3.5 Data of Geology

Table 1 Microscopic Analysis

Table 2 Laboratory Test Results

Table 3 Micro Fussils from the Limestone Blocks in the Vicinity of Se Kong No.4 Dam Site

Photogeological Maps

Table 1 Microscopic Analysis

Project	Sample Number	Locality	Lithologic Name
Se Kong No.4	SK - 1	Left bank of the dam site	Altered andesite
	SK - 8	River bank on the right bank of the damsite	Calcareous conglomerate
	SK - 9	River bed 500m downstream of the dam axis	Lapilli tuff
Xe Kaman No. 1	KX - 3	River bed downstream of the dam site	Conglomerate
Xe Namnoy Midstream	NH - 1	Right bank near B.Latsasin	Laterite

Table 2 Laboratory Test Results

Sample locality		Lithology	Unconfined Compression Strength (Kgf/cm²)	Splitting Tensile Strength (Kgf/cm²)
Drill hole	depth (m)			
XN - 1	32.78 - 33.0	Basalt	1,220	147
XN - 1	20.45 - 20.63	Basalt	>2,120	
XN - 1	19.00 - 19.15	Basalt	1,590	
XN - 1	19.25 - 19.40	Basalt	880	
SK - 1	20.25 - 20.40	Tuff	510	173
SK - 1	8.0 - 8.1	Tuff		178
SK - 1	8.65 - 8.75	Tuff	>1,270	
SK - 1	17.10 - 17.20	Tuff	1,400	
SK - 1	51.25 - 51.40	Shale	510	166
SK - 1	7.15 - 7.25	Basalt	100	
SK - 1	20.65 - 20.90	Sandstone	250	159
XN - 1	19.28 - 19.39	Sandstone	1,470	
XN - 1	53.46 - 53.56	Conglomerate	660	

Table 3 Micro Fussils from the Limestone Blocks in the Vicinity of Se Kong No.4 Dam Site

Sample	Micro Fussil	Age
A	Fusulinaceans	
	Robustoschwagerina sp. (n. sp. ?)	
	Schwagerinidae gen. et sp. indet.	Early Permian
	Schubertella sp.	
	Boultoniidae gen. et sp. indet.	
	Smaller foraminifer	
	Neoendothyra sp.	
B	Fusulinaceans	
	Schwagerinidae gen. et sp. indet.	
	Staffella sp.	
	Minojapanella(Russiella)? sp.	
	Schubertella sp.	
	Smaller foraminifers	
	Eotuberitina ex gr. reitlingerae Miklukho-Maklay	Middle Permian
	Tuberitina sp.	
	Tetrataxis sp.	
	Climacammina valvulinoides Lange	
	Endothyra sp.	
	Globivalvulina gracea Reichel	
	Pachyphloia sp.	
	Langella sp.	
	Multidiscus sp.	
D	Smaller forminifers	Permean
	Globivalvulina sp.	After Early
	Lunucammina? sp.	Permean
E	Fusulinaceans	
	Schwagerinidae gen. et sp. indet.	Permean

PHOTOGEOLOGICAL LEGEND

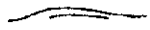
(Common for 3 Projects)

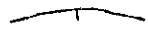
Litho stratigraphic boundary

Fault(inferred, high certainty)

Fault(inferred, low certainty)

Lineaments


Bedding trace

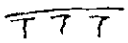

Bedding trace with sign of dip

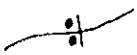
Indication of strike and dip


Syncline with plunge


Anticline with plunge

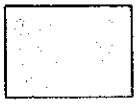
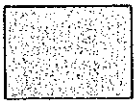
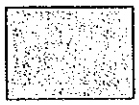
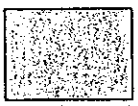
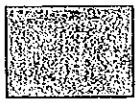
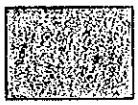
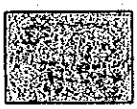
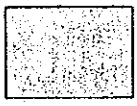

Landslide scarp


Erosion cliff

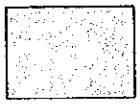
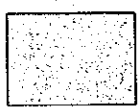
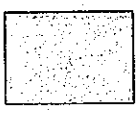
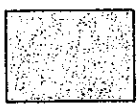

Waterfall


Photograph center with numbers

LEGEND FOR XE KAMAN No.1 PROJECT AREA

Photo-geological Units		Characteristics
1		Unit 1 is distributed along by rivers and valleys, forming flat and smooth surfaces of the terrain including terrace. This Unit may consist of alluvial deposits.
2		Unit 2 appears at the foot of mountains and at the mouth of a valley, covering a small area. It has gentle and rounded relief with moderate to nearly horizontal slopes. The drainage density is low. This Unit may consist of talus deposits and alluvial deposits.
3		Unit 3 is distributed in the basen located in the northeastern part of the study area, spreading at the both sides of the Xe Kaman river. The sedimentary structure is not observed. The vegetation cover is dense. The Unit 3 may mainly composed of argillaceous rocks.
4		The topography is moderate, presenting flat lands in places. As the thickness of the overburden, which may consist of alluvial deposits, is thin the layers of the Unit 4 with high resistance against whethering show linear alignment of outcrops. They are recongnized as bedding traces. The layers are inclined to the southwest, and locally microfolded.
5		Unit 5 forms continuous mountain ridges. The layers with high resistance are exposed on the slope of the mountainside. The sedimentary structure is obvious. Unit 5 may conprise alternating beds of arenaceous to rudaceous rocks and argillaceous rocks. Probably, the arenaceous to rudaceous rocks are predominant. The attitude of dip and strike of the layers are consistent with those of the Unit 4.
6		Unit 6 is widely distributed in the basen situated on the east of the Unit 5. Linearments in the direction of NE~SW are prevalent. Drainage density is high. Bedding structure is not observed. The low resistance against weathering of the Unit 6 suggests that the Unit comprises predominant argillaceous rocks.
7		Unit 7 forms an isolated hill with thin ridges. On the whole, it presents massive features excepting local bedding traces. Resistance against weathering is high. Although the Unit 7 shows similar characteristics to those of the Unit 8, they are not definitely identified.
8		Unit 8 has thin and high ridges comprising high resistant layers with white bands. As the Unit is massive, The sedimentary structure of the Unit is not observed. Drainage density is relatively high. This Unit probably comprises alternating beds of arenaceous and rudaceous rocks and argillaceous rocks.
9		Unit 9 forms thin ridges including white-coloured outcrops of layers. White-coloured mottled pattern are observed in places. Bedding traces are obviously recognised along by the fault striking NW-SE in the valley. This Unit may comprise alternating beds of sedimentary rocks mainly composed of arenaceous rocks and/or limestone. The karst topography is not observed.
10		Unit 10, forming moderate slopes, is situated at the foot of the mountain composed of the Unit 7, 8. The drainage density is high and the resistance against weathering is low. This Unit may consist of argillaceous rocks and/or talus deposits.

LEGEND FOR XENAMNOY MIDSTREAM PROJECT AREA

Photo-geological Units		Characteristics
1		Unit 1 forms terraces with flat or gently inclined slopes, showing smooth geomorphic surfaces. This Unit forms escarpments on the marginal sides to the river. The levels of the terraces are slightly different in different localities. Unit 1 may consists of terrace deposits.
2		Unit 2 forms hills overlying the Unit 3. Valleys are shallow whereas the undulation of the terrain is slightly high. Dense vegetation covers the area, and the cultivated lands are scarce. Unit 2 is massive in generall. Sedimentary structure is not observed. The drainage density is low.
3		The topography shows gentle undulation and many flat lands. Many settlements are recognised. Cultivated lands are widely developped. Unit 3 overlies the Unit 4 almost horizontally. As the thickness of this Unit is thin the layers have been eroded to form hills studded in places. The Unit 3 is massive, and sedimentary structure is not observed.
4		Unit 4, conformably overlying the Unit 5, comprises horizontally layered or gently inclined sedimentary rocks. The outcrops, forming scarps along valleys, show high resistance against weathering. The sedimentary structure of this Unit 4 is clearly observed. Unit 4 may comrise alternating beds of arenaceous to rudaceous rocks and argillaceous rocks. Probably, the arenaceous and/or rudaceous rocks are predominant.
5		Unit 5 comprises horizontally layered or gently inclined sedimentary rocks, forming scarps along the valley with rather moderate slopes than that of the Unit 4. The Unit 5 may comrise thick alternating beds of arenaceous to rudaceous rocks and argillaceous rocks. Probably, the arenaceous and/or rudaceous rocks are predominant in the upper part whereas the argillaceous rocks are predominant in the lower part.

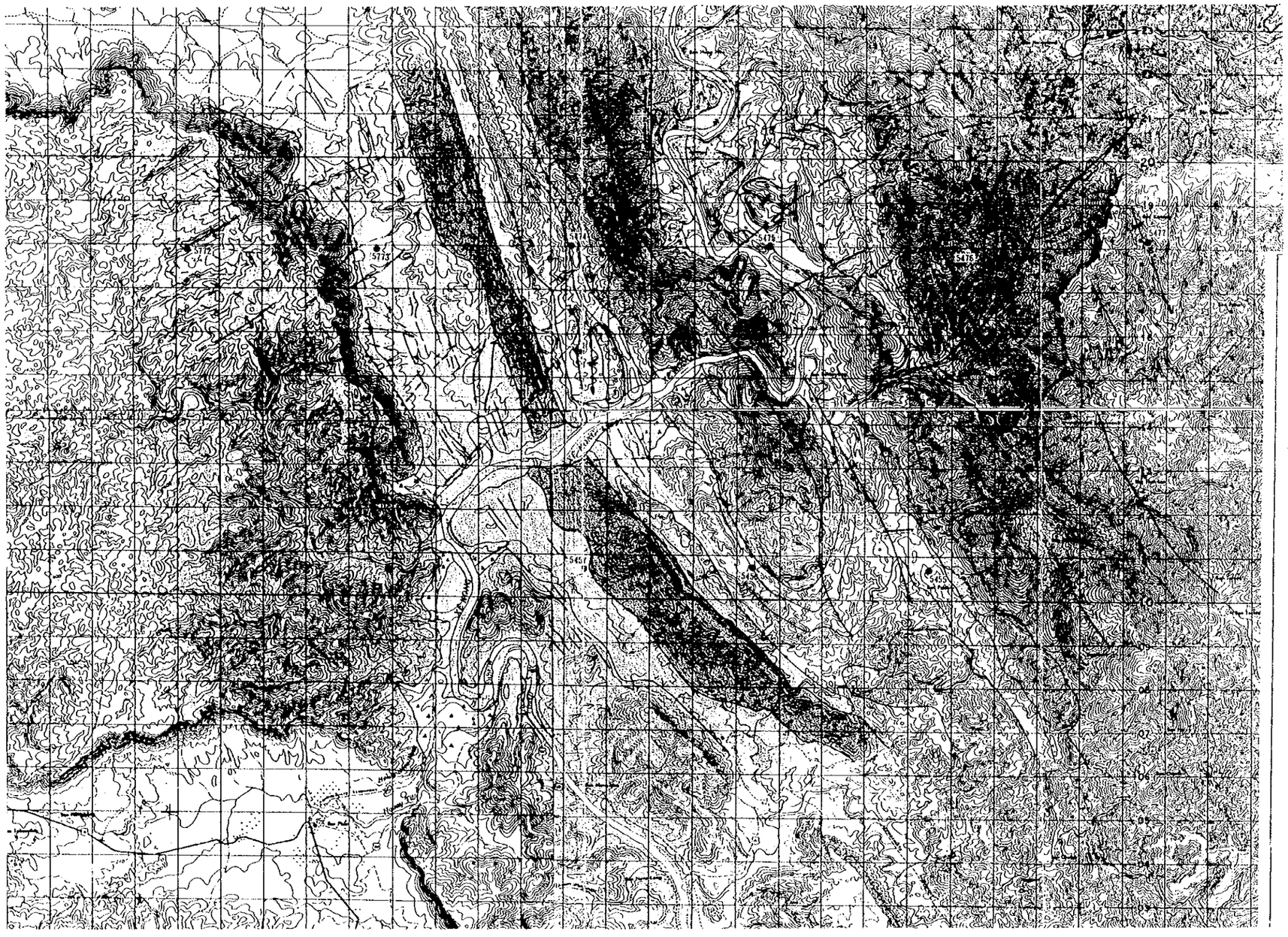
LEGEND FOR SE KONG NO. 4 PROJECT AREA

Photo-geological Units	Characteristics
1	Unit 1 is distributed along by rivers and valleys, forming flat and smooth surface of the terrain including terraces. It may consist of alluvial deposits.
2	Unit 2 appears locally at the foot of mountains and at the mouth of valleys. It has gentle and rounded relief with moderate to nearly horizontal slopes. The drainage density is low. It may consist of talus deposits.
3	Unit 3 is distributed to the south of Ban Palai Vil. located in the southeastern part of the study area. Sedimentary structure is not observed. The Unit horizontally overlies the lower layers which show distinct bedding traces. It may consist of sedimentary rocks mainly composed of argillaceous rocks.
4	The topography is moderate with flat lands. As the thickness of the overburden, consisting of alluvial deposits, is thin the resistant layers of the Unit against whethering show linear alignment of the outcrops as bedding traces. The layers, generally dipping southwest, show locally microfolded structures.
5	Unit 5 is distributed in the western part of the study area. It may comprise alternating beds of sedimentary rocks composed of arenaceous and ruddaceous rocks and argillaceous rocks. This Unit is horizontal or gently dips west in general whereas it shows a microfolded structure with the axis in ENE-WSW direction.
6	Unit 6 forms continuous mountain ridges. The layers with high resistance against wheathering are exposed on the slopes of the mountainside. The sedimentary structure is obvious. Unit 5 may comprise alternating beds of arenaceous to rudaceous rocks and argillaceous rocks. Probably, the arenaceous to rudaceous rocks are predominant. The attitude (dips and strikes) of the layers are consistent with those of the Unit 4.
7	Unit 7 is distributed in the long and narrow basen situated to the east of the Unit 6. This Unit is horizontal in attitude or gently dips west in general whereas it shows a microfolded structure with an axis in N-S direction in the right bank area of the Xe Kong River. Unit 7 may comprise alternating beds of arenaceous and rudaceous rocks and argillaceous rocks. Probably, the arenaceous rocks are predominant.
8	Unit 8 forms long and thin ridges, showing clear bedding traces. The Unit forms outside rims of the wings of the anticlinal and synclinal structures with the axes in NNW-SES direction. The resistance against weathering is high. Slope failures are not observed. The Unit may comprise alternating beds of sedimentary rocks mainly composed of arenaceous and rudaceous rocks.
9	Unit 9 is overlain by the Unit 8, forming the cores of the anticlinal folds. The resistance agaist weathering is relatively low. As it is massive, sedimentary structure is not observed. Drainage density is relatively high. Many slope failures are observed. This Unit may comprise prevalent argillaceous rocks.
10	Unit 10 is a member of the Unit 9. Bedding plains, horizontal or gently dipping to the W-WSW direction, are clearly observed. Gentle topographic relief of the Unit and its occurence in the lowlands area lead to assume that this Unit may comprise alternating beds of arenaceous rocks and predominant argillaceous rocks.
11	Unit 11 is a member of the Unit 9. Bedding plains are clearly observed, striking NNW-NW, dipping 20-30 degrees in the northern part and steeply in the southern part. The unit 11 may comprise of alternating beds of dominant arenaceous rocks to ruddaceous rocks.
12	Unit 12 is distributed in the northern central part of the study area. It dips W or SW in general. The bedding plains, which are ambiguously observed at the isolated hills forming scarps, show incoherent strikes and dips respectively. The geological structure of this Unit is so complicated that faults are inferred and that the relationship with other Units is not defined.

N

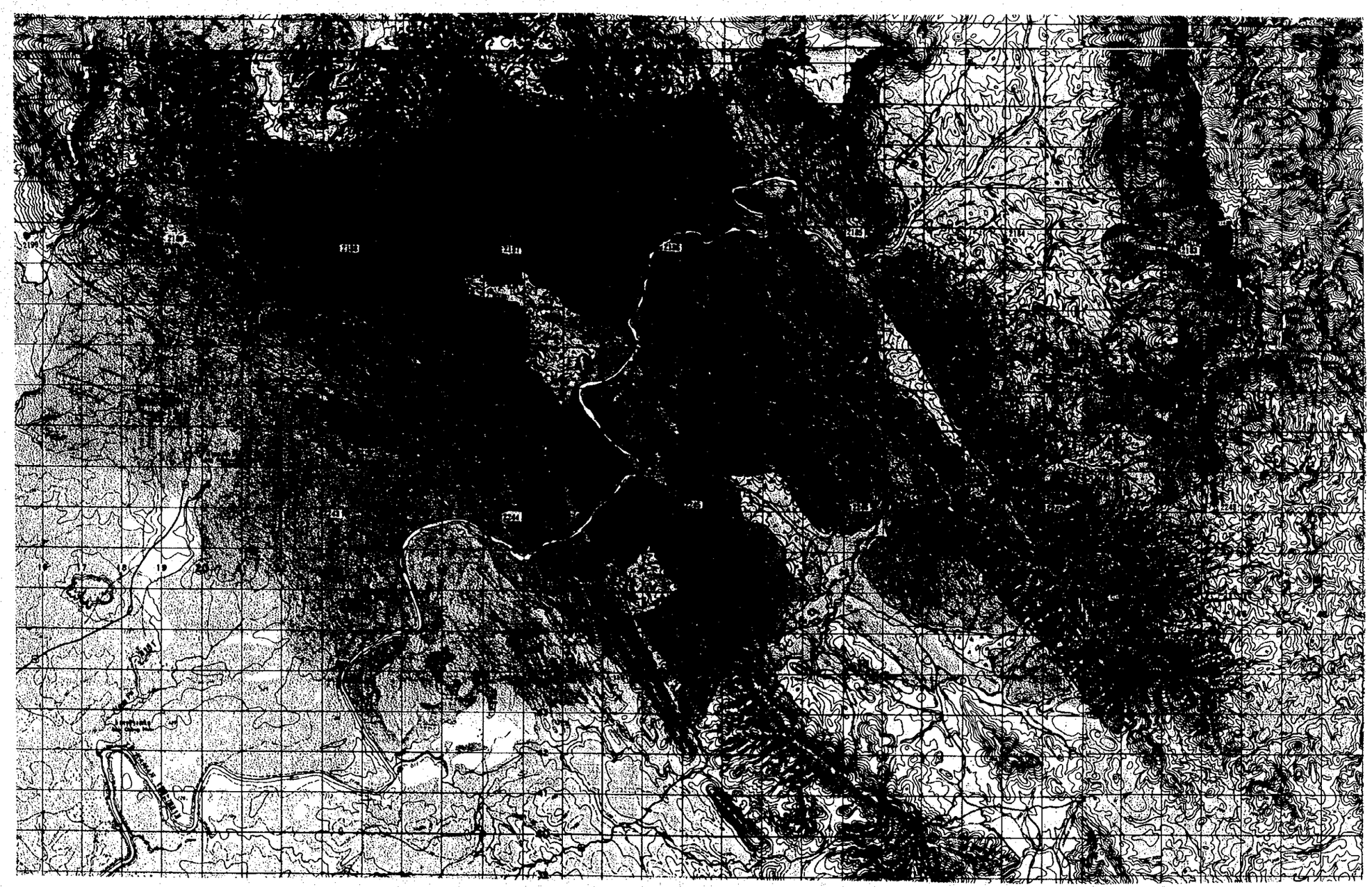
0 5 km

PHOTOGEOLOGICAL MAP
OF XE KONG NO.4 PROJECT AREA



N

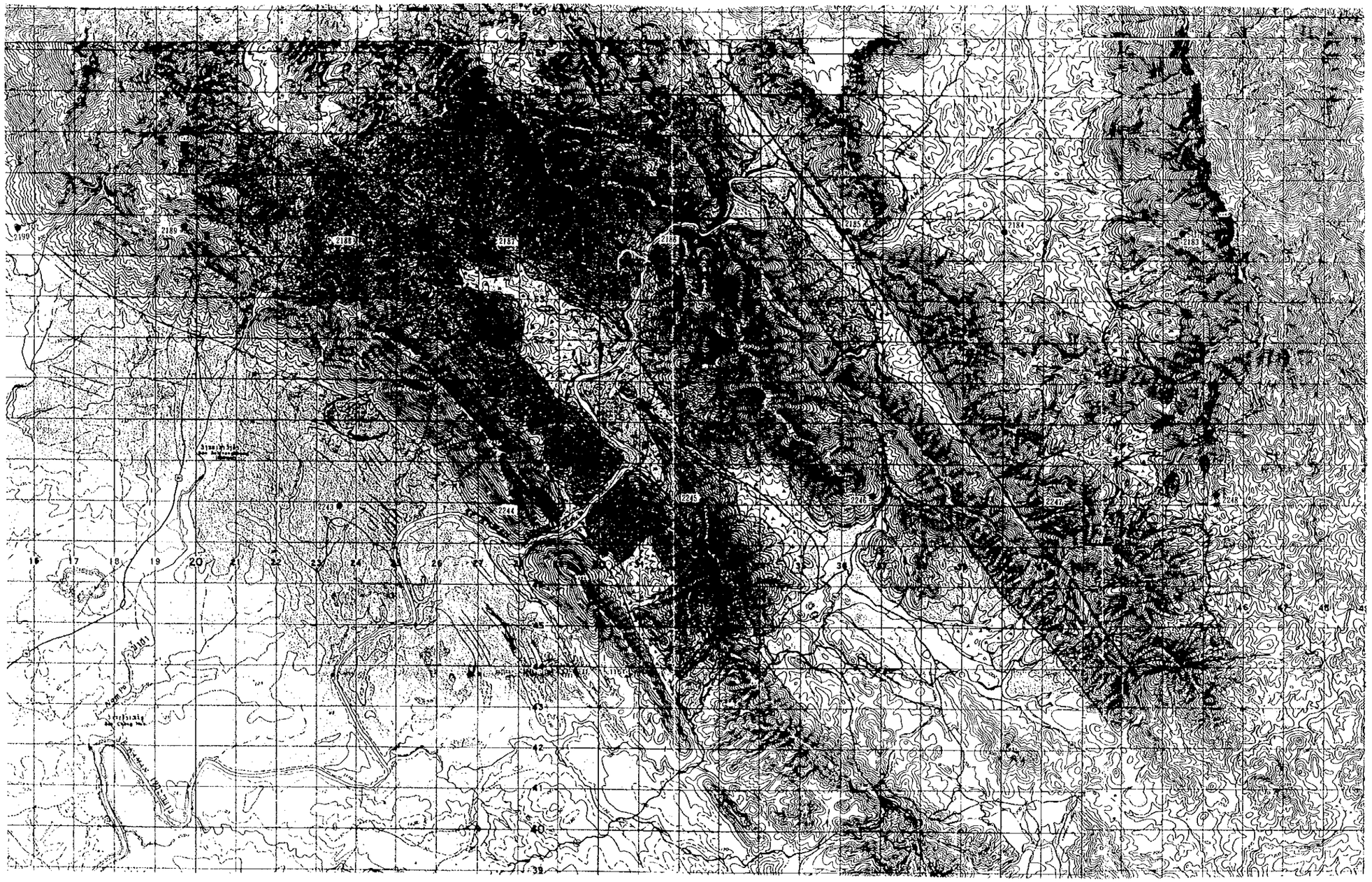
PHOTOGEOLOGICAL MAP
OF XE KONG NO.4 PROJECT AREA



N

0 5 km

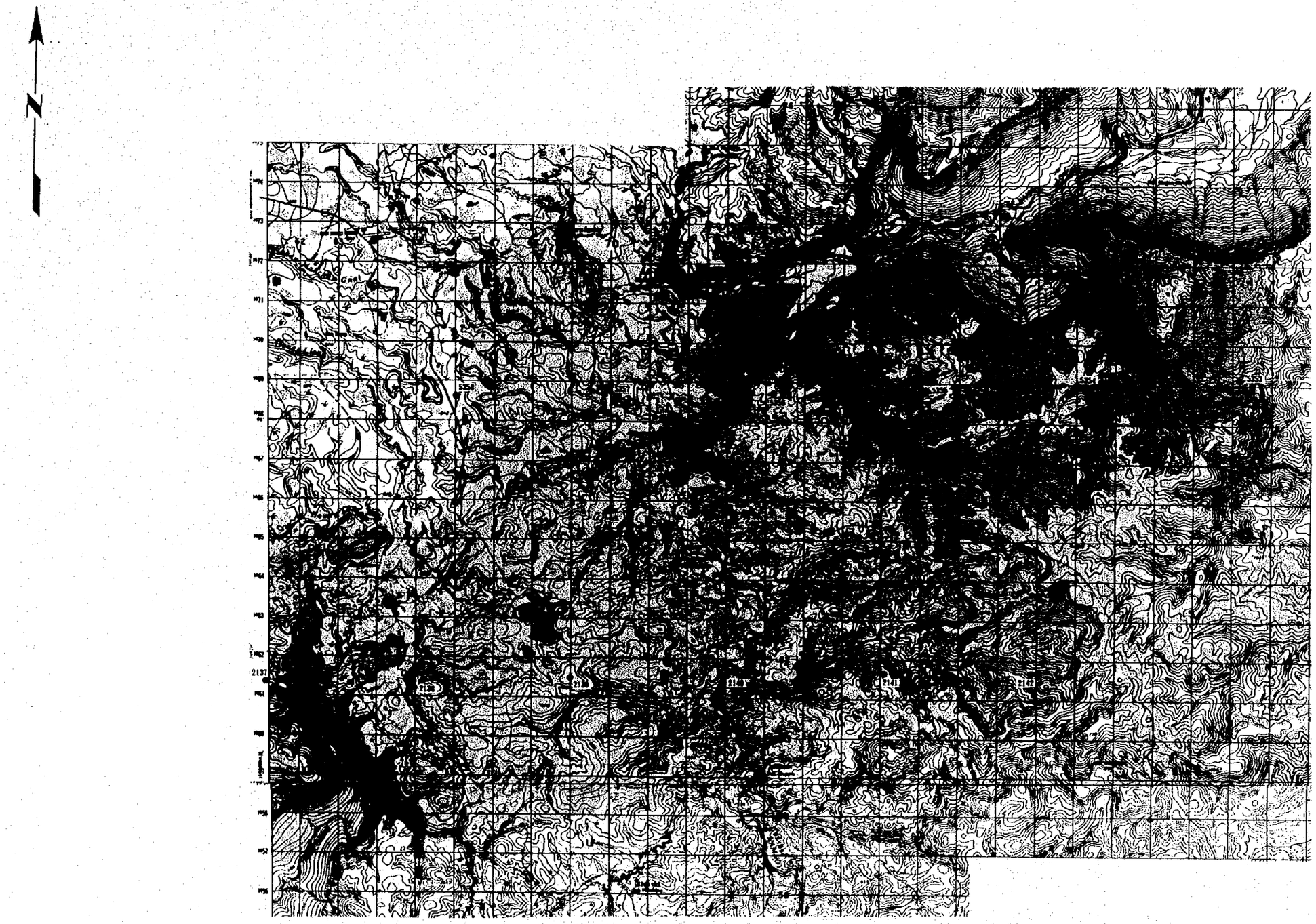
PHOTOGEOLOGICAL MAP
OF XE KAMAN NO.1 PROJECT AREA



N

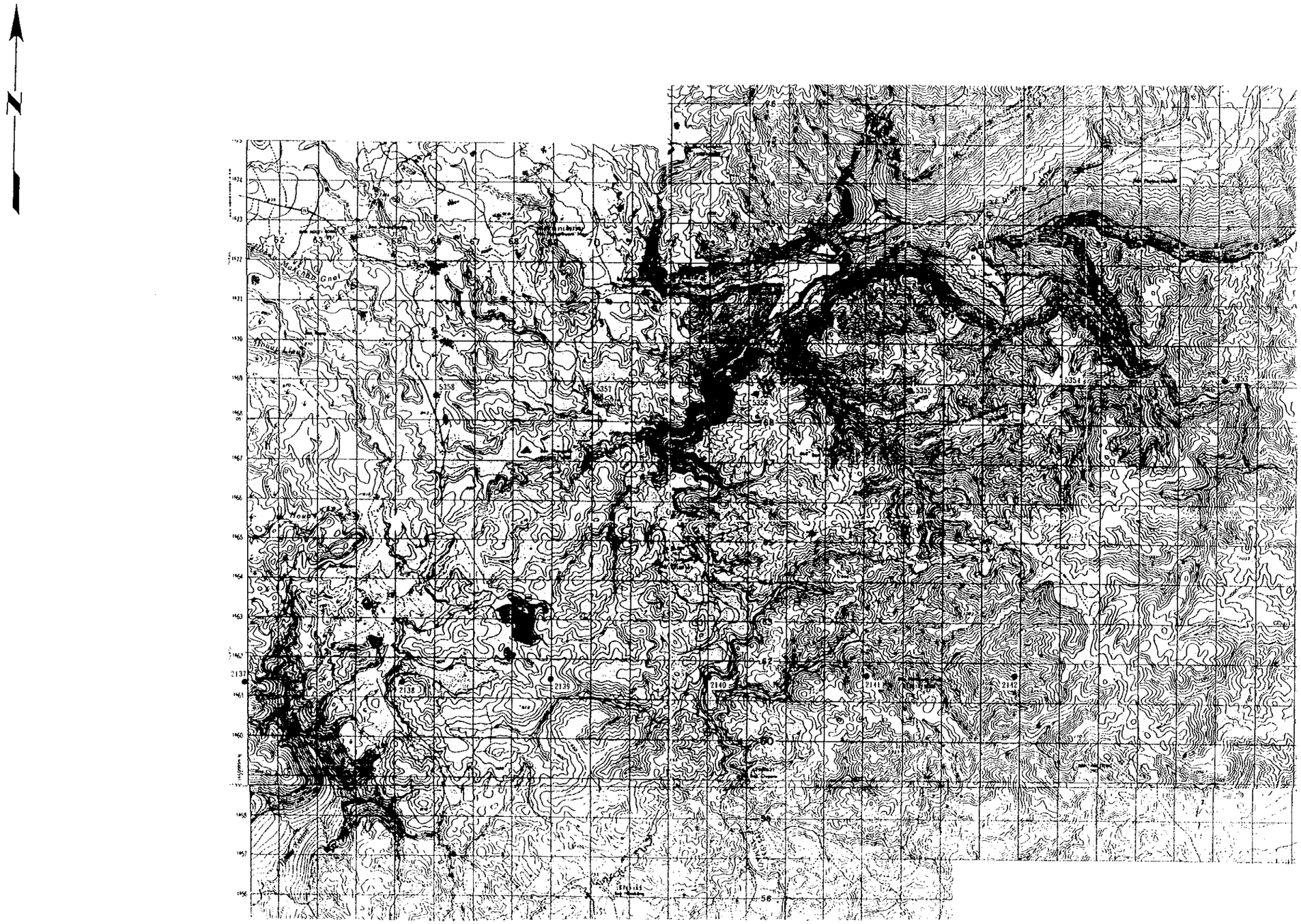
0 5 km

PHOTOGEOLOGICAL MAP
OF XE KAMAN NO.1 PROJECT AREA



0 5 km

PHOTOGEOLOGICAL MAP
OF XE NAMNOY MIDSTREAM PROJECT AREA



PHOTOGEOLOGICAL MAP
OF XE NAMNOY MIDSTREAM PROJECT AREA

Appendix 4

Data of Pre-feasibility Study

Appendix 4

Data of Pre-feasibility Study

4.1 Data of Optimum Development Plan Study

4.2 Data of Cost Estimation

4.1 Data of Optimum Development Plan Study

4.1.1 Se Kong No. 4 Project

Table AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No. 4 Project (1/6) to (6/6)

Fig. AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No. 4 Project (1/3) to (3/3)

4.1.2 Xe Kaman No. 1 Project

Table AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No. 1 Project (1/6) to (6/6)

Fig. AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No. 1 Project (1/3) to (3/3)

4.1.3 Xe Namnoy Project

Table AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (1/6) to (6/6)

Fig. AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (1/3) to (3/3)

Table AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (1/5) to (5/5)

Fig. AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (1/2) to (2/2)

Note) Tables attached are for monthly data of reservoir inflow, spilled reservoir outflow, power discharge, reservoir water level, peak output, and energy production.

Figures are for inflow and outflow balance of the reservoirs, reservoir operation lines, and energy generation.

Table AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (1/6) and (2/6)

(1/6) Monthly Reservoir Inflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1985	1041.4	1590.0	443.9	236.4	158.2	108.0	67.2	67.2	60.5	246.3	286.7	355.8	4661.5
2	1986	921.2	2044.2	310.3	274.1	214.6	148.8	104.3	98.7	85.8	316.3	424.9	2047.5	6990.7
3	1987	1781.1	809.6	435.8	326.4	321.7	192.7	129.0	114.3	98.2	253.3	377.9	1720.0	6559.9
4	1988	1640.4	819.5	409.6	503.0	311.9	214.6	141.9	104.7	98.2	293.9	319.4	358.6	5215.8
5	1989	599.8	313.3	881.1	347.4	254.7	176.6	115.0	111.3	110.6	339.2	576.8	984.2	4810.1
6	1990	1189.0	1195.8	748.1	382.2	218.1	148.6	112.9	126.7	122.8	262.2	386.0	664.6	5557.2
7	1991	810.6	1735.2	1143.8	646.8	501.6	238.9	128.5	140.2	128.2	168.0	298.0	425.5	6365.2
8	1992	1467.8	1114.3	1048.1	386.3	309.6	184.1	111.9	142.8	113.1	126.0	345.2	598.6	5947.7
9	1993	1410.4	928.5	1364.9	652.9	233.5	134.6	118.2	134.6	163.2	143.7	174.3	360.2	5819.0
10	1994	1267.9	641.6	533.3	367.3	540.3	156.1	111.9	108.7	114.7	151.2	300.7	992.1	5285.7
	TOTAL	12129.6	11192.0	7318.9	4122.7	3064.1	1702.9	1140.9	1149.1	1095.4	2300.1	3490.0	8507.0	57212.8
	AVE	1213.0	1119.2	731.9	412.3	306.4	170.3	114.1	114.9	109.5	230.0	349.0	850.7	5721.3
	MAX	1781.1	2044.2	1364.9	652.9	540.3	238.9	141.9	142.8	163.2	339.2	576.8	2047.5	6990.7
	MIN	599.8	313.3	310.3	236.4	158.2	108.0	67.2	67.2	60.5	126.0	174.3	355.8	4661.5

(2/6) Monthly Spilled Outflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1985	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2	1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3	1987	254.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.3
4	1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
5	1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6	1990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
7	1991	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	TOTAL	254.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	254.8
	AVE	25.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5
	MAX	254.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.3
	MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (3/6) and (4/6)

(3/6) Monthly Power Discharge Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1985	914.7	959.0	383.0	370.7	383.0	383.0	346.0	383.0	157.0	237.6	281.6	350.3	5149.0
2	1986	383.0	959.0	383.0	370.7	383.0	383.0	346.0	383.0	370.7	383.0	370.7	991.0	5706.1
3	1987	991.0	959.0	383.0	370.7	383.0	383.0	358.3	383.0	370.7	383.0	472.3	991.0	6428.1
4	1988	991.0	959.0	383.0	370.7	383.0	383.0	346.0	383.0	370.7	383.0	512.1	383.0	5847.5
5	1989	383.0	370.7	383.0	370.7	383.0	383.0	346.0	268.4	97.9	330.5	372.8	383.0	4071.8
6	1990	991.0	878.6	383.0	370.7	383.0	383.0	346.0	383.0	370.7	383.0	500.7	383.0	5755.7
7	1991	555.4	959.0	934.3	636.7	488.6	383.0	358.3	383.0	370.7	383.0	646.0	383.0	6481.1
8	1992	973.6	535.1	641.9	376.2	383.0	383.0	346.0	383.0	370.7	383.0	494.3	383.0	5652.8
9	1993	991.0	447.4	958.7	642.8	383.0	383.0	345.9	383.0	370.7	383.0	370.7	383.0	6042.2
10	1994	602.5	370.7	383.0	370.7	383.0	383.0	346.0	383.0	370.7	358.2	295.6	383.0	4629.3
	TOTAL	7776.3	7397.6	5216.1	4250.2	3935.7	3830.2	3484.2	3715.5	3220.1	3607.4	4316.9	5013.5	55763.6
	AVE	777.6	739.8	521.6	425.0	393.6	383.0	348.4	371.6	322.0	360.7	431.7	501.3	5576.4
	MAX	991.0	959.0	958.7	642.8	488.6	383.0	358.3	383.0	370.7	383.0	646.0	991.0	6481.1
	MIN	383.0	370.7	383.0	370.7	383.0	383.0	345.9	268.4	97.9	237.6	281.6	350.3	4071.8

(4/6) Monthly Reservoir Water Level in m

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AVE >
1	1985	281.53	284.60	287.38	287.00	285.44	283.28	280.90	278.06	275.93	275.40	275.40	275.40	280.86
2	1986	277.97	284.89	288.98	288.21	287.03	285.27	283.21	280.93	278.20	276.40	276.27	281.34	282.39
3	1987	287.82	289.36	288.91	288.87	288.34	287.20	285.36	283.19	280.84	278.94	277.79	280.68	284.78
4	1988	286.29	288.33	287.81	288.39	288.55	287.46	285.81	283.71	281.32	279.70	278.27	277.17	284.40
5	1989	278.05	278.77	280.70	282.58	281.88	280.40	278.24	276.24	275.40	275.40	276.35	280.15	278.68
6	1990	283.39	285.46	288.20	289.67	288.95	287.20	285.17	283.03	280.84	279.10	277.89	278.64	283.96
7	1991	281.00	285.19	289.17	290.00	290.00	289.35	287.70	285.63	283.51	281.53	279.01	277.49	284.97
8	1992	280.02	284.38	288.37	290.00	289.65	288.42	286.53	284.45	282.28	280.07	278.06	278.32	284.21
9	1993	281.14	284.79	288.37	290.00	289.33	287.59	285.52	283.44	281.45	279.43	277.26	276.16	283.71
10	1994	279.20	283.12	284.79	285.32	285.86	285.47	283.47	281.26	278.78	276.44	275.40	278.30	281.45
	AVE	281.64	284.89	287.27	288.00	287.50	286.17	284.19	281.99	279.85	278.24	277.17	278.36	3395.28
	MAX	287.82	289.36	289.17	290.00	290.00	289.35	287.70	285.63	283.51	281.53	279.01	281.34	3419.59
	MIN	277.97	278.77	280.70	282.58	281.88	280.40	278.24	276.24	275.40	275.40	275.40	275.40	3344.17

Table AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (5/6)

Monthly Peak Power Output in MW

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1985	426.50	441.05	443.00	443.00	443.00	434.80	423.54	410.20	207.04	299.99	365.06	397.87	4735.03
2	1986	409.79	442.43	443.00	443.00	443.00	443.00	434.46	423.66	410.89	402.51	401.91	425.58	5123.21
3	1987	443.00	443.00	443.00	443.00	443.00	443.00	443.00	434.36	423.26	414.34	408.97	422.48	5204.41
4	1988	443.00	443.00	443.00	443.00	443.00	443.00	443.00	436.81	425.50	417.86	411.18	406.07	5198.41
5	1989	410.15	413.51	422.60	431.48	428.13	421.19	411.08	339.86	129.00	397.88	402.30	420.02	4627.18
6	1990	435.30	443.00	443.00	443.00	443.00	443.00	443.00	433.61	423.23	415.05	409.43	412.93	5187.55
7	1991	424.01	443.00	443.00	443.00	443.00	443.00	443.00	443.00	435.86	426.51	414.67	407.57	5209.62
8	1992	419.40	440.04	443.00	443.00	443.00	443.00	443.00	440.36	430.04	419.63	410.20	411.45	5186.11
9	1993	424.63	441.96	443.00	443.00	443.00	443.00	443.00	435.56	426.09	416.63	406.51	401.37	5167.75
10	1994	415.56	434.02	441.98	443.00	443.00	443.00	435.68	425.21	413.57	402.68	382.45	411.35	5091.50
	TOTAL	4251.35	4385.00	4408.58	4418.48	4415.13	4399.99	4362.76	4222.62	3724.47	4013.09	4012.67	4116.68	50730.78
	AVE	425.13	438.50	440.86	441.85	441.51	440.00	436.28	422.26	372.45	401.31	401.27	411.67	5073.08
	MAX	443.00	443.00	443.00	443.00	443.00	443.00	443.00	443.00	435.86	426.51	414.67	425.58	5209.62
	MIN	409.79	413.51	422.60	431.48	428.13	421.19	411.08	339.86	129.00	299.99	365.06	397.87	4627.18

Table AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (6/6)

Monthly Energy Production in GWh

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1985	296.82	317.55	129.57	125.04	127.68	125.88	111.74	121.12	49.69	74.40	87.61	108.57	1675.69
2	1986	121.04	318.55	131.13	126.18	129.24	127.52	113.64	123.73	117.34	119.62	115.64	316.63	1860.27
3	1987	329.59	318.96	131.06	126.79	130.51	129.40	119.38	125.79	119.67	121.93	149.07	314.32	2116.48
4	1988	329.59	318.96	130.00	126.35	130.71	129.65	115.66	126.26	120.09	122.61	162.20	120.31	1932.39
5	1989	121.11	117.84	123.53	121.20	124.60	123.26	109.56	84.29	30.96	102.42	116.37	123.03	1298.16
6	1990	323.87	292.95	130.37	127.55	131.10	129.40	115.09	125.65	119.66	122.07	158.15	121.66	1897.52
7	1991	179.53	318.96	320.33	219.62	168.54	131.49	121.51	127.87	122.02	124.28	205.76	120.61	2160.52
8	1992	312.03	177.24	218.78	129.76	131.78	130.59	116.29	126.94	120.93	122.96	156.32	121.37	1864.98
9	1993	315.93	148.63	326.75	221.73	131.47	129.78	115.40	126.02	120.20	122.37	116.52	119.39	1994.20
10	1994	192.18	121.67	127.25	123.46	128.10	127.72	113.85	124.04	117.85	111.89	91.79	121.35	1501.13
	TOTAL	2521.70	2451.32	1768.77	1447.67	1333.73	1284.69	1152.11	1211.71	1038.41	1144.55	1359.44	1587.24	18301.34
	AVE	252.17	245.13	176.88	144.77	133.37	128.47	115.21	121.17	103.84	114.45	135.94	158.72	1830.13
	MAX	329.59	318.96	326.75	221.73	168.54	131.49	121.51	127.87	122.02	124.28	205.76	316.63	2160.52
	MIN	121.04	117.84	123.53	121.20	124.60	123.26	109.56	84.29	30.96	74.40	87.61	108.57	1298.16

Note) Efficiency adjustment:

Total annual power discharge : 5578 MCM

Annual discharge for partial operation (30 m^3/s) : 537 MCM

Net efficiency for peak operation : 0.8920

Net efficiency for partial operation : 0.7958

Adjustment on energy production :

1830.13 - (1 - 537 / 5578) x (1 - 0.7958 / 0.8920) = 1816 GWh

Fig. AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (1/3)
(Simulated Monthly Reservoir Operation in Water Level)

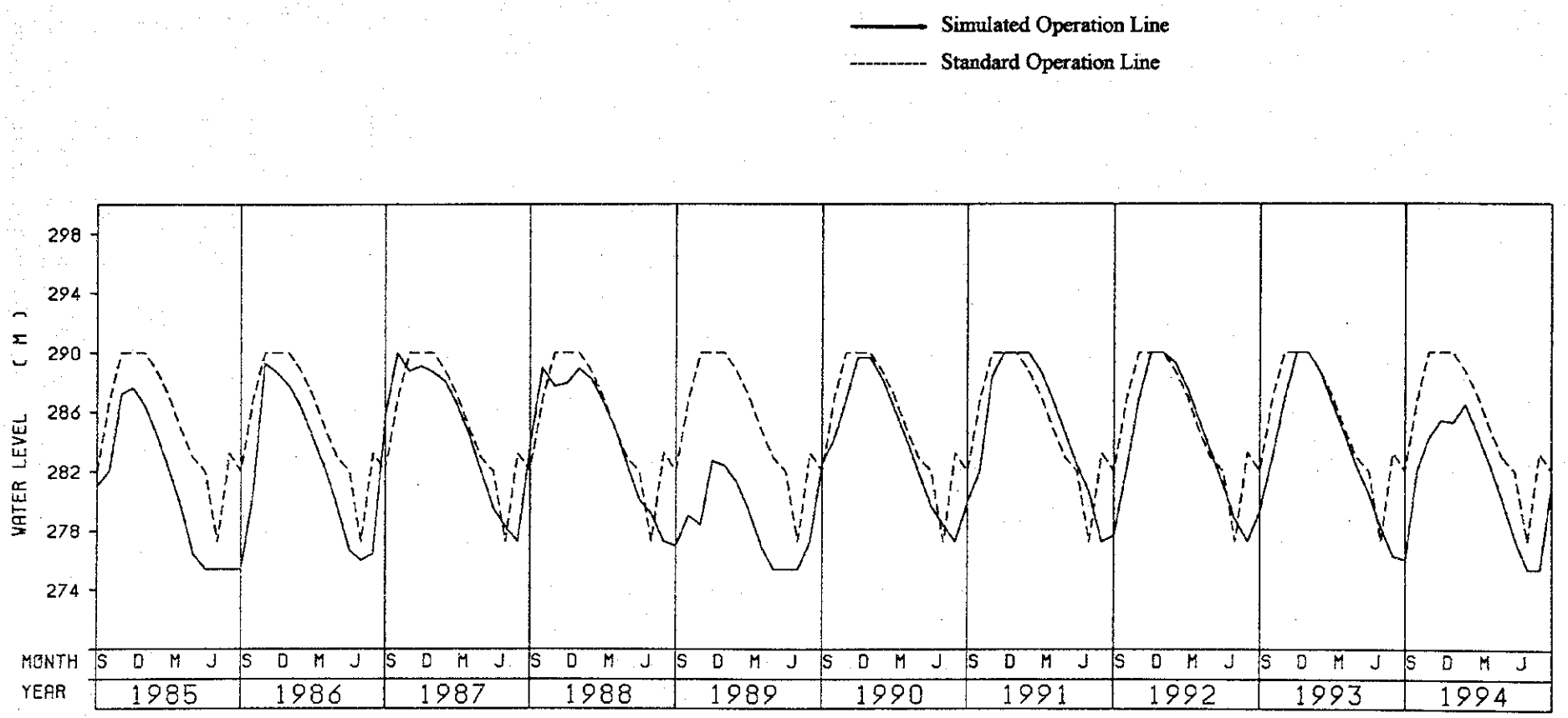


Fig. AP4.1-1 Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (2/3)

(Simulated Monthly Reservoir Inflow and Outflow Balance in MCM)

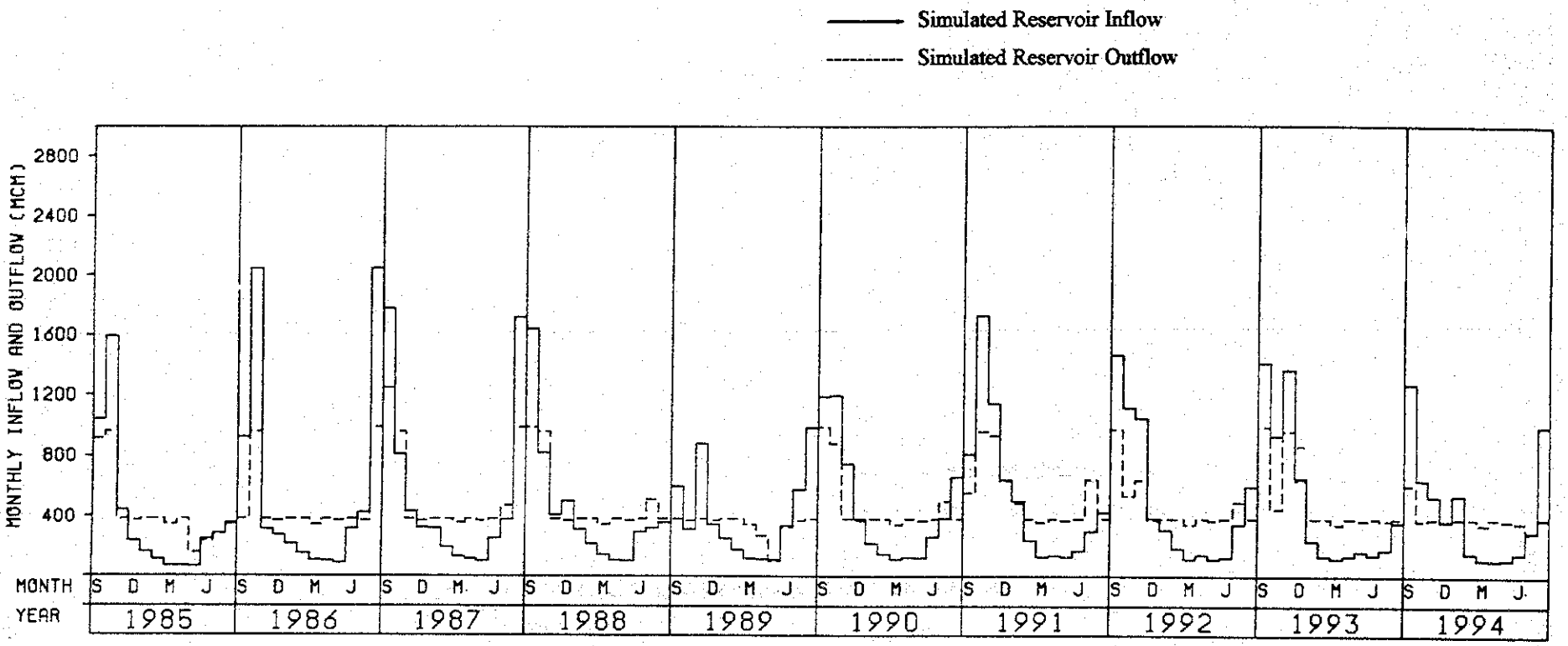


Fig. AP4.1-1 **Data of Reservoir and Power Plant Operation of Se Kong No.4 Project (3/3)**
(Simulated Monthly Energy Generation in GWh)

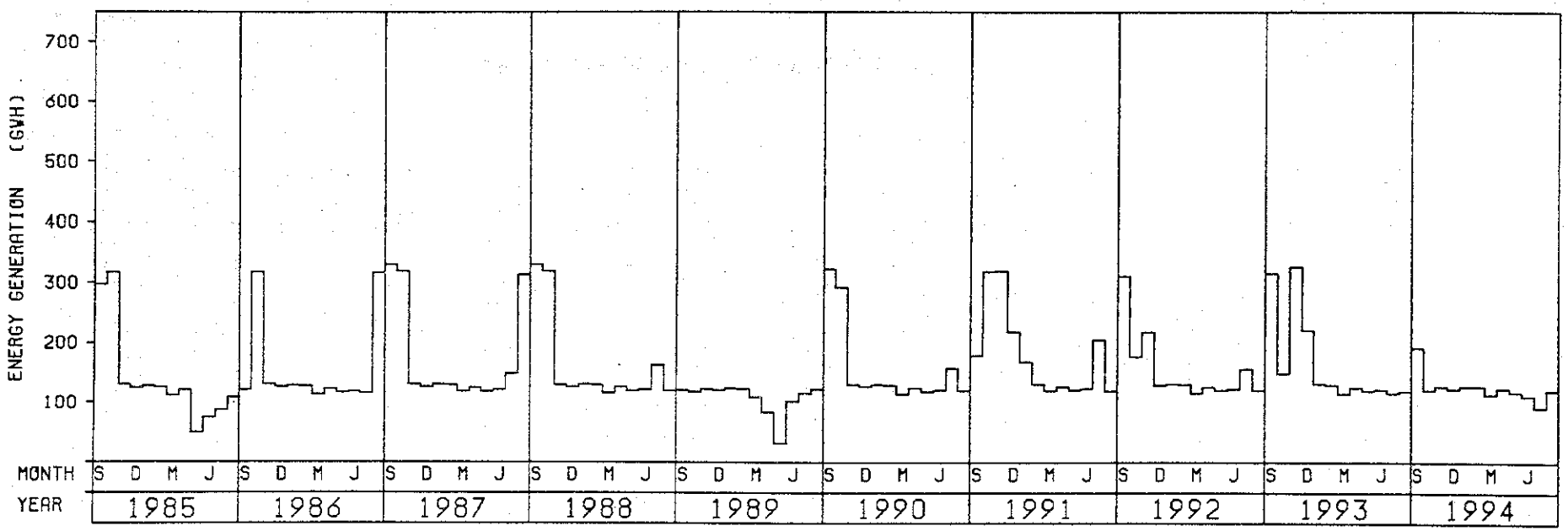


Table AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (1/6) and (2/6)

(1/6) Monthly Reservoir Inflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	885.3	820.9	784.6	831.7	440.7	242.5	142.4	103.8	106.9	119.2	323.7	307.1	5108.9
2	1985	572.8	587.1	527.4	356.3	294.0	168.4	87.9	49.2	41.4	349.2	158.8	260.1	3452.6
3	1986	790.0	733.9	862.6	441.2	657.0	231.2	127.5	85.7	36.2	35.9	108.8	198.2	4308.1
4	1987	404.2	505.2	259.5	448.1	220.5	100.7	60.4	40.8	32.3	105.1	195.0	229.6	2601.4
5	1988	469.0	188.8	748.3	203.9	130.1	69.5	28.4	18.9	20.7	210.5	357.3	601.1	3046.5
6	1989	871.5	727.2	342.8	140.5	101.6	55.5	34.0	34.3	35.6	51.9	182.8	239.2	2816.7
7	1990	613.3	1159.8	1009.1	435.4	173.5	96.9	66.8	63.5	54.1	53.0	213.4	496.2	4434.9
8	1991	1661.0	1202.0	922.9	221.6	218.3	140.8	117.7	137.6	105.2	153.7	298.1	564.6	5743.3
9	1992	1077.3	814.5	803.5	376.1	155.2	136.3	110.8	112.5	96.8	81.5	156.7	1009.5	4930.7
10	1993	2271.0	1461.7	262.4	174.6	194.9	130.3	98.6	92.2	103.0	143.9	216.8	858.6	6007.8
	TOTAL	9615.3	8201.0	6523.0	3629.3	2585.7	1371.9	874.5	738.5	632.1	1303.8	2211.5	4764.2	42450.9
	AVE	961.5	820.1	652.3	362.9	258.6	137.2	87.5	73.9	63.2	130.4	221.2	476.4	4245.1
	MAX	2271.0	1461.7	1009.1	831.7	657.0	242.5	142.4	137.6	106.9	349.2	357.3	1009.5	6007.8
	MIN	404.2	188.8	259.5	140.5	101.6	55.5	28.4	18.9	20.7	35.9	108.8	198.2	2601.4

(2/6) Monthly Spilled Outflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	0.0	0.0	0.0	182.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	182.8
2	1985	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1986	0.0	0.0	35.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.2
4	1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
5	1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6	1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
7	1990	0.0	0.0	181.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	181.8
8	1991	126.3	601.4	297.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1025.3
9	1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
10	1993	875.3	861.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.4
	TOTAL	1001.6	1462.5	514.5	182.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	3161.7
	AVE	100.2	146.2	51.5	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	316.2
	MAX	875.3	861.1	297.6	182.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1736.4
	MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (3/6) and (4/6)

(3/6) Monthly Power Discharge Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	610.7	416.8	603.1	591.0	415.6	257.8	379.9	463.9	310.2	250.4	358.8	238.4	4896.6
2	1985	238.4	230.7	238.4	274.2	238.4	238.4	266.1	409.4	244.6	480.5	230.7	238.4	3328.0
3	1986	350.0	232.4	610.7	453.6	596.8	246.4	365.1	445.9	239.5	238.4	230.7	205.2	4214.4
4	1987	238.4	230.7	238.4	230.7	238.4	238.4	223.0	238.4	29.6	87.3	186.4	218.8	2398.4
5	1988	238.4	230.7	238.4	230.7	238.4	238.4	215.3	77.1	4.9	192.7	230.7	348.0	2483.5
6	1989	610.7	256.8	238.4	230.7	238.4	238.4	215.3	238.4	230.7	70.8	174.1	228.4	2971.0
7	1990	238.4	443.6	610.7	447.7	238.4	238.4	215.3	261.8	257.4	238.4	230.7	264.5	3685.2
8	1991	610.7	591.0	610.7	233.9	238.4	238.4	223.0	467.6	308.4	284.9	333.2	369.2	4509.3
9	1992	610.7	549.7	610.7	364.7	238.4	238.4	215.3	375.9	300.0	238.4	230.7	610.7	4583.6
10	1993	610.7	591.0	282.8	230.7	238.4	238.4	215.3	298.4	306.3	275.1	251.9	610.7	4149.7
	TOTAL	4356.9	3773.3	4282.1	3287.8	2919.5	2411.3	2533.7	3276.7	2231.6	2356.9	2457.9	3332.2	37219.7
	AVE	435.7	377.3	428.2	328.8	291.9	241.1	253.4	327.7	223.2	235.7	245.8	333.2	3722.0
	MAX	610.7	591.0	610.7	591.0	596.8	257.8	379.9	467.6	310.2	480.5	358.8	610.7	4896.6
	MIN	238.4	230.7	238.4	230.7	238.4	238.4	215.3	77.1	4.9	70.8	174.1	205.2	2398.4

(4/6) Monthly Reservoir Water Level in m

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AVE >
1	1984	256.09	257.86	259.36	259.91	260.00	259.91	259.11	257.36	255.74	254.75	254.23	254.27	257.38
2	1985	255.29	257.09	258.76	259.65	259.89	259.73	258.95	257.36	255.74	254.75	254.13	253.95	257.11
3	1986	255.13	257.60	259.46	259.91	259.91	259.91	259.11	257.36	255.74	254.56	253.62	253.22	257.13
4	1987	253.59	254.72	255.45	255.99	256.40	255.87	254.94	253.84	253.21	253.17	253.17	253.17	254.46
5	1988	253.76	254.22	255.41	256.61	256.12	255.26	254.19	253.40	253.17	253.17	253.49	254.45	254.44
6	1989	255.77	257.68	259.16	259.10	258.36	257.39	256.29	255.12	253.94	253.27	253.17	253.17	256.03
7	1990	254.15	257.02	259.46	259.91	259.57	258.90	258.00	256.93	255.74	254.60	253.99	254.51	256.90
8	1991	257.55	260.00	260.00	259.91	259.69	259.25	258.59	257.28	255.74	254.75	254.23	254.61	257.63
9	1992	256.33	258.23	259.39	259.84	259.52	258.91	258.23	257.10	255.74	254.68	253.99	254.81	257.23
10	1993	257.92	260.00	259.91	259.60	259.21	258.68	257.96	256.95	255.74	254.75	254.23	254.75	257.47
	AVE	255.56	257.44	258.64	259.04	258.87	258.38	257.54	256.27	255.05	254.25	253.83	254.09	3078.94
	MAX	257.92	260.00	260.00	259.91	260.00	259.91	259.11	257.36	255.74	254.75	254.23	254.81	3091.60
	MIN	253.59	254.22	255.41	255.99	256.12	255.26	254.19	253.40	253.17	253.17	253.17	253.17	3053.27

Table AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (5/6)

Monthly Peak Power Output in MW

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	252.23	256.00	256.00	256.00	256.00	256.00	256.00	255.93	251.20	248.34	246.84	246.95	3037.48
2	1985	249.91	255.14	256.00	256.00	256.00	256.00	256.00	255.93	251.20	248.34	246.56	246.02	3033.09
3	1986	249.43	256.00	256.00	256.00	256.00	256.00	256.00	255.93	251.20	247.78	245.07	243.93	3029.34
4	1987	244.99	248.25	250.36	251.93	253.13	251.57	248.90	245.72	38.09	108.33	235.15	243.79	2620.21
5	1988	245.49	246.80	250.25	253.73	252.31	249.82	246.72	95.87	6.28	235.25	244.70	247.48	2574.70
6	1989	251.31	256.00	256.00	256.00	256.00	255.99	252.80	249.40	245.99	88.02	220.22	243.79	2831.51
7	1990	246.61	254.94	256.00	256.00	256.00	256.00	256.00	254.66	251.20	247.92	246.14	247.65	3029.11
8	1991	256.00	256.00	256.00	256.00	256.00	256.00	256.00	255.69	251.20	248.34	246.84	247.93	3041.99
9	1992	252.91	256.00	256.00	256.00	256.00	256.00	256.00	255.17	251.20	248.14	246.14	248.50	3038.06
10	1993	256.00	256.00	256.00	256.00	256.00	256.00	256.00	254.72	251.20	248.34	246.84	248.33	3041.43
	TOTAL	2504.87	2541.13	2548.61	2553.66	2553.44	2549.39	2540.42	2379.02	2048.76	2168.78	2424.49	2464.36	29276.91
	AVE	250.49	254.11	254.86	255.37	255.34	254.94	254.04	237.90	204.88	216.88	242.45	246.44	2927.69
	MAX	256.00	256.00	256.00	256.00	256.00	256.00	256.00	255.93	251.20	248.34	246.84	248.50	3041.99
	MIN	244.99	246.80	250.25	251.93	252.31	249.82	246.72	95.87	6.28	88.02	220.22	243.79	2574.70

Table AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (6/6)

Monthly Energy Production in GWh

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	187.66	130.13	190.46	184.32	132.01	81.82	119.82	144.86	95.66	76.65	109.39	72.69	1525.46
2	1985	73.27	71.88	74.97	86.83	75.65	75.55	83.81	127.82	75.45	147.06	70.27	72.51	1035.08
3	1986	107.43	72.51	190.46	143.95	189.39	78.21	115.12	139.22	73.86	72.85	69.99	62.05	1315.06
4	1987	72.31	70.59	73.35	71.28	73.89	73.59	68.36	72.45	9.14	26.86	56.44	66.16	734.43
5	1988	72.41	70.32	73.33	71.62	73.73	73.25	65.62	23.77	1.51	58.34	69.92	106.26	760.09
6	1989	186.97	80.10	75.21	72.75	74.73	74.44	66.68	73.17	70.17	21.83	52.85	69.05	917.95
7	1990	72.63	138.14	190.46	142.10	75.45	75.05	67.30	81.48	79.37	72.88	70.20	80.82	1145.88
8	1991	190.46	184.32	190.46	74.24	75.53	75.27	70.04	145.90	95.12	87.21	101.57	112.87	1403.00
9	1992	188.16	172.17	190.46	115.68	75.43	75.06	67.43	117.15	92.53	72.92	70.20	184.89	1422.07
10	1993	190.46	184.32	89.76	73.04	75.24	74.92	67.28	92.88	94.46	84.21	76.80	184.76	1288.14
	TOTAL	1341.76	1174.48	1338.95	1035.81	921.05	757.16	791.46	1018.70	687.27	720.83	747.63	1012.07	11547.14
	AVE	134.18	117.45	133.89	103.58	92.10	75.72	79.15	101.87	68.73	72.08	74.76	101.21	1154.71
	MAX	190.46	184.32	190.46	184.32	189.39	81.82	119.82	145.90	95.66	147.06	109.39	184.89	1525.46
	MIN	72.31	70.32	73.33	71.28	73.73	73.25	65.62	23.77	1.51	21.83	52.85	62.05	734.43

Note) Efficiency adjustment:

Total annual power discharge : 3722 MCM

Annual discharge for partial operation (30 m^3/s) : 500 MCM

Net efficiency for peak operation : 0.8853

Net efficiency for partial operation : 0.7726

Adjustment on energy production :

$1154.71 - (1 - 500 / 3722) \times (1 - 0.7726 / 0.8853) =$ 1137 GWh

Fig. AP4.1-2 **Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (1/3)**

(Simulated Monthly Reservoir Operation in Water Level)

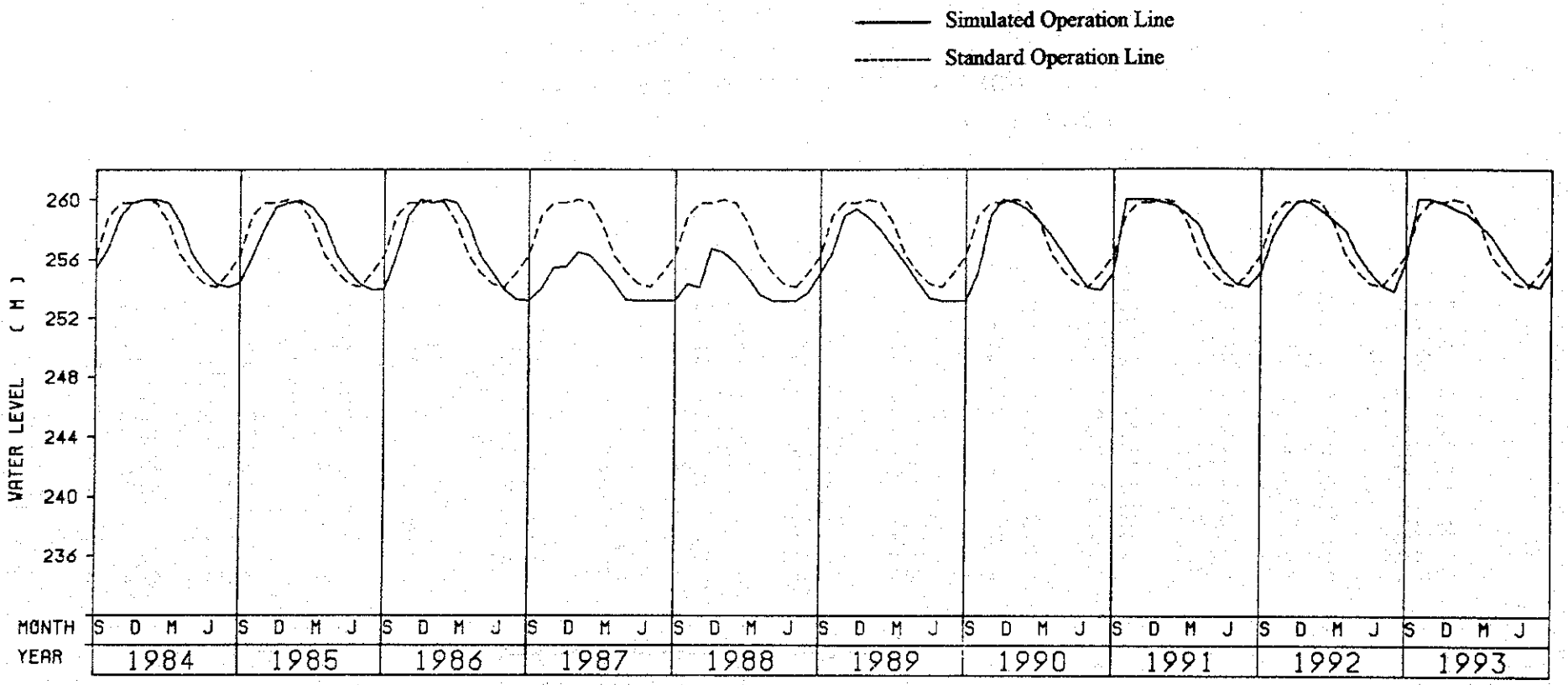


Fig. AP4.1-2 Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (2/3)

(Simulated Monthly Reservoir Inflow and Outflow Balance in MCM)

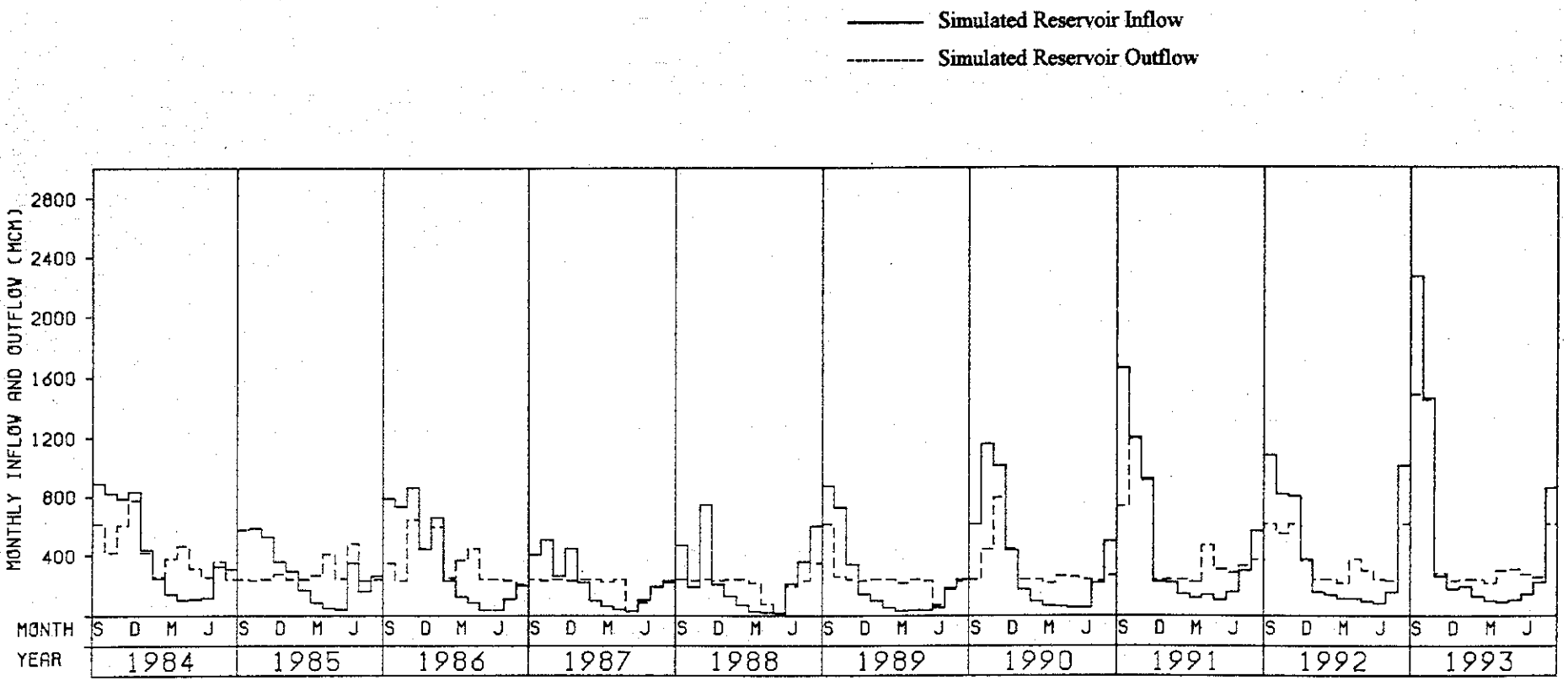


Fig. AP4.1-2 **Data of Reservoir and Power Plant Operation of Xe Kaman No.1 Project (3/3)**
(Simulated Monthly Energy Generation in GWh)

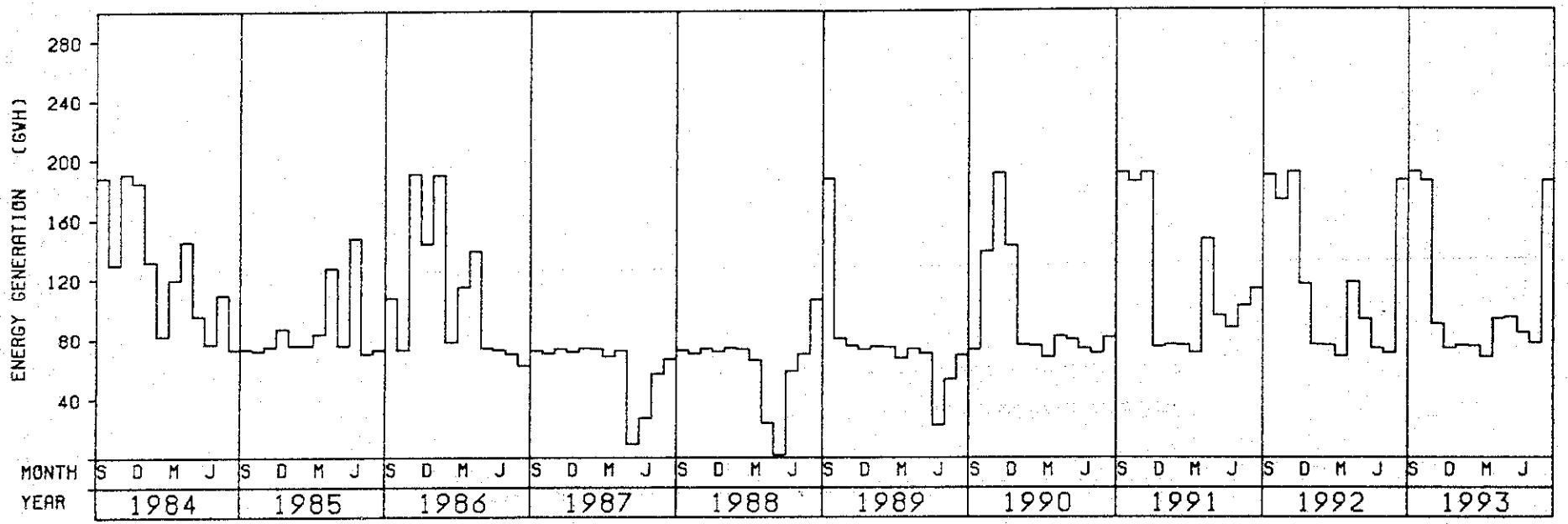


Table AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (1/6) and (2/6)

(1/6) Monthly Reservoir Inflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	164.6	154.1	149.7	155.6	54.7	30.6	16.2	14.5	19.4	59.7	209.2	184.2	1212.6
2	1985	197.8	185.6	129.2	64.1	37.2	21.6	11.9	8.2	15.1	62.3	75.1	94.0	902.2
3	1986	231.4	205.7	153.1	114.5	46.2	16.4	11.0	9.5	8.2	50.7	77.4	306.2	1230.2
4	1987	294.3	161.9	84.2	64.1	26.9	18.2	12.1	8.7	8.2	59.4	113.2	89.3	940.6
5	1988	166.6	66.5	111.2	57.8	21.1	19.0	8.6	4.7	14.5	80.8	153.9	197.2	901.9
6	1989	263.9	288.7	154.6	55.2	31.1	16.1	2.8	9.2	9.2	39.1	46.8	105.1	1021.7
7	1990	142.5	187.9	255.4	140.8	95.3	14.3	9.5	7.6	5.1	20.9	88.3	253.7	1221.3
8	1991	344.9	280.7	179.9	50.9	24.8	15.6	8.9	7.1	7.1	18.7	89.3	159.1	1187.0
9	1992	249.0	194.9	110.5	39.1	21.4	13.7	7.9	8.2	8.4	24.5	52.4	138.5	868.5
10	1993	256.0	195.8	109.6	53.7	28.0	14.0	6.0	7.4	13.8	36.4	50.6	160.7	932.0
	TOTAL	2311.0	1921.7	1437.3	795.8	386.9	179.5	94.8	85.1	109.0	452.5	956.3	1688.1	10417.9
	AVE	231.1	192.2	143.7	79.6	38.7	17.9	9.5	8.5	10.9	45.3	95.6	168.8	1041.8
	MAX	344.9	288.7	255.4	155.6	95.3	30.6	16.2	14.5	19.4	80.8	209.2	306.2	1230.2
	MIN	142.5	66.5	84.2	39.1	21.1	13.7	2.8	4.7	5.1	18.7	46.8	89.3	868.5

(2/6) Monthly Spilled Outflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1985	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1987	64.3	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.0
5	1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1989	0.0	89.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.6
7	1990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1991	54.1	121.6	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	190.7
9	1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL	118.4	213.9	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	347.3
	AVE	11.8	21.4	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7
	MAX	64.3	121.6	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	190.7
	MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (3/6) and (4/6)

(3/6) Monthly Power Discharge Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	105.1	60.5	85.4	151.3	64.1	53.7	48.0	53.5	51.3	53.0	155.5	160.7	1042.2
2	1985	160.7	155.5	102.4	59.9	53.0	53.0	47.9	53.0	51.3	53.0	51.3	139.2	980.4
3	1986	160.7	123.2	88.8	110.2	55.5	53.0	47.9	53.0	51.3	53.0	51.3	160.7	1008.9
4	1987	160.7	155.5	114.7	59.9	53.0	53.0	-49.6	53.0	51.3	53.0	51.3	148.3	1003.4
5	1988	107.2	51.3	53.0	51.3	53.0	53.0	47.9	17.8	11.5	53.0	97.7	160.7	757.5
6	1989	160.7	155.5	160.7	75.1	53.0	53.0	47.9	53.0	51.3	41.1	43.7	93.5	988.6
7	1990	83.0	94.3	160.7	155.5	115.9	53.0	47.9	53.0	51.3	34.2	51.3	160.7	1061.0
8	1991	160.7	155.5	160.7	81.0	53.0	53.0	49.6	53.0	50.0	15.4	51.3	160.7	1044.1
9	1992	160.7	151.4	53.0	51.3	53.0	53.0	47.9	53.0	25.2	21.3	49.3	126.9	846.1
10	1993	160.7	137.9	53.0	51.3	53.0	53.0	47.9	53.0	47.9	33.2	47.5	149.1	887.7
	TOTAL	1420.2	1240.7	1032.6	846.9	606.8	531.0	482.5	495.5	442.5	410.3	650.4	1460.4	9619.8
	AVE	142.0	124.1	103.3	84.7	60.7	53.1	48.3	49.6	44.3	41.0	65.0	146.0	962.0
	MAX	160.7	155.5	160.7	155.5	115.9	53.0	47.9	53.0	47.9	53.0	155.5	160.7	1061.0
	MIN	83.0	51.3	53.0	51.3	53.0	53.7	48.0	17.8	11.5	15.4	43.7	93.5	757.5

(4/6) Monthly Reservoir Water Level in m

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	< AVE >
1	1984	751.56	757.24	761.70	763.24	762.89	761.83	760.21	757.66	755.07	753.68	755.77	758.08	758.24
2	1985	759.83	761.40	762.66	763.24	762.72	761.29	759.16	756.23	752.76	751.27	752.44	751.21	757.85
3	1986	752.05	757.60	761.70	763.24	762.89	761.49	759.21	756.29	752.58	750.29	751.05	757.46	757.15
4	1987	763.33	765.00	764.12	763.24	762.46	760.68	758.21	755.25	751.18	748.99	751.98	751.82	758.02
5	1988	751.56	754.55	756.84	758.72	757.62	755.19	751.70	748.73	747.71	749.19	752.82	756.19	753.40
6	1989	760.42	763.98	764.74	763.86	762.57	760.84	758.11	754.89	750.80	748.02	747.70	748.22	757.01
7	1990	751.56	757.24	762.48	764.30	763.18	761.43	759.02	756.00	751.99	748.72	749.77	755.19	756.74
8	1991	761.78	765.00	765.00	764.12	762.41	760.51	757.80	754.58	750.37	747.70	749.83	751.19	757.52
9	1992	754.70	758.89	761.53	762.48	761.14	758.86	755.97	752.24	748.92	747.70	747.70	748.22	754.86
10	1993	753.12	758.41	761.51	762.80	762.00	760.15	757.25	753.80	749.98	747.70	747.70	748.22	755.22
	AVE	755.99	759.93	762.23	762.92	761.99	760.23	757.66	754.56	751.14	749.33	750.68	752.58	9079.22
	MAX	763.33	765.00	765.00	764.30	763.18	761.83	760.21	757.66	755.07	753.68	755.77	758.08	9098.90
	MIN	751.56	754.55	756.84	758.72	757.62	755.19	751.70	748.73	747.71	747.70	747.70	748.22	9040.79

Table AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (5/6)

Monthly Peak Power Output in MW

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	232.78	236.98	238.00	238.00	238.00	238.00	238.00	237.13	234.08	233.37	235.90	237.61	2837.83
2	1985	238.00	238.00	238.00	238.00	238.00	238.00	238.00	234.67	232.90	232.15	232.74	232.53	2830.96
3	1986	233.14	237.26	238.00	238.00	238.00	238.00	238.00	234.70	232.81	231.65	232.03	237.15	2828.72
4	1987	238.00	238.00	238.00	238.00	238.00	238.00	235.68	234.17	232.10	230.98	232.51	232.98	2826.39
5	1988	232.78	233.81	234.98	238.00	235.38	234.14	232.36	81.23	54.35	231.09	233.71	236.21	2478.03
6	1989	238.00	238.00	238.00	238.00	238.00	238.00	235.62	233.99	231.91	182.44	199.17	230.33	2741.43
7	1990	232.78	236.98	238.00	238.00	238.00	238.00	238.00	234.55	232.51	153.89	231.38	235.47	2747.54
8	1991	238.00	238.00	238.00	238.00	238.00	238.00	235.47	233.83	226.17	70.38	231.41	232.51	2657.74
9	1992	235.11	238.00	238.00	238.00	238.00	238.00	234.54	232.64	118.25	96.62	222.26	230.33	2559.70
10	1993	233.94	237.86	238.00	238.00	238.00	238.00	235.19	233.43	217.70	148.92	215.04	230.33	2704.39
	TOTAL	2352.53	2372.87	2376.94	2379.96	2377.34	2376.10	2360.84	2190.33	2012.77	1811.47	2266.14	2335.44	27212.72
	AVE	235.25	237.29	237.69	238.00	237.73	237.61	236.08	219.03	201.28	181.15	226.61	233.54	2721.27
	MAX	238.00	238.00	238.00	238.00	238.00	238.00	238.00	237.13	234.08	233.37	235.90	237.61	2837.83
	MIN	232.78	233.81	234.98	238.00	235.38	234.14	232.36	81.23	54.35	70.38	199.17	230.33	2478.03

Table AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (6/6)

Monthly Energy Production in GWh

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	114.18	66.45	94.85	168.54	71.31	59.66	53.10	58.81	56.18	57.88	169.84	176.78	1147.56
2	1985	177.07	171.36	113.97	66.70	59.02	58.82	52.86	58.20	55.90	57.57	55.86	151.02	1078.33
3	1986	173.46	135.52	98.56	122.81	61.83	58.84	52.86	58.20	55.88	57.45	55.69	176.44	1107.55
4	1987	177.07	171.36	128.01	66.70	58.98	58.73	54.68	58.07	55.70	57.28	55.80	161.11	1103.50
5	1988	116.37	56.11	58.28	56.57	58.37	58.07	52.05	20.15	13.04	57.31	106.38	175.74	828.44
6	1989	177.07	171.36	177.07	83.81	59.00	58.75	52.78	58.03	55.66	45.24	47.80	100.81	1087.38
7	1990	90.13	103.58	177.07	171.36	129.14	58.84	52.84	58.17	55.80	38.16	55.53	175.19	1165.79
8	1991	177.07	171.36	177.07	90.47	58.98	58.71	54.63	57.99	54.28	17.45	55.54	172.99	1146.52
9	1992	174.92	166.90	58.85	57.08	58.80	58.48	52.54	57.69	28.38	23.96	53.34	136.85	927.78
10	1993	174.05	151.88	58.85	57.12	58.93	58.66	52.68	57.89	52.25	36.93	51.61	160.80	971.65
	TOTAL	1551.38	1365.87	1142.57	941.16	674.35	587.54	531.01	543.20	483.06	449.24	707.40	1587.73	10564.50
	AVE	155.14	136.59	114.26	94.12	67.44	58.75	53.10	54.32	48.31	44.92	70.74	158.77	1056.45
	MAX	177.07	171.36	177.07	171.36	129.14	59.66	54.68	58.81	56.18	57.88	169.84	176.78	1165.79
	MIN	90.13	56.11	58.28	56.57	58.37	58.07	52.05	20.15	13.04	17.45	47.80	100.81	828.44

Note) Efficiency adjustment:

Tentative net efficiency applied in energy calculation : 0.8742

Final net efficiency determined in the study : 0.8712

Adjustment on energy production :

1056.45 x (0.8712 / 0.8742) = 1052 GWh

Fig. AP4.1-3 Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (1/3)
(Simulated Monthly Reservoir Operation in Water Level)

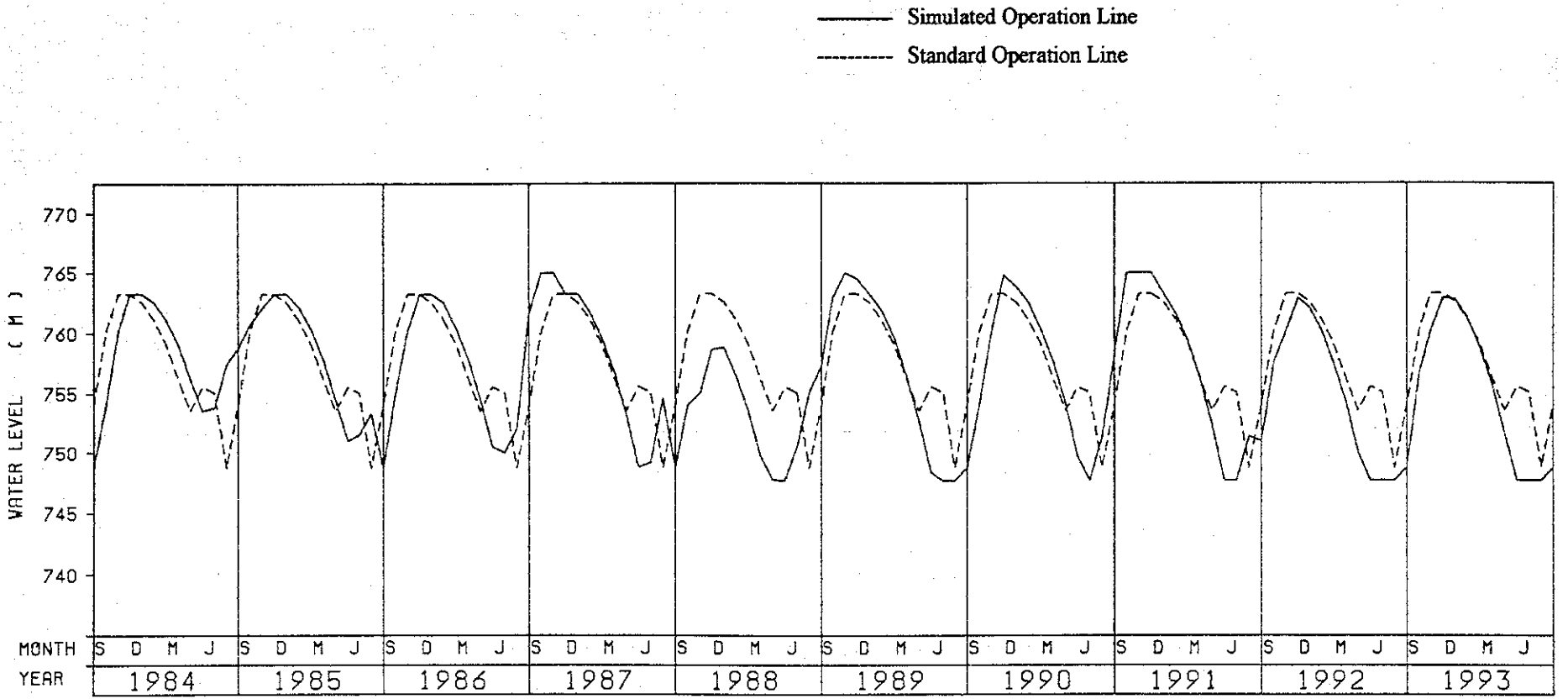


Fig. AP4.1-3 **Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (2/3)**

(Simulated Monthly Reservoir Inflow and Outflow Balance in MCM)

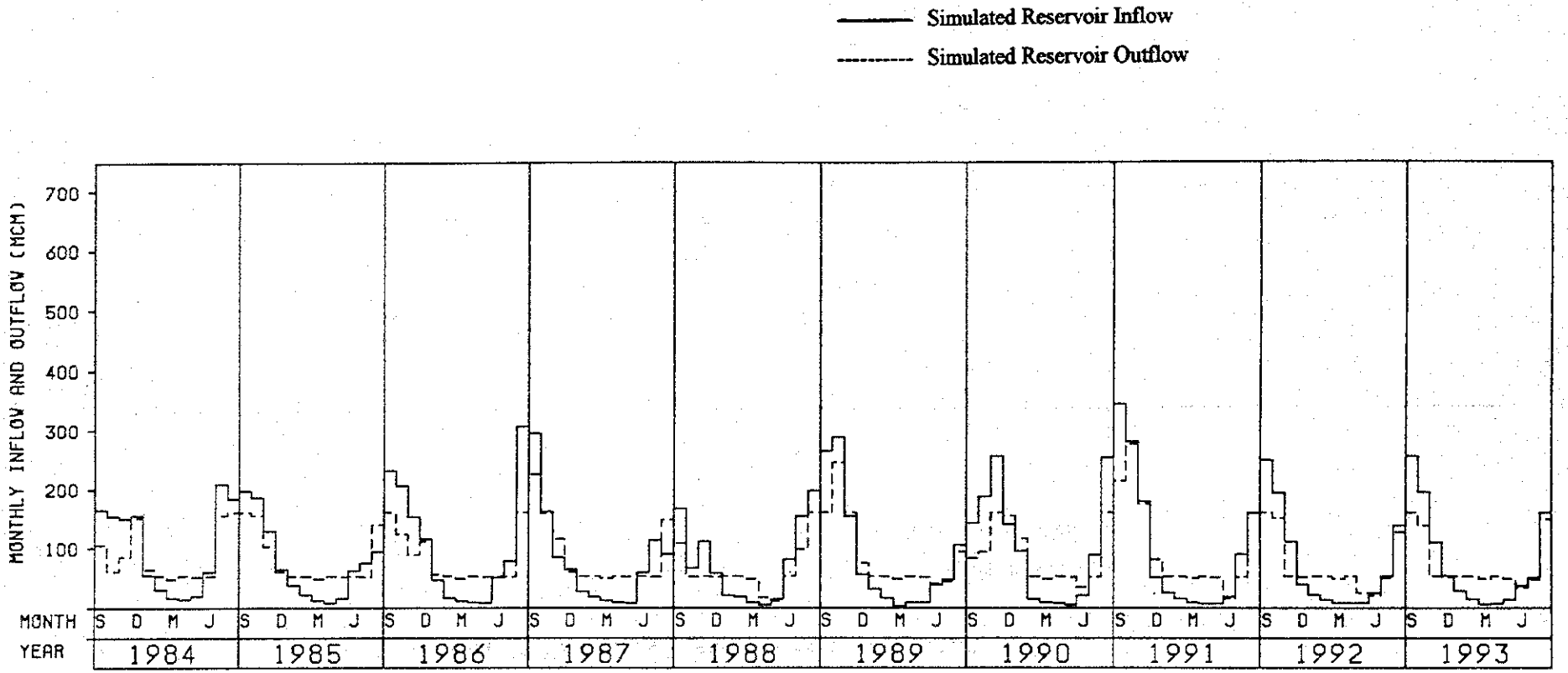


Fig. AP4.1-3 **Data of Reservoir and Power Plant Operation of Xe Namnoy Midstream Project (3/3)**
(Simulated Monthly Energy Generation in GWh)

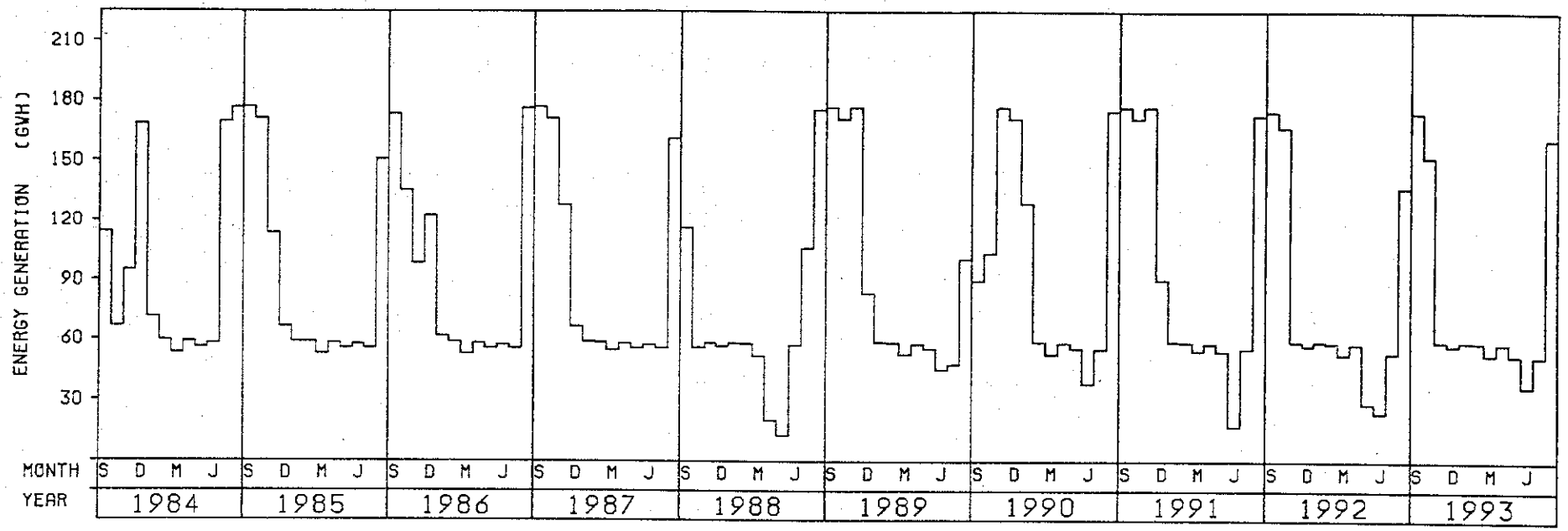


Table AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (1/5) and (5/2)

(1/5) Monthly Reservoir Inflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	272.3	216.2	235.4	308.7	116.9	86.7	66.9	71.1	73.5	113.8	379.7	354.3	2295.4
2	1985	370.4	351.6	230.3	124.8	92.4	77.5	62.6	64.6	69.4	116.4	126.9	232.8	1919.7
3	1986	410.6	343.3	245.2	223.4	103.5	72.4	61.7	65.8	62.7	105.4	129.0	511.9	2335.1
4	1987	560.0	326.0	198.9	124.8	82.5	74.2	64.7	65.1	62.7	113.6	163.3	237.5	2073.4
5	1988	279.7	118.5	163.2	110.3	77.0	75.0	59.4	26.1	29.0	134.0	255.9	369.6	1697.6
6	1989	454.3	574.8	318.9	131.5	86.7	72.2	54.0	65.7	63.8	82.2	92.0	197.8	2193.9
7	1990	226.7	293.1	442.7	298.0	210.9	69.3	59.7	63.7	59.8	57.3	130.9	412.9	2324.9
8	1991	580.4	572.6	371.2	131.2	79.3	70.9	61.1	63.4	61.1	39.9	173.4	336.6	2541.1
9	1992	490.0	380.5	157.1	90.6	76.1	69.1	58.4	64.2	36.7	49.9	104.8	289.6	1867.2
10	1993	402.0	347.0	161.3	106.7	82.0	69.4	56.9	63.9	66.1	72.0	99.9	311.8	1838.8
	TOTAL	4046.3	3523.7	2524.2	1650.1	1007.3	736.7	605.4	613.6	584.9	884.5	1655.8	3254.6	21087.1
	AVE	404.6	352.4	252.4	165.0	100.7	73.7	60.5	61.4	58.5	88.4	165.6	325.5	2108.7
	MAX	580.4	574.8	442.7	308.7	210.9	86.7	66.9	71.1	73.5	134.0	379.7	511.9	2541.1
	MIN	226.7	118.5	157.1	90.6	76.1	69.1	54.0	26.1	29.0	39.9	92.0	197.8	1697.6

(2/5) Monthly Spilled Outflow Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	15.1	0.0	0.0	59.8	0.0	0.0	0.0	0.0	0.0	0.0	130.8	97.1	302.8
2	1985	113.2	102.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	216.0
3	1986	153.5	94.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.7	502.7
4	1987	302.8	77.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	380.0
5	1988	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	112.5	142.0
6	1989	197.2	325.9	61.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	584.8
7	1990	0.0	44.2	185.5	49.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	155.7	434.6
8	1991	323.2	323.8	114.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.4	840.5
9	1992	232.8	131.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.4	397.0
10	1993	144.9	98.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.6	297.6
	TOTAL	1505.2	1198.1	361.3	109.0	0.0	0.0	0.0	0.0	0.0	0.0	137.8	786.5	4098.0
	AVE	150.5	119.8	36.1	10.9	0.0	0.0	0.0	0.0	0.0	0.0	13.8	78.6	409.8
	MAX	323.2	325.9	185.5	59.8	0.0	0.0	0.0	0.0	0.0	0.0	130.8	254.7	840.5
	MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	142.0

Table AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (3/5) and (4/5)

(3/5) Monthly Power Discharge Volume in MCM

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	257.1	216.2	235.4	248.8	116.8	87.7	66.8	71.0	73.4	112.8	248.8	257.1	1991.9
2	1985	257.1	248.8	230.2	124.8	92.4	78.4	62.5	64.5	69.4	115.3	126.8	232.8	1703.0
3	1986	257.1	248.8	245.2	223.3	103.4	73.4	61.7	65.7	62.7	104.3	128.9	257.1	1831.7
4	1987	257.1	248.8	198.9	124.8	82.5	75.1	64.6	65.0	62.7	112.5	163.3	237.5	1692.7
5	1988	257.1	118.4	163.1	110.2	76.9	75.9	59.4	27.0	28.9	132.0	248.8	257.1	1555.0
6	1989	257.1	248.8	257.1	131.5	86.6	73.2	54.9	64.7	63.7	81.1	92.0	197.7	1608.4
7	1990	226.7	248.8	257.1	248.8	210.8	70.3	59.6	64.3	60.0	57.2	128.9	257.1	1889.6
8	1991	257.1	248.8	257.1	131.1	79.2	71.9	61.0	64.3	61.0	39.8	171.4	257.1	1700.0
9	1992	257.1	248.8	157.1	90.5	76.1	70.1	58.3	64.3	37.5	49.8	102.7	257.1	1469.5
10	1993	257.1	248.8	161.2	106.6	81.9	70.3	57.8	63.8	65.1	70.9	99.9	257.1	1540.6
	TOTAL	2540.8	2325.2	2162.5	1540.5	1006.6	746.3	606.6	614.5	584.3	875.7	1511.6	2467.8	16982.5
	AVE	254.1	232.5	216.2	154.1	100.7	74.6	60.7	61.4	58.4	87.6	151.2	246.8	1698.2
	MAX	257.1	248.8	257.1	248.8	210.8	87.7	66.8	71.0	73.4	132.0	248.8	257.1	1991.9
	MIN	226.7	118.4	157.1	90.5	76.1	70.1	54.9	27.0	28.9	39.8	92.0	197.7	1469.5

(4/5) Monthly Peak Power Output in MW

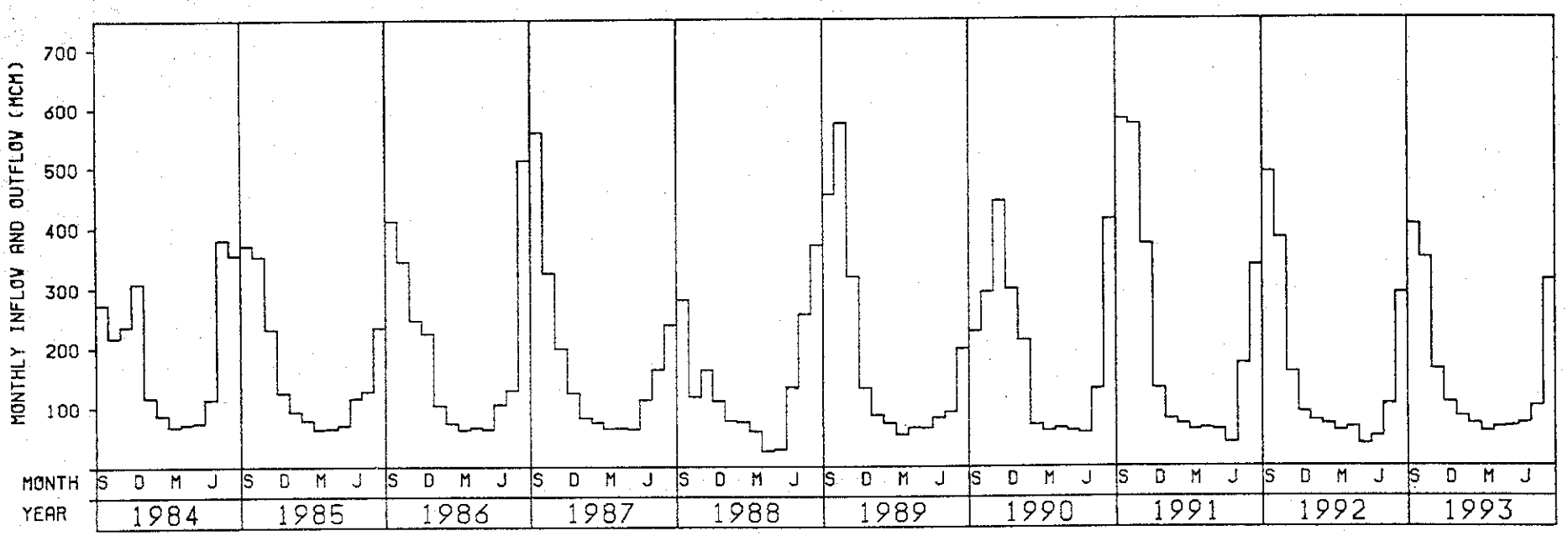
NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.98	66.98	67.00	67.00	67.00	803.93
2	1985	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.98	66.98	67.00	67.00	67.00	803.93
3	1986	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.98	66.98	67.00	67.00	67.00	803.93
4	1987	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.98	66.98	67.00	67.00	67.00	803.93
5	1988	67.00	67.00	67.00	67.00	67.00	67.00	66.98	29.99	32.78	67.00	67.00	67.00	732.74
6	1989	67.00	67.00	67.00	67.00	67.00	67.00	63.34	66.04	66.98	67.00	67.00	67.00	799.35
7	1990	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.32	63.94	59.60	67.00	67.00	792.83
8	1991	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.04	64.67	43.06	67.00	67.00	776.74
9	1992	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.85	42.30	52.83	67.00	67.00	764.96
10	1993	67.00	67.00	67.00	67.00	67.00	67.00	66.06	65.15	66.04	67.00	67.00	67.00	800.25
	TOTAL	670.00	670.00	670.00	670.00	670.00	670.00	665.20	628.29	604.60	624.49	670.00	670.00	7882.57
	AVE	67.00	67.00	67.00	67.00	67.00	67.00	66.52	62.83	60.46	62.45	67.00	67.00	788.26
	MAX	67.00	67.00	67.00	67.00	67.00	67.00	66.98	66.98	66.98	67.00	67.00	67.00	803.93
	MIN	67.00	67.00	67.00	67.00	67.00	67.00	63.34	29.99	32.78	43.06	67.00	67.00	732.74

Table AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (5/5)

Monthly Energy Production in GWh

NO.	YEAR	< AUG >	< SEP >	< OCT >	< NOV >	< DEC >	< JAN >	< FEB >	< MAR >	< APR >	< MAY >	< JUN >	< JUL >	<TOTAL>
1	1984	49.85	42.91	46.72	48.24	23.18	17.19	12.96	13.76	14.24	22.10	48.24	49.85	389.24
2	1985	49.85	48.24	45.69	24.77	18.33	15.37	12.13	12.52	13.45	22.59	25.17	46.20	334.32
3	1986	49.85	48.24	48.67	44.33	20.53	14.38	11.96	12.75	12.15	20.44	25.59	49.85	358.74
4	1987	49.85	48.24	39.48	24.77	16.37	14.73	12.53	12.60	12.15	22.06	32.41	47.13	332.31
5	1988	49.85	23.51	32.38	21.88	15.27	14.88	11.51	5.58	5.90	25.60	48.24	49.85	304.44
6	1989	49.85	48.24	49.85	26.09	17.19	14.34	10.64	12.43	12.36	15.89	18.26	39.25	314.39
7	1990	44.99	48.24	49.85	48.24	41.85	13.78	11.56	12.39	11.51	11.09	24.99	49.85	368.32
8	1991	49.85	48.24	49.85	26.03	15.73	14.09	11.84	12.35	11.64	8.01	33.24	49.85	330.70
9	1992	49.85	48.24	31.18	17.97	15.10	13.74	11.31	12.45	7.61	9.83	19.93	49.85	287.05
10	1993	49.85	48.24	32.00	21.17	16.26	13.78	11.10	12.14	12.51	13.89	19.83	49.85	300.62
	TOTAL	493.62	452.33	425.66	303.48	199.81	146.28	117.54	118.97	113.53	171.50	295.91	481.51	3320.14
	AVE	49.36	45.23	42.57	30.35	19.98	14.63	11.75	11.90	11.35	17.15	29.59	48.15	332.01
	MAX	49.85	48.24	49.85	48.24	41.85	17.19	12.96	13.76	14.24	25.60	48.24	49.85	389.24
	MIN	44.99	23.51	31.18	17.97	15.10	13.74	10.64	5.58	5.90	8.01	18.26	39.25	287.05

Fig. AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (1/2)
(Monthly Inflow / Outflow in MCM)



Note) Since the Xe Namnoy Downstream Project is planned as a daily regulation type power plant, inflow volume and outflow volume of the project are balanced each other.

Fig. AP4.1-4 Data of Reservoir and Power Plant Operation of Xe Namnoy Downstream Project (2/2)
(Simulated Monthly Energy Generation in GWh)