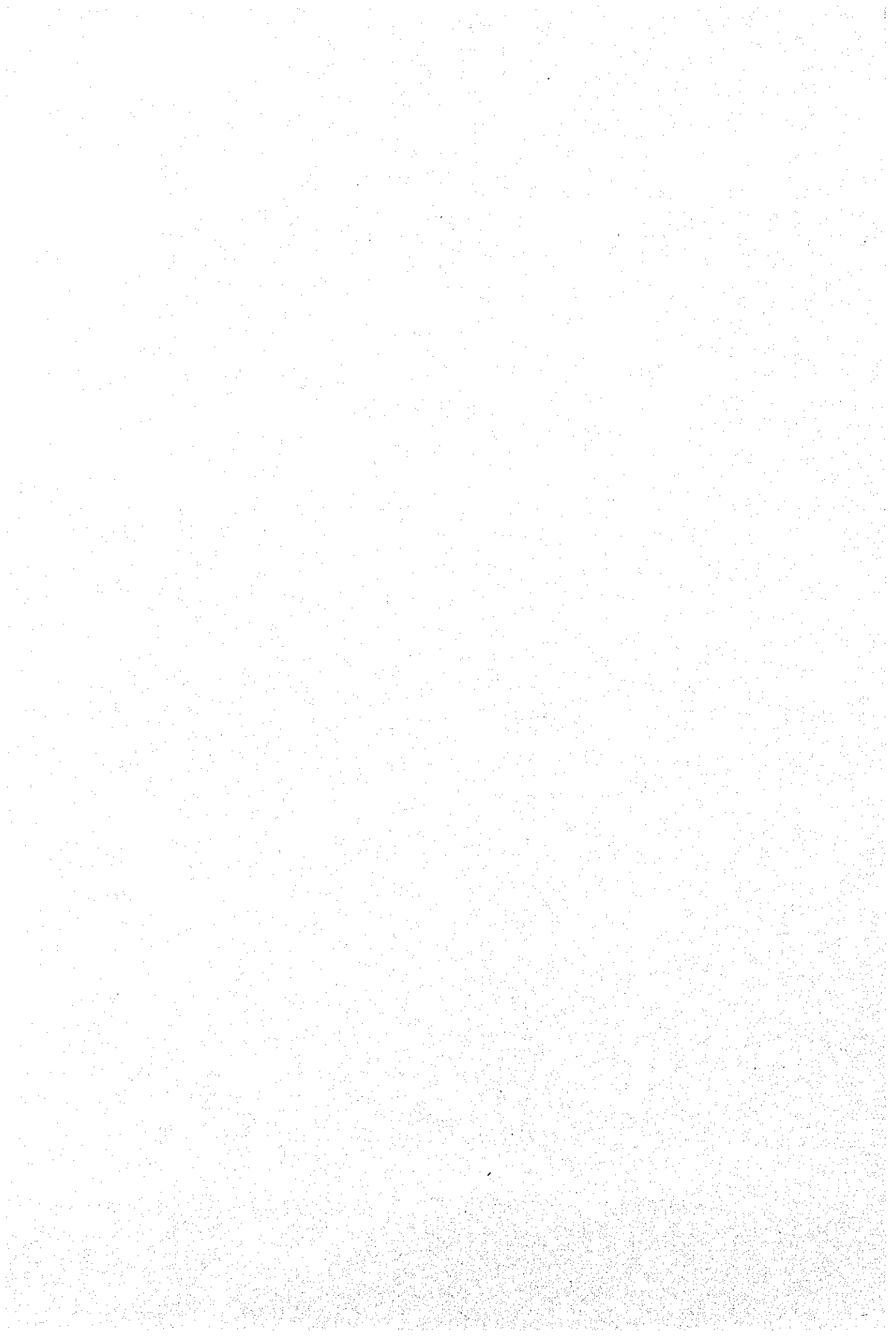
LUC "Ham Thuan & Da Mi" 0.0524 \$/kWh
 B/C "Ham Thuan & Da Mi" T=24 0.77 T=12 1.21 T=8 1.39 T=6 1.73



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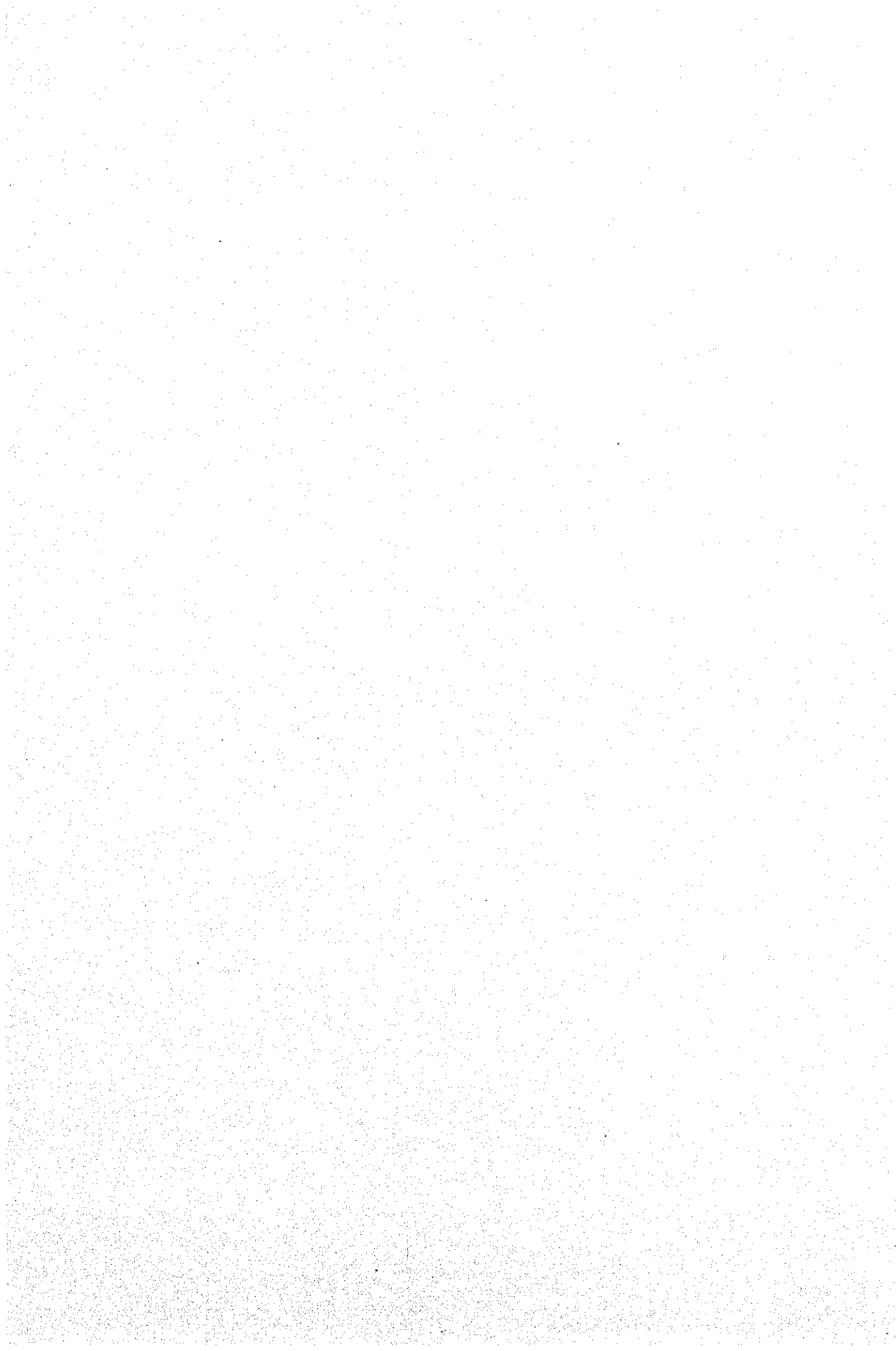


6.2.8 Items to be confirmed in F/S of Son La Hydropower Project with Work Schedule

- (1) Topographical Survey
 - Making topographical map by survey for four dam axis candidates and all the reservoir area
- (2) Geological Investigation
 - Study on the results of geological investigation by PIDC1
 - Geological investigation work at Pa Vinh site of dam axis candidate
 - Seismic prospecting along the dam axis for four dam axis candidates and spillway
 - Grouting test for dam axis candidates
 - Site selection of borrow area for impervious core materials and quarry site for rock materials
 - Core boring for borrow area and quarry
 - Core boring for the area with geological problem in the reservoir area
 - Adits for dam axis, borrow area, and quarry
 - Material tests for dam embankment materials
 - Site investigation in the reservoir area to find sinkhole, landsliding area
- (3) Hydrological Study
 - Review of inflow discharge data along the Da river
 - Study about designed flood discharge
 - Study about sedimentation
 - Study about flood control volume of the reservoir
 - Study about irrigation downstream
- (4) Designing Work
 - General design of the structures
 - Analysis of dam stability under static conditions and dynamic conditions
 - General study for hydro-mechanical works
- (5) Construction Work Study
 - Service facilities planning
 - Cost estimation
 - Study about construction schedule
- (6) Electro-mechanical Work study
 - Study about turbine and generator
 - Cost estimation for electro-mechanical work
 - Study about transmission line
 - Power system operation
- (7) Compensation
 - Environmental estimation
 - Study about quantities of compensation
 - Cost estimation for compensation

(8) Others

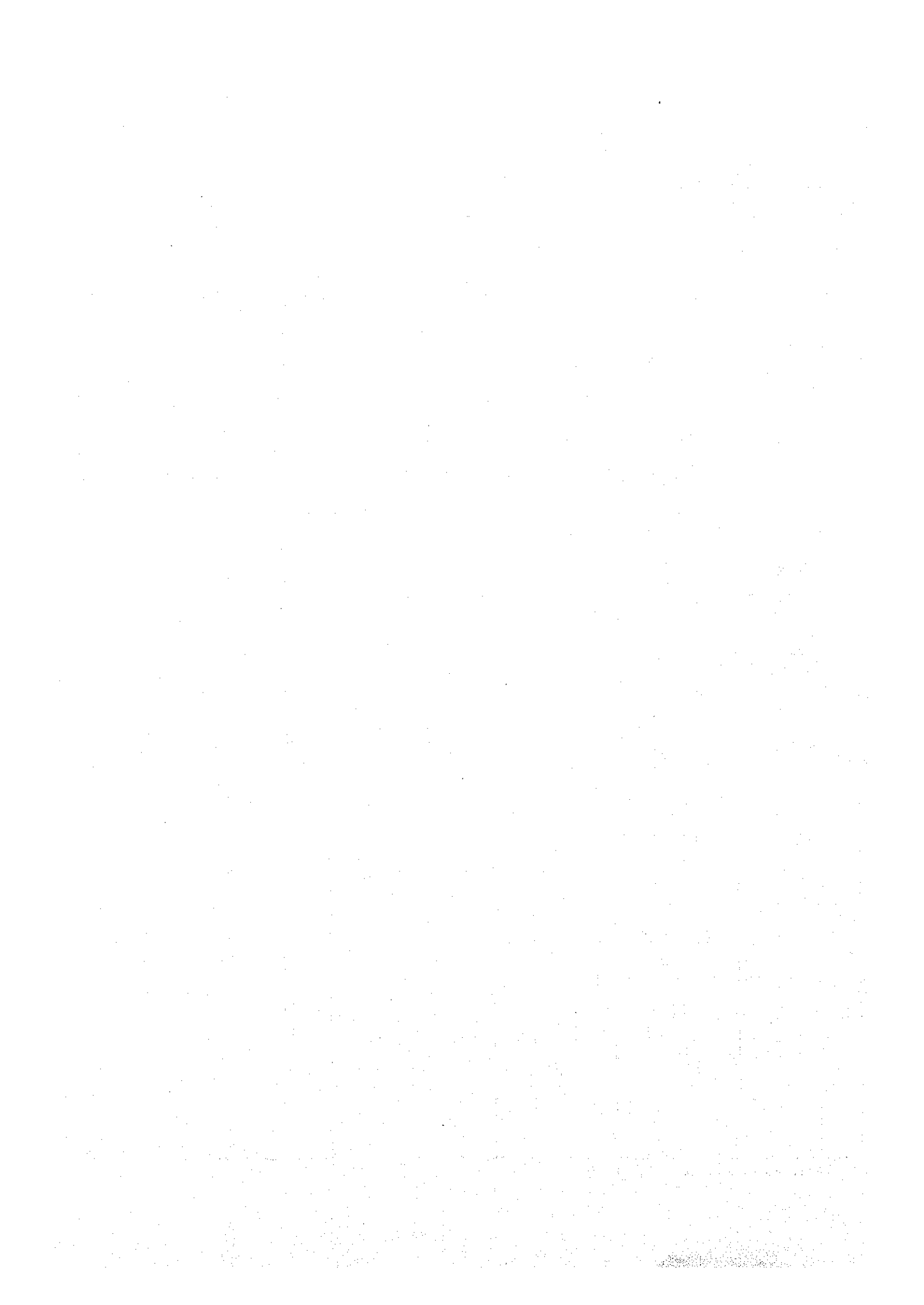
- Demand and supply forecasting
- Financial analysis
- Study about development scale

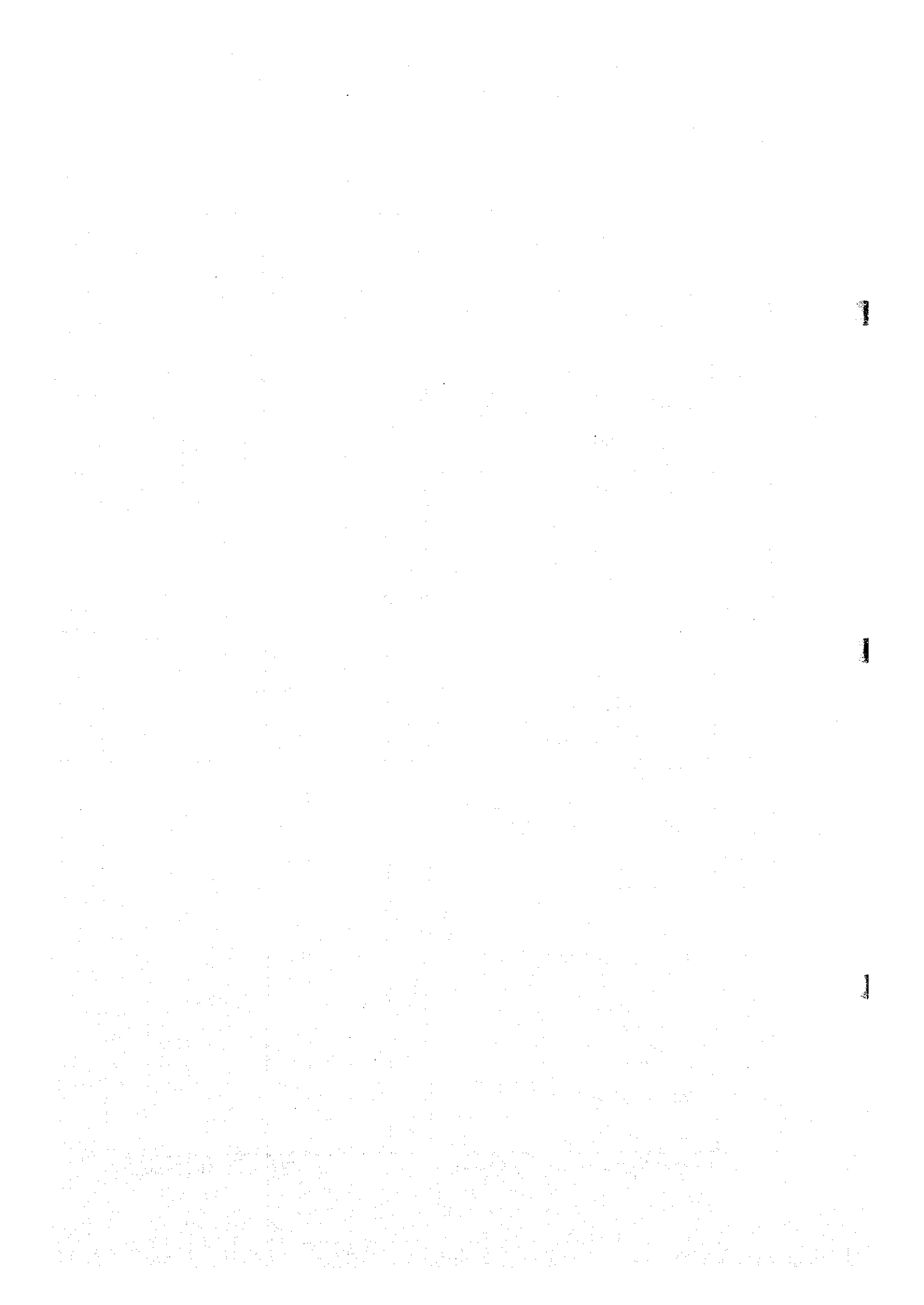


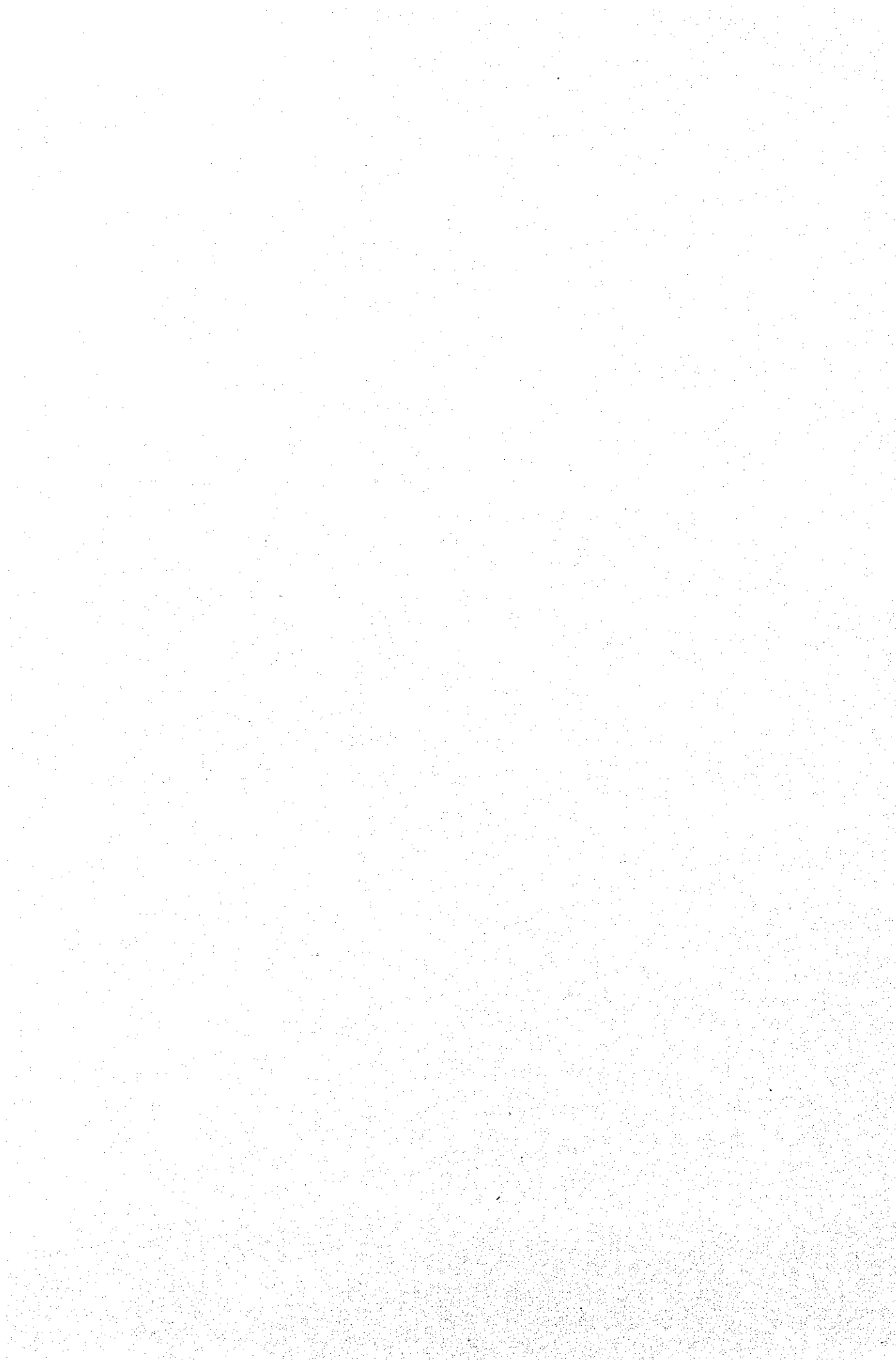
Appendix 6.2-8 Tentative Time Schedule of the Feasibility Study on Son La Project

		Year																																														
		Project Month												Calendar Month												Rainy Season																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30																	
		5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10																	
First Stage	- Data collection & site reconnaissance	■																																														
	- Data review & analysis			□																																												
	- Review of existing development schemes & Comparative study for optimum scheme							□																																								
	- Formulation of detailed investigation program									■																																						
	- Preparation of detailed investigation program									■																																						
Second Stage	- Topographic surveys									---																																						
	- Geological investigation & material tests									---																																						
	- Geological & geotechnic studies									■																																						
	- Hydrological survey	---		---				■		---																																						
	- Power survey							■		□																																						
	- Environmental assessment							■		---																																						
	- Compensation survey							---		---																																						
Third Stage	- Optimum studies											□																																				
	- Review & study of optimum power generation expansion program											□																																				
	- Feasibility-grade design											□																																				
	- Cost estimation													□																																		
	- Implementation plan															□																																
	- Economic & financial analyses																	□																														
Report	- Inception Report	▽																																														
	- Porgress Report							▽																																								
	- Interim Report											▽																																				
	- Draft Final Report															▽																																
	- Final Report																			▽																												

■ : Work in Viet Nam by Consultant □ : Work in Japan by Consultant --- : Field Investigation Work by PIDC-1







6.2.9 Geological Information about Son La Hydropower Project

The geology of Son La hydropower project comprises of various sedimentary and effusive strata and intrusive rocks, covered by sediments. The basement rocks were subjected to regional metamorphisms and deformations resulting in many foldings and faults. Considering the geological conditions of the project site, dam type of Son La hydropower project should be recommended to be Rock Fill. Otherwise, RCC, or Concrete Facing are possible, but these dam types will be difficult in construction work, especially for quality control in Vietnam.

On the other hand, a large stratum of lime stone is widely distributed along the right bank of the middle to downstream reservoir area. During our site reconnaissance near Son La town, many topographic features, such as sinkhole, caused by karstification were seen. These sinkhole can exist in the reservoir area. Therefore, geological site investigation should be made to check the existence of such sinkhole near dam axis and reservoir area. These sinkhole can make influence for stability of dam and watertightness of reservoir, especially at the ridge of catchment area boundary. A regional assessment on the reservoir watertightness is required more carefully to select optimum dam site and development scale.

Geological investigation work has been already done to make sure the geological feature of three dam site candidates, except Pa Vinh site. The results of geological investigation is summarized in Table-a. According to this investigation work, alluvium is estimated between 10 and 20 m in thickness, and intensively weathered zone of right and left abutments are estimated to vary from 5 m to 20 m from upstream candidate site to downstream. According to our site reconnaissance, some fresh outcrops can be seen at upstream dam candidate site, such as Pa Vinh site and Ta Bu site. On the other hand, result of permeability test of borehole shows that high permeable zone is estimated to be 20 ~ 50 m at both abutments at all three candidate sites. Therefore, grouting work of dam foundation can be the key for dam construction. Engineering geology of the Alternative Damsite Foundation is shown in the table in next page. For dam site selection, geological investigation work should be made at Pa Vinh site, the most upstream site which is not investigated yet to make comparative study with the results of investigation work at other three dam site candidates made by PIDC-1.

Table 1 Topographical Characteristics of the Alternative Damsites

Name of Cross Section	Unit	No. 1 Pa Vinh Damsite		No. 2 Ta Bu Damsite		No. 3 Ban Pau Damsite		No. 4 Ban Tan Damsite	
		A - A		A - A		A - A		Upstream C - C (Alternative 265 m)	Downstream D - D (Alternative 215 m)
Elevation of River Bed	m	106.78*	102.23*		92.47*	93.19*			
Width of River Bed	m	220	230		170	180	180	180	180
Average Inclination of the Left Abutment	degree	25°	35° (EL. 110 ~ 230 m) 10° (EL. 230 ~ 320 m)		35°	13°	13°	25°	25°
Average Inclination of the Right Abutment	degree	40°	32° (EL. 110 ~ 270 m) 10° (EL. 270 ~ 310 m)		18°	20°	20°	25°	25°
Valley Width at EL. 265 m	m	740	840		920	1,360	1,360	-	-
Valley Width at EL. 245 m	m	670	740		810	1,260	1,260	1,260	1,260
Valley Width at EL. 215 m	m	580	560		670	1,140	1,140	1,130	1,130
Minimum Pass Length at EL. 265 m									
Left bank	m	Thick	300		150	220	220	0	0
Right bank	m	950	300		Thick	Thick	Thick	Thick	Thick
Minimum Pass Length at EL. 215 m									
Left bank	m	-	-		-	-	-	300	300
Right bank	m	-	-		-	-	-	Thick	Thick
Remarks					Thin ridge of the left bank			Thin saddle (EL. 220 m) on the left bank	

* Ref. Da River Profile

Table 2 Geological Characteristics of the Alternative Damsites (1/2)

	No. 1 Pa Vinh Damsite	No. 2 Ta Bu Damsite	No. 3 Ban Pau Damsite	No. 4 Ban Ta Damsite
Foundation Rocks	Muong Trai Formation (Triassic)	Vien Nam Formation (Permian ~ Triassic)	Vien Nam Formation (Permian ~ Triassic)	Vien Nam Formation (Permian ~ Triassic)
Strata	Left bank ~ Riverbed: (Lower formation) Massive basalt porphyrite Right bank: (Upper formation) Alternation of siltstone, sandstone and tuffaceous sandstone	Left bank ~ Right bank: (Lower subformation) Basalt porphyrite, transformed and schistosed, interbedded with green schist layers Right bank: (Upper subformation) Basalt porphyrite, massive	Left bank ~ Riverbed: (Lower part) Basalt porphyrite, transformed, schistosed, massive, interbedded with green schist layers Right bank: (Upper part) Basalt porphyrite, massive	Left bank ~ Right bank: (Upper part) Basalt porphyrite, massive, intercalated with green schist layers
Intrusive Rocks	Gabbro diabase and rhyolite porphyry along faults	Gabbro diabase and rhyolite porphyry along faults	Gabbro diabase dykes along faults	Gabbro diabase dykes along faults

Table 3 Geological Characteristics of the Alternative Damsites (2/2)

	No. 1 Pa Vinh Damsite	No. 2 Ta Bu Damsite	No. 3 Ban Pau Damsite	No. 4 Ban Ta Damsite
Quaternary System	<p>Alluvium: River bed deposit consisting of fine grained sand with pebble and gravel 3 m in thickness</p> <p>Residual soil: Left bank 5 m thick Right bank 3 m thick</p>	<p>Alluvium: River bed deposit Terrace deposit Reservoir sedimentary silt on both banks</p> <p>Residual soil: Less than 5 m thick (max. 9 m)</p>	<p>Alluvium: River bed deposit Reservoir sedimentary silt on both banks</p> <p>Residual soil: 2 m thick thicker at high elevation max. 10 m</p>	<p>Alluvium: River bed deposit 2 ~ 10 m thick Terrace deposit 2 ~ 5 m thick</p> <p>Residual soil:</p>
Geologic Structure	<p>Anticlinorium: Mainly dipping to the right bank with 40 ~ 80° III grade fault on the right bank</p>	<p>Folding: Mainly dipping 50 ~ 80° Faults, III grade, IV grade, V grade</p>	<p>Monoclinic: Dipping to the right bank with 25 ~ 70° Faults, IV grade, V grade</p>	<p>Monoclinic: Dipping to the right bank Faults</p>
Remarks	No existing borehole	Muong Trai Formation (middle subformation): Massive limestone on the right bank		

Table 4 Engineering Geology of the Alternative Damsite Foundation (1/2)

	No. 1 Pa Vinh Damsite	No. 2 Ta Bu Damsite	No. 3 Ban Pau Damsite	No. 4 Ban Ta Damsite
Foundation Classification				
(1) Alluvium	Estimated less than 15 m in thickness	Estimated less than 10 m in thickness Thick silt sedimentation on both banks	Estimated less than 20 m in thickness Thick silt sedimentation on both banks	Estimated less than 10 m in thickness Thick silt sedimentation on both banks
(2) Residual Soil	Thicker on the gentle left abutment (basalt porphyrite) than the steep right abutment (sandstone and siltstone)	Estimated less than 5 m in thickness on both abutments, but at the right rim, residual soil is 9.1 m at borehole TB-4	Estimated 5-10 m in thickness on the right gentle abutment, and less than 5 m on the left, rather steep, abutment	Estimated to be thick about 10 m in thickness on the gentle slope of the left abutment, and thinner on the right abutment comparatively
(3) Intensively Weathered Zone	No borehole data	Estimated less than 5 m in thickness on the left abutment, 5 ~ 7 m on the right abutment	Estimated less than 10 m in thickness on the right abutment, and less than 20 m at high elevation abutment on the left bank	Estimated less than 10 m in thickness on both abutment, but partially thick about 20 m on the left abutment (Bta 1)
(4) Strongly Weathered Zone	No borehole data	Estimated about 15 m in thickness on both abutments	Estimated about 20 m in thickness on the right abutment (massive basalt porphyrite), and thinner less than 5 m on the left abutment (schistosed basalt porphyrite)	Generally thick at high elevation on both abutments

Table 5 Engineering Geology of the Alternative Damsite Foundation (2/2)

	No. 1 Pa Vinh Damsite	No. 2 Ta Bu Damsite	No. 3 Ban Pau Damsite	No. 4 Ban Ta Damsite
(5) Fresh Rock Zone	Lots of fresh outcrops of basalt porphyrite on the riverbed and both banks	Some fresh outcrops on the riverbed	No outcrops of fresh rock on the riverbed, but below alluvium on the riverbed and at low elevations on both banks, fresh rock zone can be observed (BP6, 2, 21, 7)	Some fresh outcrops on the riverbed, and fresh rock zone can be observed below alluvium (BP8, 23)
Permeability	No borehole data	High permeable zone ($q \geq 0.10$) is estimated to be 30 ~ 35 m at the left abutment (strongly fractured zone), thinner at the right abutment but thick, about 55 m, at the right rim (strongly fractured zone)	High permeable zone ($q \geq 0.10$) is estimated to be 25 ~ 55 m on the left abutment (strongly fractured schistosed basalt porphyrite), and thinner on the right abutment (massive basalt porphyrite)	Generally low permeability ($q \leq 0.02$) in fresh rock zone Some high permeable zones along tectonic crushed zones (faults)
Ground Water Level	No borehole data	Low groundwater level at high elevations on both abutments (strongly fractured zone)	Low groundwater level at the left abutment (strongly fractured schistosed basalt porphyrite, thin ridge)	Low groundwater level on the left abutment (strongly fractured zone, thin ridge)
Remarks	Lens of limestone just downstream of the damsite on the left bank	A limestone layer lying on the right bank shall be carefully investigated	Thin ridge on the left abutment	Thin ridge on the left abutment