SAMBOR PROJECT REPORT

Lower Mekong River Basin

Volume VII

Basic Data

Appendix (I) to Volume III

OVERSEAS TECHNICAL COOPERATION AGENCY

GOVERNMENT OF JAPAN

JUNE 1969

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SAMBOR PROJECT REPORT

The Sambor Project Report consists of the following eight volumes:

Volume I	General Report (1)
Volume II	General Report (2) — Sambor with Nam Ngum and Pa Mong
Volume III	Dam and Hydroelectric Power — Supplementary Material to Volume I
Volume IV	Irrigation and Agriculture — Supplementary Material to Volume I
Volume V	Navigation — Supplementary Material to Volume I
Volume VI	Fishery — Supplementary Material to Volume I
Volume VII	Basic Data — Appendix (1) to Volume III
Volume VIII	Drill Hole Logs — Appendix (2) to Volumes III and V

SAMBOR PROJECT REPORT

Lower Mekong River Basin

Volume VII

Basic Data

Appendix (1) to Volume III

OVERSEAS TECHNICAL COOPERATION AGENCY

GOVERNMENT OF JAPAN

JUNE 1969

国際協力事業団
受入月日 '84. 5. 20
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APPENDIX A. HYDROMETEOROLOGICAL DATA

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Note: H.E.C. : Harza Engineering Co., U.S.A.
M.C. : Mekong Committee
Res. : Reservoir

A 1 Precipitation (Kratie)

Year 1960 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1										49.7			1
2										4.5			2
3										1.7			3
4										7.1			4
5										2.9			5
6										0.4			6
7										0.8			7
8										28.5			8
9										0.3			9
10										0.0			10
11										0.0			11
12										5.7			12
13										0.6	10.0		13
14										0.0	5.8		14
15									18.6	1.0	50.0		15
16									10.1	17.2			16
17									0.0				17
18									0.7				18
19									0.0				19
20									29.1	2.9			20
21									29.8				21
22									1.8	0.5	7 2		22
23									23.5				23
24									11.4	15.0			24
25									14.1				25
26									1.6		4.3		26
27									16.9				27
28									6.4		47.7		28
29									1.7				29
30									17.8				30
31													31
									183.5	138.8	125.0		

ANNUAL TOTAL ( )

Year 1961 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1			6.5						7.5	6.9	0.3		1
2													2
3									5.4	2.9			3
4										1.5			4
5								10.1	3.7	6.0	7.7		5
6			28.7						2.0		1.5		6
7						14.1		1.0	20.7				7
8								8.8	20.3	28.1			8
9								3.1	1.8	5.9	0.8		9
10						1.4	18.1	50.1	0.4	3.9			10
11						16.6		2.0	1.0				11
12								26.2	11.2				12
13								2.0	9.7				13
14								27.5	0.8	8.0			14
15				2.0				10.1		11.3			15
16				0.5	20.3			5.0		3.0			16
17						5.6	1.2	6.0				0.3	17
18				40.0	45.3		27.5	28.8					18
19				10.0	25.4	8 6	71.6	29.3	2.6	0.6			19
20						12.3	2.4	41.9		0.9	16.3		20
21			24.8			3.3	6.5	20.8	6.3	24.1			21
22						14.7	0.5				23.2		22
23						8.3	63.2	3.6	0.3				23
24						17.9		10.0	30.1				24
25								2.1					25
26								4.4	4.6				26
27			10.6			2.4							27
28						3.0	23.0		4.7				28
29						39.4	3.7		15.3			8.8	29
30						24.9						2.9	30
31								10.0					31
	0.0	0.0	70.6	52.5	91.0	171.5	217.7	302.8	148.4	103.1	49.8	12.0	

ANNUAL TOTAL ( )

Year 1962 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1					5.8								1
2				2.5	4.9	1.8	1.8		1.5	2.1			2
3								7.2	1.0	3.8			3
4								21.3		1.0	4.5		4
5								26.6		1.1			5
6					9.5			9.0	30.5	4.3			6
7									14.9	7.0			7
8						3.5			1.5				8
9					59.9	18.7		64.7	20.8	24.0			9
10								33.4	16.3	17.2			10
11					11.8								11
12									20.5				12
13				12.3		5.5	10.4	7.7		1.0			13
14				15.0				2.2					14
15							72.0		1.6	6.7			15
16					15.5	6.6	52.9						16
17					9.8		33.5		46.5	7.2			17
18						3.2							18
19				14.3		0.5	1.8		1.5				19
20				2.9	7.0		1.8	1.8	23.3		0.7		20
21				1.1	2.3			15.9		2.5			21
22					1.3		7.9		2.5				22
23							3.3		48.0				23
24					7.0		14.0	8.0					24
25					3.5		22.8	2.7	4.0				25
26				33.5			5.5		17.5				26
27							20.3		3.5				27
28								1.5	1.7				28
29				57.8	7.7		9.5	0.5					29
30					14.5		7.5		4.5		0.8		30
31					27.2		6.2						31
	0.0	0.0	0.0	139.4	187.7	39.8	271.2	202.5	261.6	77.9	6.0	0.0	

ANNUAL TOTAL ( ) 1,186.1

Year 1963 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						6.9		18.6		10.0	3.8		1
2								42.8		1.9			2
3						0.5		3.2	2.5	34.7	1.1		3
4						0.9		0.5		2.9	18.6		4
5						0.5		15.7	12.6	33.7			5
6								20.5					6
7				4.0				17.6	0.9	3.0	2.3		7
8							1.3	10.6			7.3		8
9						11.2		12.4			4.0		9
10						1.8	12.8	16.5	5.0	5.9			10
11							15.4		4.3	0.5			11
12							2.0	11.5			1.9		12
13								8.5	0.9				13
14						15.5		3.5	26.1				14
15						12.6	5.2	4.7		27.6			15
16							2.7						16
17							40.6						17
18								10.0		16.8			18
19					55.1		25.2	0.1		0.7			19
20					5.7	21.9	4.9		12.5	0.7			20
21					19.7	67.8	2.5	7.0					21
22						15.3	18.5	6.3					22
23							34.9	11.9	9.0				23
24					17.0		19.1		34.9				24
25					46.8		0.6	28.8		6.7			25
26							1.1		29.9				26
27					12.0			4.9	13.3				27
28					9.0			4.0	3.1				28
29					37.8		0.3	0.7	2.5				29
30							0.7	16.9					30
31							16 8	26.3					31
	0.0	0.0	0.0	4.0	203.1	154.9	204.6	303.5	163.9	138.4	39.0	0.0	

ANNUAL TOTAL ( ) 1,211.4

Year 1964 UNIT mm.

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						0.9				4.3			1
2					17.7		2.0	16.0		5.0			2
3							1.2		30.5				3
4					3.8		9.2	43.0					4
5					22.1	5.0		2.5		18.0			5
6					2.2	37.5		3.8	19.6	3.0	6.2		6
7					2.7	11.1		14.8	27.0				7
8						0.2		117.5					8
9					1.5	0.5		1.1			1.2		9
10											40.0		10
11					9.6			14.1	108.2	1.7	7.6		11
12					2.5		5.6	5.5	4.5			1.3	12
13					3.7			8.0		0.7			13
14						13.2		8.8	11.4				14
15				1.7	32.0	5.0	40.4	2.7	16.6				15
16					4.8			10.2	3.3		19.1		16
17											2.0		17
18				6.0				12.1		8.5			18
19					2.0				17.7				19
20							40.3		4.9	1.0			20
21					3.7	15.9	42.8		1.7	15.5			21
22				15.0	31.2	6.6		8.4	0.5				22
23					18.3			49.3	2.1				23
24					9.3	12.8			29.5				24
25					0.3	3.5	19.0			16.9			25
26					15.9	28.7		31.5		3.5			26
27					25.0	15.8		1.0	0.8				27
28					45.3			17.0	21.3	19.6			28
29				5.5	30.0	4.3	1.5		13.0				29
30						1.9	21.2		35.8	0.2			30
31							1.2	1.4		1.7			31
Total	N	N	N	28.2	283.6	162.9	184.4	368.7	338.4	99.6	76.1	1.3	

Annual Total ( ) 1,543.2 mm.

Year 1965 UNIT mm.

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1					4.4						1.0		1
2					60.0			0.8	30.1	2.7	4.9		2
3					30.6	4.6		17.1		0.9			3
4				3.0	13.0			1.0	3.9	2.6			4
5					9.2	0.8		16.8	38.5				5
6				41.0	12.7	0.5	0.1	4.9	1.1				6
7				11.3	5.0	6.0	17.0		24.8				7
8							30.9		1.0	1.0			8
9						18.6	71.8		1.6	31.1			9
10							10.9	1.9	15.9	28.5			10
11				9.5		51.8	14.8			16.3			11
12					0.5	3.1	3.0						12
13				2.5			8.0		37.9				13
14						1.2	26.6	33.2	6.8				14
15							7.5	3.9	5.0		3.9		15
16						0.3	3.0		3.4	2.5	6.0		16
17					1.6	20.9	1.9	0.8	6.6				17
18						22.1							18
19					33.3	6.5		12.9	5.7				19
20					16.1	21.1	3.0	3.4	33.0				20
21						7.5			8.0				21
22						13.9	5.9		45.4	1.9		2.8	22
23					1.6	14.5	1.0		8.8				23
24						17.1	8.0	1.7	4.9	3.8			24
25					2.3	7.7	10.2	8.6		44.5			25
26				1.0	3.6	16.8	18.0	14.0					26
27				3.0	0.6	14.4	9.6	18.5	6.5				27
28			14.3		5.0		0.8	6.0					28
29			24.9		14.1	14.8	0.8			17.0			29
30					39.6			59.7	6.0	7.0			30
31					16.4			10.9		0.6			31
Total	N	N	39.2	71.3	269.6	264.2	252.8	216.1	294.9	160.4	15.8	2.8	

Annual Total ( ) 1,587.1 mm

A 2 Daily Precipitation (Stung Treng)

Year 1961 UNIT mm

(Daily Precipitation)

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1							5.9		7.6	3.2			1
2							1.8		0.1	4.2			2
3						2.9	2.2		1.5	34.8	1.3		3
4					0.9	2.5	3.0			3.7	0.7		4
5					15.4	0.5	41.1	11.2	0.5	6.8			5
6			1.2		6.3	0.9	3.1	36.9	6.0		1.2		6
7			2.1		18.5	28.1	29.8	11.5			3.5		7
8						32.1	6.7	0.6	3.7	0.6			8
9					3.8	12.4	2.3	15.5	6.3	0.6	15.4		9
10			3.6				6.7		0.7	11.3	23.6		10
11			0.5				2.3	2.2	5.0				11
12				11.1		0.7		7.6					12
13				3.4			9.8	8.6	1.6	0.5	3.4		13
14							9.9	20.8	31.7	27.9			14
15								5.7	27.2				15
16				74.7	15.3		2.4	6.8	11.1				16
17				1.7			0.4	6.9	2.7	6.4			17
18					53.6		3.2	9.5	11.6				18
19					6.3		74.4	24.2	0.9				19
20				9.3	28.1	8.3	45.1	8.7	3.9	19.6			20
21				1.9	34.2	7.0	10.5	14.3		48.0			21
22					8.3	10.1	3.9	7.4	27.6	4.1	2.0		22
23					41.7	8.2		15.3	82.1	2.7	3.7		23
24					17.9	0.5	10.1	18.8	52.6	1.9			24
25					41.9	0.9	14.6	2.7	40.7				25
26					0.5	0.8	11.7	10.6		3.3			26
27				2.1	0.1	0.7	17.4	21.7	3.3				27
28				6.5	23.6	5.2	4.4						28
29				0.7	8.0	5.7	3.6		59.0				29
30					0.3	26.9	9.4		6.2				30
31							17.0	8.3					31
	0.0	0.0	7.4	111.4	324.7	154.4	352.7	275.8	393.6	179.6	54.8	0.0	

ANNUAL TOTAL ( ) 1,854.4

Year 1962 UNIT mm

(Daily Precipitation)

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1					2.9	9.1			2.9	13.9			1
2						16 9	4.3	11.1	4.9	4.6			2
3						2.5	5 2	23.3	6.8	3.5	5.1		3
4							18.1	12 6	4.9	0.6	5.6		4
5						8.6	7.4	0.9	19.2				5
6					0.4	0.5	0.7	4.1	5.1	2.9			6
7					5 5		31.7		27.2	10.0	1.5		7
8						73.9	2.2	19.6	1.0	24.1			8
9					5.4	27.4	0.2	78.2	4.4	20.2			9
10						1.6	5.7	3.8	35.1				10
11					6.3	2.4	109.3	4.0					11
12						13.3	43.5	1.4	2.0				12
13						9.6		0.2	9.5				13
14						14.6	6.6			4.6			14
15						49.3	17.0		5.7				15
16					0.9	22.0	32.8		41.1	4.4			16
17					1 1	5.7	21.6		9.7	11.9			17
18						0.2	25.1	2.4	31.3	7.7			18
19						8.5	0.5	0.9	66.4				19
20									0.5				20
21					10.1	14.4	2.3	0.5	14.5				21
22					31.3		3.2	6.1	2.1	4.4			22
23					4.0			0.4	3.1				23
24					5.8		11.8	12.8	2 4		5.3		24
25						11.6	10.0	11.3	25.1	1.7	0.2		25
26					1.0		13.8			6.9	0.4		26
27							11.2		4.6				27
28							26.5		22.6				28
29					9.4		5.4		30.6				29
30					3.4				30.6			12.9	30
31					20.7		5.2	2.7					31
	0.0	0.0	0.0	0.0	112.2	292.1	421.3	196.3	390.7	121.4	18.1	12.9	

ANNUAL TOTAL ( ) 1,565.0

Year 1963 UNIT mm

( )

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						9.4	4.8	42.5	36.8	52.3		2.5	1
2							3.0	5.8		18.7			2
3						8.7	1.3	3.2	85.3	16.4		0.2	3
4						4.5	49.2	0.8	4.8	0.4	1.1		4
5					21.6	3.8	2.8	33.1		1.9	8.0		5
6							6.0	9.0	11.2	0.1			6
7				3.1			5.9	4.6	3.1				7
8					0.5		3.3	12.8	2.6	0.2	0.6		8
9						20.3		4.9					9
10						0.1	2.1	1.6	17.2	9.4			10
11							8.4		10.8				11
12							14.0	2.3		0.3	2.3		12
13								11.3	6.1	7.6			13
14						1.8	4.7	11.7		0.2			14
15						38.5	7.3	28.2	15.6				15
16						13.4	21.5	0.5	0.5				16
17						0.2	5.7	0.6					17
18						10.7	0.2	25.6	2.3	5.0			18
19					30.6	1.1		7.0					19
20					31.2	29.5		12.8	7.8	5.0			20
21					9.8	34.0		1.8					21
22						0.4	7.6	2.2	7.5	1.7			22
23			14.7				60.6	5.8	84.0				23
24					0.2		29.9	4.8	14.7				24
25			1.3		20.3		2.5	1.1	8.5			0.9	25
26					5.3	3.2	38.9	37.3	4.8				26
27					29.3	0.3	0.1	0.1	2.6				27
28			3.7		6.0	4.9		1.6	18.0				28
29			0.5			35.8	17.5	3.3	58.9				29
30					0.8	18.0		11.9	24.2	4.4			30
31					2.1		2.2	12.7		4.9			31
	0.0	0.0	20.2	3.1	157.9	233.6	299.5	300.9	427.3	124.5	12.0	3.6	

ANNUAL TOTAL ( ) 1,587 6

Year 1964 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						1.4	0.2	0.4	47.9	35.3	10.7		1
2							0.3	22.0	0.1	3.8			2
3					4.0	10.5	11.3			0.9			3
4					17.6	1.4	2.0	5.6		3.1			4
5					0.1			34.4			3.9		5
6						3.2		43.0	0.5	34.8	0.5	0.9	6
7					29.3	8.4	1.6	23.7	54.4		10.6		7
8							3.1	9.7	0.5	1.5			8
9					39.4	1.0		1.9	1.3		47.0		9
10					5.0	0.1		33.3	9.7		1.2		10
11					4.0		20.8	4.4	0.3			7.1	11
12					1.3	5.7	18.8	0.5	0.7	5.9		0.8	12
13					6.7			26.1	0.5				13
14					8.2	0.1		17.1	1.5	0.3			14
15				25.6	9.6	0.5	8.9	15.7	6.4	0.6			15
16				0.3				3.7	4.1		13.6		16
17				1.7	14.1	0.2			0.3				17
18				1.1			1.2	0.1	1.2				18
19								7.0	7.4		2.2		19
20						14.0	8.7		15.8				20
21					3.0	17.5	0.1		3.2	9.0	12.9		21
22				37.9	38.6	7.3		7.2	1.3	1.7	0.8		22
23				0.9	47.9	1.9	3.9	4.0	34.3				23
24					52.9	5.7	0.9	8.2	42.8	2.7			24
25				2.4	40.0	10.2	1.6	0.8	17.6	2.6			25
26					6.4	12.2	7.4	27.9	2.4				26
27					7.4	3.0		1.8	0.4	1.8			27
28					2.2	2.5		22.3					28
29				6.7		17.9		39.2	3.4				29
30					6.4	0.7	0.5	0.6	1.9				30
31							5.0	6.9		0.3			31
Total	N	N	N	76.6	344.1	125.4	96.3	367.5	259.9	104.3	103.4	0.0	

Annual Total ( ) 1,486.3 mm

A 2 Daily Precipitation (Stung Treng)

Year 1965

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						0.2		0.2	14.5	3.6			1
2		0.5			0.6	34.1			9.3	2.2			2
3						0.4	0.9	0.4	12.4				3
4			16.8			13.4		17.9	5.4	48.5			4
5					14.4	0.9		23.0	21.4		1.2		5
6				6.6	7.9	10.6		1.9	37.3				6
7						39.7	0.7		10.0	0.2			7
8					2.6	1.4	3.7			10.3			8
9				1.3	1.1	20.5	17.0	65.1	12.8	88.0			9
10						17.4	1.3		2.9	2.0			10
11				0.4	1.8	9.7	15.0	0.1	23.0	0.4			11
12					10.7	10.0	50.2						12
13							44.9		3.1	11.7			13
14					12.3	0.1	6.0	0.5	1.5	14.9			14
15							0.4						15
16					1.0	9.7	4.9		18.1	2.3	10.5	14.6	16
17					34.9	12.2		10.5	28.1	22.3		7.0	17
18					18.1	27.9			8.5	6.6			18
19						7.1	1.7	2.1	1.3				19
20				12.0	17.3	5.4		0.2	43.5	0.2			20
21					0.2	19.0		2.3		0.9	0.1		21
22					12.0	7.7	7.2		27.6	9.0	1.0		22
23					25.9	23.7	27.0	0.4	16.5	2.5			23
24					0.1	23.0	1.5		0.7				24
25				2.5	25.7	2.9	17.5	2.2					25
26					3.8	6.4	2.2	40.4					26
27			0.4		14.9	8.3	33.3	17.0	0.3	3.5			27
28			30.3		24.6	0.8	16.9	5.9	19.3				28
29					16.2	16.3	1.8	26.4	2.3	70.6			29
30				20.9	25.1		7.8	6.2	1.3	0.5			30
31					8.7		1.3	4.8					31
Total	N	0.5	47.5	43.7	279.8	329.8	263.2	227.5	321.1	300.2	12.8	21.6	

Annual Total ( ) 1,847.7 mm

A 3 Temperature (Kratie)

Year 1963 UNIT °C

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1											28.0	-	1
2											28.0	28.0	2
3											28.0	28.5	3
4											28.5	28.0	4
5											26.5	27.0	5
6											28.0	26.0	6
7											31.2	25.2	7
8											28.0	25.2	8
9											27.5	26.0	9
10											26.5	25.5	10
11											28.5	26.0	11
12											26.1	26.0	12
13											24.3	25.2	13
14											24.4	25.0	14
15											28.0	25.5	15
16											28.5	25.0	16
17											27.4	24.5	17
18											28.5	25.5	18
19											28.0	26.0	19
20											28.5	24.5	20
21											28.0	24.5	21
22											28.0	24.5	22
23											28.0	24.5	23
24											28.5	24.0	24
25											28.5	25.0	25
26											28.0	27.5	26
27											27.5	27.5	27
28											27.5	26.0	28
29											28.0	25.0	29
30											27.5	25.5	30
31										29.0		22.8	31

ANNUAL TOTAL ( )

Year 1964 UNIT °C

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	24.1	29	29	32	29	29	32	30	29	29	28	23	1
2	28.0	30	28	32	29	28	29	30	29	30	24	25	2
3	30	29	28	32	29	29	29	30	30	30	30	24	3
4	30	28	31	31	29	29	31	30	30	30	24	31	4
5	30	29	29	32	30	29	30	30	29	29	28	24	5
6	29	28	28	32	29	29	31	30	29	28	24	28	6
7	29	28	29	31	30	28	30	30	29	28	24	25	7
8	29	27	28	31	29	28	39	39	29	25	29	24	8
9	29	29	29	31	29	28	29	30	30	29	25	23	9
10	28	28	28	32	28	28	39	3k	39	27	24	29	10
11	29	28	28	30	29	28	29	39	39	29	31	27	11
12	29	28	29	30	28	28	30	31	30	30	23	29	12
13	29	30	28	30	29	29	29	30	30	28	29	28	13
14	28	29	28	31	30	29	30	31	30	27	24	25	14
15	29	30	29	31	29	28	30	31	29	23	25	27	15
16	29	29	29	31	30	28	30	31	28	29	27	30	16
17	29	30	30	31	30	29	30	30	30	27	28	30	17
18	29	29	29	31	30	28	29	29	28	24	30	29	18
19	29	29	30	30	29	29	29	29	29	24	27	25	19
20	29	26	29	30	29	29	29	30	29	23	24	28	20
21	29	27	30	30	29	29	29	30	29	25	23	27	21
22	29	28	28	30	30	28	29	29	30	23	22	29	22
23	28	29	29	30	30	28	29	30	28	24	24	30	23
24	29	27	30	29	30	28	29	30	30	24	29	28	24
25	30	29	30	30	30	28	30	29	30	26	31	25	25
26	29	29	29	29	30	29	30	30	30	24	28	29	26
27	29	26	31	29	30	29	30	30	30	29	29	29	27
28	30	26	30	29	30	29	31	29	29	28	24	28	28
29	30	28	31	29	30	28	30	30	29	25	24	27	29
30	29		31	29	30	28	30	28	29	26	25	29	30
31	28		31		30		30	28		30		25	31

ANNUAL TOTAL ( )

A-4 Monthly Temparature and Humidity at Kratie and Stung Treng

Stations & Month	No. of Years of Obs'on	Temperature (°C)			Humidity (%)		
		Mean	Max.	Min.	Mean	Max.	Min.
Kratie							
Jan.	11	25.3	35.6	11.4	67.4	100	29
Feb.	11	27.3	37.2	16.3	67.4	99	18
Mar.	11	28.9	38.3	18.4	67.2	100	24
Apr.	10	29.7	39.6	21.3	70.8	99	23
May	11	28.1	38.1	20.7	81.9	99	41
June	11	27.5	37.7	21.7	84.3	99	45
July	11	26.8	34.8	21.4	86.5	99	46
Aug.	11	27.0	36.0	21.0	87.2	99	39
Sept.	11	26.5	34.1	21.4	87.1	99	48
Oct.	11	26.4	34.5	17.0	83.9	98	43
Nov.	11	25.7	33.8	16.4	81.3	99	41
Dec.	11	24.7	35.0	9.5	75.4	99	40

Stations & Month	No. of Years of Obs'on	Temperature (°C)			Humidity (%)		
		Mean	Max.	Min.	Mean	Max.	Min.
Stung Treng							
Jan.	18	24.2	35.0	9.5	72.5	100	24
Feb.	18	26.5	37.1	14.0	66.6	97	15
Mar.	18	28.8	37.5	17.3	64.2	97	21
Apr.	18	29.5	39.0	20.0	68.4	97	22
May	18	28.1	38.2	18.9	81.8	98	37
June	18	27.1	35.8	19.6	85.4	100	38
July	18	26.6	34.4	20.1	86.9	98	42
Aug.	18	26.4	34.2	19.3	87.6	99	[illegible]
Sept.	18	26.3	34.0	19.4	[illegible]	99	52
Oct.	18	26.1	34.0	[illegible]	[illegible]	99	48
Nov.	18	25.3	34.2	[illegible]	83.[illegible]	99	37
Dec.	18	23.7	34.0	[illegible]	78.9	99	33

A 5 Humidity (Kratie)

Year 1963 UNIT %

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1											92	-	1
2											87	81	2
3											85	80	3
4											87	76.5	4
5											95	72.5	5
6											85	78.0	6
7											93	81	7
8											88	83	8
9											92	74.5	9
10											93.5	84	10
11											81	88.5	11
12											91.5	72.5	12
13											91	70	13
14											91.5	72.5	14
15											84.5	80	15
16											74.5	88	16
17											91	80.5	17
18											77	78	18
19											80	72	19
20											76	64.5	20
21											73	70.2	21
22											74.5	72.5	22
23											72.5	76	23
24											80.5	84.5	24
25											92	88.5	25
26											77.5	86.5	26
27											76.5	74.5	27
28											78.5	68	28
29											74.5	74	29
30											78	76.5	30
31										90		63	31

ANNUAL TOTAL ( )

Year 1964 UNIT %

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	65.5	74	65	90	79	87	68	93	84	89	84	89	1
2	82.5	68	62	90	82	68	73	88	93	98	89	84	2
3	60	69	68	90	83	73	83	95	97	92	90	97	3
4	72	68	74	90	84	83	69	91	89	95	95	92	4
5	71	74	72	88	89	69	74	94	74	81	98	84	5
6	79	70	70	90	73	74	68	98	78	92	79	89	6
7	80	72	74	92	95	82	74	99	84	87	71	92	7
8	74	68	78	90	78	85	82	97	81	89	93	87	8
9	73	76	80	92	82	89	85	89	94	88	74	88	9
10	70	70	82	90	73	79	89	74	98	84	89	89	10
11	80	71	80	90	93	91	79	88	99	97	85	79	11
12	81	69	72	90	72	74	91	79	95	91	97	83	12
13	79	80	74	90	80	84	74	95	97	92	95	82	13
14	78	72	76	92	98	94	84	78	90	93	79	91	14
15	83	80	64	94	87	90	94	84	79	95	89	90	15
16	85	73	82	92	97	92	99	85	82	97	90	99	16
17	87	80	78	90	90	73	92	93	94	94	87	87	17
18	74	80	74	90	91	87	93	97	83	95	84	84	18
19	80	74	80	92	86	78	91	85	79	79	74	93	19
20	86	66	78	84	78	92	93	77	88	87	98	89	20
21	90	64	70	83	84	72	84	79	76	84	95	79	21
22	88	70	84	77	94	93	79	84	93	87	92	89	22
23	92	72	86	89	95	74	89	95	74	93	91	85	23
24	88	68	78	75	96	85	97	89	89	84	94	91	24
25	74	72	80	91	90	93	93	79	87	99	88	92	25
26	81	64	72	74	95	73	84	98	93	97	87	89	26
27	88	65	78	83	98	84	85	95	95	84	89	78	27
28	70	66	88	87	98	79	79	78	84	79	85	92	28
29	72	70	90	72	92	96	93	97	79	74	91	89	29
30	70		88	84	94	78	95	82	81	81	99	98	30
31	68		86		89		89	89		81		80	31

ANNUAL TOTAL ( )

A-6 Evaporation (Kratie)

UNIT mm/month

YEAR	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL TOTAL
1962										129	154	173	
1963	203	214	260	271	208	166	128	41	44	179.1	163	183	2,060.1
1964	182	227	211	212	203	156	129						

A 7 (1) Evaporation (Stung Treng)

UNIT mm/month

YEAR	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	ANNUAL TOTAL
1960											133	164	
1961	216	221	245	219	162	133	138	114	121	133	147	140	1,989
1962			223						82	109	118	138	
1963	164	190	218	226	213	160	146	117	141	175	165	181	2,096

A 7 (2) Daily Evaporation (Stung Treng)

Year 1961 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	6	7	9	10	7	6	2	7	5	3	5	4	1
2	5	7	9	11	7	7	2	9	5	4	5	4	2
3	5	8	9	10	8	5	5	5	3	3	6	5	3
4	5	7	8	9	6	5	4	4	6	4	4	5	4
5	5	7	7	8	6	5	5	6	5	4	5	6	5
6	6	7	8	8	7	4	3	3	6	4	4	5	6
7	6	6	8	9	7	4	4	5	6	5	5	4	7
8	5	7	7	7	7	2	4	2	4	5	5	4	8
9	5	8	7	8	8	2	3	3	5	4	7	4	9
10	6	8	11	9	6	4	5	6	3	2	4	4	10
11	8	7	10	9	5	4	6	3	4	3	5	5	11
12	7	7	4	7	4	5	7	3	3	5	5	5	12
13	7	9	7	7	6	4	5	4	5	6	5	4	13
14	7	9	10	8	5	3	6	6	4	1	5	4	14
15	7	10	11	7	6	3	7	2	3	4	5	3	15
16	8	9	9	8	8	4	5	1	2	5	5	3	16
17	7	8	8	2	5	7	7	2	3	5	5	4	17
18	8	10	3	7	9	5	4	5	3	5	5	4	18
19	8	9	2	5	4	6	2	3	3	6	5	6	19
20	7	8	3	3	2	7	1	3	2	4	5	5	20
21	7	9	7	6	3	6	4	1	4	3	4	5	21
22	8	7	8	4	3	5	5	1	3	4	5	5	22
23	11	8	8	8	2	4	2	5	3	5	6	5	23
24	8	8	8	7	1	3	5	2	5	5	4	5	24
25	7	4	8	8	4	2	4	2	2	5	5	6	25
26	8	7	9	8	4	3	6	4	3	4	5	4	26
27	8	10	9	6	4	5	4	1	5	5	5	5	27
28	10	10	9	5	4	4	3	3	5	5	4	4	28
29	7		9	7	3	6	5	5	6	5	5	5	29
30	8		10	8	5	3	4	4	5	5	4	4	30
31	6		10		6		9	4		5		4	31
Total	216	221	245	219	162	133	138	114	121	133	147	140	
Mean	7.0	7.9	7.9	7.3	5.2	4.4	4.4	3.7	4.0	4.3	4.9	4.7	

Annual Total ( ) 1,989 mm

A 7 (2) Daily Evaporation (Stung Treng)

Year 1962 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1			5.0	9.0	4.0		6.0	3.5	2.5	3.4	4.5	3.4	1
2			3.0	8.0	4.0		2.0		3.7	3.1	4.0	4.0	2
3			9.0	5.0	5.0				3.2	2.0	5.6	3.0	3
4			8.0	5.0	5.5	5.0			4.2	3.2	2.6	5.0	4
5			8.0	8.5	6.0			1.5	1.7	2.5	4.0	4.0	5
6			7.5	8.0	5.0	5.0			1.1	4.4	3.0	4.0	6
7			7.3	6.0		6.5		6.0	1.2	3.8	3.5	4.0	7
8			7.0	9.0	5.5				3.0	2.1	4.5	5.0	8
9			7.0	8.0			6.5		3.4	2.0	3.5	3.7	9
10			6.3	7.0	4.0	4.5	4.5		1.6	4.0	4.5	4.0	10
11			5.2	8.0	1.5	2.0			3.2	4.5	4.0	3.5	11
12			9.0	7.0	5.0			4.5	3.3	3.5	3.0	5.5	12
13			8.0	7.5	6.5		4.0	4.0	2.5	3.0	3.5	3.5	13
14			9.0	7.0	7.0	2.0		4.5	4.0	3.6	4.0	6.0	14
15			6.0		6.5			3.5	2.7	4.0	4.3	4.3	15
16			4.0	4.0	5.0			4.0	0.9	3.2	4.5	3.5	16
17			6.5	6.0	4.0			5.0	2.0	2.4	4.0	7.0	17
18			6.5	6.0	6.5			2.0	1.8	4.2	4.4	4.0	18
19			4.5	5.0	4.0		4.5	4.5	3.9	4.0	4.0	7.5	19
20			7.0	1.0	7.0	6.0	5.5	2.5	3.0	5.0	3.5	3.5	20
21			6.5				3.5	5.0	2.2	3.2	4.0	6.0	21
22			8.5			4.5	1.0	2.1	4.3	2.4	4.5	4.5	22
23			6.5	5.0		7.0	5.0	3.4	2.6	3.0	4.3	4.0	23
24			8.0			5.5		1.8	3.4	4.0	3.8	5.0	24
25			8.0	4.0	4.6			2.3	3.6	4.5	1.7	5.0	25
26			8.0		3.0	6.0		3.8	1.5	3.4	3.0	3.0	26
27			9.0	6.0	5.0	4.5		4.5	3.8	4.4	4.5	5.0	27
28			9.0	1.0	3.0	6.0		4.8	1.6	4.5	4.3	4.0	28
29			9.0	5.0		5.0		5.2	2.1	4.0	5.0	2.9	29
30			8.0	6.0	1.0	5.5		5.1	3.5	3.5	4.0	4.1	30
31			8.0							4.5		6.0	31
Total			223.3						81.5	109.3	118.0	137.9	
Mean			7.2						2.7	3.5	3.9	4.4	

Annual Total ( )

Year 1963 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	4.5	5.0	8.0	5.0	9.0	5.4	3.8	3.3	3.9	3.5	7.0	5.5	1
2	6.5	5.5	6.5	6.5	8.0	6.5	6.0	6.0	2.0	3.2	6.0	5.0	2
3	4.5	6.0	5.0	7.0	8.0	7.7	4.7	4.2	3.5	5.3	5.0	6.2	3
4	4.5	5.5	5.0	6.0	8.0	5.5	5.8	2.2	2.8	3.5	4.1	6.0	4
5	5.0	6.0	6.0	6.0	6.6	6.3	1.0	2.2	4.0	4.7	4.0	6.0	5
6	5.5	6.0	7.0	7.4	8.0	6.0	4.6	2.0	4.2	4.1	5.0	6.0	6
7	5.5	6.0	8.0	3.7	6.5	4.0	4.4	4.4	4.7	5.2	4.0	5.0	7
8	4.5	6.0	8.5	7.0	3.0	5.0	3.8	3.1	3.5	7.0	5.6	7.0	8
9	5.5	6.0	8.5	7.5	8.0	5.3	5.0	3.4	6.0	6.4	6.0	5.0	9
10	5.0	5.0	8.5	9.5	8.0	5.1	5.6	3.5	3.2	7.0	5.0	6.0	10
11	4.5	6.5	7.0	7.0	8.0	5.0	3.7	4.0	5.8	6.3	6.0	6.0	11
12	5.0	5.5	6.0	9.0	8.0	7.0	3.7	4.5	6.0	3.6	2.8	7.0	12
13	4.5	7.5	7.0	8.0	8.0	8.0	5.5	5.3	5.1	7.0	5.0	6.0	13
14	6.5	6.5	9.5	6.5	8.0	5.8	7.3	2.0	6.5	7.2	5.0	6.0	14
15	5.0	6.0	9.5	8.0	9.0	7.6	7.0	3.2	5.6	5.0	6.0	4.0	15
16	5.0	7.9	10.0	7.0	9.0	5.2	3.0	3.5	5.5	8.0	6.0	5.0	16
17	5.5	7.3	9.0	8.0	9.0	4.1	4.9	2.6	4.0	6.0	6.0	5.0	17
18	5.0	7.5	7.0	8.0	8.4	2.1	6.0	5.6	5.8	7.0	6.0	5.0	18
19	5.0	7.0	6.5	8.0	5.7	4.2	5.0	5.3	5.0	6.0	6.0	6.0	19
20	5.0	7.0	6.0	8.0	8.5	0.7	5.0	2.5	9.0	6.5	7.0	5.0	20
21	5.0	8.0	6.5	8.5	5.0	1.4	6.0	3.8	4.2	5.0	5.0	6.0	21
22	6.0	7.5	5.5	9.0	6.0	4.4	3.7	3.2	3.4	7.7	5.0	6.0	22
23	6.0	8.5	6.5	9.0	6.0	6.0	3.1	4.0	4.4	7.0	5.0	6.0	23
24	6.5	9.0	5.3	8.0	4.0	6.5	3.9	3.6	5.3	6.0	6.0	5.0	24
25	6.5	7.5	6.0	7.0	3.0	6.0	3.4	5.1	3.1	6.5	5.0	5.9	25
26	6.0	7.0	6.0	8.0	5.0	3.8	3.1	5.3	5.2	5.5	6.0	6.0	26
27	5.5	8.0	7.0	9.0	7.3	6.2	6.0	5.4	3.4	5.0	6.0	7.0	27
28	5.0	9.0	7.7	8.0	4.2	6.0	7.0	5.6	3.0	4.5	6.0	7.0	28
29	4.0		7.0	8.0	6.0	6.8	6.0	3.0	5.5	5.4	7.0	7.0	29
30	5.5		6.0	8.0	5.9	6.0	4.8	2.9	7.7	6.0	6.0	6.0	30
31	5.5		6.0		6.0		3.4	2.6		3.9		6.0	31
Total	163.5	190.2	218.0	225.6	213.1	159.6	146.2	117.3	141.4	175.0	164.5	180.6	
Mean	5.3	6.8	7.0	7.5	6.9	5.3	4.7	3.8	4.7	5.6	5.5	5.8	

Annual Total ( ) 2,095.0 mm

Year 1964 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	6.0	7.0	8.0	10.0	7.0	5.4	3.5	4.4	6.1	2.9	7.7	5.0	1
2	6.0	10.0	9.0	11.0	7.0	7.0	6.0	6.0	6.0	2.2	5.0	5.0	2
3	6.0	8.0	8.0	11.0	2.6	4.5	1.3	4.0	5.0	2.6	4.0	5.0	3
4	7.0	6.0	7.0	10.0	6.0	4.4	4.0	4.6	6.0	1.9	2.9	6.0	4
5	6.0	8.0	7.0	10.0	4.1	7.0	5.0	1.4	5.0	5.4	3.5	4.0	5
6	7.0	8.0	7.0	8.0	2.6	5.2	6.0	3.2	1.3	3.4	5.0	4.9	6
7	6.0	6.0	8.0	11.0	1.7	3.4	6.5	1.3	4.1	2.8	4.6	4.0	7
8	7.0	7.0	11.0	11.0	1.4	5.0	6.0	3.0	5.0	3.2	5.0	5.0	8
9	7.0	7.0	10.0	11.0	8.0	5.0	5.0	4.9	4.5	4.5	1.1	5.0	9
10	8.0	9.0	10.0	10.0	4.8	3.1	6.0	4.3	2.8	5.0	4.1	5.0	10
11	8.5	9.5	10.0	11.0	5.5	4.0	2.0	2.4	6.0	4.9	4.0	3.1	11
12	7.0	9.5	10.0	11.0	7.0	6.2	5.8	5.1	4.8	4.0	4.0	3.8	12
13	6.0	9.0	12.0	11.0	5.7	6.0	5.0	4.2	3.7	5.0	4.0	6.0	13
14	6.0	9.5	12.0	6.7	1.2	6.1	6.0	4.0	2.3	3.3	5.0	5.0	14
15	5.0	8.5	11.0	9.3	4.6	6.5	2.9	5.1	3.6	5.6	2.0	5.0	15
16	6.0	8.0	8.0	6.0	4.1	4.0	6.0	6.7	3.8	5.0	5.6	4.0	16
17	6.0	9.0	6.0	9.0	6.0	6.2	5.2	4.0	3.3	6.0	3.0	5.0	17
18	8.0	8.0	8.0	5.1	7.0	6.0	5.0	5.1	4.2	5.0	3.0	4.0	18
19	7.0	8.0	7.0	7.0	7.0	7.0	5.0	5.0	1.4	6.0	1.2	5.0	19
20	7.0	10.0	9.0	9.0	8.0	6.6	4.8	4.0	6.2	6.0	4.0	5.0	20
21	7.0	10.0	8.0	4.1	5.4	4.9	6.0	6.0	5.8	5.7	4.7	4.0	21
22	6.0	11.0	7.0	3.9	2.9	3.3	5.5	4.2	2.3	5.0	5.0	5.0	22
23	6.0	11.0	8.0	7.0	2.2	5.9	6.0	2.0	3.9	5.0	5.0	5.0	23
24	6.0	11.0	8.0	9.4	1.9	5.3	4.9	3.2	5.2	4.7	5.0	5.0	24
25	7.0	10.0	11.0	7.0	2.2	3.1	5.7	4.1	5.1	3.6	5.0	5.0	25
26	6.0	11.0	10.0	8.0	-	2.7	1.7	4.4	2.9	5.0	3.0	5.0	26
27	6.0	10.0	11.0	8.0	-	4.0	5.0	5.0	4.0	4.8	4.0	6.0	27
28	7.0	9.0	10.0	7.7	-	5.5	3.0	4.3	4.4	6.0	4.0	5.0	28
29	7.0	8.0	11.0	6.0	-	4.9	5.0	3.2	1.4	6.0	6.0	5.0	29
30	7.0		11.0	7.0	4.4	6.7	5.0	1.5	3.9	6.0	4.0	5.0	30
31	7.0		10.0		6.0		2.0	4.9		4.3		6.0	31
Total	204.5	255.5	283.0	256.2	126.3	154.9	148.8	125.5	124.0	140.8	125.4	150.8	
Mean	6.6	8.8	9.1	8.5	4.6	5.2	4.8	4.0	4.1	4.5	4.2	4.9	

Annual Total ( ) 2,095.7 mm

Year 1965 UNIT mm

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	5.0	7.0	7.0	7.0	7.0	5.2	5.0	5.2	4.3	5.2	5.0	5.0	1
2	5.0	6.5	7.0	7.0	6.6	4.5	4.9	5.5	2.3	3.2	5.0	4.5	2
3	5.0	7.0	6.9	10.0	6.0	5.0	3.5	5.4	3.4	5.5	5.0	5.0	3
4	5.0	7.0	6.0	8.0	7.0	7.4	6.0	4.0	2.7	4.0	6.0	5.0	4
5	5.0	7.0	7.0	7.0	7.3	4.9	7.5	3.7	4.6	4.0	6.2	5.0	5
6	4.0	7.0	8.0	6.5	3.0	7.1	5.5	4.2	1.6	3.0	5.0	5.0	6
7	5.0	8.0	8.0	7.0	5.6	6.6	4.7	5.0	5.2	3.5	5.0	5.0	7
8	4.0	7.0	9.0	7.0	5.1	5.0	3.1	5.0	4.2	3.9	4.0	4.0	8
9	4.0	7.0	8.0	7.3	5.0	6.3	3.9	4.0	3.1	2.6	4.0	5.0	9
10	6.0	7.0	9.0	6.0	7.0	4.1	5.0	6.0	3.9	5.0	5.0	5.0	10
11	6.0	8.0	8.0	6.4	4.8	3.8	3.5	6.1	5.0	5.4	5.0	4.0	11
12	5.0	7.0	8.0	7.0	6.7	2.9	1.8	5.0	3.0	4.0	5.0	6.0	12
13	5.0	8.0	7.0	8.0	5.3	3.0	1.3	3.5	2.1	5.7	5.0	6.0	13
14	6.0	7.0	6.0	5.0	5.0	3.1	2.4	4.0	3.0	5.9	4.0	5.0	14
15	6.0	8.0	8.0	7.0	6.1	4.1	5.0	6.0	2.6	5.5	4.0	5.0	15
16	6.0	5.0	7.0	8.0	4.0	4.4	4.4	4.5	2.4	4.3	5.0	4.6	16
17	6.0	7.0	7.0	7.0	5.0	4.6	5.0	2.5	4.3	5.3	5.7	6.0	17
18	6.0	5.0	7.0	8.0	6.0	3.3	5.0	4.0	2.7	2.6	5.0	5.0	18
19	5.0	6.0	7.0	8.0	6.2	2.1	4.7	5.1	5.0	5.5	5.0	1.0	19
20	6.0	5.0	7.0	7.5	3.1	3.2	5.0	4.0	3.5	5.2	5.0	3.5	20
21	6.0	3.5	7.0	7.0	2.4	2.4	6.0	5.0	4.5	5.4	5.1	3.0	21
22	6.0	6.0	6.0	8.0	7.8	5.7	3.2	6.5	3.1	5.0	5.0	4.0	22
23	6.0	7.0	6.0	8.0	2.2	2.5	5.0	5.4	3.7	5.0	4.0	6.0	23
24	6.0	7.0	7.0	7.3	4.0	1.9	3.5	5.1	2.5	5.0	5.0	5.0	24
25	6.0	7.0	6.0	7.2	4.3	1.8	3.8	6.0	5.0	5.0	4.0	6.0	25
26	6.0	7.0	7.0	6.5	3.5	3.3	2.9	3.8	5.0	6.5	5.0	5.0	26
27	6.0	7.0	5.6	6.0	2.0	3.3	3.2	4.3	5.3	5.0	5.0	5.0	27
28	6.0	7.0	4.6	8.0	3.4	4.8	7.4	3.8	3.3	5.5	4.5	5.0	28
29	6.0		5.0	7.0	2.1	4.3	3.4	3.3	3.3	3.1	6.0	5.0	29
30	6.0		5.0	7.7	1.3	5.0	4.9	2.8	3.8	5.0	6.0	6.0	30
31			7.0		2.8		4.0	3.0		5.0		7.0	31
Total	171.0	188.0	214.1	217.4	147.6	125.6	134.5	141.7	108.4	144.8	148.5	151.6	
Mean	5.5	6.7	6.9	7.2	4.8	4.2	4.3	4.6	3.6	4.7	5.0	4.9	

Annual Total ( ) 1,893.2 mm

A 8 Discharge (Kratie)

Year 1933 — UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	2,600	1,800	1,160	1,340	1,410	2,220	10,400	38,500	25,000	27,900	13,400	6,630	1
2	2,600	1,800	1,160	1,340	1,470	2,470	9,680	39,200	25,000	24,700	15,800	6,540	2
3	2,600	1,800	1,160	1,330	1,530	2,650	9,270	40,300	24,800	25,900	16,200	6,420	3
4	2,600	1 800	1,160	1,320	1,560	2,890	10,900	41,000	24,800	25,100	19 600	6,160	4
5	2,600	1,800	1,160	1,320	1,570	3,410	12,300	44,600	23,800	24 800	21,900	6,050	5
6	2,600	1,800	1,160	1,310	1,550	4,240	12,700	50,200	23,200	24,900	20,000	5,870	6
7	2,600	1,800	1,160	1,300	1,560	4,500	12,200	53,900	23,600	25,400	18,400	5,780	7
8	2,600	1,800	1 160	1,290	1,450	4,590	11,800	52 400	23,800	22,200	16,600	5,630	8
9	2,600	1 800	1,160	1,290	1,450	4,560	11,700	49 400	24,100	21,200	15,900	5,450	9
10	2,600	1,800	1,160	1,280	1,430	4,560	11,500	48,700	23,200	21,100	14,900	5,380	10
11	2,600	1 800	1,160	1,260	1,430	4,800	12,000	46,200	21,600	20,600	13,700	5,270	11
12	2,600	1 800	1,160	1,250	1,450	5,040	12,800	43,500	21,800	20 100	13,300	5,170	12
13	2,600	1 800	1,160	1,230	1,430	5,740	14,300	39,000	24,400	20,100	13,000	5,070	13
14	2,600	1,800	1,160	1,230	1,420	6,010	14,700	36 100	23,600	19,800	12,100	4,900	14
15	2 600	1,800	1,480	1,220	1,410	6,100	14,800	34,200	23,700	20,100	11,800	4,800	15
16	2,600	1,600	1,470	1,220	1 410	6,290	15,400	31 800	24,900	20,300	10,800	4,700	16
17	2,600	1,800	1,470	1,220	1,710	6,290	17,000	29,400	25,200	20,800	10,500	4 650	17
18	2,600	1,600	1 460	1,230	1,710	6,370	18,500	28,800	26 000	24,900	10,200	4,600	18
19	2,600	1,800	1 450	1,230	1 650	6,480	20,500	26,800	28,800	23,900	10,000	4,550	19
20	2,600	1,800	1 440	1,240	1,570	6,200	23,000	25,800	33,200	23,300 -	9,590	4,500	20
21	2,600	1,800	1 430	1,310	1,580	5,880	25,300	24,800	38,400	20,700	9,150	4,450	21
22	2 600	1,800	1,420	1,310	1,590	5,850	26 000	23,600	44,400	20,000	8,710	4,400	22
23	2,600	1,800	1,410	1,300	1,610	5,850	26,800	23,200	47,300	18,100	8,200	4,300	23
24	2,600	1,800	1,410	1,310	1,650	5,880	27,600	22,600	46,500	18,000	7,990	4,200	24
25	2 600	1,800	1,400	1,340	1,810	6,250	27,800	22,600	43,300	16,000	7,690	4 100	25
26	2 600	1,800	1 400	1,310	1,920	6,730	27,800	23,400	42,500	15,200	7,650	4,000	26
27	2,600	1,800	1,380	1,330	1,790	7,550	29,200	23,800	40,200	13,900	7,450	3,900	27
28	2 600	1 800	1,370	1,340	1,810	8,820	31,400	24,200	39,600	13,100	7,150	3,800	28
29	2 600		1,360	1,330	2,010	9,960	32 600	24,800	38,200	12,900	7,050	3,700	29
30	2 600		1,350	1,340	2,050	10,600	35 200	25,000	37,800	12,400	6,820	3,650	30
31	2,600		1,350		2,120		37,200	25,100		12,400		3 600	31
TOTAL	80 600	50,400	40,290	38,670	50 110	168,780	602,350	1,062,900	912,900	629 800	365,550	152,220	
MEAN	2 600	1,800	1,300	1,290	1,620	5,630	19,430	34,290	30,430	20,320	12,190	4,910	
L/S/KM2	4 02	2 79	2 01	2 00	2.50	8 71	30 08	53 08	47 11	31 45	18 86	7 60	
RUNOFF (MM)	10 8	6 7	5 4	5 2	6 7	22 6	80 6	142 2	122 1	84 2	48 9	20 4	
MILLION M3	6,964	4,355	3,481	3,341	4,330	14,583	52,043	91,835	78,875	54,415	31,584	13,152	
MAXIMUM	2 600	1,800	1,480	1,340	2,120	10,600	37,200	53,900	47,300	27,900	21,900	6,630	
MINIMUM	2 600	1,800	1,160	1,220	1,410	2,220	9,270	22,600	21,800	12,400	6,820	3 600	

MAXIMUM 53 900 MINIMUM 1,160 MEAN 11,382 ANNUAL RUNOFF 358,958 MILLION M3

Year 1934 — UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,560	2 460	2,050	1,500	1,510	3,570	13,800	27,200	44,000	46,800	18 200	9,150	1
2	3,530	2,460	2 130	1,470	1 690	3,570	16,300	28,200	42,700	48,900	17,500	8,820	2
3	3,500	2,460	2,120	1,470	1 730	3,710	17,000	26,900	42,500	47,800	16 400	8,620	3
4	3,420	2,450	2,100	1,460	1,790	3,970	18,800	26,800	42,500	47,400	15 200	8,270	4
5	3,340	2,340	2 050	1 470	1,910	4,220	19,500	26 800	40 000	45,700	14,400	7,850	5
6	3 280	2 330	2 040	1,460	1,920	4,450	19,400	26 800	38,800	45,500	13,800	7,550	6
7	3 210	2,310	1,940	1,450	1,910	4,560	23,200	26 600	37,400	45,400	13,300	7,250	7
8	3 150	2,300	1,940	1,450	2,280	4,530	24,700	27,600	37,000	45,400	13,000	7 050	8
9	3,110	2,250	1,900	1,450	2,350	4,400	26,400	29,900	36,900	42,800	12,800	6,860	9
10	3 080	2,210	1,890	1,450	2,540	4,510	27,200	33,200	34,400	39,200	13,000	6,670	10
11	3 070	2 200	1,850	1,430	2,760	4,880	26,600	38,000	37,400	36,500	12,500	6,540	11
12	3 030	2,200	1,830	1,440	2,750	4 650	26,200	38,400	37,300	35,400	12,100	6,390	12
13	3 000	2 200	1,770	1,410	2,590	4,990	25,200	38,000	38,200	35,100	12,500	6,160	13
14	2 980	2,170	1,750	1,410	2,470	5 290	24,500	37,400	39,100	33,100	12,100	5,960	14
15	2 960	2,150	1,730	1,430	2,570	5,360	22,800	38,400	40,600	30,200	11,800	5,740	15
16	2 960	2,140	1,750	1 420	2,750	5,340	21,100	41,500	42,400	27,400	11,700	5,580	16
17	2 950	2,130	1,730	1,470	2,630	5 200	19,600	44,200	46,400	24,900	11,300	5,380	17
18	2 900	2,100	1,690	1,440	2,590	5,140	18,200	47,000	49,700	23 100	10,900	5,240	18
19	2 820	2,100	1,690	1 450	2,780	5,140	16 900	48,800	51,500	21,400	10,500	5,120	19
20	2 760	2,070	1,690	1,450	2,980	4,980	16 900	50,400	50,600	20,400	10,400	5,010	20
21	2 770	2 050	1 700	1,530	3,050	4,980	17,810	50,800	51,000	19,800	10,200	4,880	21
22	2,720	2,030	1,710	1,790	2,950	4,820	18,300	50,200	52,900	18,800	10,100	4,800	22
23	2,710	1,950	1,710	1 610	3,020	4,720	20,100	48,900	52,600	18,400	9,840	4,620	23
24	2 650	1,970	1,670	1,450	2,990	4,720	23 200	45,000	51,900	17,700	9,700	4,610	24
25	2,580	2,320	1,630	1 440	2,950	4,560	24,700	46,500	52,000	17,500	9,730	4,510	25
26	2,530	2,250	1 610	1,430	2 930	4,690	26,500	48,900	52,800	16,500	9,840	4,400	26
27	2,470	2 100	[illegible]	1,470	3 080	5,560	27,200	51,700	51,900	16,300	9,960	4,350	27
28	2,470	2 060	[illegible]	1,500	3,250	6,290	28,000	51,000	48,700	16,600	9,960	4,240	28
29	2,470		[illegible]	1,460	3,430	7,450	29,700	49,000	46,000	16,900	9,770	4 290	29
30	2,450		1,530	1,510	3,470	9,560	28,000	48 000	47,300	16,800	9,500	4,370	30
31	2,450		[illegible]		3,560		27,600	46,300		16,700		4,290	31
TOTAL	90 880	61 760	55,390	44,190	81,180	150 010	695,410	1,238,400	1,336,500	936,400	362,000	184,570	
MEAN	2 930	2,210	1 790	1 470	2,620	5 000	22 430	39,950	44,550	30,210	12,070	5,950	
L/S/KM2	4 54	3 41	2 77	2 28	4 05	7 74	34 73	61 84	68 96	46 76	18 68	9 22	
RUNOFF (MM)	12 2	8 3	7 4	5 9	10 9	20 1	93 0	165 6	178 8	125 2	48 4	24 7	
MILLION M3	7,852	5,336	4 786	3,818	7,014	12,961	60 083	106 998	115,474	80,905	31,277	15 947	
MAXIMUM	3,560	2 460	2 130	1,790	3,560	9,560	29,700	51,700	52 900	48,900	18,200	9,150	
MINIMUM	2,450	1,950	1 500	1,410	1,510	3,570	13,800	26,600	24 400	16,300	9,500	4,240	

MAXIMUM 52 900 MINIMUM 1 410 MEAN 14,347 ANNUAL RUNOFF 452,451 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1935 UNIT c.m.s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,160	2,690	1,980	1 790	1 490	6,900	9,430	42,600	23 400	33,500	24,000	14,300	1
2	4,050	2,640	1,970	1 790	1,550	8,970	10,300	42,800	23,200	32,600	23,700	13,300	2
3	4 000	2,610	1,950	1,770	1,580	10,500	11,100	44 200	23 200	31,700	23,900	12,100	3
4	3,970	2,580	1,920	1,750	1,660	10,800	12,400	43,400	23 000	37,700	23,700	11,500	4
5	3,950	2,550	1,900	1,730	1,730	11,200	13,600	42,900	23 400	42,200	23,900	10,700	5
6	3 950	2,530	1,910	1,700	1,790	11,700	13,800	41,000	25,600	40,000	23,700	10,200	6
7	3,920	2,510	1,900	1,670	1,850	12,200	12,800	39,000	27,400	39,700	23,600	9,610	7
8	3,890	2,460	1,880	1 630	2 290	12,300	12,000	37,300	30,300	37,500	23,000	9,040	8
9	3,840	2,450	1,880	1 620	2,770	12,400	12,000	36,400	32,200	34,800	22,300	8,560	9
10	3,820	2,390	1,880	1,550	2 690	12,300	13,900	37,800	34,200	35,700	21,900	8 160	10
11	3 820	2,370	1,890	1,540	2 930	12,000	16,300	38,400	36 600	30,500	21,000	7,850	11
12	3,810	2,370	1,890	1,530	3,110	12,400	20 200	38,200	37,200	29,100	20 800	7,550	12
13	3,740	2,330	1,890	1,530	3,020	12,300	20,700	36,800	37,800	27,700	20,600	7,350	13
14	3,700	2,290	1 860	1,540	3,180	12,200	20,400	35,400	43 000	26,300	20,300	7,250	14
15	3,570	2 290	1,860	1,540	3 240	12,000	22,000	33,400	43 900	27,100	20,700	7,090	15
16	3,520	2,250	1,840	1,550	3 020	11,700	26 800	32 000	43,700	29,100	21,800	7,410	16
17	3 440	2,220	1,800	1,530	2,980	11,300	29,800	30,600	42,500	33,300	23,500	7,690	17
18	3,310	2,190	1,760	1,530	2,890	11,100	31,000	29,600	40,700	31,000	24,300	7,350	18
19	3,260	2,170	1,750	1,550	3 080	10 900	31,000	29,200	36,600	30,000	23,600	6,990	19
20	3,220	2,140	1,710	1,530	3,210	10 400	31,800	29,000	35 800	30,000	22,800	6 480	20
21	3,170	2,100	1 690	1,510	3,300	10,400	32,400	28,000	34,600	27,600	21,500	6,580	21
22	3,110	2,080	1 670	1,510	3,300	10,300	35,500	28,400	33,200	26,700	20,400	6 250	22
23	3,030	2,070	1,670	1,560	3,440	9 770	38,200	28,000	37 200	25,600	19,700	6,100	23
24	3,020	2 050	1,720	1,560	3,310	9,380	40,800	26,800	38 000	29,500	18,700	5,970	24
25	3,000	2,030	1 720	1,570	3,210	8,890	42,800	25,400	36,600	28,300	18,200	5,920	25
26	2,990	2,000	1 720	1,560	3,210	8,270	43,800	23,600	32,600	27,600	17,500	5,700	26
27	2,940	1,970	1,710	1,570	3,600	7,990	44 000	23,400	35,200	27,200	16,900	5,630	27
28	2,890	1,970	1 700	1,550	4,020	7 850	43,600	23,200	37,600	26,400	16 600	5,540	28
29	2,830		1,690	1,520	4,400	7,850	42,500	23,200	33,500	25,300	16,100	5,380	29
30	2,760		1,710	1,490	4,880	8,310	40,300	23,100	35,000	24 800	15 700	5,520	30
31	2,710		1,760		6,080		40 800	23,200		24,500		5,090	31
TOTAL	107,390	64,300	56 200	47,770	92,810	314,580	816,030	1,016,300	1,017,400	953,000	634 400	244,160	
MEAN	3,460	2,300	1 810	1,590	2,990	10,490	26,320	32,780	33,910	30,740	21 150	7,880	
L/S/KM2	5.36	3 55	2 81	2 46	4 63	16 23	40 75	50 75	52.50	47 59	32,73	12 19	
RUNOFF (MM)	14 4	8 6	7.5	6 4	12 4	42 1	109 1	135 9	136 1	127 5	84 8	32 7	
MILLION M3	9,278	5,556	4,856	4,127	8,019	27,180	70,505	87,808	87 903	82,339	54,812	21 095	
MAXIMUM	4 160	2 690	1 980	1,790	6,080	12 400	44,000	44,200	43,900	42 200	24,300	14,300	
MINIMUM	2,710	1,970	1,670	1,490	1,490	6,900	9,430	23,100	23,000	24,500	15,700	5,090	

MAXIMUM 44 200 MINIMUM 1,496 MEAN 14 697 ANNUAL RUNOFF 463,478 MILLION M3

Year 1936 UNIT c.m.s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DFC	DATE
1	4 950	3,010	2 670	2 020	2,310	5,300	16,300	36 600	34,400	26,000	7,830	4,660	1
2	4,860	2 980	2 740	2 020	2,320	5,650	16,800	36,500	34,800	23,900	7,690	4,550	2
3	4,740	2 910	2 800	2,000	2,340	5 850	16 200	35,400	35,200	22,400	7,420	4,550	3
4	4,700	2,880	2,750	1,980	2,320	6,210	15,700	34,500	37,700	21,200	7,300	4,550	4
5	4,550	2,850	2,700	1 950	2,300	6 670	16,800	34,400	43,600	20,600	7,280	4 450	5
6	4,450	2,820	2,650	1 940	2 290	6 910	17,900	34,900	51,200	19,400	7,000	4,370	6
7	4,350	2,790	2,600	1 920	2 280	7,300	18,600	35,000	54,600	18,300	7,000	4,350	7
8	4,250	2,760	2,500	1,900	2 270	7,780	18,400	33 900	55 200	17,700	6,820	4,310	8
9	4,220	2,730	2,400	1 930	2 260	8,010	19,000	32,900	54,400	19,200	6,730	4,220	9
10	4,110	2,700	2,300	1 970	2 250	8,110	20,900	33,100	51,600	20,700	6,570	4,110	10
11	4 070	2 800	2,200	2,000	2 280	8,110	22,600	32,500	47,300	18,400	6 290	4,030	11
12	4 030	2,780	2,100	2 010	2,300	8 110	22,400	31,200	43,600	19,000	6,250	3,960	12
13	4,000	2 750	2 100	2 020	2,350	8,380	22,700	31,700	40,800	19,400	6,170	3,890	13
14	3,850	2 730	2 100	2 030	2,550	9,310	22,800	30,800	39,500	17,300	6,170	3,850	14
15	3,810	2,700	2,100	2,050	2 810	9,360	22,600	31,800	37,700	14,700	6 050	3,850	15
16	3 810	2 720	2,080	2,060	2,810	9 260	25,600	32,500	36,600	13,600	5,930	3,740	16
17	3 740	2 740	2 060	2,070	2,600	9,030	29,000	34,300	36,000	12,900	5,890	3,670	17
18	3 700	2,750	2,040	2,080	2,700	9,460	29,200	35,100	36 000	12,600	5,730	3 630	18
19	3 630	2 740	2 020	2 090	2,700	11,000	27,500	36,000	36,500	12,500	5 610	3,550	19
20	3,510	2 720	2,000	2,100	2,700	11,300	27 600	35,900	36,700	12,300	5,410	3,510	20
21	3,440	2,700	1,990	2 120	3 070	11,700	27,100	35,100	37,300	11,800	5,330	3,480	21
22	3,440	2,680	1,980	2 140	3,370	11,500	27 800	34,000	34,300	11,600	5,330	3,400	22
23	3 440	2,650	1 970	2,160	3,690	11,200	30,500	33,200	31,700	11,000	5,170	3,320	23
24	3 400	2 630	1,960	2 180	3,510	11,200	31,800	33,100	30,900	10,700	5 090	3,290	24
25	3,360	2,600	1 950	2,200	3,370	11 700	34,100	32,500	31,400	10,700	5 010	3,250	25
26	3,360	2 600	1,940	2,220	3,550	11,700	35,900	34,500	32,200	10,200	5,010	3,250	26
27	3,360	2,600	1,920	2,240	3,810	12 200	36,300	39,800	33,700	9,210	4,890	3 290	27
28	3,290	2 600	1,90[illegible]	2 260	4,370	13,500	36,800	41,200	31,900	8 840	4,780	3,210	28
29	3,170	2 600	[illegible]	2 280	4,660	13,900	36,800	41,400	31,100	8,520	4,780	3,170	29
30	3,110		[illegible]	2,300	4,770	14,500	36,800	39,800	28,600	8,290	4,660	3,170	30
31	3,070		[illegible]		5,010		35,600	36,000		8,060		3,170	31
TOTAL	119,770	79,520	68 420	62 240	91,920	284,210	798,100	1,079,600	1,166,500	471,020	181,190	117,800	
MEAN	3 860	2 740	2 210	2 080	2,970	9 470	25,750	34,830	38,880	15,190	6,040	3 800	
L/S/KM2	5 98	4 24	3 42	3 21	4 59	14 67	39 85	53 91	60 19	23.52	9.35	5 88	
RUNOFF (MM)	16 0	10 6	9 2	8 3	12.3	38 0	106 7	144 4	156.0	63 0	24 2	15 8	
MI[illegible]ION M3	10,348	6 871	5 911	5,378	7,942	24,556	68,956	93,277	100,786	40,696	15,655	10,178	
MA[illegible]MUM	4 950	3,010	2 800	2,300	5,010	14,500	36,800	41,400	55,200	26 000	7,830	4,660	
MI[illegible]MUM	3 070	2 600	1 900	1,900	2,250	5,300	15,700	30,800	28,600	8,060	4,660	3,170	

MAXIMUM 55 200 MINIMUM 1 900 MEAN 12,351 ANNUAL RUNOFF 390,554 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1937 UNIT c.m.s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,200	2,270	1,810	1,530	2,080	5 290	20,100	53,100	52,300	36,500	15 400	7,690	1
2	3,240	3,250	1,790	1,510	2,200	5 650	19,300	52,800	56 000	35,700	14,600	7,650	2
3	3,200	2,230	1,760	1,510	2,070	6 200	18 900	53,300	58,500	33,500	14,100	7,630	3
4	3,170	2,210	1,790	1,480	2,070	7,310	19,100	53,000	59,900	31,800	13,700	7,610	4
5	3 110	2,190	1,820	1,440	2,000	8 600	19,400	53,300	63,300	29,100	13,300	7,470	5
6	3,070	2,160	1,850	1,440	2,300	9,730	20 100	55,600	62,300	27,900	12 900	7,250	6
7	2,120	2,120	1,900	1,440	2,200	10,200	20 500	57,600	62,600	26,600	12,700	7 050	7
8	3,080	2,080	2,000	1,450	2 270	11,000	20,600	59,500	62,700	26 900	12,400	6,900	8
9	3,030	2,060	2,080	1 440	2,590	11 700	20,900	60,000	63,000	26,100	12,300	6,820	9
10	3,000	2,040	2,150	1,440	2,890	11 900	20,700	58,000	63,500	24 900	12,200	6,670	10
11	2,990	2,030	2,210	1,430	3,150	12,300	21 800	55,000	63,700	26,200	11,800	6,580	11
12	2,950	2,030	2,210	1,410	3,280	13,300	23 700	52 400	64,300	25,100	11,700	6,480	12
13	2,950	1 980	2,100	1,410	3 640	14 400	25 400	49,900	64,100	23 800	11,400	6,390	13
14	2 900	1 970	2,000	1 440	4,560	15 400	25,800	47,100	62,000	23,700	11 000	6 290	14
15	2 880	1,970	1 870	1,470	5 200	15,500	26,500	45,000	61,500	23,700	10,800	6 210	15
16	2 870	1,950	1,830	1,490	6 480	15 000	27,400	42,600	60 500	26,500	10 700	6,100	16
17	2 840	1,930	1,780	1,450	6 860	14 400	27,600	41,500	58,500	27 700	10,800	6 060	17
18	2,810	1,900	1,720	1,430	6,770	13,800	29,100	42,500	57 200	26,600	10 900	6 050	18
19	2,730	1,870	1,690	1,400	6 060	13,600	31 000	44,400	55,600	25,500	10,700	6 210	19
20	2 710	1,850	1,670	1,390	5 740	13,800	32 200	44 000	54,500	23,800	19,300	6,290	20
21	2,670	1,840	1,630	1,390	5,380	14,300	35,200	43,800	53 000	21,700	9,840	6,860	21
22	2,650	1 830	1,590	1,380	5,250	14,300	38,500	46,500	51,800	20 600	9,660	6,900	22
23	2,590	1,830	1,570	1,450	5,040	14,300	43 100	47,500	49,500	20 100	9,500	6,440	23
24	2,530	1,830	1,550	1,650	4,800	14 800	45 000	46,100	49,000	21,600	9,310	6 250	24
25	2,470	1 830	1,530	1 770	4,480	15,400	46,000	46,000	47,200	22,100	9 040	5,960	25
26	2,410	1,820	1,530	1,850	4,240	15 400	48,500	46 000	46 000	20 100	8,820	5,700	26
27	2,370	1,810	1,570	1,950	4,210	14,900	50,300	45,800	44 400	18,800	8 580	5,560	27
28	2,350	1,810	1,570	1,970	4,050	14,500	50,400	46,100	43,500	17,800	8,310	5,470	28
29	2,310		1,550	1 880	4,050	14,900	50 400	47,600	40,800	17,000	8,050	5,380	29
30	2 280		1,530	2,000	4 040	15,800	50,500	49 400	38 600	16,200	7,850	5,290	30
31	2,260		1,530		5 040		51,100	49,100		15,500		5 040	31
TOTAL	86,740	56,690	55,180	46,290	125 790	377,680	979,100	1 534,500	1,669,600	763 100	332 660	200,250	
MEAN	2,800	2 030	1 780	1,540	4 060	12,590	31,560	49,500	55,660	24,620	11 090	6,460	
L/S/KM2	4.33	3 13	2 76	2 39	6 28	19 49	48 89	76 63	86 16	38 11	17 17	10 00	
RUNOFF (MM)	11 6	7 6	7 4	6 2	16 8	50 5	131 0	205 3	223.3	102 1	44 5	26 8	
MILLION M3	7 494	4,898	4 768	3 999	10 868	32,632	84,594	132,581	144 271	65,932	28,742	17,302	
MAXIMUM	3 240	3,250	2 210	2,000	6 860	15 800	51,100	60 000	64,300	36,500	15,400	7 690	
MINIMUM	2 260	1 810	1,530	1,380	2 000	5 290	18 900	41,500	38 600	15,500	7 850	*5 040	

MAXIMUM 64,300 MINIMUM 1,380 MEAN 17 062 ANNUAL RUNOFF 538,081 MILLION M3

Year 1938 UNIT c.m.s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5 000	3,660	2 980	2 900	3,300	8,520	20 800	28 900	33,300	53,900	18,200	11,600	1
2	4 900	3,820	2 950	3 000	3,320	8 750	20 400	28,000	34 100	54,100	17,600	11,300	2
3	4,800	3 780	2 930	3 100	3,340	10 100	20,400	28 200	34 000	52 000	17,600	10 900	3
4	4 750	3 740	2 900	3 200	3,360	12 600	21,700	28 000	33,300	49,700	17 600	11,000	4
5	4,700	3 700	2 870	3,300	3,380	13 600	23 000	28,000	32,500	47,100	16 800	11,300	5
6	4 660	3 660	2 850	3,250	3 400	14,100	22,100	28,000	34,900	45,000	16 000	11,000	6
7	4,620	3 620	2 830	3 200	3,450	14,300	23 400	28,600	36,900	44,600	16,000	10,800	7
8	4,580	3,580	2 800	3 150	3 500	17,100	24,700	28 600	38 700	44,100	15,900	10,100	8
9	4,540	3 540	2 780	3 100	3 400	25 200	25,400	28,200	38 000	42 800	15,400	9,960	9
10	4,500	3,500	2 750	3,050	3,300	26 500	31,000	27,900	38,400	40 400	15,000	9,500	10
11	4,420	3 470	2,750	3 000	3,200	23,100	36 900	27 900	38,900	38,200	14 600	9,150	11
12	4,350	3 440	2 750	2 980	3 100	17,300	38 400	27,800	38,400	35,700	14,800	8 860	12
13	4,270	3 410	2,750	2 960	3 120	15 800	36,300	28 100	37,200	33,700	14,100	8,490	13
14	4,200	3,380	2,750	2 950	3 140	15 100	31 800	30,800	37,600	35,100	13,600	8 400	14
15	4 200	3,350	2 750	2 930	3 160	15,100	27,400	35 600	39,000	33,900	13,400	8,400	15
16	4,350	3,320	2 740	2 910	3 180	14 700	28 000	40 400	37,700	34,200	13 800	8,050	16
17	4 500	3 290	2 730	2 900	3 200	14 700	28 600	40 400	36,300	32,600	14,400	7,950	17
18	4,650	3 260	2,720	2 970	3 220	15,600	28 600	40,400	35,000	32 600	13,800	7,850	18
19	4,800	3 230	2,710	3 040	3,240	16 100	30 200	40,400	31,700	33,200	13,000	7,690	19
20	4,700	3 200	2,700	3 110	3 260	18 400	33,200	39,800	29,400	36,300	12,600	7,610	20
21	4 600	3,230	2 690	3 180	3 280	21 200	31,300	39,000	27,900	37,100	12,000	7,450	21
22	4,500	3 260	2 680	3,250	3,300	22,300	31,300	38,300	29,500	36,700	11,900	7,250	22
23	4,400	3,300	2,670	3,330	4 000	20 700	32,300	37,500	30 000	32 900	11,800	7,050	23
24	4,300	3,300	2 660	3,400	4 700	18 200	35,400	36,800	31,200	29,900	11,500	6,860	24
25	4,200	3 230	2 650	3,500	5 400	16 400	36,100	36,600	32,200	27,000	11,300	6 690	25
26	4 150	3,130	2 680	3,500	6 100	15 600	33,200	36,700	37,700	24,700	11,200	6,580	26
27	4 100	3 080	2 700	3 480	6 800	15,300	30,800	36 100	32,500	23,200	11,200	6,310	27
28	4 050	3,000	2 730	3 450	7 400	17 100	29,400	36,100	34,300	22,900	11,300	6,100	28
29	4 000		2 75[illegible]	3,430	8 000	20 700	30,000	35,700	42,500	22,700	11,700	5,900	29
30	3,950		2 750	3 400	8,200	21,300	30,000	34,700	50,800	20,100	11,600	5,740	30
31	3,900		2 [illegible]		8,400		29,300	34,400		19,400		5 670	31
TOTAL	137,640	95 700	8[illegible]	94 920	131,150	505,470	901,400	1,035,900	1,063,900	1,115,800	419,700	261,510	
MEAN	4 440	3,420	2 770	3 160	4 230	16 850	29,080	33,420	35,460	35,990	13,990	8,440	
L/S/KM2	6 87	5 29	4 28	4 90	6 55	26 08	45 01	51 73	54 90	55 72	21 66	13 06	
RUNOFF (MM)	18 4	12 8	11 5	12 7	17 5	67 6	120 6	138.5	142 3	149 2	56 1	35 0	
MILLION M3	11,892	8,268	7 411	8,201	11,331	43 673	77,881	89,502	91,921	96,405	36,262	22,594	
MAXIMUM	5,000	3,860	2,980	3,500	8,400	26,500	38,400	40,400	50,800	54,100	18,200	11,600	
MINIMUM	3 900	3,000	2 650	2,900	3,100	8,520	20,400	27,800	27,900	19,400	11,200	5,670	

MAXIMUM 54,100 MINIMUM 2,650 MEAN 16 024 ANNUAL RUNOFF 505,341 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1939 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5,560	3,680	2,750	2,430	3 200	9,060	18,200	40,220	63,130	47,250	18,500	8,250	1
2	5 470	3,600	2,750	2,470	3 240	9,630	18,100	39,250	65,230	45,000	17,800	8,350	2
3	5,380	3,600	2,750	2,500	3,260	10,700	18,000	38,450	66,700	43,300	17,200	8,500	3
4	5,380	3,560	2,760	2,550	3,350	11,800	17,800	39,950	66,350	43,050	16,200	8,600	4
5	5,250	3,500	2,760	2,600	3,340	13,300	18,090	41,500	65,020	44,200	16,400	8,500	5
6	5,150	3 440	2,760	2,670	3,320	14,900	18,200	42,560	63,760	44,150	16 400	8,350	6
7	5 100	3,340	2 760	2 720	3,350	16,000	18,500	42,260	62,710	44,400	16,600	8,200	7
8	5,040	3,310	2 760	2,790	3 400	16 000	18 800	41,450	60 610	44,460	17,000	8,050	8
9	4,960	3,280	2,740	2 790	3 500	14 800	18,900	41,050	57,910	44,460	17,000	7,900	9
10	4,850	3,240	2,700	2,720	3 600	13,900	18,700	39 400	54,680	46,100	16,500	7,750	10
11	4,750	3,180	2,650	2,670	3,600	13,300	18,500	38,150	51,040	43,780	16,000	7,600	11
12	4,690	3,150	2,630	2,560	3,600	13,300	19 000	36,620	47,150	41,200	15,500	7,450	12
13	4,560	3,110	2 600	2,500	3,750	13,300	18 400	35,600	43,840	37,550	14,500	7,300	13
14	4,530	3,080	2,570	2,420	4 130	13 600	19 100	34,150	41,400	35,520	13,000	7,150	14
15	4,530	3,020	2 540	2,380	4,530	14,300	20,400	33,050	40,340	33,300	12 200	7,000	15
16	4,500	2,950	2,530	2,300	4 800	14 800	21,800	32,680	40 000	32,180	12,000	6,850	16
17	4,500	2,950	2,520	2 250	5,120	15,700	25 600	33,540	37,600	29 700	11,500	6,700	17
18	4,460	2 940	2,500	2 200	5,560	16 400	31,000	37,250	36,550	29,620	10,800	6,600	18
19	4,430	2,910	2,480	2 200	5,470	17 100	34,400	41,400	35,800	28 980	10,200	6,500	19
20	4,400	2 900	2,450	2 250	5,170	17 200	32,000	46 700	34,800	27 440	9,600	6,300	20
21	4,370	2 880	2,420	2,350	5 040	17,500	30 600	49,720	30,680	25,600	9,300	6,300	21
22	4,340	2 840	2 420	2,480	4 880	18 700	29,900	61 240	34,800	24,500	9 100	5,160	22
23	4 260	2 800	2 410	2,580	4 860	18 900	30 400	54,640	37,100	23,040	8,800	6,020	23
24	4 180	2 780	2 400	2,700	4 780	19 800	32,000	56,610	39,000	22,540	8,700	5,880	24
25	4,110	2,750	2 400	2 800	4 820	20 600	34,900	58,400	39 200	22,180	8,500	5,740	25
26	4 050	2,730	2 400	2 920	4,860	21,400	38,800	60 190	39 200	21,600	8,400	5,600	26
27	3 950	2 720	2,400	3,040	4 960	21,900	41,200	61,590	39,000	21,860	8,300	5,460	27
28	3,890	2 720	2 400	3 100	5,610	21,300	42,100	62,010	39,960	21,750	8,200	5,320	28
29	3 840		2,420	3 200	6,480	20,100	41,300	55 060	43,000	21,280	8,100	5,180	29
30	3,730		2,420	3 200	7 050	19,100	40 800	61,530	46,400	20,990	8 000	5,040	30
31	3 710		2,440		7,990		39,800	61,240		20,290		4,900	31
TOTAL	141 920	86 960	79,490	78,360	140,640	478,390	825,200	1,417,520	1,422,960	1,031,270	380,300	212,500	
MEAN	4,580	3 110	2,560	2,610	4,540	15,950	26 620	45,730	47,430	33,270	12 680	6,860	
L/S/KM2	7 09	4 81	3 97	4 04	7 02	24 68	41 21	70 78	73 42	51 49	19 62	10 61	
RUNOFF (MM)	19 0	11 6	10 6	10 5	18 8	64 0	110 4	190 1	190 3	137 9	50 9	28 4	
MILLION M3	12 262	7,513	6 868	6 770	12,151	41,333	71,297	122,774	122 944	89,102	32,858	18,360	
MAXIMUM	5,560	3 680	2 760	3 200	7,990	21,900	42,100	62,010	66,700	47,250	18,500	8,600	
MINIMUM	3,710	2,720	2 400	2 200	3 200	9 060	17,800	32,680	30,680	20,290	8,000	4,900	

MAXIMUM 66,700 MINIMUM 2 200 MEAN 17 247 ANNUAL RUNOFF 543,932 MILLION M3

Year 1940 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,800	3 360	2 600	2,350	2 000	7 930	29,500	34,000	72,400	33,000	12,600	5,960	1
2	4 730	3,320	2 580	2,330	2 020	8,290	31,900	33,000	73,600	32 200	11,800	5 920	2
3	4 650	3 280	2,550	2,330	2 000	8,530	30,600	31,500	73,500	30,000	11,400	5,880	3
4	4 580	3 240	2,540	2,310	1,980	8,710	30 000	32,500	73,000	30,100	11,000	5 840	4
5	4 500	3 200	2 500	2,310	2,150	9,310	28 200	32,700	71,000	30,100	10,800	5,800	5
6	4 460	3 180	2 480	2,300	2,470	9 610	26,500	33,400	68,000	28,600	10,400	5,830	6
7	4 420	3 160	2 460	2,260	2,700	9,960	26,600	34,400	67,000	27,000	10,000	5,850	7
8	4 380	3 140	2 440	2 220	2,770	11,100	27,300	35,300	66,800	25,400	9,600	5,880	8
9	4,340	3 120	2 420	2 170	2 830	11,900	28,400	37,200	67,800	23,900	9,200	5,900	9
10	4,300	3 100	2 400	2 140	2,790	12,300	31,000	40 100	69,400	23,500	8,800	5,730	10
11	4 240	3 080	2,380	2 120	2,660	12,700	34,700	41,400	71 600	22,400	8,400	5,650	11
12	4 180	3 060	2 360	2 100	2,590	13,300	39,600	43 000	72,300	21,800	8,000	5,520	12
13	4 120	3 040	2 340	2,080	2,570	13,300	45 000	44,900	72,300	20,400	7,800	5,390	13
14	4 060	3 020	2,320	2 110	2,470	13 100	48,400	45,200	72,000	20,600	7,700	5,260	14
15	4 000	3 000	2 300	2 190	2 120	12 900	50 800	46,100	71,700	20,000	7,600	5,130	15
16	3 960	2 980	2 250	2 270	2,350	12 000	49,300	49,400	71,300	19,400	7,500	5,000	16
17	3 920	2 960	2 240	2,310	2,430	11,700	47,200	51,000	67,300	18,800	7,400	4,950	17
18	3 880	2 940	2 240	2 290	2,490	11,500	44,500	57,100	64,300	18,200	7,300	4,900	18
19	3 840	2 920	2 250	2 290	2,600	11,200	41,700	60 800	59 200	17,600	7,200	4,850	19
20	3 800	2 900	2 250	2,330	2,850	10,800	38 800	62 900	56,000	17 000	7,100	4,800	20
21	3 760	2 860	2 220	2,270	2,880	10,700	36,200	64,000	51,600	16,800	7,000	4,740	21
22	3 720	2 820	2 220	2 190	2,940	11 000	33 000	64 000	48,500	16,600	6,900	4,680	22
23	3 680	2 780	2 200	2 130	3 030	11 000	30,600	62 200	47,600	16,400	6 800	4,620	23
24	3 640	2 740	2 190	2 100	3,430	11 800	28,200	60,300	45,400	16,200	6,700	4,560	24
25	3 600	2 700	2 180	2 080	3 790	12,800	28,700	60,300	42,500	16,000	6,600	4,500	25
26	3 570	2 680	2 180	2 050	4,060	14,900	29,000	61,200	42,600	15,400	6,500	4,440	26
27	3 540	2 660	2 240	1 970	4 270	16 400	29,900	62,400	40,400	14,800	6,400	4,380	27
28	3 500	2,640	2 250	1 950	4 560	18 700	31,300	64,300	38,100	14,200	6,300	4,310	28
29	3 470	2 620	2 [illegible]	1,960	5,960	22,500	32,400	65,300	36,000	13,600	6,100	4,240	29
30	3 430		2 370	1 960	6 460	25,600	33 800	67,800	34,500	13,000	6,000	4,170	30
31	3 400		2 400		7 170		34,200	70,200		12,800		4,100	31
TOTAL	124 460	86 500	72 700	65 470	97,590	175 540	1,077,300	1,547,900	1,807,700	645,800	246,900	158,780	
MEAN	4 020	2 980	2,350	2 180	3 150	12,520	34,750	49,930	60,260	20,830	8,230	5,120	
L/S/KM2	6 21	[illegible]	[illegible]	3 38	4 87	19 38	53 80	77 29	93 28	32,25	12 74	7 93	
RUNOFF (MM)	16 6	11 6	9 7	8 8	13 1	50 2	144 1	207 0	241 8	86 4	33 0	21 2	
MILLION M3	10 751	7 474	6 281	5 657	8,432	32,447	93 079	133 739	156 185	55,797	21,332	13,719	
MAXIMUM	4 800	3 360	2 600	2,350	7 170	25 600	50,800	70,200	73,600	33,000	12,600	5,960	
MINIMUM	3 400	2 620	2 180	1 950	1 980	7 930	26,500	31,500	34,500	12,800	6,000	4,100	

MAXIMUM 73 600 MINIMUM 1 950 MEAN 17,231 ANNUAL RUNOFF 544,895 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1941

UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4 000	3,280	2 730	2 260	2,540	6,290	25,400	35,200	43,500	39 100	27 600	10,500	1
2	3 980	3 250	2,720	2 230	2,550	6,400	27,400	32 600	43,700	39,600	26 400	10,200	2
3	3,970	3,230	2,710	2,230	2,510	7,200	28 000	32,600	43,200	37,600	25,200	10,000	3
4	3,960	3,200	2,700	2,210	2,450	9,360	28,100	31,200	42,200	35,200	24,200	9 700	4
5	3 950	3,180	2,680	2,180	2,410	10,900	28,100	31,800	41,400	37,400	23,200	9 400	5
6	3 940	3,150	2,660	2,160	2,450	11,000	32,400	31,700	41 400	36,600	22,100	9,220	6
7	3 930	3 130	2,640	2 160	2 470	11,100	33,200	32 000	42,600	34,700	21,200	9,040	7
8	3 920	3 100	2,620	2,130	2,510	10,500	32,400	34,400	42,800	33,600	20,200	8 860	8
9	3 910	3,100	2 600	2 120	2,510	10 000	31 800	36,300	43 900	32 400	19,500	8,680	9
10	3 900	3,100	2,580	2 100	2 490	9,800	32,000	38,200	44,100	30,800	18 800	8,500	10
11	3 860	3 100	2,550	2,070	2,470	11,000	34,600	41,200	43,500	29,300	18,300	8,300	11
12	3 850	3,080	2,530	2,060	2,460	13,700	33,400	45,100	42,300	29,000	17,500	8,100	12
13	3 820	3,060	2,500	2 040	2,450	15,400	31,400	49,100	42 000	25 400	17,100	7,900	13
14	3 790	3 040	2,480	2 040	2,520	15 800	29 100	54,000	41,400	28,200	16,600	7 700	14
15	3,760	3 010	2,450	2 050	2,630	15,600	27,100	54,100	41,400	29,000	16,300	7,500	15
16	3 730	2 980	2 430	2,090	2 710	16 200	25,300	54,700	40,000	33,800	15 600	7,400	16
17	3 700	2 950	2 400	2,110	2 810	16 900	23,500	57,300	39 500	34 200	15,500	7,300	17
18	3 680	2 920	2,360	2 120	2,980	17,200	22,900	60,300	38,600	32,000	15 100	7,200	18
19	3,560	2 890	2,330	2 100	2,980	17 000	21,800	59,600	37 800	29,200	14,800	7,100	19
20	3 620	2,860	2,320	2 130	2,940	16 100	21 200	57,600	35,200	28,100	14,600	7,000	20
21	3 590	2 830	2,370	2 230	3,090	15,300	20 400	54,900	32,800	27,400	14,300	6 840	21
22	3,560	2,800	2,360	2,300	3,510	14,700	19,400	54 000	33,800	27,200	13,900	6,680	22
23	3 530	2,790	2,320	2,450	3 870	14,600	18,000	50,000	34,400	26 800	13,600	6,520	23
24	3 500	2,780	2,310	2,540	4 700	15,300	19 700	45 200	34,800	26,000	13,200	6,360	24
25	3,480	2,770	2,310	2,570	4,940	15,600	22 600	44,400	34,400	26,200	13,000	6,200	25
26	3,450	2 760	2 260	2,570	5,670	16,700	22 900	45 100	34,800	28,000	12,700	6 050	26
27	3 420	2,750	2,310	2,530	6 100	17,200	22 100	45,000	33,700	29,000	12,300	5 900	27
28	3,390	2,740	2,320	2,510	6 520	18,400	24 000	44 400	33 400	29,400	11 800	5 750	28
29	3,360		2,310	2 480	6,580	21,200	29 600	43 800	35,900	29,800	11,300	5 600	29
30	3,310		2,300	2,510	6 580	23,300	34 900	43 400	39,000	29,600	10 800	5,450	30
31	3,330		2 280		6,440		38 000	43,500		28,600		5,300	31
TOTAL	114,880	83 830	76 440	67 280	109 840	419 750	840,700	1,382 700	1 177,500	963 200	516 700	236 250	
MEAN	3 710	2 990	2 470	2,240	3,540	13 990	27,120	44,600	39 250	31 070	17,220	7 620	
L/S/KM2	5 74	4 63	3 82	3 47	5 48	21 66	41 98	69 05	60 76	48 10	26 66	11 80	
RUNOFF (MM)	15 4	11 2	10 2	9 0	14 7	56 1	112 4	184 9	157 5	128 8	69 1	31 6	
MILLION M3	9 926	7,243	6 604	5 813	9 490	36,266	72 636	119 465	101 736	83 220	44 641	20 412	
MAXIMUM	4 000	3,280	2 730	2 570	6.580	23.300	38 000	60,300	44 100	39,600	27 600	10 500	
MINIMUM	3.330	2,740	2 260	2,040	2.410	6 290	18,000	31 200	32 800	25 400	10 800	5 300	

MAXIMUM 60,300 MINIMUM 2 040 MEAN 16 408 ANNUAL RUNOFF 517 454 MILLION M3

Year 1942

UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5 200	3,520	2,520	2,420	2 610	5 400	18,700	42,300	50 000	28 000	16 900	9,380	1
2	5,080	3,500	2 470	2,370	2 700	5,520	20 000	44,500	49 200	27,000	16 600	9 080	2
3	4 950	3 470	2,410	2,340	2 740	5,600	23 000	47 000	48,300	26,000	16,300	8,840	3
4	4 830	3 430	2,400	2,340	2,780	5,610	26 200	49,500	44 700	25,300	15 700	8 530	4
5	4 700	3,410	2,360	2,330	2 940	5,900	26 000	52 000	42,000	24,400	16 200	8 120	5
6	4,640	3,340	2,330	2,340	3,340	6,630	24 600	53 100	39 200	24 200	16 400	7 750	6
7	4,580	3,300	2,320	2,370	3 420	6 750	24,300	51 100	39 000	24,000	15 700	7 470	7
8	4,520	3 220	2 280	2,390	3 410	7 010	24 500	49 000	40 600	23,400	15,200	7 190	8
9	4 460	3,210	2,250	2,350	3,500	7,590	25,400	46,500	40 600	23 700	14,600	6,700	9
10	4 400	3 200	2 240	2,350	3 890	8 010	24 900	44 400	39,500	23 700	14,200	6,200	10
11	4,340	3,170	2 230	2,350	4 420	8,070	25 700	42,600	39,000	28,500	13,400	5 800	11
12	4 280	3 160	2 200	2,330	4,700	8 070	26 400	41 100	39,100	26 100	13,400	5 600	12
13	4 220	3 150	2 180	2,330	4,370	8 240	29 200	39 100	40,400	23 900	13,700	5,300	13
14	4 160	3 120	2 160	2,280	4 290	8 580	31,300	39,000	41,500	22 600	13,500	5 100	14
15	4 100	3 110	2 160	2 260	4,400	9 910	34 000	38 100	41,700	21,700	12 900	5,000	15
16	4 060	3 050	2,150	2 220	4 600	10 700	34,300	37,700	41,700	21,000	12 600	4,900	16
17	4,020	2 980	2,170	2 200	4,220	11 600	32 500	37,300	42,600	22,200	12 400	4.800	17
18	3 980	2 930	2 210	2 160	4 110	14 600	31 800	37,900	41,000	22,700	12 200	4 750	18
19	3 940	2 910	2 240	2 130	4 270	15 700	30 000	38,200	37 400	21 800	12 000	4 700	19
20	3 900	2 840	2,270	2 110	4 510	16,300	29,100	38,300	37,700	20 800	12 000	4,650	20
21	3,880	2 790	2 290	2 100	4,530	16 500	28,300	38,300	37 400	19,900	12,200	4 600	21
22	3 860	2 760	2 290	2 130	4 380	16,300	27,300	38,000	39,100	20,100	12 700	4,550	22
23	3 840	2 710	2 280	2 140	4 500	17 300	26,500	37 400	41,700	19,500	12,800	4,500	23
24	3 820	2 700	2 250	2 140	4 480	17 000	26 400	37,200	41,000	19,300	12,600	4,550	24
25	3 800	2 660	2 220	2 170	4 540	17,500	28,600	37,700	38,500	18,800	12,100	4 600	25
26	3 780	2 640	2 200	2 300	4 860	17 800	31,900	38 200	36,500	18 200	11,800	4 700	26
27	3 750	2 590	2 200	2 370	4 740	18 000	37,400	39 000	34,500	17,600	11 200	4 800	27
28	3 700	2 550	2 200	2,390	4,720	18 000	38,500	38 800	31,900	17,400	10 600	4,900	28
29	3 650		2 210	2,330	4 640	17 800	38,800	40 800	29 800	16,700	10 200	4 990	29
30	3 600		2 270	2,390	4 960	18,000	38,700	44 100	29,100	16,700	9,750	4 880	30
31	3 550		2 340		5 140		40 000	49,000		17,400		4 750	31
TOTAL	129 590	85 410	70 300	68,310	126 710	349 980	904,600	1,307 200	1,194 700	682,600	401,850	181 680	
MEAN	4 180	3 050	2 270	2 280	4 090	11 670	29,180	42 170	39 820	22 020	13,400	5,860	
L/S KM2	6 47	4 72	3 51	3 53	6 33	18 06	45 17	65 28	61 65	34 09	20 74	9 07	
RUNOFF (MM)	17 3	11 4	9 4	9 1	16 9	46 8	121 0	174 2	159 8	91 3	53 7	24 3	
MILLION M3	11 197	7 379	6 074	5 904	10,948	30,238	78,157	112 942	103,222	58 977	34 720	15 697	
MAXIMUM	5 200	3,520	2,520	2 420	5,140	18 000	40,000	53 100	50,000	28,500	16 900	9,380	
MINIMUM	3 550	2,550	2 150	2,100	2,610	5 400	18 700	37,200	29 100	16 700	9,750	4,500	

MAXIMUM 53 100 MINIMUM 2 100 MEAN 15,077 ANNUAL RUNOFF 475 455 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1943 UNIT c m s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,580	3,080	2,400	2,530	3,170	4,690	18,600	36,700	38,500	46,600	14,500	7,350	1
2	4,580	3,050	2,450	2,590	3,160	5,540	16,900	36,300	38,000	44,700	16,000	7,000	2
3	4,560	3,040	2,500	2,720	3,160	6,480	15,400	36,500	37,600	42,300	15,200	6,800	3
4	4,500	3,030	2,500	2,730	3,180	7,190	13,800	37,200	37,000	40,600	14,200	6,600	4
5	4,340	2,990	2,450	2,660	3,380	8,010	13,100	37,600	37,400	40,000	15,200	6,400	5
6	4,270	2,940	2,400	2,630	3,650	9,080	13,300	37,200	41,700	39,800	15,500	6,300	6
7	4,210	2,900	2,350	2,550	4,000	9,500	14,300	36,000	45,000	38,600	16,500	6,300	7
8	4,110	2,880	2,300	2,470	3,970	9,430	15,200	35,500	45,500	36,000	17,300	6,200	8
9	4,050	2,820	2,300	2,450	3,660	9,840	16,300	34,000	44,000	35,500	17,000	6,000	9
10	3,980	2,770	2,350	2,450	3,740	11,000	17,900	32,400	44,000	34,200	16,500	5,800	10
11	3,920	2,760	2,350	2,460	3,970	13,500	20,000	31,500	43,000	32,500	14,800	5,500	11
12	3,870	2,720	2,400	2,410	3,910	18,200	22,000	30,600	42,400	30,000	13,800	5,430	12
13	3,840	2,650	2,400	2,390	3,080	23,000	24,000	31,200	39,500	27,500	13,000	5,350	13
14	3,810	2,660	2,400	2,320	2,910	24,300	24,700	31,900	39,100	25,600	12,600	5,280	14
15	3,790	2,610	2,400	2,350	2,840	24,100	24,700	32,500	40,700	24,000	11,800	5,200	15
16	3,760	2,590	2,400	2,340	2,820	22,900	26,100	34,000	42,100	23,800	11,800	5,100	16
17	3,710	2,550	2,400	2,310	2,790	20,800	26,000	34,500	41,500	21,700	11,600	5,000	17
18	3,660	2,530	2,400	2,350	2,830	19,200	26,200	35,600	39,200	20,300	11,600	4,900	18
19	3,600	2,520	2,400	2,420	2,830	17,800	25,900	36,500	43,100	19,600	11,300	4,800	19
20	3,590	2,520	2,400	2,510	2,870	17,000	26,800	37,000	49,500	18,600	11,200	4,700	20
21	3,540	2,490	2,400	3,020	2,950	16,200	29,600	39,500	48,300	18,600	10,800	4 650	21
22	3,470	2,470	2,400	3,650	2,960	15,500	30,900	40,000	50,200	17,200	10,300	4,600	22
23	3,420	2,450	2,400	3,970	3,000	16,000	30,300	38,500	50,800	16,500	9,930	4,550	23
24	3,340	2,420	2,400	3,790	3,220	16,700	31,000	37,600	52 100	16,200	9,660	4,500	24
25	3,310	2,390	2,400	3,570	3,470	17,200	32,500	37,100	54,000	15,400	9,500	4,430	25
26	3,310	2,350	2,400	3,250	3,660	16,700	32,900	37,100	53,500	14,800	9,130	4,350	26
27	3,300	2,350	2,400	3,210	3,600	16,300	32,600	35,600	51,500	14,600	8,770	4,280	27
28	3,260	2,340	2,410	3,210	3,500	16,600	33,200	35,300	50,500	14,300	8,410	4,210	28
29	4,080		2,430	3,180	3,630	16,700	35,200	34,600	49,200	14,000	8,050	4,140	29
30	3,160		2,430	3,180	3,790	16,100	36,000	34,500	47,700	14,300	7,700	4,070	30
31	3,030		2,410		4,110		36,500	36,400		14,000		4,000	31
TOTAL	117,950	74,870	74,430	83,670	104,010	445,560	761,900	1,100,900	1,336,600	811,800	373,650	163,790	
MEAN	3,810	2,670	2,400	2,790	3,360	14,850	24,580	35,510	44,550	26,190	12,460	5,280	
L/S/KM2	5 89	4 14	3 72	4.32	5 19	22 99	38 05	54 97	68 97	40 54	19 28	8 18	
RUNOFF (MM)	15.8	10 0	10 0	11 2	13 9	59 6	101 9	147 2	178 8	108 6	50 0	21 9	
MILLION M3	10,191	6,469	6,431	7,229	8,986	38,496	65,828	95,118	115,482	70,140	32,283	14,151	
MAXIMUM	4,580	3,080	2,500	3,970	4,110	24,300	36,500	40,000	54,000	46,600	17,300	7,350	
MINIMUM	3,030	2,340	2,300	2,310	2,790	4,690	13,100	30,600	37,000	14,000	7,700	4,000	

MAXIMUM 54,000 MINIMUM 2,300 MEAN 14,929 ANNUAL RUNOFF 470,604 MILLION M3

Year 1944 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,950	3,540	2,640	2,120	2,380	5,780	11,300	35,000	39,500	29,600	18,300	9,610	1
2	3,930	3 470	2,570	2,130	2,350	5,420	12,200	34,500	37,600	36,800	17,800	9,520	2
3	3,910	3,410	2,530	2,130	2,250	5,200	12,700	34,600	36,200	40,500	17,700	9,270	3
4	3,890	3,370	2,610	2,110	2,170	5,700	13,200	34,300	36,000	41 600	17,200	9 040	4
5	3,870	3,310	2,540	2,090	2,150	6,670	13,200	33,200	36,000	40,500	17,000	8,840	5
6	3,850	3,280	2,470	2,060	2,150	7,530	14,000	32,400	35,700	37,500	16,500	8,640	6
7	3,830	3,250	2,420	2 030	2,180	8,050	15,700	32,000	34,200	32,500	16,300	8,450	7
8	3,800	3,180	2,450	2 020	2,200	8,230	15,700	32,400	32,500	32,000	15,800	8,380	8
9	3,780	3,120	2,450	2 030	2,210	8,160	15,700	32,900	32,000	29,500	15,400	8,230	9
10	3,750	3,080	2,370	2,050	2,240	8,050	15,500	34,300	31,000	27,500	15,100	7,990	10
11	3,740	3,030	2,350	2,050	2,300	8,030	14,900	34,500	30,700	26,000	14,700	7,850	11
12	3,730	3,020	2,320	2,030	2,370	8,180	15,100	35,300	29,100	24,200	14,500	7,750	12
13	3,720	2,990	2,300	2,020	2,530	8,200	16,800	34,600	28,400	22,500	14,300	7,590	13
14	3,710	2,960	2,280	2,030	2,480	8,090	17,000	34,000	28,200	21,500	14,200	7,410	14
15	3,700	2,950	2,280	2,040	2,410	8,010	17,100	35,000	28,300	20,900	14,200	7,310	15
16	3,710	2,930	2,300	2,040	2,400	7,950	21,700	37,000	27,000	19,600	14,000	7,310	16
17	3,720	2,930	2,300	2,040	2,780	7,830	25,800	40,600	28,700	18,800	14,100	7,390	17
18	3,730	2,910	2,280	2,020	3,200	7,890	27,600	45,000	28,700	18,600	13,800	7,290	18
19	3,740	2 890	2,280	2,040	4,240	8,050	27,500	47,100	29,200	17,900	13,500	6,960	19
20	3,750	2,890	2,290	2,050	5,040	8,140	27,700	47,600	28,700	17,500	13,400	6 670	20
21	3,800	2,910	2,250	2 040	5,010	8,620	26,200	46,500	26,000	17,200	13,200	6 480	21
22	3,850	2,900	2,230	2,020	4,800	9,000	25,800	45,200	26,00C	16,900	13,100	6,310	22
23	3,920	2,890	2,200	2 010	4,610	9,040	25,000	44,000	24,200	20,200	12,700	6,200	23
24	3,970	2,850	2,180	2 000	4,620	8,950	25,000	43,500	23,200	22,800	12,100	6,060	24
25	4,000	2 810	2,170	1,990	4,320	9,110	25,400	43,000	21,900	21,600	11,900	5,960	25
26	4,020	2,760	2,150	2,000	4,370	9,330	26,300	43,500	22,200	21,300	11,500	5,870	26
27	4,020	2,720	2,140	2,120	4,880	9,840	29,200	45,000	21,900	21,600	11,000	5,780	27
28	3,920	2,690	2,120	2,170	5,290	10,400	32,300	45,300	22,000	20,800	10,700	5,700	28
29	3,840	2,640	2,110	2,230	5,560	10,400	33,100	45,200	23,000	20,400	10,400	5,610	29
30	3,710		2,120	2,270	5,850	10,500	33,500	43,700	24,000	19,900	10,100	5,510	30
31	3,660		2,120		6,010		35,000	42,300		19,000		5,380	31
TOTAL	118,520	87,680	71,820	61,980	107,350	244,350	667,200	1,213,500	872,100	777,200	424,500	226,360	
MEAN	3,820	3,020	2,320	2,070	3,460	8,150	21,520	39,150	29 070	25,070	14,150	7,300	
L/S/KM2	5 92	4.68	3.59	3 20	5 36	12 61	33 32	60 60	45.00	38 81	21 90	11.30	
RUNOFF (MM)	15 9	11 7	9 6	8.3	14 4	32 7	89 2	162.3	116.6	103 9	56 8	30 3	
MILLION M3	10,240	7,576	6,205	5,355	9,275	21,112	57,646	104 846	75,349	67,150	36,677	19,558	
MAXIMUM	4,020	3,540	2,640	2,270	6,010	10,500	35,000	47,600	39,500	41,600	18,300	9,610	
MINIMUM	3,660	2,640	2,110	1,990	2,150	5,200	11,300	32,000	21,900	16,900	10,100	5,380	

MAXIMUM 47,600 MINIMUM 1,990 MEAN 13,313 ANNUAL RUNOFF 420,989 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1945 UNIT c.m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5,280	3,380	2,570	2,200	2,200	4,880	24 000	20,800	40,800	34,700	12,100	8,710	1
2	5,180	3,340	2,580	2,200	2,250	4,880	25,200	21,400	41,800	32,300	12,300	8,070	2
3	5,070	3,340	2,580	2,200	2,350	5,040	26,500	21,600	41,800	30,800	12,500	7,650	3
4	4,980	3,300	2,550	2,200	2,350	5,200	27,900	20,300	42,500	29,500	12,600	7,150	4
5	4,900	3,280	2,650	2,200	2,470	5,200	29,600	19,600	42,000	28,600	13,100	6,800	5
6	4,820	3,330	2,730	2,200	2,470	5,200	30,000	19,300	42,900	27,000	11,500	6,670	6
7	4,780	3,290	2,880	2,200	2,590	5,120	30,600	19,300	42,500	25,500	11,200	6,860	7
8	4,640	3,300	2,910	2,200	2,710	5,040	32,000	20,800	44,500	24,200	10,700	6,670	8
9	4,560	3,350	2,400	2,200	2,950	5,200	33,600	21,000	45 600	23,800	10,300	6,580	9
10	4,500	3,350	2,400	2,200	3,590	6,770	35,600	22,300	46,700	23,200	10,000	6,290	10
11	4,420	3,310	2,400	2,200	3,600	8,600	33,600	24,000	45,400	21,300	9,840	6,100	11
12	4,350	3,210	2,400	2,200	3,920	10,700	30,600	25,800	44,500	20,300	9,730	5,970	12
13	4 290	3,150	2,400	2,200	4,160	14,400	29,200	28,200	42,300	19,400	10,400	5,830	13
14	4,220	3,070	2,400	2,200	4,720	18,300	29,000	30,000	41,500	18,400	11,300	5,740	14
15	4,160	3,020	2,400	2,200	5,700	19,800	27,800	32,000	42,200	17,800	11,400	5,650	15
16	4,080	2,950	2,400	2,200	5,740	22,300	27,400	33,800	42,300	17,100	10,900	5,580	16
17	4,000	2,850	2,400	2,200	5,740	24,500	27,500	34,000	43,100	16,500	10,300	5,580	17
18	3,920	2,830	2,400	2,200	5,740	26,400	28,000	35,800	44,000	16,000	9,840	5,600	18
19	3,920	2,810	2,400	2,200	6,290	26,600	28,200	35,800	47,000	15,500	9,700	5,560	19
20	3,920	2,770	2,400	2,200	6,960	26,800	29,000	36,800	48,000	15,200	9,860	5,810	20
21	3,870	2,770	2,400	2,200	7,650	26,800	29,200	37,200	48,500	14,700	11,000	6,060	21
22	3,790	2,710	2,400	2,200	8,490	26,400	30,200	38 800	48,000	14,400	11,000	5,960	22
23	3,730	2,720	2,400	2,200	7,650	26,200	31,100	40,000	47,600	13,800	9,890	5,850	23
24	3,700	2,710	2,400	2,200	7,050	27,600	26 200	40,900	46,600	13,500	9,150	5,700	24
25	3,680	2,710	2,400	2,200	6,860	28 600	24,800	40,900	44,000	13,200	8,620	5,510	25
26	3,650	2,660	2,400	2,200	6,290	27,800	24,400	39,400	44,000	12,800	8,710	5,360	26
27	3,590	2,630	2,400	2,200	5,560	27,600	23,600	40,000	45,500	12,400	8,800	5,270	27
28	3,620	2,580	2,400	2,200	5,040	26,200	23,300	38,000	43,500	12,000	8,800	5,200	28
29	3,540		2,400	2,200	4,880	25,700	25,000	38,400	39,600	11,800	9,000	5,140	29
30	3,510		2,400	2,200	5,040	24,200	24 400	38,400	36,800	11,700	8,820	5,060	30
31	3,470		2,400		4,640		22,500	39,400		11,900		5,010	31
TOTAL	130,140	84,720	76,650	66,000	147,650	518,230	870,000	954,000	1,315,500	599,300	313,360	188,990	
MEAN	4,200	3,030	2,470	2,200	4,760	17,270	28,070	30,770	43,850	19,330	10,450	6,100	
L/S/KM2	6.50	4 68	3 83	3 41	7 37	26 74	43 44	47 64	67 88	29 93	16 17	9 44	
RUNOFF (MM)	17 4	11.3	10.3	8 8	19 7	69.3	116 4	127 6	175 9	80 2	41 9	25 3	
MILLION M3	11,244	7,320	6,623	5,702	12,757	44,775	75,168	82,426	113,659	51,780	27,074	16,329	
MAXIMUM	5,280	3,380	2,910	2,200	8,490	28 800	35,600	40,900	48,500	34,700	13,100	8,710	
MINIMUM	3,470	2,580	2,400	2,200	2,200	4,880	22,500	19,300	36,800	11,700	8,620	5,010	

MAXIMUM 48,500 MINIMUM 2,200 MEAN 14,423 ANNUAL RUNOFF 454,857 MILLION M3

Year 1946 UNIT c.m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,960	3,090	2,470	1,750	2,060	6,500	23 000	28,200	47,200	40,700	16,600	8,950	1
2	4,880	3,050	2,410	1,740	2,150	6,670	25,200	28,200	47,500	39 800	17,600	8,380	2
3	4,830	3,020	2,390	1,620	2,530	7,050	25,600	27,800	47,000	38,000	16,800	8,010	3
4	4,820	2,980	2,360	1,630	2,720	7,910	25,900	26,400	45,500	38,600	16,200	7,830	4
5	4,800	2,930	2,330	1,670	2,700	8,580	24,600	29 600	44,100	39,000	15,600	7,750	5
6	4,740	2,890	2,290	1,690	2,590	8,510	24,000	32,200	42,700	37,500	15,300	7,450	6
7	4,640	2,830	2,270	1,710	2,580	8,640	22,500	31,200	42,500	36,000	15,200	7,230	7
8	4,560	2,780	2,250	1,770	2,530	8,930	20,800	29,000	44,700	34,500	14,800	7,010	8
9	4,450	2,770	2,220	1,770	2,570	9,500	20,500	28,000	46,100	33,000	14,400	6,860	9
10	4,560	2,730	2,200	1,770	2,640	11,300	19,700	28,200	46,200	31,400	13,800	6,520	10
11	4,500	2,710	2,170	1,750	2,730	13,500	18,500	29,500	46,100	29,300	13,300	6,590	11
12	4,320	2,660	2,150	1,770	2,830	14,900	18,000	28,400	47,900	27,500	13,100	6,460	12
13	4,160	2,610	2,140	1 780	2,910	16,400	17,300	29,000	49,200	27,000	12,600	6,290	13
14	4,080	2,590	2,130	1,790	3 070	16,000	16,700	30,600	50,300	26,600	12,100	6,200	14
15	4 050	2,590	2,100	1,800	3,160	16,900	17,500	31,500	50,900	25,000	11,600	6,050	15
16	3,980	2,590	2,070	1,850	3,430	18,000	19,800	32,900	52,400	23,400	11,400	5,850	16
17	3,920	2,570	2,050	1,950	4,050	17,400	22,600	33,400	51,500	22,500	11,200	5,740	17
18	3,860	2,550	2,020	2,020	5,360	17,400	25,400	33,400	50,200	21,700	10,900	5,690	18
19	3,700	2,540	1,960	2,060	5,760	17,600	27,200	32,800	48,900	20,700	11,000	5,520	19
20	3,630	2,530	1,960	2,040	6,100	18,500	27,800	36,200	48,400	20,000	10,700	5,450	20
21	3,540	2,520	1,950	2,080	6,560	19 400	27,000	39,000	48,000	19,000	10,300	5,340	21
22	3,480	2,510	1,950	2,100	6,960	19,600	26,800	41,200	46,800	18,400	10,100	5,240	22
23	3,430	2,550	1,940	2,140	7,050	19,800	27,000	44,500	46,000	18,200	9,860	5,180	23
24	3,430	2,550	1,920	2,140	6,880	20,500	26,000	45,500	46,000	18,000	9,680	5,120	24
25	3,420	2,530	1,920	2,100	6,730	22,000	25,800	47,500	45,500	17,600	9,520	5,040	25
26	3,350	2,520	1,950	2,070	6,780	21,800	26,000	49,400	44,500	17,600	9,150	4,990	26
27	3,310	2,480	1,850	2,040	6,710	20,800	25,400	50,000	42,700	17,200	9,200	4,960	27
28	3,280	2,470	1,830	2,020	7,350	23,300	24,500	49,100	42,200	17,000	9,040	4,900	28
29	3,210		1,810	2,000	7,650	22,800	23,800	48,600	42,500	16,300	8,930	4,860	29
30	3,180		1,810	2,020	7,270	21,400	23,800	47,300	42,500	15,900	8,840	4,800	30
31	3,150		1,790		6,670		26,600	47,000		15,600		4,720	31
TOTAL	124,220	75,140	64,660	56,640	141,080	461,590	725,300	1,115,600	1,396,000	803,000	368,820	190,980	
MEAN	4,010	2,680	2,090	1,890	4,550	15,390	23,400	35,990	46,530	25,900	12,290	6,160	
L/S/KM2	6 20	4 15	3 23	2 92	7 04	23 82	36 22	55 71	72 03	40 10	19 03	9.54	
RUNOFF (MM)	16 6	10 0	8 6	7 6	18 9	61 7	97 0	149 2	186 7	107 4	49.3	25.5	
MILLION M3	10,733	6,492	5,587	4,894	12,189	39,881	62,666	96,388	120,614	69,379	31,866	16,501	
MAXIMUM	4,960	3,090	2,470	2,140	7,650	23,300	27,800	50,000	52,400	40,700	17,600	8,950	
MINIMUM	3,150	2,470	1,790	1,620	2,060	6,500	16,700	26,400	42,200	15,600	8,840	4,720	

MAXIMUM 52,400 MINIMUM 1,620 MEAN 15,132 ANNUAL RUNOFF 477,190 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1947 UNIT cms

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,670	3,460	2,390	1,880	4,400	7 790	21,200	37,000	46,400	36 600	13 200	6 860	1
2	4,560	3,460	2,370	1,890	5,090	7 650	21,200	36 400	46,500	36,300	13 100	6,770	2
3	4,560	3,430	2,390	1,900	4,850	7 610	21,600	36 200	46,600	35,400	12 800	6 670	3
4	4,530	3,430	2,360	1,890	4,720	7,840	22,300	35 800	47,900	33,000	12 400	6,520	4
5	4,460	3 420	2,360	1 940	4,560	8,050	23,300	34,600	48,900	32,900	12 400	6 420	5
6	4,400	3 420	2,320	1 950	4,370	8,140	24 700	34 000	48,800	31 700	12,400	6,330	6
7	4,370	3,380	2,300	1 990	4 220	8,270	25 400	33,300	48,300	30 100	12 400	6 230	7
8	4,340	3,340	2 270	2 040	4,160	8,600	27 000	32,800	46 700	29,300	12,300	6 100	8
9	4,240	3 280	2,260	2,060	4,290	9,270	28 200	33,400	46,000	28,600	12,700	5 740	9
10	4 190	3 210	2,250	2 060	4 430	9,840	29 600	35,400	47,400	28 400	13,100	5 560	10
11	4 110	3 160	2,230	2,050	4,560	10,100	30 700	35,700	46,300	27 400	12 700	5 470	11
12	4 050	3 110	2,230	2,030	4,240	10,500	31 000	35 600	46 200	25,500	12,500	5,650	12
13	4 000	3,080	2,220	2,060	4,160	10,900	31 800	35 000	46,000	25 100	12 000	5 580	13
14	3,920	3,020	2,210	2,100	4,480	11,400	34,000	33,300	45,200	23 400	11,400	5,520	14
15	3,870	3 000	2,200	2 110	4,640	11,500	36 200	33,300	45,200	22,200	11 000	5 420	15
16	3 820	2,950	2 170	2,070	9,150	11 600	37,900	33 800	41 400	21,600	10 500	5,310	16
17	3 740	2,930	2 150	2 040	9,450	11,700	38,400	35,000	41,800	21,100	10,300	5 240	17
18	3 700	2 830	2,130	1 980	8 890	12,000	38 000	36,200	43 000	20 200	9 860	5 150	18
19	3 630	2,830	2,090	1 940	8,310	12,300	36 000	37,800	47,200	19 600	9 730	5 040	19
20	3,600	2,730	2 040	2,070	8 270	12 400	36,300	39,800	47 500	19 000	9,500	4 930	20
21	3,550	2,700	2 020	2,390	7,850	12 400	37 200	39 200	46 500	18,200	9 130	4 820	21
22	3,520	2,650	2 010	2,480	7,810	12,300	38 200	39,400	47,300	17 400	9 080	4 760	22
23	3 500	2,630	1,990	2,540	7,750	12,300	39 000	40,000	46 800	16 600	8 250	4 740	23
24	3,470	2,580	1,960	2,590	7,630	12,400	39 500	38 400	46,800	16,200	7 950	4 720	24
25	3 460	2,540	1 930	2,600	7,850	12,500	39 500	40,500	46 800	15 600	7 770	4 740	25
26	3,440	2,470	1 900	2,710	8 050	14,700	39,400	42 700	46 800	14,800	7 610	4 740	26
27	3,430	2,430	1,890	2,830	8 230	17,500	39,400	44,400	45 600	14 600	7,350	4 690	27
28	3,410	2,400	1 860	2 950	8,510	18 000	38,400	47 200	43,400	14,200	7 250	4 640	28
29	3,410		1 850	3 200	8,360	19 000	38 200	47 800	42 400	13 800	7 190	4 590	29
30	3,460		1,870	3 500	8,010	20 000	37 400	46 600	40 000	13,600	7 050	4,540	30
31	3,460		1 880		7 750		37 400	44 600		13,400		4 460	31
TOTAL	120,870	83,870	66 100	67 850	199 040	348,550	1,016,400	1 175 200	1,375,700	715 800	314 920	167 970	
MEAN	3,900	3 000	2,130	2,260	6 420	11,620	32 850	37 910	45 860	23 090	10 500	5 420	
L/S/KM2	6 04	4 64	3 30	3 50	9 94	17 99	50 85	58 68	70 99	35 74	16 25	8 39	
RUNOFF (MM)	16 2	11 2	8 8	9 1	26 6	46 6	136 2	157 2	184 0	95 7	42 1	22 5	
MILLION M3	10 443	7,246	5,711	5 862	17,197	30 115	87 990	101 537	118 860	61,845	27 209	14,513	
MAXIMUM	4 670	3,460	2,390	3,500	9,450	20,000	39 500	47 800	48 900	36 600	13,200	6 860	
MINIMUM	3 410	2,400	1 850	1 880	4 160	7 610	21 200	32 800	40 000	13,400	7 050	4 460	

MAXIMUM 48,900 MINIMUM 1 850 MEAN 15 491 ANNUAL RUNOFF 488,528 MILLION M3

Year 1948 UNIT cms

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,320	3,050	2,420	1 820	2,390	6 700	19 100	32 800	51 000	31 400	19 600	8 490	1
2	4 260	3 020	2,390	1,820	2,430	7 000	16 600	32 100	53 200	31 800	19 000	8,670	2
3	4,190	2 980	2,360	1 830	2 490	7 900	16 100	32 100	55,300	32,500	18 200	8 470	3
4	4 140	2 950	2,360	1 850	2 670	8,800	16 200	30 600	56,500	31 700	17 800	8 230	4
5	4 080	2 910	2,310	1 840	2,750	9 900	18 100	29 500	56,500	33 700	17 200	8 340	5
6	4 000	2 880	2 290	1 850	2 710	10 600	19,500	28 000	56 500	33 000	16 600	8 450	6
7	4 010	2,840	2 250	1,830	2,710	11,500	21,500	26 400	57,100	33 400	16 100	8 360	7
8	4 000	2 790	2 220	1 820	3,020	11,800	23,300	26 400	57 000	35 500	15 200	8 270	8
9	3 970	2 770	2 210	1 830	3 240	11 800	25 600	27,900	56,500	34 700	14 700	7 990	9
10	3 950	2,760	2 180	1 870	3 210	11 800	27 000	28,100	55 000	32 100	14,300	7 650	10
11	3 950	2 730	2 170	1 930	3,470	11,800	26,300	28 100	54 500	29 700	14 200	7 570	11
12	3 940	2 720	2 160	2 050	3,300	11 800	26 000	29 200	48 500	28 600	14 000	7 350	12
13	3 900	2 700	2 140	2 150	3,330	11 700	24,600	31,400	47 500	27 000	14 000	7 250	13
14	3 840	2,670	2 120	2,170	3,380	11,900	23 800	34,400	47 000	25 600	13 600	7 030	14
15	3 760	2 650	2 100	2 170	3 290	11,900	22 600	37 000	46 500	25 200	13 000	6 900	15
16	3 680	2 660	2 080	2 160	3,350	11 800	22,100	40,500	46 500	24 200	12 600	6 650	16
17	3,570	2 650	2 050	2 210	4 240	11 800	20 800	43 800	48 000	23 400	12 200	6 580	17
18	3 540	2 640	2 040	2,200	4,560	11,600	20 100	44 600	53 500	23,400	11 900	6 440	18
19	3 470	2 610	2,030	2,300	4 990	11,500	19 400	44 200	54 700	24 400	11 800	6 330	19
20	3 430	2 610	2 030	2 570	5 400	11 400	19 900	43,000	55 600	26 000	11 300	6 200	20
21	3 410	2,590	2 000	2,550	5 700	12,000	21 200	42 700	55 500	26 000	10 800	5 960	21
22	3,340	2,580	1 990	2 470	6 000	13 200	22,300	43 400	53 600	26 100	10 500	5 880	22
23	3 330	2 580	1 960	2 490	6 590	15 500	23 500	43 600	48 800	25 600	10,300	5 690	23
24	3,300	2,570	1 940	2 650	6 670	17 800	24 700	42 900	46 200	24 900	10 200	5 630	24
25	3 290	2,530	1 900	2 630	6 880	18 700	36 100	41 700	44 100	24 200	9 840	5 450	25
26	3 280	2 490	1 880	2,630	7 170	19 100	29 100	39 200	44 500	23 500	9 380	5 420	26
27	3 240	2 470	1 860	2,600	7 170	18,300	32 800	39 400	40 000	22 800	8 930	5,330	27
28	3 210	2 430	1,850	2,360	6 960	18 200	35,000	40 500	35 500	22 400	8 860	5 240	28
29	3 170	2 430	1 850	2 360	6 630	18 300	36 200	43 000	32 000	21 200	8 710	5 150	29
30	3 120		1 840	2 350	6 670	18 200	35 400	47 000	31 400	20 000	8 490	5 060	30
31	3 080		1 830		6 590		34 400	49 300		19 400		5 010	31
TOTAL	113 790	78 250	64 810	65 360	139 960	384 500	759 400	1 143 000	1 488 700	843 700	393 330	211 040	
MEAN	3 670	2 700	2 090	2 180	4 520	12 820	24 490	36 870	49 620	27 220	13 110	6 810	
L/S/KM2	5 68	4 18	3 24	3 37	6 99	19 84	37 92	57 96	76 82	42 11	20 29	10 54	
RUNOFF (MM)	15 2	10 5	8 7	8 7	18 7	51 4	101 6	152 9	199 1	112 8	52 6	28 2	
MILLION M3	9 831	6 761	5 600	5 647	12 093	33 221	65 604	98 755	128 624	72 896	33 982	18 234	
MAXIMUM	4,320	3,050	2 420	2 650	7 170	19 100	36 200	49 300	57 100	35,500	19 600	8 670	
MINIMUM	3 080	2,430	1 830	1,820	2,390	6 700	16 100	26 400	31 400	19 400	8 490	5 010	

MAXIMUM 57 100 MINIMUM 1 820 MEAN 15 535 ANNUAL RUNOFF 491 248 MILLION M3

(to be continued)

A 8 Discharge (Kratie)

Year 1947 UNIT c m s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,670	3,460	2,390	1,880	4,400	7 790	21,200	37 000	46,400	36,600	13,200	6 860	1
2	4,560	3,460	2,370	1,890	5 090	7 650	21,200	36,400	46,500	36,300	13 100	6 770	2
3	4,560	3 430	2,390	1,900	4,850	7,610	21,600	36,200	46,600	35 400	12,800	6 670	3
4	4,530	3 430	2,360	1,890	4,720	7,810	22,300	35 800	47 900	33,000	12,400	6,520	4
5	4,460	3,420	2,360	1,940	4,560	8,050	23,300	34,600	48,900	32,900	12,400	6 420	5
6	4,400	3,420	2,320	1 960	4,370	8,140	24,700	34,000	48 800	31,700	12,400	6 330	6
7	4,370	3,380	2,300	1 990	4,220	8,270	25,400	33,300	48,300	30,100	12,400	6 230	7
8	4,340	3,340	2,270	2,040	4,160	8,600	27,000	32,800	46,700	29,300	12,300	6 100	8
9	4,240	3,280	2,260	2,060	4,290	9,270	28,200	33,400	46,000	28,600	12 700	5 740	9
10	4,190	3,210	2 250	2,060	4,430	9,840	29 600	35,400	47,400	28,400	13,100	5,560	10
11	4,110	3,160	2,230	2,050	4,560	10,100	30,700	35,700	46,300	27,400	12 700	5 470	11
12	4,050	3,110	2 230	2,030	4,240	10,500	31,000	35,600	46,200	25,500	12,500	5,650	12
13	4 000	3,080	2,220	2,060	4,160	10,900	31 800	35,000	46,000	25 100	12 000	5,580	13
14	3,920	3,020	2,210	2,100	4,480	11,400	34,000	33,300	45 200	23,400	11,400	5,520	14
15	3 870	3,000	2 200	2 110	4,640	11,500	36,200	33,300	45,200	22,200	11 000	5 420	15
16	3,820	2,950	2,170	2 070	9,150	11,600	37,900	33,800	41,400	21,600	10,300	5,310	16
17	3,740	2 930	2,150	2,040	9,450	11,700	38 400	35,000	41,800	21,100	10,300	5 240	17
18	3 700	2,830	2 130	1 980	8 890	12,000	38,000	36,200	43,000	20,200	9 860	5 150	18
19	3,630	2,830	2,090	1 940	8,310	12,300	36 000	37,800	47,200	19,600	9 730	5 040	19
20	3,600	2,730	2,040	2 070	8,270	12,400	36,300	39,800	47,500	19,000	9,500	4 910	20
21	3,550	2,700	2,020	2,390	7,850	12,400	37 200	39 200	46,500	18,200	9 130	4 820	21
22	3,520	2,650	2,010	2,480	7,810	12,300	38 200	39,400	47,300	17,400	9 060	4 780	22
23	3,500	2,630	1,990	2,540	7,750	12,300	39,000	40,000	46,800	16,600	8,250	4 740	23
24	3 470	2,580	1,960	2,590	7,630	12,400	39,500	38,400	46,800	16 200	7 950	4 720	24
25	3,460	2,540	1,930	2,600	7 850	12,500	39,500	40,500	46 800	15,600	7 770	4 740	25
26	3 440	2,470	1,900	2,710	8,050	14,700	39,400	42,700	46 800	14,800	7 610	4 740	26
27	3 430	2,430	1,890	2,830	8 230	17,500	39,400	44,400	45,600	14 600	7,350	4 690	27
28	3,410	2,400	1,860	2 950	8,510	18 000	38,400	47 200	43,400	14 200	7,250	4 640	28
29	3,410		1,850	3 200	8,360	19,000	38 200	47,800	42 400	13 800	7 190	4,590	29
30	3,460		1 870	3 500	8 010	20 000	37 400	46,600	40 000	13 600	7 050	4,540	30
31	3 460		1,880		7 750		37 400	44,600		13,400		4 460	31
TOTAL	120,870	83 870	66,100	67,850	199,040	348,550	1 018 400	1 175,200	1,375,700	715 600	314,920	167 970	
MEAN	3 900	3,000	2,130	2,260	6,420	11,620	32 850	37,910	45 860	23,090	10,500	5 420	
L/S/KM2	6 04	4 64	3 30	3 50	9 94	17 99	50 85	58 68	70 99	35 74	16 25	8 39	
RUNOFF (MM)	16 2	11 2	8 8	9 1	26 6	46 6	136 2	157 2	184 0	95 7	42 1	22 5	
MILLION M3	10,443	7,246	5,711	5 862	17,197	30 115	87,990	101,537	118,860	61,845	27,209	14,513	
MAXIMUM	4,670	3,460	2,390	3,500	9,450	20 000	39,500	47,800	48,900	36,600	13 200	6 860	
MINIMUM	3,410	2,400	1 850	1 880	4 160	7,610	21 200	32 800	40,000	13,400	7 050	4,460	

MAXIMUM 48,900 MINIMUM 1,850 MEAN 15 491 ANNUAL RUNOFF 488,528 MILLION M3

Year 1948 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,320	3 050	2,420	1,820	2,390	6,700	19 100	32 800	51 000	31,400	19 600	8,490	1
2	4,260	3 020	2,390	1,820	2 430	7 000	16,600	32 100	53 200	31,800	19 000	8 670	2
3	4 190	2,980	2,360	1,830	2 490	7 900	16,100	32 100	55,300	32,500	18 200	8 470	3
4	4,140	2,950	2,360	1 850	2 670	8,800	16,200	30,600	56 500	33 700	17,800	8 230	4
5	4,080	2,910	2,310	1 840	2,750	9 900	18,100	29 500	56 500	33 700	17 200	8,340	5
6	4 000	2,880	2 290	1 850	2,710	10,800	19 500	28 000	56 500	33 000	16 600	8 450	6
7	4 030	2,840	2 250	1,830	2,710	11,500	21,500	26 400	57,100	33 400	16 100	8,360	7
8	4 000	2 790	2 220	1 820	3,020	11 800	23,300	26 400	57 000	35 500	15 200	8 270	8
9	3 970	2 770	2 210	1 830	3 240	11 800	25,600	27 900	56,500	34 700	14 700	7 990	9
10	3 950	2 760	2 180	1,870	3 210	11 800	27 000	28,100	55 000	32,100	14 300	7,650	10
11	3 950	2 730	2 170	1,930	3,470	11 800	26,300	28,100	54 500	29 700	14 200	7 570	11
12	3 940	2 720	2 160	2 050	3,300	11,800	26 000	29 200	48 500	28 800	14 000	7 350	12
13	3 900	2 700	2 140	2 150	3,330	11,700	24,600	31,400	47 500	27,000	14 000	7 250	13
14	3 840	2,670	2 120	2,170	3,380	11,900	23 800	34,400	47 000	25 800	13 600	7 030	14
15	3 760	2,650	2 100	2 170	3 290	11 900	22,600	37 000	46 500	25 200	13 000	6 900	15
16	3 680	2 660	2 080	2 160	3,350	11,800	22,100	40,500	46,500	24 200	12 600	6 650	16
17	3 570	2 650	2 050	2 210	4,240	11 800	20 800	43,800	48 000	23 400	12 200	6 580	17
18	3,540	2 640	2,040	2 200	4,560	11 600	20 100	44 600	51,500	23,300	11 900	6 440	18
19	3 470	2 610	2,030	2,300	4 990	11,500	19 400	44 200	54 700	24 400	11 800	6,340	19
20	3 430	2 610	2,030	2,570	5,400	11 400	19,900	43,000	55 600	26 000	11,300	6 200	20
21	3 410	2 590	2,000	2,550	5 700	12,000	21 200	42 700	55 500	26 000	10 800	5 960	21
22	3,340	2,580	1 990	2 470	6 000	13 200	22,300	43,400	53 600	26,100	10 500	5 860	22
23	3,330	2 580	1 960	2 490	6 590	15 500	23 500	43,600	48 800	25 600	10,300	5 690	23
24	3,300	2,570	1 940	2 650	6 670	17 800	24 700	42 900	46 200	24 900	10 200	5 640	24
25	3 290	2,530	1,900	2 630	6 880	18 700	26 100	41 700	44 300	24 200	9 840	5 450	25
26	3 280	2 490	1 880	2,640	7 170	19 100	29 100	39 200	44 500	23 500	9 380	5 420	26
27	3 240	2,470	1 860	2 600	7 170	18 300	32 800	39 400	40 000	22 800	8 930	5,330	27
28	3 210	2,430	1,850	2,360	6 960	18 200	35 000	40 300	35 500	22 400	8 860	5 240	28
29	3,170	2,430	1 850	2,360	6 630	18 300	36 200	43 000	32 000	21 200	8 710	5 150	29
30	3 120		1 840	2,350	6 670	18 200	35 400	47 000	31 400	20 000	8 490	5,060	30
31	3,080		1 830		6,590		44 400	49 300		19 400		5 010	31
TOTAL	113 790	78 250	64 810	65,360	139 940	384 500	759 400	1 143 000	1 488 700	843 700	393 310	211 040	
MEAN	3 670	2 700	2 090	2 180	4,520	12 820	24 490	36 870	49 620	27 220	13 110	6 810	
L/S/KM2	5 68	4 18	3 24	3 37	6 99	19 84	37 92	57 98	76 82	42 13	20 29	10 54	
RUNOFF (MM)	15 2	10 5	8 7	8 7	18 7	51 4	101 6	152 9	199 1	112 8	52 6	28 2	
MILLION M3	9 831	6 761	5 600	5 647	12 093	33 221	65 604	98 755	128 624	72 896	33 982	18 214	
MAXIMUM	4 320	3,050	2 420	2,650	7 170	19 100	36 200	49,300	57 100	35,500	19 600	8 670	
MINIMUM	3 080	2 430	1 830	1,820	2,390	6 700	16 100	26,400	31 400	19,400	8 490	5 010	

MAXIMUM 57 100 MINIMUM 1 820 MEAN 15,535 ANNUAL RUNOFF 491 248 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1949 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,930	3,300	2,690	1,970	2,640	4,320	7,600	24,800	34,700	43,500	18 800	11,300	1
2	4,860	3,280	2 610	1,950	2,770	4,220	8,700	27,000	34,000	42,600	18,000	11,000	2
3	4,830	3,220	2,590	1,930	2,960	4,220	10,000	28,600	32,400	42,100	17,600	10 800	3
4	4,740	3,180	2,570	1,930	3,480	4,370	11,600	29,800	32,500	41,400	17 600	10,500	4
5	4,660	3,150	2,540	1,920	3,800	4,460	13,000	30,700	32,800	38,500	18,400	10,300	5
6	4,690	3,120	2,490	1,930	3,890	4,640	13,900	31,200	36,100	38,000	19,600	10,000	6
7	4,530	3,110	2,460	1,930	3,710	5 020	14,400	31,300	38,000	38,900	21,100	9 840	7
8	4 460	3,030	2,410	1,9501	3,650	5,020	13,000	32,300	40,000	40,200	21,400	9,610	8
9	4,370	3,050	2,400	1,940	3,510	4,920	11,600	32,400	42,600	38 400	22,100	9,360	9
10	4,270	3,040	2,390	1,940	3,220	4,700	12,000	33,100	45,000	37,000	20,300	9,130	10
11	4,220	3 030	2,340	1,930	3,080	4,370	12,600	33 900	45,000	35,000	20,200	8 860	11
12	4,160	3,000	2,310	1,910	2,990	4,350	12,900	34,600	44,700	34,000	19,600	8,710	12
13	4 080	3,000	2,320	1,920	3,390	4,220	13,000	35,400	47,500	32,400	19,000	8,710	13
14	4 060	2,990	2,320	1 940	4,240	4,110	12,900	35,800	48,000	29,800	18 400	8 670	14
15	4 000	2,980	2,260	1,970	4,160	4,110	12,700	38,400	47,500	28,300	17,800	8 670	15
16	3,920	3 950	2,250	1,990	4,000	4,100	12,200	39,400	47,100	27,500	17,200	8,560	16
17	3,860	2,930	2,230	2,000	3,920	4,100	12,100	38,400	46,400	26,800	17 000	8,270	17
18	3,870	2,910	2,230	2,030	3,820	4,100	12,100	39 200	46,900	26,900	16,000	8,050	18
19	3,820	2,890	2,240	2,040	3,860	4,160	12,300	42,000	46,800	26,900	15,500	7,810	19
20	3,760	2,890	2 240	2,030	4,580	4,400	12,500	40,500	45,500	27 600	15,000	7,650	20
21	3,710	2,910	2,240	2,230	4,640	4,530	12 800	38,200	43,100	27,000	14,400	7 450	21
22	3,680	2,910	2,210	2,250	4,240	4,560	13,200	36,400	43,700	26,000	14 000	7,290	22
23	3,630	2 910	2,210	2,350	4,080	4,620	13,700	34,000	45,500	25,400	14,000	7,190	23
24	3,550	2,860	2,180	2,290	4,080	4,880	14,200	34,000	47,200	24,600	13 600	7,030	24
25	3,520	2,870	2,130	2,290	4,000	4,910	15,100	34,800	48,100	23,500	13,300	6 860	25
26	3,500	2,790	2,090	2,270	3,920	5 270	15,900	35 400	47,500	22,500	13,200	6 690	26
27	3,460	2,760	2,060	2,260	3,890	5,510	17,000	35,500	47,200	21,800	12,800	6,590	27
28	3 420	22,730	2,050	2,310	3,840	5,720	18,000	35,300	46,900	22,000	12,200	6,460	28
29	3,390		2,030	2,410	3,940	6,080	19,500	35,300	45,600	21,400	11,600	6,290	29
30	3,380		2,030	2 490	4,080	6,800	20,800	34,600	44,800	20,500	11,400	6,140	30
31	3,340		2,010		4,420		22,600	34,600		19 400		6,080	31
TOTAL	124,670	83,810	71,130	62,320	116,800	140,790	423,900	1,066,900	1 293,100	949,900	501,300	259,870	
MEAN	4 020	2,990	2,300	2,080	3,770	4 690	13,670	34,420	43,100	30 640	16,710	8,380	
L/S/KM2	6 23	4 63	3.55	3 22	5 83	7 26	21 17	53 28	66 72	47 43	25 87	12 98	
RUNOFF (MM)	16 7	11 2	9 5	8.3	15 6	18 8	56 7	142 7	172 9	127 0	67 0	34 8	
MILLION M3	10,771	7,241	6,146	5,384	10 092	12 164	36,625	92,180	111,724	82,071	43,312	22,453	
MAXIMUM	4,930	3,300	2,690	2,490	4 640	6,800	22 600	42,000	48 100	43,500	22,100	11,300	
MINIMUM	3,340	2,730	2,010	1,910	2,640	4 100	7,600	24 800	32,400	19,400	11,400	6,080	

MAXIMUM 48,100 MINIMUM 1,910 MEAN 13 958 ANNUAL RUNOFF 440,163 MILLION M3

Year 1950 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5,990	3,650	2,490	1,950	1,990	4 800	28,500	40 400	30,100	37 000	29,800	11,000	1
2	5 920	3 600	2,470	1 960	2,010	4 910	27,800	39,000	30,700	39,000	30,500	10,700	2
3	5 810	3,550	2,450	1 950	2,020	5 060	26,700	37,200	30,400	40 000	29,500	10,400	3
4	5,740	3,500	2,420	1,940	2,000	5,400	25,000	35,900	31 400	42,000	27,200	10,200	4
5	5,650	3,480	2,370	1 940	2,010	5 470	24,400	35,400	31,000	41,900	25,700	9,800	5
6	5,230	3,400	2,360	1,930	2,020	5,740	23,800	38,200	30,500	44,500	24,100	9,610	6
7	5,200	3,320	2,390	1,960	2,040	6,330	22,600	40,700	32,300	45,600	22,300	9,380	7
8	5,160	3,300	2,370	1,930	2,150	6,480	21,100	41,800	32,800	44,800	21,500	9,170	8
9	5,100	3,250	2,330	1 970	2,130	7,290	20,200	40,300	35,200	42,100	20,300	8 950	9
10	5,080	3,200	2,290	1,980	1,930	9 130	19,800	37 900	43,700	37,600	19,900	8,820	10
11	5,020	3,170	2,270	2,020	1,950	10 100	21,100	36 700	49 000	35,100	18,200	8,620	11
12	5 000	3,120	2,290	1 980	2,120	10,300	21,200	35,200	51,500	32,800	17,700	8,380	12
13	4,850	3 100	2,230	1,960	2,330	11 800	21,100	35,200	52,700	32,900	16 900	8,070	13
14	4 800	3,050	2,200	1 920	2 640	12,700	20,400	36,400	52,900	33,100	16,200	7,990	14
15	4 750	3,020	2,180	1 880	2,580	12 200	20,200	37,800	51,500	31,800	16,300	7,850	15
16	4,620	3,000	2 170	1,860	2,640	11,400	20,400	38 800	50,200	32,100	15,800	7,590	16
17	4 600	2,920	2,170	1,820	2,650	10,900	21,200	39 000	46,800	30,100	15 400	7,450	17
18	4,510	2,900	2 160	1 850	2,580	11,200	25,000	38 400	43,000	29,000	15,000	7,270	18
19	4,500	2,840	2,150	1 830	2 480	11,200	26,400	38,300	10,500	28,200	15,000	7,150	19
20	4 400	2,800	2 130	1 830	2,470	10 900	26 400	37,000	38,900	27,700	14 200	6,970	20
21	4,300	2 780	2,110	1 830	2,550	10,700	25,600	36,400	37,600	26,500	14 000	6,840	21
22	4,250	2,750	2,110	1,880	2,760	10,500	25,600	35,600	36 900	26 000	13 600	6,730	22
23	4 180	2 700	2 050	1,900	3,470	11 000	24,300	35,200	36,000	25,100	13,600	6,480	23
24	4 100	2 630	2,020	1,890	4,060	12,500	23,800	34,000	35,600	25,100	13 200	6,420	24
25	4 050	2,590	2,000	1 910	4,270	14 000	23 200	32,800	35,000	24,600	12,800	6 270	25
26	4 000	2,570	1,960	1 910	4,400	16 000	24,300	32,400	33,000	23,500	12,600	6,100	26
27	3,920	2,520	1,950	1,970	4 450	19,000	26,200	30,800	30 900	22,800	12,200	5,870	27
28	3,850	2 490	1,950	1,960	4 480	21,500	31,400	29 600	31,300	23,000	12,000	5 630	28
29	3,800		1 940	1,950	4 640	25 000	36,000	29 800	33,400	23,500	11,400	5,520	29
30	3,740		1 930	1,960	4 880	27 200	39,200	29 800	35,700	24,700	11,300	5,360	30
31	3,700		1 940		4 880		39,900	30,000		26,000		5,200	31
TOTAL	145,820	85 200	67,850	57,640	89 600	340,710	782,600	1 116 000	1,150,500	998,100	538 200	241 790	
MEAN	4 700	3,040	2 190	1 920	2 890	11,360	25,250	36 000	38,350	32,200	17,940	7 800	
L/S/KM2	7 28	4 71	3 39	2 97	4 47	17 58	39 09	55 73	59 37	49 84	27 77	12 07	
RUNOFF (MM)	19 5	11 4	9 1	7 7	12 0	45 6	104 7	149 [illegible]	153 9	133 5	72 0	32 3	
MILLION M3	12 599	7,361	5 862	4 980	7,741	29 437	67 634	96 422	99 403	86,236	46,500	20 891	
MAXIMUM	5 990	3 650	2,490	2 020	4 880	27 200	39,900	41 800	52 900	45,600	30,500	11 000	
MINIMUM	3 700	2,490	1 930	1,820	1,930	4 800	19,800	29 600	30,100	22,800	11,300	5,200	

MAXIMUM 52,900 MINIMUM 1 820 MEAN 15,381 ANNUAL RUNOFF 485,066 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1951 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5 100	3,240	2,550	1,780	3,180	4,400	30,300	22,000	27,800	26,500	20,000	8,710	1
2	5,050	3,210	2,530	1,770	3,210	4,400	30 600	24,300	27,000	25,400	18,800	8,380	2
3	5,000	3,160	2,510	1,770	3,300	4,700	30,600	25,800	27,400	25,000	17,700	8,070	3
4	4,800	3,170	2,420	1,760	3,380	5,100	30,600	28,000	29,400	24,500	16,600	7,910	4
5	4,720	3,170	2,430	1,730	3 400	5 700	29,800	31,000	28,800	24,000	15,500	7,750	5
6	4,670	3,160	2,410	1,760	3,420	6,290	29,200	34,600	29,000	24,000	15,000	7,650	6
7	4,610	3,170	2,390	1 770	3,470	7,350	27,800	38,800	30,800	23,500	14,500	7,590	7
8	4,510	3,240	2,360	1 770	3,420	8,140	25,200	45,300	40,800	22,600	14,000	7,450	8
9	4,480	3,340	2,300	1,760	3,370	9,080	24,400	43,600	44,000	21,800	13,500	7,450	9
10	4,420	3,440	2 250	1,740	3,220	8,950	22,800	43,900	50,000	21,000	13,000	7,050	10
11	4,320	3,500	2,210	1,730	3,290	8,750	21,600	42,700	51,000	20 000	12,900	6,860	11
12	4,320	3,550	2,170	1,730	3,630	9,130	21,400	41,500	50,600	20,600	12,900	6,750	12
13	4,160	3,540	2,130	1,770	3,900	9,040	21,900	40,500	49,000	21,300	12,900	6,670	13
14	4 060	3,500	2,090	1,760	4,240	9,080	21,700	40,300	47,000	21,500	12,800	6 630	14
15	4,030	3,420	2,050	1,780	4,560	9,610	21,400	40,500	40,500	22,000	12,800	6 400	15
16	3,920	3,300	2,020	1,820	4,400	10,300	21,600	42 000	38,500	23,000	12,300	6,230	16
17	3,820	3,240	1,990	1,950	4,240	11,500	21,900	43,000	36,000	25,500	11,800	6,100	17
18	3,780	3,020	1,960	2,150	3 980	12,300	22,300	41,000	36,700	27,500	11,300	6,010	18
19	3,730	2,980	1,930	2 200	3,550	14,200	21,200	40,500	34,700	28,500	10,800	5,650	19
20	3,700	2,940	1,900	2,180	3,470	15,400	20,600	41,000	32,700	29,500	10,300	5,440	20
21	3,660	2,820	1,880	2,150	3,420	16,900	20,400	41,500	31,900	29,500	10 100	5,200	21
22	3,600	2,820	1,860	2,160	3,380	19,100	20,100	41,000	29,700	29,000	9,900	5,100	22
23	3,560	2,770	1 840	2,170	3,760	23,000	18,700	40 000	28,400	27,000	9,700	4,950	23
24	1,540	2,710	1,820	2,150	3,870	26,000	18,100	36,200	29,100	24,000	9,500	4,800	24
25	3,510	2,630	1,800	2,170	4,000	27,800	17,600	35,400	27,700	23,000	9,300	4,750	25
26	3,470	2,570	1,800	2,230	3 920	28,900	18,000	33,600	27,500	22,500	9,120	4,700	26
27	3,420	2,590	1 800	2,310	3,760	30,200	18,300	31,400	26,800	21 000	9,130	4,550	27
28	3,420	2,580	1,790	2,760	3,780	29,400	18,600	30,600	26,800	20 200	9,080	4,500	28
29	3,410		1,780	2,910	3,940	29,400	19,200	30,000	26 800	20 000	9,380	4,450	29
30	3,290		1,790	3,080	4 080	30,200	20,200	29,300	26,900	20,500	9,150	4,400	30
31	3,260		1,780		4 160		21,100	29,200		20,800		4,300	31
TOTAL	125,340	86,780	64,540	60,770	114,700	434,320	707,200	1,128,500	1,033,300	735,200	373,760	192,450	
MEAN	4,040	3,100	2,080	2,030	3,700	14 480	22,810	36,400	34,440	23 720	12,460	6,210	
L/S/KM2	6 26	4 80	3 22	3 14	5 73	22 41	35.31	56 35	53.32	36 71	19 29	9 61	
RUNOFF (MM)	16 8	11 6	8 6	8 1	15 3	58 1	94 6	150 9	138 2	98 3	50 0	25 7	
MILLION M3	10,829	7,498	5,576	5 251	9,910	37,525	61,102	97,502	89,277	63,521	32,293	16 628	
MAXIMUM	5 100	3,550	2,550	3,080	4,560	30,200	30,600	45,300	51,000	29,500	20 000	8,710	
MINIMUM	3,260	2,570	1,780	1,730	3 180	4 400	17,600	22,000	26 800	20,000	9 080	4,300	

MAXIMUM 51,000 MINIMUM 1,730 MEAN 13 854 ANNUAL RUNOFF 436,912 MILLION M3

Year 1952 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,100	2,280	1,790	1,730	1,850	4,880	15 600	34,200	40,800	40 000	18,140	6,870	1
2	4 000	2,220	1,780	1,740	1,940	4,800	17 000	37,400	44,300	39,400	18,140	6,640	2
3	3,900	2,190	1,770	1,740	1,970	3,603	18,500	40,100	45,400	37,800	17,780	6,520	3
4	3 800	2,170	1,770	1,740	1,990	5,200	19 200	42,200	46,500	37,500	18,020	6,280	4
5	3,720	2,140	1 770	1,730	2,020	5,200	19,600	42,700	50,100	36,300	17,780	6,050	5
6	3 650	2,110	1,770	1,720	2,100	5,010	20 900	43,100	51,400	35 200	17,190	5 810	6
7	3,560	2,100	1,780	1,720	2,200	4,990	22,300	43,000	52,700	34,400	16,360	5,570	7
8	3,500	2 060	1,790	1,720	2,490	4,960	23 000	42,000	53,000	32,100	15,650	5,330	8
9	3,420	2,050	1 790	1 720	2,820	5,020	21,800	40,800	52,500	29,200	14,700	5 220	9
10	3,350	2,020	1 800	1 720	2 870	4,800	20,200	40,900	50 600	29,400	14,220	4,980	10
11	3,300	2,000	1 800	1 720	2 850	4,700	18,600	42,300	50 000	27,900	13,750	4,860	11
12	3 250	1,990	1 800	1 720	2 930	4,650	17,300	44,900	49,400	26,600	13 870	4,620	12
13	3 200	1 980	1 800	1 720	2 930	4,670	16,300	48,500	48,500	25 200	13,390	4,390	13
14	3 120	1 970	1 790	1 720	3 000	4,820	15 200	50 400	47,800	25,700	12,920	4 270	14
15	3 080	1 950	1,770	1 720	3 060	5 670	14,300	49,500	47,500	25 200	12,680	4 030	15
16	3,000	1,920	1,760	1,710	3,150	7,050	13 600	49,500	47 200	24,000	11,970	3,910	16
17	2,970	1,900	1,760	1,710	3,000	8,270	12 800	48,800	47,000	24,300	11,050	3,790	17
18	2 900	1 890	1 760	1,700	3,340	8,250	12,000	49 800	44,700	25,300	10 490	3,670	18
19	2 860	1 880	1,760	1,700	3,420	8,490	11,500	51,500	43,100	28,700	9,930	3,560	19
20	2 800	1 850	1 750	1 700	3 420	8,710	11,000	51,600	46,000	28 700	9 260	3,440	20
21	2,750	1 840	1,740	1,700	3,630	9 430	11,000	51,300	48,300	28,300	9,010	3,320	21
22	2 700	1,820	1 740	1,700	3 700	9,730	12 600	51 000	47,400	26 100	8,770	3,200	22
23	2,650	1 810	1,740	1,690	3 950	8,610	14,400	50 200	45,500	26,500	8,530	3 080	23
24	2,600	1,800	1 740	1,680	4,000	9,310	16,600	46 900	43,500	27 000	8,300	3,020	24
25	2,560	1 800	1 730	1 680	4,100	9,130	19 100	44,800	43 200	29,500	8,060	2 960	25
26	2,500	1 790	1,730	1,690	4,270	8,860	22,800	41,000	43,300	32,000	7 940	2 900	26
27	2 480	1 780	1 730	1 700	4,270	9,820	25,500	39,600	43,900	34,300	7,700	2 840	27
28	2 420	1 780	1,720	1,720	3 660	11,300	27 400	39,400	43 800	35 000	7,590	2,790	28
29	2,380	1,780	1,720	1,760	4,720	12 000	28 600	40,300	42,400	35,600	7,350	2,730	29
30	2,350		1,730	1,810	4,910	14 400	31,400	39,800	41,600	35,100	7,110	2 670	30
31	2,300		1 740		4,720		33 000	40,300		32 900		2,610	31
TOTAL	95 170	56,870	54,620	51,530	99,280	216,330	583,100	1,377 800	1,400,900	955,200	367 650	131,930	
MEAN	3,070	1,960	1,760	1,720	3,200	7 210	18,810	44 450	46,700	30 810	12,260	4,260	
L/S/KM2	4 75	3 04	2 73	2 66	4 96	11 16	29 12	68 80	72 29	47 70	18 97	6 60	
RUNOFF (MM)	12 7	7 6	7 3	6 9	13.3	28 9	78 0	184 3	187 4	127 8	49 2	17 6	
MILLION M3	8,223	4,914	4,719	4,452	8,578	18 691	50,380	119 042	121,038	82,529	31,765	11,399	
MAXIMUM	4,100	2,280	1,800	1 810	4,910	14,400	33,000	51,600	53,000	40,000	18,140	6,870	
MINIMUM	2,300	1,780	1,720	1 680	1 850	3,600	11,000	34,200	40,800	24,000	7,110	2,610	

MAXIMUM 53 000 MINIMUM 1,680 MEAN 14 728 ANNUAL RUNOFF 465,730 MILLION M3

(to be continued)

A-8 Discharg

Year 1953 — UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	2,580	1,830	1,850	1,460	2,100	6 400	18,500	21,100	41,000	38,500	15,900	8,600	1
2	2,540	1 800	1,840	1,520	2,250	6 600	18 000	22,200	39,600	36,500	12,800	8,000	2
3	2,470	1,790	1,820	1,510	2,400	7 000	17,200	21,200	37,200	35 000	12,700	7 600	3
4	2,370	1,790	1,800	1,510	2,550	7,400	16,700	22,000	37,900	31,400	12,700	7,200	4
5	2,280	1,810	1 780	1,510	2 700	7,800	16,500	24 400	35,900	30,400	12,800	6 800	5
6	2,170	1,810	1,760	1,510	2 800	8,400	16,600	23,700	33,600	29 000	12 800	6,600	6
7	2,070	1 820	1,740	1,510	3,000	9,000	16 800	22,300	31,500	27,500	12,800	6,400	7
8	2,020	1,840	1,720	1,510	3 400	9,800	17,500	21,500	30 600	26,300	12,700	6,200	8
9	2,050	1,860	1 710	1,510	3,600	12 000	18,800	20 900	30,900	25,000	12,500	6 000	9
10	2 090	1 690	1 700	1,520	3 650	10,500	22,600	21 100	29,900	23 600	12,300	5,800	10
11	2 120	1 920	1 690	1,520	3 850	9,200	26 400	22,500	28 800	22 000	12,000	5 600	11
12	2 130	1 950	1,690	1,530	4,200	9 000	27,300	23,900	27,500	20 800	11,700	5,400	12
13	2,120	1 980	1 680	1 550	4,400	9 200	27,100	24,000	26 800	19,500	11,500	5,200	13
14	2 110	2 030	1 660	1,570	4 500	10,200	26 000	26 700	27 000	18,200	11,000	5 000	14
15	2,090	2 060	1 670	1 600	4 500	9 400	25 700	30,000	26,300	17,400	10,800	4,800	15
16	2 080	2,080	1 650	1 630	4,530	9,300	23,300	32,000	29,300	16,500	10,200	4,650	16
17	2,060	2,070	1,640	1 650	4 500	10,000	22,500	34,000	30 800	16,300	9,700	4,550	17
18	2,040	2,040	1,630	1 660	4 700	13 500	22,100	35,500	31 600	16,100	9,400	4,500	18
19	2,030	2,000	1,610	1 660	5,090	15 700	21,000	37,500	34 200	16 000	9 180	4,300	19
20	2,010	1 970	1,590	1 640	5 470	20 400	20,000	40,000	35 200	16,000	8 900	4 200	20
21	2,000	1 950	1,570	1 630	6 250	24 600	19 600	44,800	33 900	16,000	8,600	4 100	21
22	1,980	1 920	1 550	1 630	6,360	26 700	19,300	46 000	34 100	15,800	8,250	4 000	22
23	1,970	1 910	1,530	1 630	6,580	27,500	18,700	47 600	33,800	15,700	8,050	3 900	23
24	1,950	1,920	1 500	1 650	6 560	26,400	18 300	48 900	34,000	15,500	7,800	3 800	24
25	1 930	1 930	1,480	1 700	6 250	25 000	18 100	48,500	34,200	15 100	7 700	3,700	25
26	1 910	1,920	1 460	1 750	5 970	23 700	18,300	46 400	36 800	15 000	7,600	3,650	26
27	1 900	1 900	1,450	1 810	5 830	22 000	19,400	44 800	39 800	14,500	8 000	3,600	27
28	1,880	1 880	1,450	1 890	5,720	21 600	19 400	- 43 900	38 800	14,300	8,900	3 550	28
29	1,870	1 450	1,450	1 940	5 830	21 200	19 900	42,600	39,000	13,600	9,180	3,500	29
30	1 850		1,460	2,000	5,050	19,400	19 700	43,600	38 600	13,200	9 100	3 450	30
31	1,840		1,460		6,080		19,400	42,300		13,000		2,400	31
TOTAL	64,510	53 670	50 610	48,710	141 890	438,900	630,700	1,026,100	1,010 600	643,900	314 760	157,050	
MEAN	2,080	1 920	1 630	1,620	4,580	14 630	20,350	33,100	33,690	20 770	10 490	4,070	
L/S/KM2	3 22	2 97	2.52	2 51	7 09	22 65	31 49	51 24	52 15	32 15	16 24	7 84	
RUNOFF (MM)	8 6	7 2	6 8	6 5	19 0	58 7	84 4	137 2	135 2	86 1	42 1	21 0	
MILLION M3	5,574	4 637	4,371	4 209	12,259	37 921	54,492	88 635	87,316	55 633	27,195	13,569	
MAXIMUM	2,580	2 080	1,850	2,000	6,580	27,500	27,300	48 900	41,000	38,500	12 900	8,600	
MINIMUM	1,840	1 790	1,450	1 460	2,100	6,400	16,500	20 900	26,300	13,000	7 700	2 400	

MAXIMUM 48 900 MINIMUM 1 450 MEAN 12,552 ANNUAL RUNOFF 395,833 MILLION M3

Year 1954 — UNIT c m s

DATF	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SFP	OCT	NOV	DEC	DATF
1	3,670	2,220	1,690	1 430	2,230	4,620	9 080	11,530	30 270	34 490	16 710	6,400	1
2	3,620	2,170	1,690	1,510	2,450	5 100	8 930	11,590	33,350	33,780	16,360	6 280	2
3	3,560	2 140	1 680	1,540	2 480	5 930	8,930	11 630	35 070	33 070	15 880	6 050	3
4	3 490	2,120	1,670	1,550	2,490	7,350	9,380	11 830	34 060	32 240	15 290	5 930	4
5	3 440	2,100	1 660	1,550	2,470	8,300	10,120	12 210	32,220	30 460	14 940	5 810	5
6	3,380	2 070	1 650	1,540	2,430	9 130	11 110	13,750	32 010	28,570	14,580	5,690	6
7	3,320	2 030	1 640	1,540	2,390	9 840	13,040	15,290	30,690	27,380	14 220	5,570	7
8	3,270	2 000	1 630	1,530	2,370	10,310	13 280	16,360	30 290	26,200	13,390	5,450	8
9	3,220	1,960	1,620	1,510	2,350	10,550	13,280	17,310	29 870	24,690	12,560	5,330	9
10	3,160	1 920	1,620	1,490	2,360	10,670	12 800	19,560	29 720	24,180	11,750	5,270	10
11	3,090	1 900	1,610	1,480	2 430	10 430	12,210	20 620	29,330	24,300	11 500	5 220	11
12	3 010	1 880	1,600	1,470	2,540	10 080	11 830	21,450	29,390	24 180	11,110	5,100	12
13	2 930	1,860	1,580	1 470	2,660	10,310	11,970	21,570	32,720	24,330	10 680	4,980	13
14	2 850	1,840	1,560	1 480	2,790	10 670	11,850	21 910	39 890	24 650	10 220	4,860	14
15	2,780	1,830	1,540	1,500	2 920	10 900	11 430	23 000	41 020	23 940	9 930	4,740	15
16	2 730	1 810	1,520	1,540	3 100	11 240	10 860	23 470	41 490	23,350	9 460	4,680	16
17	2 690	1,800	1 490	1,580	3 260	11 050	10 490	23 820	41 090	23 000	9 260	4,620	17
18	2,660	1,790	1 480	1 640	3,470	10 580	10,620	24 160	41 370	21,810	9 040	4,500	18
19	2 620	1 760	1 460	1 700	3 660	10 240	10 490	24,500	42 830	20 620	8 780	4,440	19
20	2,580	1 770	1 440	1 760	3 820	9 560	10 430	25 970	42 660	20 030	8 430	4,390	20
21	2,550	1,770	1,420	1 810	3 920	9 160	10,340	27 740	42,830	19,560	8 180	4 270	21
22	2,510	1,770	1,400	1 870	3 930	8 690	10 240	28 150	45 460	19 560	7 940	4 150	22
23	2 470	1 760	1,390	1 920	3 920	8,080	11,370	28 970	44 480	19 200	7 820	4 090	23
24	2 430	1 750	1,370	1,980	3,840	7 780	11,370	28 920	44 180	19,200	7 590	4,030	24
25	2,400	1 740	1,360	2,020	3 790	8 200	12 210	29,300	43 400	18 850	7,350	3 970	25
26	2,380	1 730	1,350	2,060	3 780	8 200	12 450	29 790	42 930	18 490	7 110	3,910	26
27	2,360	1 710	1,340	2,090	3 790	8,340	12 450	31 570	41 850	18 490	6 990	3 790	27
28	2,340	1 700	1,330	2 120	3 910	8 780	12,320	31 950	39 270	18 250	6 760	3,730	28
29	2,320		1,340	2,150	4 060	8 980	12 090	30 840	36 150	18 140	6 640	3 670	29
30	2,290		1 360	2 180	4 230	9 220	11 830	30 720	34 970	17 780	6,520	3 560	30
31	2 250		1,400		4 410		11,370	30,470		17,310		3 440	31
TOTAL	88,370	52 920	46 890	51 010	98 270	272 310	350 170	699 890	1 114 860	730 500	316 990	147 920	
MEAN	2,850	1,890	1 510	1 700	3 170	9 080	11,300	22 580	37 160	23 560	10 570	4 770	
L/S/KM2	4 41	2 92	2 34	2 64	4 90	14 05	17 50	34 95	57 52	36 47	16 36	7 38	
RUNOFF (MM)	11 8	7 1	6 3	6 8	13 1	36 4	46 8	93 6	149 1	97 7	42 3	19 8	
MILLION M3	7 635	4,572	4 051	4 407	8 491	21,528	30 255	60,470	96,324	63 115	27,388	12 780	
MAXIMUM	3 670	2 220	1 690	2 180	4 410	11 240	13 280	31 950	45 460	34 490	16 710	6 400	
MINIMUM	2,250	1 700	1,330	1 410	2 230	4 620	8 930	11 530	29,330	17,310	6 520	3 440	

MAXIMUM 45,460 MINIMUM 1 690 MEAN 10 880 ANNUAL RUNOFF 341 016 MILLION M3

(to be continued)

A-8 Dscharge (Kratie)

Year 1955

UNIT c m s.

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,700	2,520	2,060	1,670	2,120	2,620	16,270	22,100	32,860	25,910	9,750	11,640	1
2	3,700	2,490	2,050	1,760	2,240	2,760	17,550	21,840	32,900	25,640	9,370	11,290	2
3	3,680	2,460	2,040	1,910	2,420	3,020	18,000	21,740	32,820	25,250	9,040	10,810	3
4	3,660	2,420	2,030	2,020	2,540	3,440	18,100	21,540	32,700	23,890	8,720	10,320	4
5	3,620	2,390	2,020	2,070	2,580	4,220	18,200	21,460	32,880	22,610	8,640	9,830	5
6	3,570	2,370	2,010	2,090	2,600	5,440	18,280	21,330	32,960	22,140	8,950	9,400	6
7	3,510	2,350	1,990	2,100	2,600	7,030	18,320	21,340	33,230	21,010	9,590	9,130	7
8	3,450	2,330	1,980	2,100	2,600	8,400	18,380	21,540	33,690	19,540	9,970	8 870	8
9	3,400	2,310	1,970	2,100	2,600	8,460	18,860	21,760	33 980	18,490	10 190	8 600	9
10	3,370	2,290	1,960	2,100	2,600	7,720	20,210	21,840	33,560	18 080	10,570	8,370	10
11	3,330	2,280	1,940	2,100	2,600	6 940	20 080	22,060	32,390	19,120	10,890	8,160	11
12	3,290	2,280	1,930	2,100	2,600	6 400	19,490	22,480	31,840	21,440	10 990	8,010	12
13	3,250	2,260	1,920	2,100	2,600	6,200	19,180	23,170	31,640	20,710	10,960	7,870	13
14	3,200	2,240	1,910	2,100	2,600	6,290	19,540	24 250	31,240	19,470	10,730	7,680	14
15	3,140	2,220	1,900	2,100	2,600	6,710	19,660	25,340	31,200	18,380	10,370	7,470	15
16	3,100	2,200	1,880	2,100	2,600	7,470	18,710	26,080	31,020	17,320	10,220	7,290	16
17	3,080	2,170	1,860	2,100	2,600	8,270	18,480	26,710	30,470	16,310	10,200	7,210	17
18	3,050	2,140	1,840	2,100	2,600	8 660	18,500	27,390	30 140	15 260	10 740	6,990	18
19	3,020	2,110	1,820	2,100	2,600	8,760	18,940	27,850	29,490	14,320	12,970	6,160	19
20	2,990	2,100	1,810	2,100	2,600	8,890	20,710	27,750	28,110	13,850	13,850	6 100	20
21	2,940	2,090	1,790	2,100	2,600	9,100	22,300	27,160	27,330	13 650	13,680	6,460	21
22	2,860	2,090	1,770	2,100	2,600	9,370	23 060	26,520	26,990	13,450	13,760	6,470	22
23	2,790	2,090	1,760	2,100	2,600	9,570	23,640	26 130	26,700	12,810	14,460	6,360	23
24	2,740	2,090	1,750	2,100	2,600	9,540	23,930	26,340	27 050	12,330	14,970	6 220	24
25	2,710	2,090	1,750	2,100	2,600	9,560	23,530	27,060	27,830	12,180	14,720	6 130	25
26	2,680	2,909	1,740	2,100	2 600	10 140	23,070	28,500	27,580	12,020	14,170	6,070	26
27	2,660	2,080	1,720	2,100	2 600	11,270	23,000	29,290	26,390	11,720	13,580	6,030	27
28	2,630	2,070	1,710	2,100	2 600	12,480	22,960	30,570	26,030	11,290	12 810	5 990	28
29	2 610		1,700	2,100	2,600	14,530	22,780	31,320	26 000	10 870	12,260	5,910	29
30	2,580		1,690	2 100	2,600	15,620	22,630	31 870	26 000	10,620	11,850	5,800	30
31	2,550		1,670		2,600		22,490	32,370		10,170		5,700	31
TOTAL	96,860	62,620	57,970	61,920	79,500	238,880	628 850	786 720	907,040	529,850	342,970	238,340	
MEAN	3,120	2,240	1,870	2,060	2,560	7,960	20 290	25,380	30,230	17,090	11 430	7 690	
L/S/KM2	4 83	3 47	2 89	3 19	3 96	12.32	31 41	39 29	46 80	26 46	17 69	11 90	
RUNOFF (MM)	13 0	8 4	7 8	8.3	10 6	31 9	84 1	105 2	121.3	70 9	45 9	31 9	
MILLION M3	8,369	5,410	5 009	5,350	6 869	20,639	54,333	67,973	78,368	45,779	29,633	20,593	
MAXIMUM	3,700	2,520	2,060	2,100	2,600	15,620	23,930	32,370	33,980	25 910	14,970	11,640	
MINIMUM	2,550	2,070	1,670	1,670	2 120	2,620	16,270	21,330	26 000	10,170	8,640	5,700	

MAXIMUM 33,980 MINIMUM 1,670 MEAN 11 045 ANNUAL RUNOFF 348,325 MILLION M3

Year 1956

UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5,320	3,170	2,160	1 750	1,960	8 450	14 080	19,840	37,880	30 120	11 930	4,910	1
2	3 840	3 080	2 140	1 750	1 960	8 040	14,300	20 050	37 290	28 240	12,350	4 730	2
3	3 690	3 000	2 120	1 750	1 960	7 890	14 900	20,510	39 250	26,320	12,140	4,520	3
4	4,310	2 910	2 100	1 750	1 960	7 990	16,740	21,470	41,840	24,640	11 450	4,330	4
5	4 510	2,820	2 090	1 750	2 070	8,230	18,810	24,870	42,570	23,590	10 910	4,180	5
6	4,520	2 740	2 090	1 750	2 230	8,700	20 150	43,590	42,470	22 870	10,560	4,070	6
7	4 490	2 690	2 090	1 750	2 450	9,850	21 170	40 930	42,580	22,020	10,240	4,020	7
8	4 480	2 660	2 080	1 750	2 650	11 940	21 850	42,360	43,760	21,090	10 060	4 010	8
9	4 440	2 630	2,070	1 750	2 800	11 450	22 450	42 200	45,360	20,140	9,810	4 040	9
10	4,380	2,610	2 050	1,780	2 910	11 610	23 920	42,470	47 110	19,490	9,530	4 020	10
11	4,310	2 570	2 020	1 870	3,020	13 350	26,380	41 960	47 960	19,080	9 260	3,920	11
12	4 240	2 520	2 000	2 180	3 160	13,490	25 240	41 670	49 170	19,000	8 880	3,770	12
13	4 170	2 490	1 970	2 480	3,580	14 420	23 980	42,310	48,920	18,880	8 440	3 610	13
14	4,090	2 460	1 950	2,490	4 290	15,350	23,000	42 470	47,540	18,500	8 020	3 470	14
15	4,040	2 440	1 930	2 340	5,100	15 120	22,410	42,710	46,220	18 920	7 980	3,370	15
16	3 990	2 420	1 920	2 190	5 650	14 130	22,070	43 910	46,730	20,470	9 240	3,300	16
17	3 950	2 400	1 900	2 140	5 910	12 870	21,840	44,130	47,130	20 460	10 760	3,250	17
18	3 890	2 370	1 890	2 150	6 240	11 840	21,800	44,000	44,460	20 010	11,300	3,200	18
19	3 820	2,350	1 870	2 150	6 740	11 090	21,860	44,710	41,370	19 200	10,510	3 160	19
20	3 770	2,320	1 860	2 110	7 430	11 140	22,120	46,840	40 570	18,520	9,340	3,140	20
21	3 740	2,300	1 840	2 050	8 010	11 610	22,340	48 050	40,100	17 440	8,540	3 210	21
22	3 700	2 270	1 830	2 030	8 340	12 100	22,270	47,260	39,430	16 140	8,050	3,470	22
23	3,660	2 260	1 820	2 030	8 410	12 530	22,080	45 760	39 070	14,350	7,580	3 790	23
24	3 620	2 240	1 810	2 040	8 640	12 960	21,820	44 240	37 890	13,290	7,150	3 950	24
25	3 570	2 230	1 800	2 030	9 010	13 090	21,410	42 650	36,360	12 670	6 870	3 900	25
26	3 510	2 210	1 790	2 020	9 190	13 100	21,060	42,080	34 750	12,160	6,330	3,770	26
27	3 450	2 200	1 780	2 000	9,240	13 100	20,610	42 970	33 980	11,390	5 630	3 610	27
28	3 390	2 180	1 770	1 980	9 400	13 100	20,190	43,270	34 140	10,170	5,180	3,470	28
29	3,340	2 160	1 760	1 970	9 550	13 220	20 080	41,600	32,800	10,270	5,070	3,360	29
30	3 290		1 750	1 960	9 120	13 730	19,980	39,880	31 790	10,670	5,030	3,250	30
31	3 240		1 750		8 890		19 830	38 830		11 150		3,140	31
TOTAL	122 750	72 700	60 000	59 740	172 110	359 410	650 760	1 219,590	1,240,490	571,360	268,140	115,940	
MEAN	3 960	2 510	1 930	1 990	5 550	11 980	20 990	39,340	41,350	18 430	8,940	3,740	
L/S/KM2	6 14	3 89	2 99	3 08	8 59	18 55	32 49	60 90	64 01	28.53	13 84	5 79	
RUNOFF (MM)	16 4	9 7	8 0	8 0	23 0	48 1	87 0	163 1	165 9	76 4	35 9	15 5	
MILLION M3	10 606	6 281	5 184	5 162	14 870	31,053	56 226	105,371	107,178	49,366	23,167	10 017	
MAXIMUM	5 320	3 170	2 160	2 490	9 550	15,350	26,380	48 050	49 170	30,120	12,350	4,910	
MINIMUM	3 240	2 160	1 750	1 750	1 960	7,890	14 080	19 840	31,790	10,170	5 030	3,140	

MAXIMUM 49 170 MINIMUM 1 750 MEAN 11 423 ANNUAL RUNOFF 424 483 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1957 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,430	2,540	1,970	2,000	2,650	10,000	11,200	22,380	39 260	32,990	14,920	6,310	1
2	3,430	2,540	1,970	2,000	2,650	10,000	11,500	21,510	40,270	34,240	14,590	6 050	2
3	3,430	2,540	1,970	2,000	2 650	10,000	12,920	20,710	41,610	35,910	14,190	5,690	3
4	3,430	2,540	1,970	2,000	2,650	10,000	14,570	20,070	42,030	36,150	13,840	5,570	4
5	3,430	2,540	1,970	2 000	2,650	10,000	16,480	19,550	42,370	34,440	13 290	5,650	5
6	3,430	2,540	1,970	2,000	2,650	10 000	18,690	19,270	44,600	31,650	12,760	5,840	6
7	3,430	2,540	1,970	2,000	2,650	10,000	20,810	18,930	46,370	30,770	12,490	5,980	7
8	3,430	2,540	1,970	2,000	2,650	10,000	22 880	18,350	45,550	31,800	12,210	5,980	8
9	3,430	2,540	1,970	2,000	2,650	10,000	24,470	17,650	43,520	33,770	11,810	5,950	9
10	3,430	2,540	1,970	2,000	2,650	10 000	24,850	17,050	42,480	35,590	11,460	5,900	10
11	3,430	2,540	1,970	2,000	2,650	10 000	25,070	16,360	40 690	37,790	11,150	5,800	11
12	3,430	2,540	1,970	2,000	2,650	10,000	24,450	15,830	37,690	36,630	10,810	5 640	12
13	3,430	2,540	1,970	2,000	2,650	10 000	23,450	15,670	33,720	33,560	10,560	5,450	13
14	3,430	2,540	1,970	2,000	2,650	10,000	22 420	15,680	30,900	31,190	10,440	5,250	14
15	3,430	2,540	1,970	2,000	2,650	10,000	21,770	16,420	29,290	29,250	10 350	5 070	15
16	3,430	2,540	1,970	2,000	2,650	10,000	21,260	17 800	30,310	28 850	10 070	4,970	16
17	3,430	2,540	1,970	2,000	2,650	10,000	20,730	18,870	29,900	27 690	9,770	4 930	17
18	3,430	2,540	1,970	2,000	2,650	10,000	20,390	19,290	28 720	26,570	9,530	4 850	18
19	3,430	2,540	1,970	2,000	2,650	10,000	21,530	19 810	29,230	26,370	9,260	4,740	19
20	3,430	2,540	1,970	2,000	2,650	10,000	24 060	21,840	32 110	26,790	8,890	4,660	20
21	3,430	2,540	1,970	2,000	2,650	10,000	26,170	24,980	33,340	25,440	8,490	4 640	21
22	3,430	2,540	1,970	2,000	2,650	10,000	28,750	27,960	30 970	23,760	8,070	4,630	22
23	3,430	2,540	1,970	2,000	2,650	10,000	30,320	33,880	26,900	22,330	7,850	4,590	23
24	3,430	2,540	1,970	2 000	2,650	10,000	30 880	36,620	26 600	21,260	7 740	4,510	24
25	3,430	2,540	1,970	2,000	2,650	10,000	30,100	40,410	27,460	20,520	7 600	4,400	25
26	3,430	2,540	1,970	2,000	2,650	10,000	28,450	41,150	28,220	19,470	7 410	4,300	26
27	3,430	2,540	1,970	2,000	2 650	10,000	26,850	38,210	28,610	18,380	7,110	4,230	27
28	3,430	2,540	1,970	2,000	2,650	10,000	25,840	36,010	29,670	17,370	6,830	4 160	28
29	3,430		1,970	2,000	2,650	10,000	24,890	36,270	30,780	16,580	6 640	4,090	29
30	3,430		1,970	2,000	2,650	10,000	24,080	38,650	31,990	15,810	6,490	4,000	30
31	3,430		1,970		2,650		23,390	39,510		15,260		3,810	31
TOTAL	106,330	71,120	61,070	60,000	82,150	300,000	703,220	766,690	1,045,360	858 180	306,620	157,640	
MEAN	3,430	2,540	1,970	2,000	2,650	10,000	22,680	24,730	34,840	27,680	10,220	5,090	
L/S/KM2	5.31	3 93	3 05	3 10	4 10	15 48	35 11	38 28	53 93	42 85	15 82	7,88	
RUNOFF (MM)	14 2	9 5	8 2	8 0	11 0	40 1	94 1	102 5	139 8	114 8	41 0	21 1	
MILLION M3	9,187	6,145	5,276	5,184	7,098	25,920	60,758	66,242	90,319	74,147	26 492	13,620	
MAXIMUM	3,430	2,540	1,970	2,000	2,650	10,000	30,880	41,150	46,370	37,790	14,920	6,310	
MINIMUM	3,430	2,540	1,970	2,000	2,650	10,000	11 200	15,670	26,600	15 260	6,490	3,810	

MAXIMUM 46,370 MINIMUM 1,970 MEAN 12,380 ANNUAL RUNOFF 390,388 MILLION M3

Year 1958 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,810	2,700	2 180	1,780	1,680	3 640	11,040	29,490	36 100	30,340	13,870	5,630	1
2	3,640	2,660	2,140	1,770	1,670	3 840	11,780	28,880	37 190	27,890	13,450	5,450	2
3	3,660	2,630	2,100	1,770	1,660	4 030	12,000	28,450	40 130	25,960	12 980	5 250	3
4	2,700	2,610	2,070	1,760	1,660	4,190	12,400	27,810	41,380	24,520	12,500	5,060	4
5	3,690	2,580	2,040	1,760	1,660	4,330	12,600	27,130	41,240	21,000	11,870	4,850	5
6	3,660	2,560	2 020	1,760	1,660	4,540	12,690	26,530	39,310	21,370	11,340	4,670	6
7	3,630	2,530	2 010	1,750	1,670	5,150	12,770	25,730	38,360	20,520	11 050	4,500	7
8	3 630	2,510	1 990	1,740	1,680	6,150	13,170	23 130	40 210	19,690	10,790	4,320	8
9	3 670	2 490	1,980	1,740	1 690	7 170	14 950	21,750	44,210	19,850	10 340	4 150	9
10	3 680	2 460	1,960	1,730	1,700	7,570	17 040	21 270	47 460	20,710	9 830	4,010	10
11	3 640	2 450	1 950	1,720	1,710	7 680	18,880	21,220	49 400	20 110	9,350	3 930	11
12	3,580	2 460	1 940	1,700	1,730	8 890	19,920	21,370	53,540	19,370	8 920	3 860	12
13	3,520	2 460	1 930	1,700	1,760	10,870	19 980	21,560	58,620	19 010	8 610	3,800	13
14	3 480	2 480	1 920	1,700	1,790	11 660	19,600	21,360	58 190	18 760	8,380	3,740	14
15	3,440	2,500	1 910	1,710	1,830	11,700	19,070	21,280	54,430	18,370	8 170	3,690	15
16	3,400	2,520	1 900	1,720	1 880	11 700	17,460	21,410	51 280	17 860	7 930	3,540	16
17	3,380	2,560	1,890	1,730	1,950	11,500	16,130	21 980	47,080	17,310	7,690	3,540	17
18	3,360	2,590	1,880	1,730	2,050	10,720	15,570	22,170	44 270	17 070	7 440	3,450	18
19	3,330	2 620	1,870	1,740	2,180	10,410	17 000	22,360	42,530	16 910	7,130	3,360	19
20	3 290	2,610	1 860	1,750	2,360	10,360	20,970	22 270	41,060	17 250	6 950	3 270	20
21	3,260	2,580	1 850	1 750	2,520	10 750	24,360	21,840	39 860	18 490	6 900	3 200	21
22	3,220	2,540	1 840	1,750	2 620	11,850	27,360	21,840	38,940	20,660	6 790	3 150	22
23	3 150	2,510	1 830	1,750	2,680	12 900	29,260	22,550	38 950	22,300	6 630	3 110	23
24	3.070	2,460	1 820	1 740	2 720	13 710	36 930	23,090	39 240	22 430	6 460	3,060	24
25	2 980	2 400	1 810	1 730	2 730	13,900	31 930	23,920	38 400	20 780	6,340	3 000	25
26	2 910	2,320	1,810	1,730	2 720	13 640	32,270	25 420	37,640	19 250	6 250	2 920	26
27	2 860	2 260	1,810	1 720	2,710	12,990	31,630	26,870	37,540	17 130	6 170	2,850	27
28	2 820	2 220	1,800	1 700	2 770	12 910	30,870	29,680	37,000	14 740	6 050	2 770	28
29	2 790		1 800	1 690	2 970	12 260	30,460	34,070	35 260	13 820	5 920	2 720	29
30	2 760		1 790	1 680	3 210	10,610	30,690	34 950	32 720	13 770	5 790	2 690	30
31	2 730		1 790		3,440		30,290	36,040		13,970		2 660	31
TOTAL	103 740	70 270	59,490	52 000	67 060	281 620	645,090	777 420	1,281,540	613,210	261 890	116 290	
MEAN	3,350	2 510	1 920	1 730	2 160	9,390	20,810	25,080	42,720	19,780	8,730	3,750	
L/S/KM2	5 19	3 89	2 97	2 68	3 35	14 54	32 21	38 83	66 13	30 62	13 51	5 81	
RUNOFF (MM)	13 9	9 4	8 0	7 0	9 0	37 7	86.3	104 0	171 9	82 0	35 0	15 6	
MILLION M3	8 963	6,071	5 140	4 493	5 794	24,332	55,736	67 169	110,725	52 981	22 627	10 047	
MAXIMUM	3 810	2 700	2 180	1,780	3 440	13 900	32 270	36,040	58,620	30,340	13 870	5 630	
MINIMUM	2 730	2 220	1 790	1 680	1 660	3 640	11 040	21 220	32 720	13,770	5,790	2 660	

MAXIMUM 58 620 MINIMUM 1,660 MEAN 11,862 ANNUAL RUNOFF 374 078 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1959 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	2,560	1,990	1,780	1,860	1,710	4,100	6,540	17,630	41,710	34,840	15,520	5,540	1
2	2,110	1,980	1,750	1,850	1,760	5,110	6,720	18,120	42,340	33,510	14,680	5,390	2
3	1,900	1,970	1,730	1,820	1,800	6,150	6,860	18,460	40,670	32,570	13,930	5,240	3
4	2,130	1,970	1,710	1,770	1,820	6,450	6,820	19,000	40,200	32,530	13,240	5,070	4
5	2,330	1 960	1,690	1,730	1,830	6,500	6,770	20,020	40,360	32,680	12,690	4,960	5
6	2,410	1,950	1,670	1,700	1,830	6,500	6,760	22,550	38 630	32,530	12,290	4,890	6
7	2,430	1 950	1,660	1,680	1,830	6,500	6,760	25,330	37,320	31,390	12,020	4,810	7
8	2,420	1 950	1,650	1,660	1,830	6,500	6,770	27,950	36,220	30 700	11,750	4,710	8
9	2,390	1,940	1 650	1 650	1,830	6,500	6,890	29,280	35,850	30,340	11,440	4,590	9
10	2,360	1,940	1 650	1,630	1,830	6,500	7,300	29 980	36,810	28,460	11,090	4 440	10
11	2,320	1 930	1,660	1 620	1 850	6,500	8,330	30,160	36,730	27,090	10,780	4,300	11
12	2,290	1 930	1 670	1,610	1,880	6,500	9,760	29,300	36,510	25 810	10,540	4,220	12
13	2,270	1,930	1,680	1,610	1,930	6,500	11,120	28,110	37,740	25,140	10,310	4,180	13
14	2,250	1 950	1,680	1,600	1,960	6,500	12,160	27,270	39,110	25,370	10,260	4,150	14
15	2,230	2 010	1 670	1,600	1,990	6,500	12,290	26,530	39,800	24,180	10,480	4,080	15
16	2,200	2,070	1 660	1,600	1,990	6,500	12,250	25 750	38,610	24,070	10,630	4 010	16
17	2,180	2,080	1 660	1 600	1,970	6,500	12,660	24,590	37,410	23,720	10,520	3,960	17
18	2,150	2,040	1,660	1 600	1,940	6,500	13,860	23,460	36,630	22,340	10 210	3,930	18
19	2 120	2,000	1,690	1 600	1 900	6,500	14,990	22,550	36,040	20,950	9 610	3,840	19
20	2 100	1,970	1,730	1,590	1,870	6,500	15,610	22,910	35,700	19,640	8,930	3,520	20
21	2,090	1,940	1,780	1,590	1,860	6,500	15 980	24,160	35,330	18,960	8 450	3,360	21
22	2,090	1,920	1,820	1,580	1 880	6,500	15,720	23,850	35,200	18,430	8,140	3,470	22
23	2 080	1,900	1,840	1,590	1 930	6,500	15,310	24,310	35,300	17,940	7,830	3,510	23
24	2 070	1,880	1,840	1,600	2 030	6,500	15,480	25,480	34,970	17,380	7,490	3,480	24
25	2,050	1,860	1,840	1,610	2,250	6,500	16,500	26,550	34,620	17,020	7,110	3,470	25
26	2,040	1,840	1,820	1 610	2,740	6,500	16,900	27,120	34,600	16,750	6,780	3,550	26
27	2,030	1,820	1,790	1,610	3,320	6 500	16 090	28,320	34,910	16,400	6 490	3,650	27
28	2,020	1,800	1,790	1 610	3,660	6,500	16,380	30,620	35,970	16,270	6 260	3,680	28
29	2,010		1,790	1,620	3 760	6,500	16,300	33,930	36,990	16 120	6,040	3,670	29
30	2,000		1 810	1 650	3 740	6,500	16,300	37,090	36,840	15,990	5,770	3,670	30
31	1,990		1 840		3,850		16,590	39,590		15 830		3,670	31
TOTAL	67,620	54 470	53,660	49,450	68,370	190 810	369,370	809 990	1 119,120	744 950	301,260	129,010	
MEAN	2,180	1,950	1,730	1,650	2 210	6 360	11 920	26 130	37,300	24,030	10 040	4 160	
L/S/KM2	3.37	3 01	2 68	2.55	3 42	9 85	18 45	40 45	57 74	37 20	15 54	6 44	
RUNOFF (MM)	9 0	7.3	7 2	6 6	9 1	25 5	49 4	108 3	149 7	99 6	40 3	17 3	
MILLION M3	5,842	4 706	4,636	4 272	5 907	16 486	31,914	69 983	96 692	64 364	26 031	11 146	
MAXIMUM	2,560	2,080	1,840	1,860	3 850	6,500	16 900	39,590	42,340	34 840	15,520	5 540	
MINIMUM	1,900	1,800	1,650	1,580	1 710	4 100	6 540	17,630	34 600	15 830	5 770	3 360	

MAXIMUM 42,340 MINIMUM 1,580 MEAN 10 844 ANNUAL RUNOFF 342 843 MILLION M3

Year 1960 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3 480	2,200	2,050	1 600	1,310	2,540	11,000	21 200	42,000	33 100	15 400	9 560	1
2	3,430	2,200	2,040	1,590	1,350	2 540	11,300	27 600	40,300	34 100	15,500	8,490	2
3	3 430	2,240	2,000	1,550	1,360	2,520	13,400	31 200	39 000	35 400	14 800	7,650	3
4	3,380	2,240	1,970	1 510	1,370	3 440	12,900	32 800	37,100	36,400	14 800	7,150	4
5	3 280	2 240	1,940	1 480	1,370	3,500	12,700	30,100	39,400	36 600	14 600	6,660	5
6	3,280	2 230	1,910	1 460	1,370	5,600	13 000	29 900	39 600	36,200	13 900	6,610	6
7	3,220	2,210	1,900	1,420	1,350	7,090	14,400	30 000	38,500	36 800	13 400	6,400	7
8	3 170	2,170	1,890	1,420	1,310	7,650	15,400	31,000	38 700	39 100	13 200	6,210	8
9	3 120	2 170	1 860	1,400	1 270	8,780	14,900	32 900	39,500	41,500	12 800	6,030	9
10	3 150	2,210	1 820	1,370	1 260	9 750	14,400	34 800	39,300	41,500	12 400	5,880	10
11	3 180	2 430	1,820	1,340	1 280	9,700	13,700	37,600	38 900	40 400	12,400	5,780	11
12	3,130	2 480	1,830	1,310	1,300	9,700	13 700	38,000	39,000	37,700	11 800	5,810	12
13	3,170	2 530	1,840	1,300	1,310	6,590	13,800	37,000	39,000	33,700	11 600	5,900	13
14	3 180	2,550	1,870	1,290	1,370	5,610	13 800	35,900	38,800	30 800	11,400	5,920	14
15	3 130	2 630	1 900	1 260	1,400	5 490	13,800	35 000	38,300	28,600	11,300	5,940	15
16	2 990	2,630	1,900	1,260	1,600	5 600	13,100	34,600	37,800	27,500	11,300	6,010	16
17	2,890	2,580	1 900	1,250	2,120	5,520	12,800	35 800	37,000	27,400	11,200	6,030	17
18	2,840	2,530	1 880	1,270	2,160	5,380	12,500	39,200	36,300	26,400	10 900	5,960	18
19	2,790	2,430	1 860	1,280	2,160	5,310	12,500	39,900	34,700	24,500	10 600	5,780	19
20	2,710	2,340	1 820	1,290	2,000	5,270	12,500	45,000	32,400	22 700	10,300	5,560	20
21	2 670	2,310	1 780	1,300	2,010	5,310	12,800	47,600	30,600	22,600	9 960	5,330	21
22	2 630	2,270	1 750	1,310	2 090	5,490	13,100	49 400	29,200	22,500	9 700	5,100	22
23	2,580	2,230	1 750	1,310	2,170	6,670	13,200	49,500	28 500	21,500	9 450	4,940	23
24	2,480	2,190	1,750	1,310	2,170	7,570	12,800	50,000	29 400	20,100	9,150	4,850	24
25	2 410	2,110	1,720	1,310	2,290	7,650	12,500	51,000	30 600	19,400	8,820	4,740	25
26	2,350	2,070	1 690	1,310	2,950	7 850	12,500	51,000	33,400	18,800	8,450	4 610	26
27	2,270	2,060	1,670	1,310	2,710	7,450	12,800	53,200	34,100	18 200	8,140	4,480	27
28	2,230	2 060	1,660	1,310	2,420	7,250	13 100	52,000	34,900	17 400	7 850	4,400	28
29	2,230	2 050	1,650	1,300	2,300	7,450	15,300	49,200	34,100	16,900	7,730	4,320	29
30	2,210		1 610	1,300	2,210	9,270	15,700	47,000	32,900	16 400	8,580	4,220	30
31	2 210		1 600		2,420		18 600	44,300		16 000		4,130	31
TOTAL	89,420	66,590	56,630	40 720	55,760	189,540	419 900	1 225,700	1,083,500	880,200	341 430	180,650	
MEAN	2 880	2,300	1,830	1,360	1 800	6,320	13,550	39,540	36,120	28,390	11,380	5 830	
L/S/KM2	4 46	3 50	2 83	2 10	2 78	9 78	20 97	61 21	55 91	43 95	17 62	9 02	
RUNOFF (MM)	11 9	8 9	7 6	5.4	7.5	25 4	56 2	163 9	144 9	117 7	45 7	24 2	
MILLION M3	7,709	5,753	4,893	3,518	4,818	16,376	36,279	105,900	93,614	76,049	29,500	15,608	
MAXIMUM	3,480	2,630	2,050	1 600	2,950	9,750	18 600	53,200	42,000	41,500	15,500	9,560	
MINIMUM	2,210	2,050	1,600	1,250	1,260	2,520	11,000	21 200	28,500	16 000	7,730	4 130	

MAXIMUM 53,200 MINIMUM 1,250 MEAN 12,650 ANNUAL RUNOFF 400 017 MILLION M3

(to be continued)

A-8 Discharge (kratie)

Year 1961 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,030	2 700	2,250	1,780	2,170	7 130	33,200	25,900	49 100	55,400	20,200	8,560	1
2	3,940	2,650	2,230	1,740	2 160	6,780	35,900	24,300	47,000	54,700	19,500	8,270	2
3	3,870	2 630	2 200	1,730	2,190	6,360	35,600	22,800	46,500	54,400	18,800	7 960	3
4	3,820	2 610	2 180	1,720	2,240	6,210	34,300	21,800	46,100	53,100	17,600	7,710	4
5	3,760	2,570	2,160	1,710	2,350	6 460	33,500	21,800	45,400	52,700	17,200	7 490	5
6	3,690	2,530	2,140	1,690	2,510	6,630	33,400	24,000	43,700	53,200	16,600	7,270	6
7	3 620	2,500	2,130	1,690	2,630	7,510	32 800	25,900	42 800	52,500	16 400	7,070	7
8	3,550	2,490	2,110	1,680	2,620	10,900	33,500	25,900	42 800	51,000	15,800	6,900	8
9	3,510	2,470	2 090	1 680	2,540	14,700	31,900	24,200	43 400	49,000	15,600	6,800	9
10	3 480	2,460	2,060	1 680	2 430	18,200	29 600	23,900	44 200	48,400	15,200	6,900	10
11	3,420	2,440	2,030	1 690	2,380	20,200	27 600	25,200	44,700	46,900	14,500	7 150	11
12	3,350	2,420	2 010	1 720	2,350	20,000	25,500	27,500	46 000	43,700	13 900	7 250	12
13	3,330	2,400	2 000	1 750	2,350	18 900	23,600	30,500	46,500	40,200	13,400	7 210	13
14	3,260	2,360	1 990	1,780	2,400	17,700	23 100	31,900	48 200	37,700	12 900	7,030	14
15	3,200	2,350	1,970	1 810	2,380	17,000	22 400	32 700	51 400	37,300	12,500	6 820	15
16	3,150	2,320	1,960	1,940	2,520	17,200	21,200	36,500	54,100	37 400	12,100	6,590	16
17	3 110	2,300	1,950	1,960	2,890	18,600	19,700	39 900	54,300	36 200	11,800	6,390	17
18	3,120	2,280	1,940	2,070	2,680	19,600	18,400	42 400	54 200	34,400	11,500	6,200	18
19	3,130	2,260	1,940	2 120	2,790	20,000	20,000	45,500	53 900	32,200	11,300	6 010	19
20	3,100	2,240	1 940	2 170	2 940	19,600	26 000	48,200	53,300	30,400	11,100	5 880	20
21	3,060	2,230	1,940	2,260	3 120	19,100	29,500	51,000	53 100	30 700	10,800	5 780	21
22	3,060	2,220	1,940	2 340	3,380	18 400	30 400	54 300	52,200	34,800	10,700	5,650	22
23	3,050	2,210	1,930	2 350	3 970	18 100	29,400	56,600	51,200	36,600	10,600	5,540	23
24	3 020	2,210	1,960	2,370	5 250	17,600	27 300	58,500	50 100	34 700	10,400	5 470	24
25	2,990	2,230	1,930	2 400	7,390	17,100	26 500	60,300	51 100	31,600	10,300	5,360	25
26	2,960	2,250	1,900	2,360	9 270	16,600	28 200	61,300	53,400	29,000	10,100	5,250	26
27	2 930	2,260	1 890	2,340	8,640	20 100	28,300	62,400	55 900	27,100	9,790	5 220	27
28	2,890	2,260	1 870	2 280	7,890	25,800	29 600	62,300	56 700	26,000	9,540	5,110	28
29	2,850		1 860	2 200	7 690	25,800	29 500	60 700	56 700	24,600	9 200	5 040	29
30	2 800		1 820	2 160	8 150	27,000	28 300	58,000	55 700	23,000	8 860	4 970	30
31	2,760		1 800		7 710		26,000	55,000		21,600		4 920	31
TOTAL	101,810	66 870	62 120	59 170	121 980	465 480	874 200	1 241 200	1 493 700	1 220,500	398 190	199 790	
MEAN	3 280	2,390	2 000	1 970	3 940	16 160	28 200	40 040	49 790	39,370	13,270	6 450	
L/S/KM2	5 08	3 70	3 10	3 05	6 09	25 05	43.65	61 98	77 07	60 95	20 55	9 98	
RUNOFF (MM)	13 6	8 9	8.3	7 9	16 3	64 9	116 9	166 0	199 8	163 2	53 3	26 7	
MILLION M3	8,796	5,778	5,367	5 112	10 539	41 945	75,531	107,240	129 056	105 451	34 404	17 262	
MAXIMUM	4,030	2,700	2,250	2 400	9 270	27 000	35 900	62 400	56 700	55 400	20 200	8,560	
MINIMUM	2 760	2,210	1 800	1,680	2,160	6 210	18,400	21 800	42 800	21 600	8 860	4 920	

MAXIMUM 62,400 MINIMUM 1 680 MEAN 17,329 ANNUAL RUNOFF 546,481 MILLION M3

Year 1962 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	4,770	3 460	2,770	2 190	2,400	4,950	14,490	32,200	29,350	35,550	15 160	7,470	1
2	4,640	3 450	2,740	2 160	2,580	5,250	13,950	35,250	28,950	36,900	14,900	7,330	2
3	4,800	3 410	2,700	2 120	2,850	6,840	13 640	36,450	29,250	36,000	14,500	7,150	3
4	4 770	3,370	2 700	2,100	2,860	8,450	14 280	37,900	28,850	34,550	14,100	6,970	4
5	4 690	3,340	2,700	2 090	2,820	8,570	15,710	39,950	28,250	33,850	14,100	6,780	5
6	4 640	3,340	2 670	2 080	2,790	7 970	15,920	43,100	31,700	32,300	14,370	6,560	6
7	4,620	3,310	2,620	2 070	2,810	8,360	15,350	47,600	37,600	32,550	14,350	6,350	7
8	4,590	3 260	2,590	2 060	2,940	8,250	15,200	49,400	41,700	32,400	13,600	6,120	8
9	4 550	3 260	2,560	2,050	2,960	8,580	15,410	50,100	42,400	31,900	13,300	5 960	9
10	4,470	3,250	2,540	2,030	3,000	9,380	15,560	49,150	42,550	29 650	12 620	5,800	10
11	4,420	3 240	2,530	2 030	3,000	10,650	17,960	47,700	41,550	27,300	12,460	5 650	11
12	4,340	3 220	2,520	2,030	3,150	11,060	24,300	47,450	38,550	25,400	12,300	5,500	12
13	4 260	3 210	2,510	2,060	3,020	11,710	29,260	45,850	35,200	23,900	12,000	5,360	13
14	4 220	3 180	2,510	2,080	2,960	11,800	31,190	43 650	32,800	23,800	11,720	5,250	14
15	4,220	3,110	2,510	2 100	3,010	11,650	29 800	41,040	32,200	23,400	11,500	5,130	15
16	4,220	3 110	2,540	2,110	3,070	12,150	29,140	38,600	32,500	23,000	11,300	5,020	16
17	4,190	3,070	2,510	2 150	3,080	13,720	29,140	36,750	31,300	22,650	11 030	4 900	17
18	4 140	3 050	2,470	2 180	3,170	18,330	29,790	35 200	37,900	20 800	10 770	4,750	18
19	4,070	3 010	2,440	2 190	3,240	23,380	31,750	33 400	42,800	20 100	10,450	4 630	19
20	4,000	3 000	2,440	2 220	3,520	27,280	33,040	32,200	45,700	19 150	10 050	4,550	20
21	3,930	3 020	2,460	2,210	3 730	27,410	31,570	31 900	45,100	19 600	9 680	4,430	21
22	3,860	3,020	2,470	3,330	3,990	26,130	29,760	31,500	44,900	19 200	9,290	4,340	22
23	3,800	2,980	2,450	2,310	4,430	25,080	28,230	31,250	43,300	19,120	8 970	4,280	23
24	3,750	2,900	2 430	2 250	4 610	23 750	27,530	31,000	41,000	19 000	8,690	4,200	24
25	3,690	2,850	2 410	2 260	5,060	21,580	28,990	32,150	38,500	18,850	8,450	4,140	25
26	3,660	2,810	2,380	2 290	5,830	20,030	32,800	32,750	36,400	18,650	8 160	4,070	26
27	3,620	2,790	2,350	2,300	6 080	18,660	35,110	32,300	34,300	18 200	7,950	4,040	27
28	3,590	2 790	2,320	2 290	5,810	16 940	35,570	31,000	32,350	17,460	7,870	4,030	28
29	3,570		2,280	2,290	5 420	15,650	34,180	30 200	32,100	16,870	7,910	3 990	29
30	3,540		2 250	2,340	5,200	14,800	32,340	30 250	33,200	16,300	7,710	3,930	30
31	3,480		2,220		5,050		31,230	30,150		16,130		3,790	31
TOTAL	129,110	87 830	77,590	64 990	114,440	438,360	782,190	1,167,390	1.092 250	764,530	339,260	162,470	
MEAN	4,170	3 140	2,500	2,170	3,690	14 610	25,230	37,660	36 410	24,660	11,310	5,240	
L/S/KM2	6 45	4 86	3 87	3.35	5 71	22 62	39 06	58 29	56.36	38 18	17.51	8 11	
RUNOFF (MM)	17.3	11 7	10 4	8 7	15 3	58 6	104 6	156 1	146 1	102 3	45 4	21 7	
MILLION M3	11,155	7,589	6,704	5 615	9,888	37 875	67,581	100,862	94,370	66,055	29,312	14 037	
MAXIMUM	4 800	3,460	2,770	2,340	6,080	27,410	35,570	50,100	45,700	36,900	15,160	7,470	
MINIMUM	3,480	2,790	2,220	2 030	2,400	4,950	13,640	30,150	28,250	16,130	7,710	3,790	

MAXIMUM 50,100 MINIMUM 2 030 MEAN 14,303 ANNUAL RUNOFF 451 043 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1963 UNIT

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,850	2,680	2,030	1,900	1,640	2,670	13,220	38,670	35,220	34,880	12,500	10 000	1
2	3,790	2,670	2,020	1,900	1,640	2,890	12 800	40,900	35,560	35,640	12,000	9,750	2
3	3,760	2,650	2,000	1,920	1 640	3,260	12,180	40,300	35,490	35,770	11,900	9,450	3
4	3,750	2 610	1,980	1,970	1,630	3,120	11,840	38,730	39,140	35,940	11,900	9,150	4
5	3,730	2,590	1,970	1,970	1,610	2,990	12,060	38,630	39,250	34 660	12,500	8,850	5
6	3,690	2,570	4,960	1,920	1,610	2 860	12,770	38,540	38,080	31,180	14,400	8,700	6
7	3,580	2,550	1,970	1,900	1,600	2,900	13,390	37,260	36,490	29,790	15,900	8,500	7
8	3,500	2,520	1,960	1,880	1,650	3,060	15,680	37,170	34,500	28,800	16,800	8,200	8
9	3,430	2,490	1,940	1,860	1,750	3,130	17,440	39,250	31,650	28,090	16,850	7,950	9
10	3,370	2,470	1,920	1,830	1,830	3,630	21,110	42,630	30,850	26,300	16,400	7,800	10
11	3,300	2,450	1,940	1,800	1,780	6,050	21,690	45 480	30,850	24,900	15,700	7,550	11
12	3,250	2,430	1,930	1,780	1,710	9,720	21,720	47,460	32,570	22,980	15,000	7,300	12
13	3,200	2,400	1,920	1,770	1,710	11,270	22 730	49,400	35,340	21,400	14,450	7,050	13
14	3,180	2,370	1,920	1,740	1,710	11,860	25,360	50,840	36,970	20,140	14,100	6,750	14
15	3,150	2,360	1,920	1,710	1,730	10,980	25,330	50,150	38,790	19,540	13,900	6,350	15
16	3,100	2,340	1 920	1,690	1,730	11,270	24,000	49,920	38,900	18,390	14,000	6,350	16
17	3,060	2,320	1,920	1,680	1,680	11,380	23,250	48,720	41,400	17,880	14,500	6,200	17
18	3,040	2,310	1,880	1,680	1,690	11,870	22,600	46,960	42,020	16,980	14,700	6,150	18
19	3 000	2,270	1,880	1,680	1,710	12,460	22,530	45,120	40 770	16,520	14,600	5,900	19
20	2,990	2,250	1,880	1,680	1,720	13.640	21,270	44 090	39,100	15,200	14,500	5,800	20
21	2 900	2,230	1,870	1,660	1,740	16,480	20,000	45,160	37,260	15,140	14,200	5,600	21
22	2,930	2 200	1,860	1,660	1,790	18,660	19,660	42,910	36 820	15,750	13,700	5,520	22
23	2 890	2 170	1,860	1,650	1,830	18,360	20,210	40,350	36 490	15 750	13,350	5,410	23
24	2,860	2,140	1,880	1,650	1 910	16,770	24,200	39,240	34,740	15 920	12,900	5,310	24
25	2 850	2 120	1,880	1,650	2,080	14,930	27 060	38 270	35,060	15 190	12,600	5,220	25
26	2 810	2 100	1,920	1,640	2,150	13,780	29 070	37,810	36 940	14,710	12,150	5,130	26
27	2,780	2,090	1,940	1,630	2,260	13,120	29,700	35,760	38,130	14,240	11,650	4,990	27
28	2,760	2 060	1,940	1,630	2 240	13,080	30 650	33,550	36,930	13,320	11,200	4,320	28
29	2,730		1,950	1,630	2,420	13,260	34 630	34,660	37,490	13,330	10 800	3,820	29
30	2 700		1,930	1,640	2,510	13,450	35,770	35,520	36 630	12,880	10,300	4,710	30
31	2.660		1,920		2,590		37,630	36,250		12,390		4 660	31
TOTAL	98,610	66,410	62,810	52,700	57,290	292,900	681,550	1,289,700	1,099 720	674,100	409 650	208,440	
MEAN	3,180	2,370	2 030	1,760	1,850	9,760	21 990	41,600	36 660	21,750	13,660	6,720	
L/S/KM2	4 92	3 67	3 14	2 72	2 86	15 11	34 03	64 40	56 75	33 66	21 14	10.41	
RUNOFF (MM)	13 2	8 9	8 4	7 0	7 7	39 2	91 2	172 5	147 1	90 2	54 8	27.9	
MILLION M3	8.520	5,738	5 427	4.553	4,950	25,307	58,886	111,430	95 016	58,242	35,394	18 009	
MAXIMUM	3 850	2,680	4 960	1,970	2,590	18,660	37,630	50 840	42,020	35 940	16,850	10 000	
MINIMUM	2,680	2,060	1 860	1,630	1,600	2,670	11,840	33,550	30,850	12,390	10,300	3 820	

MAXIMUM 50 840 MINIMUM 1,600 MEAN ANNUAL RUNOFF 431,472 MILLION M3

Year 1964 UNIT c m s

DATF	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	4,640	2 900	2,130	1,850	2,080	9 840	12 400	16,000	38,200	47,600	18,900	9 890	1
2	4,630	2 880	2,110	1,840	2 240	8,620	12,100	15,100	37,600	46 400	18,200	9,540	2
3	4,530	2 840	2,090	1,840	2 200	7.590	12,400	14,900	37 000	46,400	17,300	9 240	3
4	4,400	2 810	2,080	1,840	2,140	7,000	15,900	14,800	36,500	45,300	16 700	9,040	4
5	4,340	2 770	2,060	1,840	2,210	6,630	18,200	15,300	33 800	45,100	16,100	8 970	5
6	4,060	2 760	2,040	1,860	2,430	6,500	19 100	18,000	31,600	45,300	15 800	9,080	6
7	4,140	2,750	2,020	1 860	2,550	6,630	19,500	20,400	30,500	45 400	15,700	9,040	7
8	4 070	2,730	2 010	1,860	3,160	7,030	20,100	26,700	28,700	43,200	16,700	8 910	8
9	4 010	2,700	2.010	1,870	3 200	7,930	21 400	28,000	27,400	40 900	17,100	8 800	9
10	3 960	2,670	2,000	1,870	3,350	8,780	21,100	26,900	27,000	38 900	18,500	8 490	10
11	3 900	2,640	2,000	1,880	3 620	9,610	20,400	28,000	27,500	37 400	21 200	8,180	11
12	3.870	2 620	1,990	1 880	3,440	10,200	20,400	25,700	27,500	35,500	23 300	7,890	12
13	3,800	2 600	1,980	1,900	4,370	10,500	21,200	24,000	27,300	35,000	23,400	7,790	13
14	3,760	2,550	1,970	1,830	4,000	10,400	23,600	24,000	27,200	34,100	20 200	7,450	14
15	3 700	2,510	1,970	1,800	3,620	10,500	25,000	26,600	29,200	33,200	17,300	7,250	15
16	3,650	2 490	1,970	1,720	3,480	10 700	25,000	27,300	30,400	32,200	16,000	7,330	16
17	3,610	2,480	1,970	1,700	3,280	10,500	23,800	30,200	34,500	29,300	15,300	7,350	17
18	3,570	2,430	1,960	1 680	3,250	10,100	23,000	31,000	39,200	28,200	14,300	7,110	18
19	3,460	2 410	1,950	1,670	3,240	9,840	23,000	31,500	43,400	27,000	14,100	6,920	19
20	3,450	2,380	1,940	1,660	3 240	9,610	22,500	30,800	41,200	25.800	13,900	6 770	20
21	3 420	2,350	1,920	1,860	3 280	9,380	21,700	30,200	40,300	24,600	13,800	6,540	21
22	3,330	2,310	1,910	1 880	3,690	9,520	20,700	29,500	40,600	23,500	13,500	6,440	22
23	3,270	2,290	1,890	1,920	4,140	9,560	20,000	29,300	41,400	22,200	13,400	6,330	23
24	3,250	2,250	1,880	1,960	4,580	9,720	19,100	30,200	45,400	20,300	12,800	6,230	24
25	3 180	2,230	1,880	1,950	5,270	9,720	18,100	34,000	52,500	19,500	12,300	6 080	25
26	3 160	2,210	1,880	1,930	5 700	9,930	17,300	32,300	55 000	19,500	11,900	5 940	26
27	3,120	2,190	1 870	1,930	6,780	10,200	16,800	35,000	56 000	19,300	11,400	5 760	27
28	3 100	2,170	1,860	1,950	7,850	10,900	16,600	37,500	52,300	18,800	10 900	5,650	28
29	3,020	2 150	1,860	1 970	8,530	11 600	16,200	37,500	49,400	18,900	10,500	5,430	29
30	3,000		1,860	2,030	9,660	12,200	16,300	38,800	48,100	19,100	10 200	5,270	30
31	2,950		1,860		10,400		16,300	38 600		19,300		5,130	31
TOTAL	114,350	73,070	60,920	55,630	130,980	281,240	599,200	848,100	1,136,900	987,200	470,700	229 840	
MEAN	3,690	2,520	1,970	1 850	4,230	9,380	19,330	27,360	37,900	31,850	15,690	7 410	
L/S/KM2	5 71	3 90	3 05	2 87	6 54	14 51	29 92	42 35	58 66	49 30	24 29	11 48	
RUNOFF (MM)	15 3	9 8	8 1	7 4	17.5	37 6	80 1	113 4	152 1	132 0	63 0	30 7	
MILLION M3	9 880	6,313	5.263	4,806	11,317	24,299	51 771	73,276	98 228	85,294	40,668	19,858	
MAXIMUM	4 640	2,900	2 130	2,030	10,400	12,200	25 000	38,800	56,000	47,600	23,400	9,890	
MINIMUM	2,950	2,150	1,860	1,660	2,080	6,500	12,100	14,800	27,000	18,600	10 200	5,130	

MAXIMUM 56 000 MINIMUM 1,660 MEAN 13,629 ANNUAL RUNOFF 430,982 MILLION M3

(to be continued)

A-8 Discharge (Kratie)

Year 1963 UNIT

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	3,850	2,680	2,030	1,900	1,640	2,670	13,220	38 670	35,220	34,860	12,500	10,000	1
2	3,790	2,670	2,020	1,900	1,640	2,890	12,800	40,900	35,560	35,640	12,000	9,750	2
3	3,760	2,650	2,000	1,910	1,640	3,260	12,160	40,300	35,490	35,770	11,900	9,450	3
4	3,750	2 610	1,980	1,970	1,630	3,120	11,840	38,730	39 140	35,940	11,900	9,150	4
5	3,730	2,590	1,970	1,970	1,610	2,990	12,060	38,630	39,250	34,660	12,500	8,850	5
6	3,690	2,570	4,960	1,920	1,610	2,860	12,770	38,540	38,080	31,180	14,400	8,700	6
7	3,580	2,550	1,970	1,900	1,600	2,900	13,390	37,260	36,490	29,790	15,900	8,500	7
8	3,500	2,520	1,960	1,880	1,650	3,060	15,680	37,170	34,500	28 800	16,800	8,200	8
9	3,430	2,490	1,940	1,860	1,750	3,130	17,440	39,250	31,650	28,090	16,850	7,950	9
10	3,370	2,470	1,920	1,830	1,830	3,630	21,110	42,630	30,850	26,300	16,400	7,800	10
11	3,300	2,450	1,940	1,800	1,780	6,050	21,690	45,480	30,850	24,900	15,700	7,550	11
12	3,250	2,430	1,930	1,780	1,710	9,720	21,720	47,460	32,570	22,980	15,000	7,300	12
13	3,200	2,400	1,920	1,770	1,710	11,270	22,730	49,400	35,340	21,400	14,450	7,050	13
14	3,180	2,370	1,920	1,740	1,710	11,860	25,360	50,840	36,970	20,140	14,100	6,750	14
15	3,150	2,360	1,920	1,710	1,730	10,980	25,330	50,150	38,790	19,540	13,900	6,350	15
16	3,100	2,340	1,920	1,690	1,730	11,270	24,000	49,920	38,900	18,390	14,000	6,350	16
17	3,060	2,320	1,920	1,680	1,680	11,380	23,250	48,720	41,400	17,880	14,500	6,200	17
18	3,040	2,310	1,880	1,680	1,690	11,870	22,600	46,960	42,020	16,980	14 700	6,150	18
19	3,000	2,270	1,880	1,680	1,710	12,460	22,530	45,120	40,770	16,520	14,800	5,900	19
20	2,990	2,250	1,880	1,680	1,720	13,640	21,270	44 090	39,100	15,200	14,500	5,800	20
21	2,900	2 230	1,870	1,660	1,740	16,480	20,000	45,160	37,260	15,140	14,200	5,600	21
22	2,930	2,200	1,860	1,660	1,790	18,660	19,660	42,910	36,820	15 750	13,700	5,520	22
23	2,890	2,170	1,860	1,650	1,830	18,360	20 210	40,350	36,490	15,750	13,350	5,410	23
24	2,860	2,140	1,880	1,650	1 910	16,770	24,200	39,240	34,740	15 920	12,900	5,310	24
25	2,850	2,120	1,880	1,650	2,080	14,930	27,060	38,270	35,060	15 190	12,600	5,220	25
26	2,810	2,100	1,920	1,640	2,150	13,780	29,070	37,810	36,940	14,710	12,150	5,130	26
27	2,780	2,090	1,940	1,630	2,260	13,120	29,700	35,760	38 130	14 240	11,650	4,990	27
28	2,760	2 060	1,940	1,630	2,240	13,080	30,050	33,550	36,950	13 820	11,200	4,320	28
29	2,730		1 950	1,630	2,420	13,260	34 630	34,660	37,490	13,330	10 800	3,820	29
30	2,700		1 930	1,640	2,510	13,450	35,770	35,520	36,630	12 880	10,300	4,710	30
31	2,680		1 920		2,590		37 630	36,250		12,390		4,660	31
TOTAL	98,610	66,410	62 810	52,700	57,290	292,900	681,550	1,269 700	1,099,720	674,100	409,650	208,440	
MEAN	3 180	2,370	2 030	1,760	1,850	9,760	21,990	41 600	36,660	21,750	13,660	6,720	
L/S/KM2	4 92	3 67	3 14	2 72	2 86	15 11	34 03	64 40	56 75	33 66	21 14	10 41	
RUNOFF (MM)	13 2	8 9	8 4	7 0	7 7	39 2	91 2	172.5	147 1	90 2	54 8	27 9	
MILLION M3	8,520	5 738	5,427	4,553	4,950	25,307	58,886	111,430	95 016	58,242	35,394	18,009	
MAXIMUM	3 850	2,680	4 960	1,970	2,590	18 660	37,630	50,840	42 020	35,940	16,850	10,000	
MINIMUM	2,680	2 060	1,860	1,630	1,600	2 670	11,840	33,550	30,850	12,390	10,300	3,820	

MAXIMUM 50,840 MINIMUM 1,600 MEAN ANNUAL RUNOFF 431,472 MILLION M3

Year 1964 UNIT c m s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	4 640	2 900	2,130	1 850	2,080	9 840	12,400	16,000	38 200	47,600	18,900	9 890	1
2	4 630	2,880	2,110	1 840	2,240	8 620	12,100	15,100	37,600	46,400	18,200	9,540	2
3	4,530	2,840	2,090	1,840	2,200	7,590	12 400	14,900	37 000	46 400	17,300	9 240	3
4	4 400	2,810	2,080	1,840	2,140	7,000	15,900	14,800	36,500	45,300	16,700	9 040	4
5	4,340	2,770	2 060	1,840	2 210	6,630	18 200	15,300	33,800	45 100	16,100	8,970	5
6	4 060	2,760	2,040	1,860	2 430	6,500	19,100	18,000	31,800	45,300	15,800	9,080	6
7	4,140	2,750	2 020	1,860	2,550	6,630	19,500	20,400	30,500	45 400	15,700	9,040	7
8	4,070	2 730	2 010	1,860	3,160	7,030	20 100	26,700	28,700	43 200	16,700	8 910	8
9	4,010	2 700	2,010	1 870	3,200	7,930	21,400	28,000	27,400	40 900	17,100	8,800	9
10	3,960	2 670	2,000	1,870	3,350	8 780	21,100	26,900	27,000	38,900	18,500	8,490	10
11	3,900	2 640	2,000	1,880	3,620	9,610	20 400	28,000	27,500	37,400	21,200	8,180	11
12	3 870	2,620	1 990	1,880	3,440	10,200	20,400	25,700	27,500	35,500	23,300	7,890	12
13	3 800	2,600	1,980	1,900	4,370	10,500	21,200	24,000	27,300	35,000	23,400	7,790	13
14	3,760	2,550	1,970	1,830	4,000	10,400	23,600	24,000	27,200	34,100	20,200	7,450	14
15	3,700	2,510	1,970	1,800	3,620	10,500	25,000	26,600	29,200	33,200	17,300	7,250	15
16	3 650	2,490	1 970	1,720	3,480	10,700	25,000	27,300	30,400	32,200	16 000	7,330	16
17	3,610	2,480	1 970	1,700	3 280	10,500	23,800	30,200	34,500	29,300	15,300	7,350	17
18	3,570	2,430	1,960	1,680	3,250	10,100	23,000	31,000	39,200	28,200	14,300	7,110	18
19	3 460	2 410	1,950	1,670	3 240	9,840	23,000	31 500	43,400	27 000	14,100	6,920	19
20	3,450	2,380	1,940	1 660	3,240	9,610	22,500	30,800	41,200	25,800	13,900	6,770	20
21	3,420	2,350	1,920	1,860	3,280	9,380	21,700	30,200	40,300	24,600	13,800	6,540	21
22	3,330	2,310	1,910	1,880	3,690	9,520	20,700	29,500	40,600	23,500	13,500	6 440	22
23	3,270	2,290	1,890	1,920	4,140	9,560	20,000	29,300	41,400	22,200	13,400	6,330	23
24	3,250	2,250	1,880	1,960	4,580	9 720	19,100	30,200	45 400	20,300	12 800	6,230	24
25	3,180	2,230	1,880	1,950	5,270	9,720	18,100	34,000	42,500	19,500	12,300	6,080	25
26	3,160	2,210	1,880	1 930	5,700	9 930	17,300	32,300	55,000	19,500	11,900	5,940	26
27	3,120	2,190	1,870	1,930	6,780	10,200	16 800	35 000	56,000	19,300	11,400	5,760	27
28	3,100	2,170	1,860	1,950	7,850	10,900	16,600	37,500	52,300	18 800	10,900	5 650	28
29	3,020	2,150	1,860	1,970	8,530	11,600	16,200	37,500	49,400	18 900	10,500	5,430	29
30	3,000		1,860	2,030	9,660	12,200	16,300	38,800	48,100	19 100	10,200	5,270	30
31	2 950		1 860		10 400		16,300	38 600		19,300		5,130	31
TOTAL	114,350	73,070	60 920	55,630	130,980	281,240	599 200	848,100	1 136,900	987,200	470 700	229,840	
MEAN	3,690	2,520	1,970	1,850	4,230	9,380	19,330	27,360	37,900	31,850	15,690	7 410	
L/S/KM2	5 71	3 90	3 05	2 87	6.54	14 51	29 92	42 35	58 66	49 30	24 29	11 48	
RUNOFF (MM)	15 3	9 8	8 1	7 4	17 5	37 6	80 1	113 4	152 1	132 0	63 0	30 7	
MILLION M3	9,880	6,313	5,263	4,806	11,317	24,299	51 771	73,276	98,228	85,294	40 668	19,858	
MAXIMUM	4,640	2,900	2 130	2,030	10,400	12,200	25,000	38,800	56 000	47,600	23,400	9,890	
MINIMUM	2 950	2,150	1 860	1,660	2 080	6,500	12,100	14,800	27,000	18 800	10,200	5,130	

MAXIMUM 56,000 MINIMUM 1,660 MEAN 13 629 ANNUAL RUNOFF 430,982 MILLION M3

(to be continued)

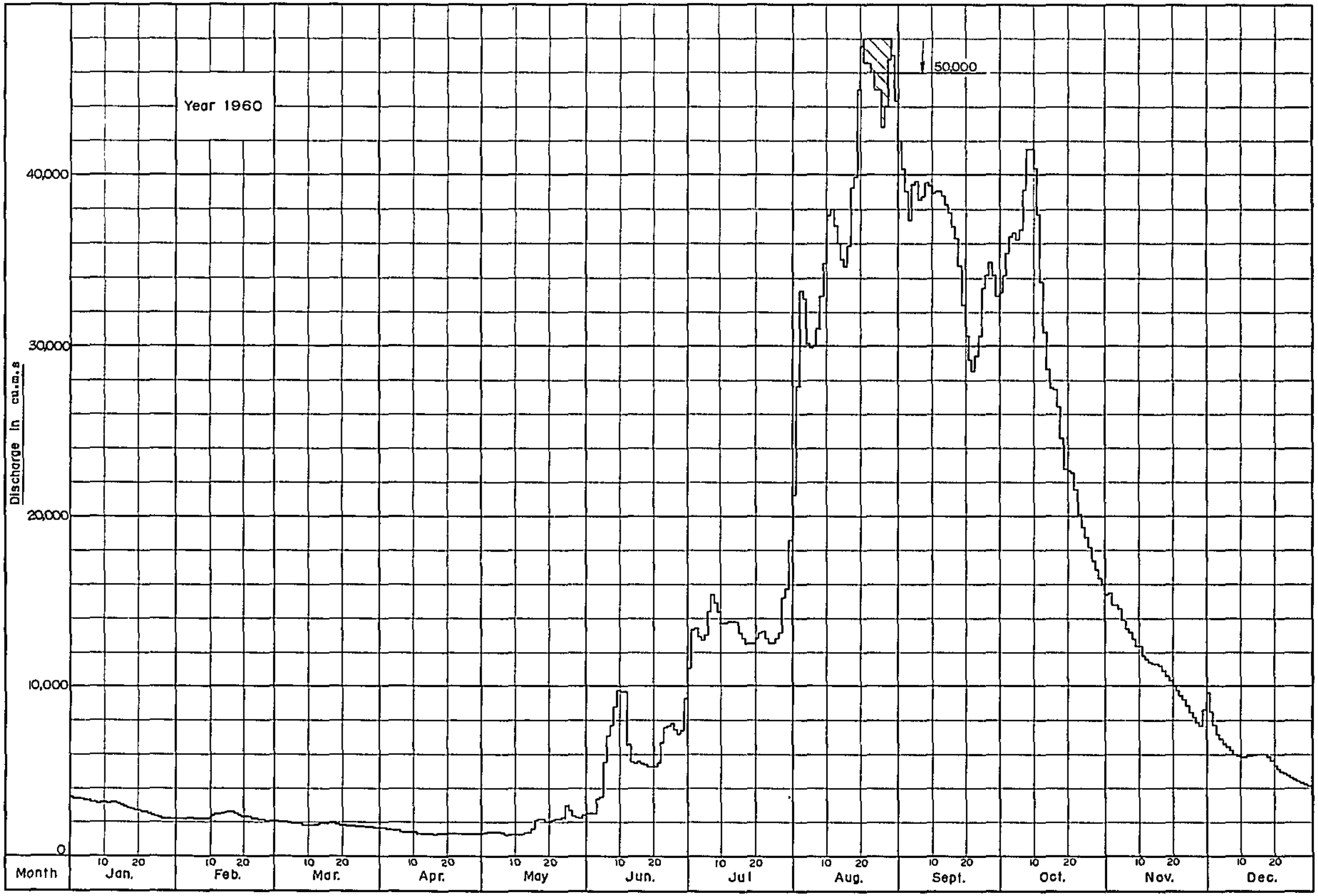
A-8 Discharge (Kratie)

Year 1965 UNIT c.m.s

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DATE
1	5,000	3,280	2,580	2,010	2,150	4,920	29,700	35,000	31,500	21,900	11,200	8,030	1
2	4,900	3,250	1,590	1,990	2,180	4,830	29,600	34,100	33,300	20,700	10,500	7,950	2
3	4,820	3,220	2,560	1,980	2,240	5,940	28,900	32,900	33,800	20,700	10,200	7,770	3
4	4,740	3,210	2,490	1,970	2,240	6,560	28,800	31,500	32,800	22,400	10,400	7,530	4
5	4,700	3,180	2,450	1,950	2,270	7,390	27,900	31,000	33,000	23,500	12,900	7,350	5
6	4,650	3,130	2,440	1,950	2,320	7,610	27,000	32,600	34,000	21,500	15,600	7,130	6
7	4,560	3,100	2,420	1,960	2,590	8,070	26,200	33,600	36,400	20,600	16,900	6,940	7
8	4,470	3,040	2,400	1,930	2,680	8,090	25,400	33,600	37,500	20,300	16,700	6,730	8
9	4,390	3,020	2,370	1,950	2,820	8,070	24,900	32,100	35,900	21,000	15,500	6,560	9
10	4,310	3,000	2,360	1,950	3,080	8,030	25,200	30,300	36,200	20,800	15,100	6,440	10
11	4,230	2,950	2,330	1,960	2,810	8,600	25,500	30,300	38,500	18,200	14,800	6,250	11
12	4,190	2,940	2,310	1,970	2,740	10,100	25,600	29,000	39,800	17,000	15,100	6,060	12
13	4,080	2,880	2,270	1,960	2,470	13,900	28,400	27,100	38,000	16,000	15,800	5,970	13
14	4,030	2,840	2,250	1,950	2,450	16,000	34,900	25,500	34,800	15,300	16,300	5,900	14
15	3,920	2,820	2,230	1,930	2,410	15,900	37,600	24,800	34,700	14,700	15,700	5,790	15
16	3,860	2,800	2,220	1,950	2,270	15,200	35,600	24,400	34,600	14,400	15,000	5,650	16
17	3,820	2,760	2,210	1,960	2,230	14,700	31,700	23,800	34,800	14,000	14,100	5,600	17
18	3,790	2,770	2,190	1,960	2,470	15,800	28,000	23,500	34,800	13,800	13,500	5,500	18
19	3,760	2,750	2,170	1,960	2,430	18,500	25,600	23,500	34,600	13,400	12,500	5,460	19
20	3,730	2,710	2,150	1,950	2,440	23,600	23,600	23,500	33,000	13,400	11,800	5,270	20
21	3,610	2,710	2,120	1,940	2,430	25,900	23,100	23,100	31,800	13,600	11,000	5,160	21
22	3,680	2,700	2,110	1,920	2,430	26,600	21,500	22,900	30,500	13,300	10,500	5,300	22
23	3,620	2,690	2,080	1,930	2,460	27,200	20,000	24,800	30,600	13,200	10,100	5,360	23
24	3,600	2,670	2,040	1,950	2,490	28,600	18,800	26,700	30,100	13,100	9,610	5,290	24
25	3,550	2,660	2,020	1,930	2,640	33,300	18,800	27,900	29,400	12,900	9,400	5,300	25
26	3,530	2,650	2,000	1,930	2,690	33,400	19,200	28,300	26,200	12,400	9,500	5,160	26
27	3,470	2,620	2,020	2,130	3,000	35,700	20,800	29,600	24,700	12,000	9,360	5,110	27
28	3,450	2,580	2,030	2,200	3,130	35,300	24,500	31,100	23,400	11,800	8,840	5,020	28
29	3,350		2,050	2,140	3,050	34,600	27,900	31,000	22,800	11,700	8,400	4,950	29
30	3,330		2,040	2,130	3,580	34,300	30,000	30,100	22,400	11,700	8,180	5,110	30
31	3,310		2,020		4,130		32,200	29,900		11,600		5,610	31
TOTAL	124,450	80,900	69,520	59,390	81,320	536,710	826,900	887,500	973,900	500,900	374,490	187,250	
MEAN	4,000	2,890	2,240	1,980	2,620	17,900	26,700	28,600	32,500	16,200	12,500	6,040	
L/S/KM2	6.19	4.47	3.47	3.07	4.06	27.7	41.3	44.3	50 3	25.1	19.3	9.35	
RUNOFF (MM)	16.7	10.8	9.30	7.94	10.9	71.8	111.0	119.0	130.0	67.0	50.2	25.1	
MILLION M3	10,800	6,990	6,010	5,130	7,030	46,400	71,400	76,700	84,100	43,300	32,400	16,200	
MAXIMUM	5,000	3,280	2,590	2,200	4,130	35,700	37,600	35,000	39,800	23,500	16,900	8,030	
MINIMUM	3,310	2,580	2,000	1,920	2,150	4,830	18,800	22,900	22,400	11,600	8,180	4,950	

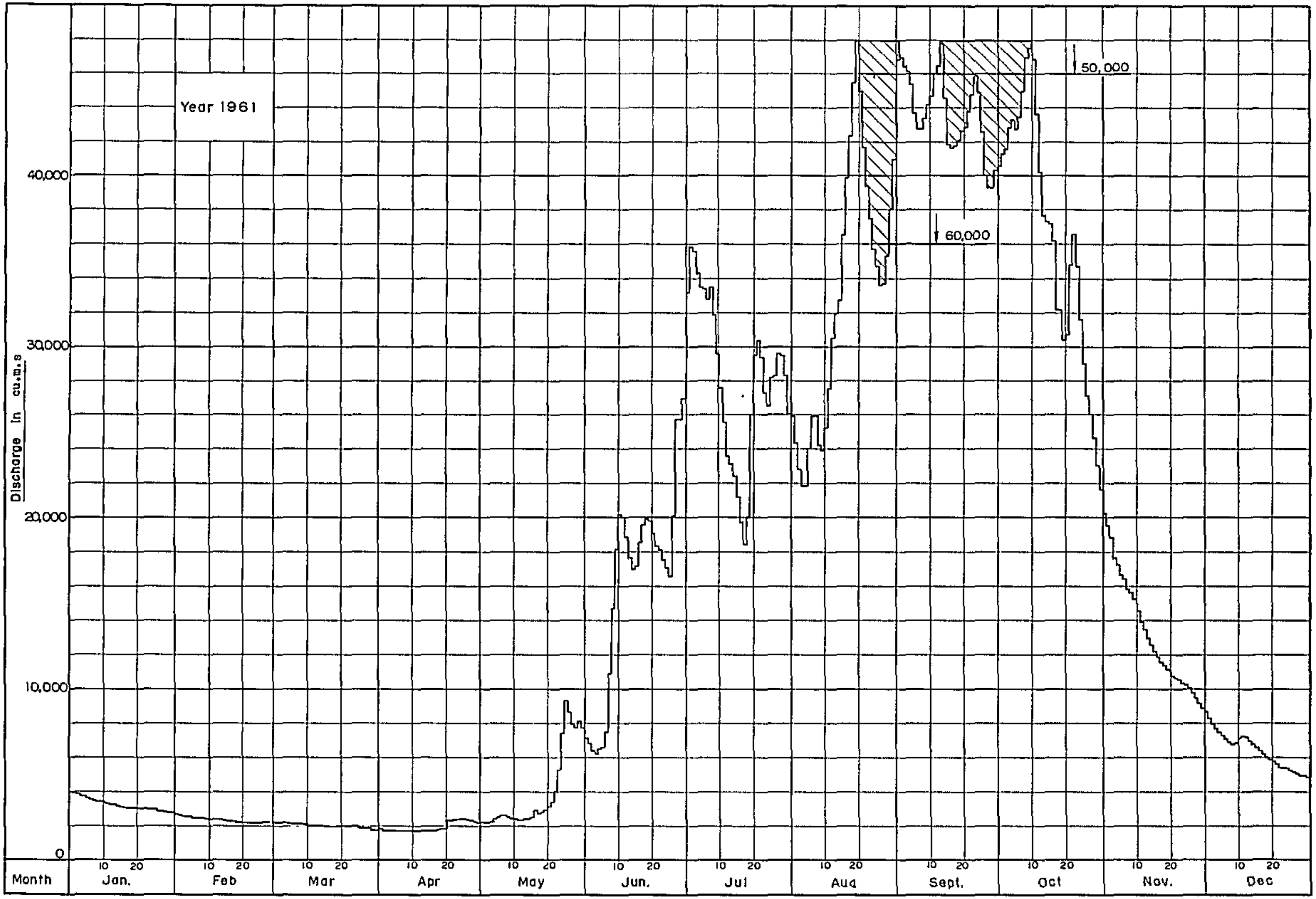
MAXIMUM 39,800 MINIMUM 1,920 MEAN 12,900 ANNUAL RUNOFF 407,000 MILLION M3

A-9 Hydrograph at Kratie



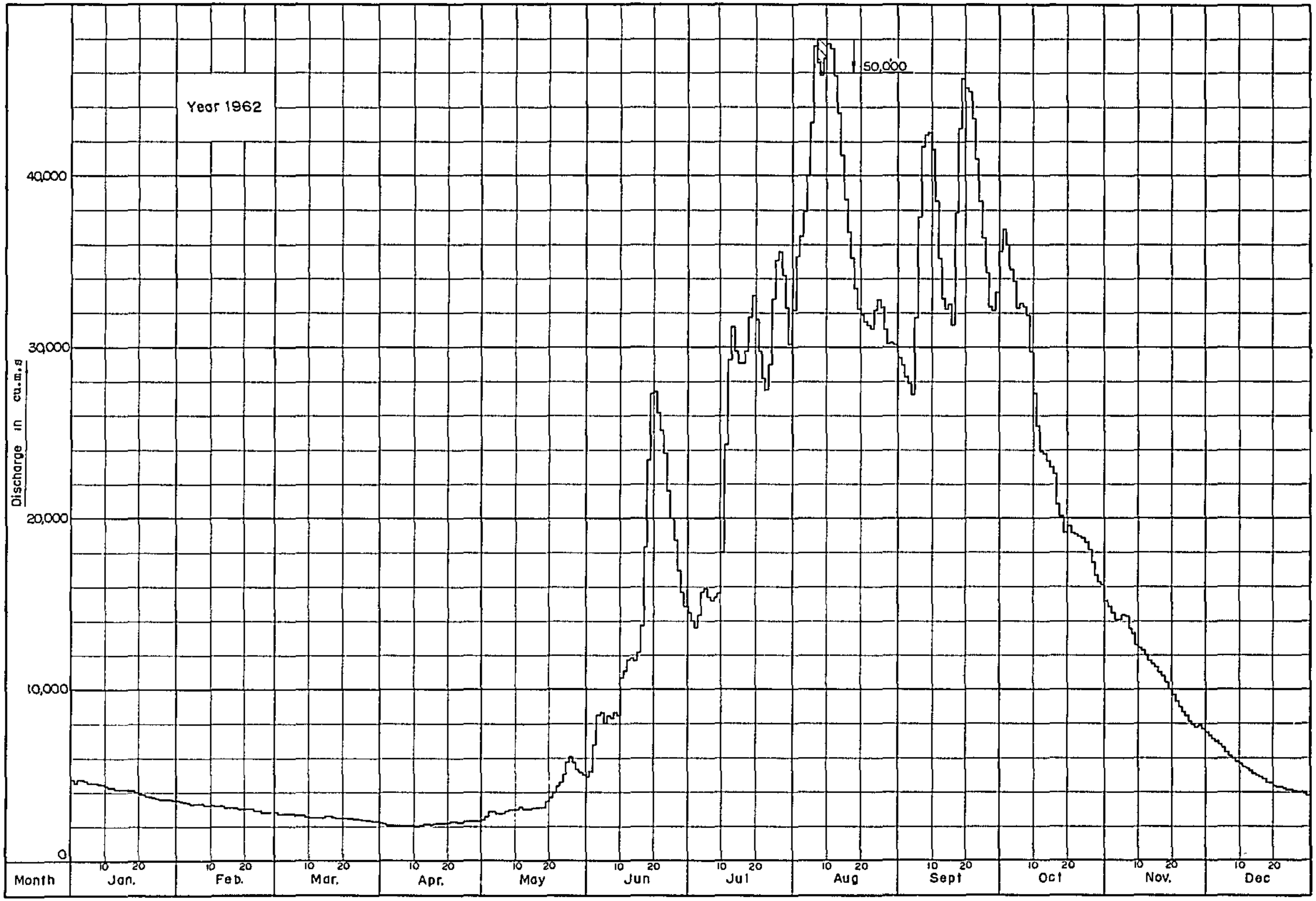
(to be continued)

A-9 Hydrograph at Kratie



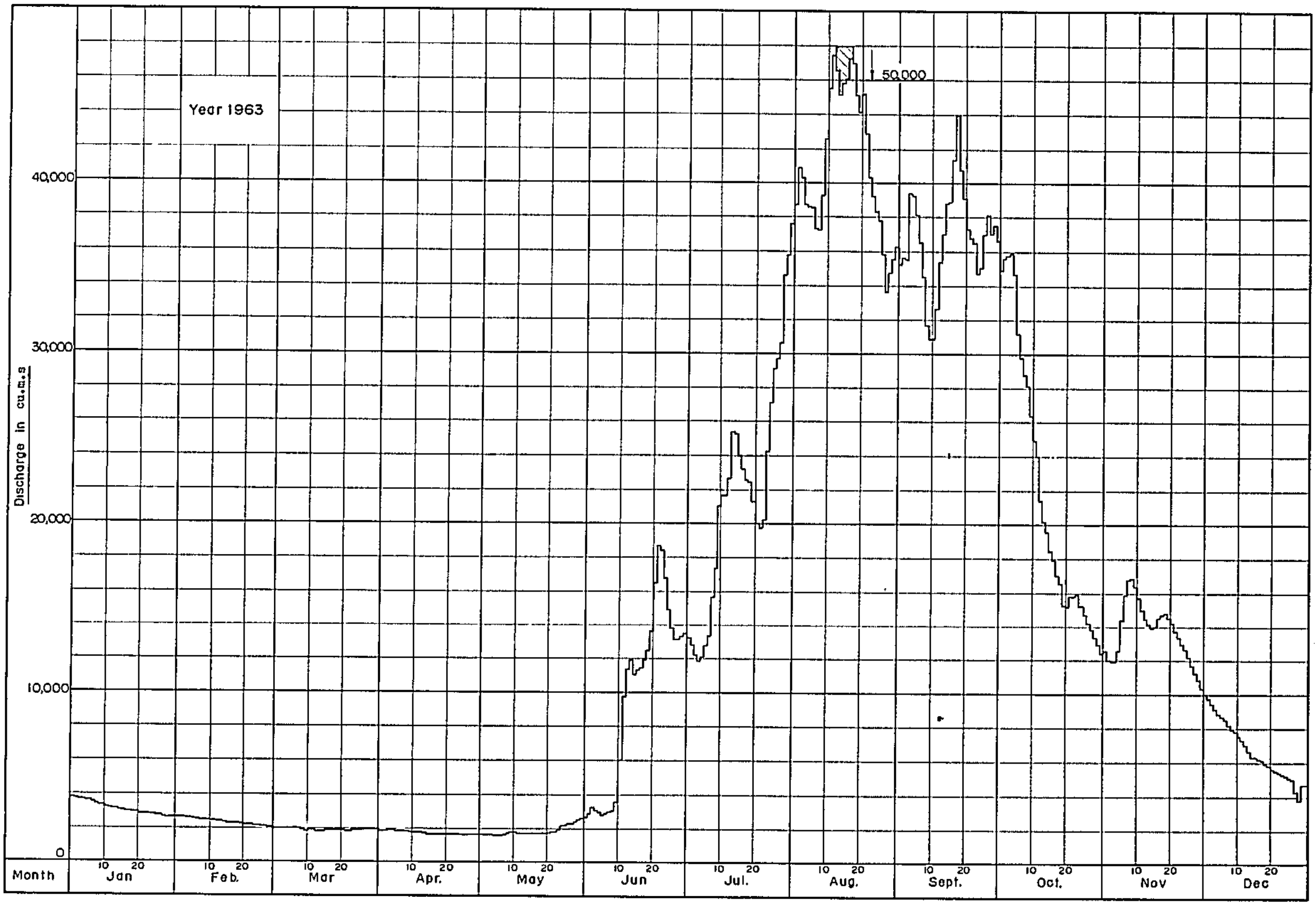
(to be continued)

A-9 Hydrograph at Kratie



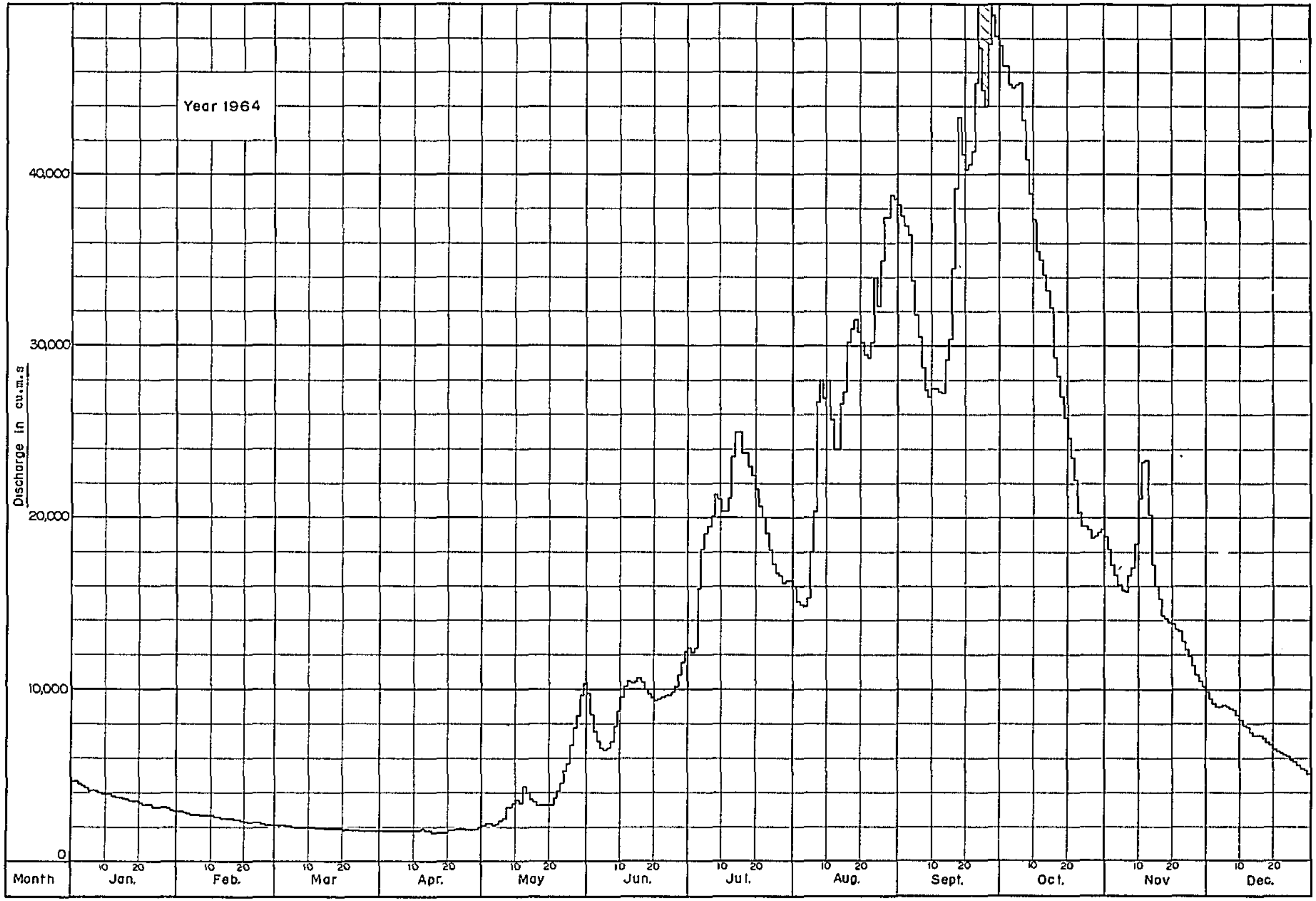
(to be continued)

A-9 Hydrograph at Kratie



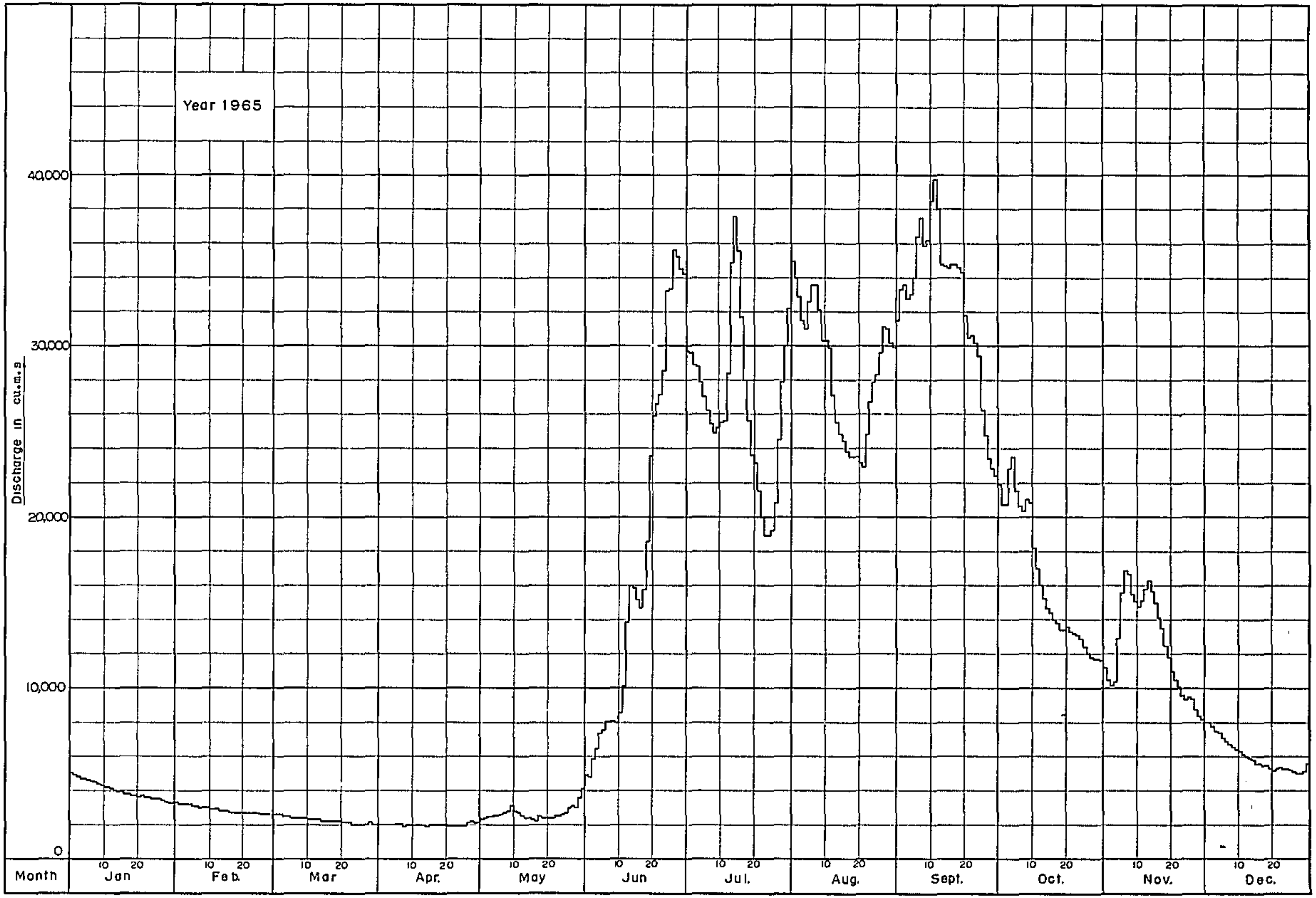
(to be continued)

A-9 Hydrograph at Kratie



(to be continued)

A-9 Hydrograph at Kratie



(to be continued)

Year	Names of Observatories	Date	Discharge (cu.m.s.)	Suspension Concentration (p.p.m.)
1960	Stung Treng	15, Oct.	28,000	249
	" "	2, Nov.	15,200	157
	" "	28, "	7,550	44
	" "	22, Dec.	4,850	27
	Kratie	17, Oct.	27,500	281
	"	14, Dec.	5,920	14
	Phnom Penh	6, Oct.	33,500	358
	" "	22, Nov.	9,590	62
	" "	5, Dec.	7,580	55
	" "	19, "	5,900	8
	Thakek	22, Nov.	4,080	45
	"	29, "	3,460	73
	"	2, Dec.	3,430	118
	"	19, "	3,000	82
	Mukdahan	26, Aug.	33,900	655
	"	28, Sept.	16,900	526
	"	12, Oct.	17,300	504
	"	22, Nov.	4,150	45
	"	25, "	3,880	54
	"	28, "	3,600	68
	"	30, "	3,490	66
	"	12, Dec.	3,980	158
	"	21, "	2,940	69
	Pakse	20, Oct.	15,800	58
	"	8, Dec.	4,030	26
	"	10, "	3,860	39
	"	14, "	4,550	50
	"	15, "	4,510	30
	"	19, "	3,780	74
	"	23, "	3,310	12
	"	28, "	3,130	61
	"	29, "	3,050	40
1961	Stung Treng	25, Jan.	2,900	22
	" "	13, Mar.	1,980	4
	" "	29, "	1,830	10
	" "	24, Apr.	2,530	2
	" "	11, June	19,100	170
	" "	30, "	29,900	552
	" "	10, July	27,800	504
	" "	29, July	29,000	463
	" "	3, Aug.	21,500	396
	" "	4, "	20,600	182
	" "	7, "	24,300	305
	" "	8, "	22,800	129
	" "	15, "	30,800	243
	" "	3, Sept.	45,500	425
	" "	5, Sept.	43,500	375
	" "	14, Sept.	48,000	767
	" "	15, Sept.	53,100	506
	" "	28, Sept.	57,000	1,097
	" "	7, Oct.	50,500	777
	" "	12, "	38,300	426
	" "	16, "	36,200	353
	" "	21, "	33,600	415
	" "	26, "	27,600	284
	" "	30, "	22,500	238
	" "	4, Nov.	17,400	225
	" "	18, "	10,700	102
	" "	28, "	8,290	55
	" "	30, "	7,970	67
	" "	8, Dec	6,340	109
	" "	15, "	6,090	149
	" "	23, "	5,120	124
	Kratie	9, Apr.	1,680	22
	Phnom Penh	7, Jan.	3,990	12
	" "	16, Jan.	3,420	9
	" "	4, Feb.	2,850	16
	" "	13, Feb.	2,490	5
	" "	2, May	2,230	12
	" "	1, June	8,070	80
	" "	12, "	17,300	339
	" "	23, "	17,700	282
	" "	30, "	25,200	463
	" "	3, July	32,500	624
	" "	7, "	32,100	474
	" "	10, "	30,400	300
	" "	14, "	25,100	253
	" "	17, "	22,300	180
	" "	21, July	28,200	189
	" "	18, Aug.	34,000	237
	" "	21, Aug.	39,600	582
	" "	24, "	45,800	734
	" "	25, "	47,500	236
	" "	28, "	49,700	438
	" "	1, Sept.	47,000	400
	" "	4, "	43,200	263
	" "	7, "	41,400	437
	" "	11, "	40,800	285
	" "	14, "	42,000	442
	" "	20, "	46,700	389
1961	Phnom Penh	22, Sept	46,000	442
	" "	25, "	45,200	212
	" "	29, "	47,700	420
	" "	2, Oct.	47,200	510
	" "	5, "	45,100	444
	" "	10, "	41,800	257
	" "	13, "	38,000	273
	" "	16, "	34,400	357
	" "	19, "	31,300	240
	" "	23, "	32,500	314
	" "	26, "	31,000	295
	" "	30, "	26,600	131
	" "	2, Nov.	23,600	113
	" "	6, "	19,500	110
	" "	23, "	9,910	65
	" "	27, "	9,540	97
	" "	6, Dec.	8,210	61
	" "	18, Dec.	7,420	36
	" "	25, "	5,920	51
1962	Vientiane	2, Jan.	2,200	202
	"	15, "	1,930	97
	"	19, "	1,820	102
	"	23, "	1,730	73
	"	25, "	1,690	53
	"	7, Feb.	1,560	31
	"	9, "	1,600	183
	"	15, "	1,480	35
	"	20, "	1,410	9
	"	23, "	1,390	10
	"	6, Mar.	1,330	6
	"	9, Mar.	1,290	57
	"	20, Apr.	1,210	18
	"	15, June	3,720	26
	"	3, July	5,720	730
	"	11, "	7,300	839
1963	Mukdahan	2, Jan.	2,310	95.2
	"	21, "	1,940	56 1
	"	7, Mar.	1,440	21.1
	"	12, "	1,430	21.7
	"	25, "	1,390	29 9
	"	29, Mar	1,430	15.7
	"	3, Apr.	1,390	13.8
	"	12, "	1,250	10.3
	"	18, "	1,260	24.5
	"	23, "	1,270	16.0
	"	4, May	1,210	47.1
	"	9, May	1,290	15.7
	"	17, "	1,300	28.8
	"	22, "	1,490	19.6
	"	27, June	9,430	319.5
	"	11, July	14,900	444.8
	"	18, "	13,800	510.5
	"	26, "	24,900	619.9
	"	26, Aug.	23,300	713.7
	"	5, Sept	18,900	738.3
	"	12, "	26,500	224.1
	"	19, "	26,800	606.5
	"	26, "	20.400	345 3
	"	4, Oct.	12.900	403.2
	"	8, "	12,200	377.9
	"	19, "	9,250	324 6
	"	24, "	8,080	363.9
	"	1, Nov	6,740	320.4
	"	11, Nov.	9,250	758.0
	"	18, "	9,500	527.0
	"	22, "	8,300	233.2
	"	25, "	7,180	570.0
	Thakek	3, Jan.	2,290	80.3
	"	15, "	1,990	68.5
	"	8, Feb	1,680	7.2
	"	15, Mar.	1,340	6.5
	"	28, Mar.	1,400	63 1
	"	2, Apr.	1,330	34.4
	"	20, Apr.	1,230	42.3
	"	6, May	1,230	42.3
	"	24, "	1,460	21.8
	"	8, June	5,280	95.0
	"	14, "	6,470	194.3
	"	22, "	7,140	151.2
	"	5, July	11,100	168.6
	"	26, Oct.	6,850	296.1
	"	30, "	6,140	179.0
	"	8, Nov.	9,720	445.8
	"	21, "	8,040	250.7
	"	26, "	6,270	378.1

(to be continued)

A-10 Suspension Concentration

Year	Names of Observatories	Date	Discharge (cu.m.s.)	Suspension Concentration (p.p.m.)
1964	Mukdahan	10, Feb.	2,120	21.46
		24, Feb.	1,920	20.47
		9, Mar.	1,780	20.96
		24, Mar.	1,640	28.63
		28, Apr.	1,860	19.53
		11, May	2,340	48.95
		27, May	3,250	137.08
		29, May	3,770	13.20
		5, June	5,380	230.51
		16, June	8,310	229.67
		29, June	9,390	247.99
		3, July	9,480	14.06
		4, July	10,800	319.48
		6, July	17,400	163.83
		10, July	18,000	4.33
		13, July	20,900	961.55
		17, July	18,800	3.22
		21, July	15,400	562.43
		28, July	12,700	501.00
		4, Aug.	11,200	6.76
		14, Aug.	16,300	44.02
		26, Aug.	26,900	360.21
		27, Aug.	28,000	837.88
		28, Aug.	28,500	405.00
		2, Sep.	26,000	631.04
		9, Sep.	20,400	67.67
		19, Sep.	24,900	52.97
		25, Sep.	25,700	766.00
		5, Oct.	21,800	914.00
		10, Oct.	18,700	488.00
		16, Oct.	16,800	459.00
		23, Oct.	12,100	488.00
		3, Nov.	8,730	457.00
		10, Nov.	8,610	747.00
		17, Nov.	6,140	383.00
		24, Nov.	5,210	212.00
		30, Nov.	4,740	166.00
		9, Dec.	4,590	13.97
		14, Dec.	4,110	28.72
		21, Dec.	3,670	17.42
		30, Dec.	3,200	12.77
1964	Thakhek	7, Jan.	2,830	81.51
		16, Jan.	2,540	81.53
		5, Feb.	2,220	107.92
		25, Feb.	1,860	25.74
		12, Mar.	1,830	30.83
		22, Apr.	1,670	18.05
		7, May	2,180	16.72
		21, May	3,100	64.45
		28, May	3,220	179.22
		25, June	7,460	158.92
		3, July	9,530	203.33
		9, July	16,400	910.67
		17, July	18,000	728.04
		24, July	13,600	56.95
		8, Aug.	12,900	106.19
		18, Aug.	17,100	68.04
		25, Aug.	23,300	119.59
		31, Aug.	24,500	212.95
		6, Sep.	19,600	93.58
		12, Sep.	19,800	153.09
		18, Sept.	21,900	96.23
		13, Oct.	16,800	1,044.00
		17, Oct.	15,800	887.00
		25, Oct.	11,400	697.00
		31, Oct.	9,310	780.00
		5, Nov.	7,600	954.00
		12, Nov.	6,750	266.00
		18, Nov.	5,360	680.00
		28, Nov.	4,780	686.00
		7, Dec.	4,740	177.20
		16, Dec.	3,900	244.62
		28, Dec.	3,250	34.05
1965	Thakhek	5, Jan.	2,910	143.38
		15, Jan.	2,660	153.51
		19, Jan.	2,580	105.51
		27, Jan.	2,490	82.24
		9, Feb.	2,230	73.74
		18, Feb.	2,160	62.25
		16, Mar.	1,650	67.14
		25, Mar.	1,530	51.39
		7, Apr.	1,470	62.40
		21, Apr.	1,560	24.45
		6, May	1,580	4.38
		27, May	1,910	20.05
		5, June	5,340	119.38
		15, June	12,300	293.64
		25, June	19,400	388.63
		9, July	15,400	383.06
		20, July	11,400	583.99

Year	Names of Observatories	Date	Discharge (cu.m.s.)	Suspension Concentration (p.p.m.)
1965	Thakhek	7, Aug.	20,100	419.27
		19, Aug.	16,100	834.60
		27, Aug.	17,300	703.08
		17, Nov.	7,880	553.73
1965	Mukdahan	7, Jan.	2,990	58.01
		11, Jan.	2,820	129.45
		22, Jan.	2,500	130.75
		26, Jan.	2,450	60.92
		3, Feb.	2,310	68.53
		8, Feb.	2,200	59.16
		25, Feb.	2,120	69.87
		9, Mar.	1,850	41.87
		23, Mar.	1,690	38.77
		9, Apr.	1,530	59.92
		23, Apr.	1,670	38.40
		8, May	1,570	41.16
		11, June	8,510	217.96
		14, June	10,300	320.48
		20, June	15,900	116.05
		22, June	17,700	242.43
		2, July	21,800	368.96
		7, July	17,300	430.73
		14, July	15,000	295.01
		21, July	11,900	497.13
		31, July	20,000	919.49
		4, Aug.	21,000	592.10
		13, Aug.	16,100	532.04
		17, Aug.	16,300	411.31
		24, Aug.	21,300	712.23
		31, Aug.	17,300	434.00
		7, Sep.	21,100	487.67
		13, Sep.	20,000	328.11
		20, Sep.	16,200	333.58
		11, Oct.	9,190	469.06
		22, Oct.	7,870	427.53
		27, Oct.	6,710	317.85
		2, Nov.	12,600	1,006.84
		8, Nov.	12,100	865.52
		15, Nov.	9,910	924.57
		22, Nov.	6,830	311.86
		14, Dec.	4.090	151.35
		27, Dec.	5,370	356.45

A-11 Water Temperature at Kratie

Unit: °C

1960

Month	Day	°C
Jan.	7	25
	22	27
May	30	32
	31	32
June	1	31
	2	31
	9	30
	16	31
	23	29
	29	30
	30	29
July	2	28
	4	28
	6	28
	7	29
	9	28
	11	30
	12	29
	13	29
	16	29
	18	29
	19	29
	20	29
	21	27
	22	27
	26	29
	29	27
	31	28
Aug.	1	27
	2	26
	3	27
	5	27
	8	27
	10	27
	11	27
	15	28
	16	28
	17	27
	18	27
	19	27
	20	27
	22	27
	23	27
	29	27
	30	27
	31	27

Month	Day	°C
Sept.	8	28
	9	28
	10	28
	13	27
	14	27
	15	27
	23	28
	24	28
	26	28
	29	27
	31	28
Oct.	1	28
	3	28
	14	26
	15	26
	18	27
	19	27
	21	27
	24	26
	25	27
Nov.	2	27
	3	27
	4	28
	5	27
	7	27
	8	27
	9	27
	16	27
	17	29
	18	28
	19	28
	21	28
	23	28
	25	27
	26	28
	28	27
	30	28
Dec.	6	26
	7	26
	9	27
	10	25
	12	26
	13	26
	14	26
	15	26

1961

Month	Day	°C
Jan.	13	26
Feb.	1	25
Apr.	8	28
Oct.	14	29
	15	27
Nov.	4	28
	5	28
	14	28
Dec.	23	27
	24	27

A 12 Water Temperature at (Stung Treng)

Unit: °C

1960

Month	Day	°C
Feb.	25	29
May	20	33
July	6	29
	11	29
	14	27
	20	30
Sept.	6	27
	7	27
	12	27
	15	27
	16	28
	24	27
	26	27
	28	26
	30	28
Oct.	4	26
	7	25
	12	26
	19	27
	22	27
	27	25
	31	26
Nov.	4	25
	11	27
	15	25
	17	27
	21	27
	29	27
Dec.	1	27
	7	26
	13	25
	16	25
	19	25
	23	26
	24	25

1961

Month	Day	°C
Jan.	2	25
	4	26
	7	25
	21	25
Feb.	13	27
Mar.	11	27
	25	28
Apr.	3	28
	20	28
May	20	30
	24	28
	29	28
June	3	27
	10	28
	13	27
	19	27
	23	27
	26	27
July	3	27
	4	27
	10	27
	18	26
	19	27
	31	27
Aug.	7	27
	12	27
	14	27
	28	26
Sept.	4	27
	5	27
	15	27
	16	27
	25	27

Month	Day	°C
Oct.	2	27
	11	27
	12	27
	21	27
	23	27
	30	27
Nov.	8	27
	13	27
	28	27
Dec.	7	27
	11	27
	21	27

A 13 Daily Wind Movement (Stung Treng)

Year 1961 UNIT km

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	35.5	55.6	59.1	106.8	52.8	32.8	51.3	18.8	39.6	12.4	20.6	34.1	1
2	25.3	82.9	75.9	97.8	45.5	34.5	26.7	25.2	36.0	16.1	21.8	37.5	2
3	30.7	58.0	59.1	74.1	41.5	31.6	57.9	28.5	24.6	14.4	18.6	36.9	3
4	34.1	54.6	70.5	40.6	49.1	34.5	32.0	33.8	32.6	12.7	14.1	35.7	4
5	44.8	37.4	74.5	52.1	40.3	42.4	24.8	32.8	107.1	15.2	15.1	38.1	5
6	62.1	38.2	54.8	62.7	39.6	30.7	38.8	42.8	53.0	15.2	17.0	36.8	6
7	55.7	32.8	57.1	60.2	35.3	59.1	31.6	32 0	21.8	13.7	14.1	36.2	7
8	33.8	35.3	53.2	51.3	48.9	41.3	32.9	32.4	25.0	13.7	24.4	36.8	8
9	41.9	40.2	43.1	58.9	49.1	23.7	25.6	21.5	30.7	23.7	27.6	31.1	9
10	48.6	43.8	55.7	52.8	27.8	7.9	32.9	13.8	21.3	12.3	25.0	24.5	10
11	65.2	39.5	88.6	87.6	29.7	13.0	43.0	30.0	27.6	9.7	17.0	21.2	11
12	60.5	38.4	32.1	82.3	19.7	23.2	23.9	28.2	20.3	13.6	23.4	25.6	12
13	70.7	50.3	43.0	47.0	48.9	19.0	26.5	21.0	27.1	22.0	22.6	27.9	13
14	66.1	78.4	47.1	67.9	35.5	19.2	47.0	27.9	32.9	36.6	22.9	17.5	14
15	61.5	84.2	94.9	62.6	39.4	13.3	49.8	22.6	17.4	8.1	20.9	8.2	15
16	65.9	68.5	60.3	107.0	43.2	10.3	38.2	13.3	30.6	11.6	15.3	7.1	16
17	65.9	48.9	57.0	22.4	19.0	29.0	52.8	26.5	20.0	13.6	11.6	7.0	17
18	79.7	67.0	59.1	61.9	55.1	12.8	64.2	52.5	16.5	6.5	19.4	11.2	18
19	75.9	51.8	60.0	50.1	28.8	12.7	27.9	37.0	13.5	5.1	23.4	29.2	19
20	50.0	55.8	59.0	58.8	55.0	22.2	37.8	43.6	20.8	20.6	22.5	33.6	20
21	61.8	70.5	41.8	67.7	54.5	19.4	38.5	69.4	16.7	17.7	21.7	31.4	21
22	73.9	77.2	84.0	36.7	41.9	33.3	42.7	61.9	11.5	14.8	23 2	51.1	22
23	52.3	86.6	69.9	74.5	37.8	27.1	17.8	25.2	22.1	8.6	19.7	55.6	23
24	42.2	75.0	87.0	61.2	14.9	36.1	24.4	10.3	23.5	3.7	35.7	56.8	24
25	34.3	42.7	97.3	52.3	19.2	60.4	24.1	27.3	37.5	1.2	30 6	51.3	25
26	65.6	76.2	81.9	43.1	33.7	68.0	37.3	51.5	32.7	4.7	29.6	39.5	26
27	63.9	96.7	65.1	51.7	46.3	55.8	40.3	36.2	15.4	4.9	17.5	101.9	27
28	56.4	77.1	74.0	38.2	36.0	28.7	24.8	24.8	18.2	2.7	20.4	12.4	28
29	48.8		74.6	38.8	37.3	58.4	23.1	34.2	34.2	3.1	31.7	40.3	29
30	36.8		100.7	45.1	24.4	53.9	22.5	27.1	13.3	12.9	30.1	44.3	30
31	35.0		95.1		22.0		15.4	29.7		2.1		31.2	31
Total	1,644.9	1,663.6	2,075.5	1,813.7	1,172.2	954.3	1,076.5	981.9	843.5	373.2	657.5	1,052.0	
Mean	53.7	59.4	66.9	60.5	37.8	31.8	34.7	31.7	28.1	12.0	21.9	33.9	

Annual Total ( )

Year 1962 UNIT km

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1						37.41	25.66	71.99	23.22	22.25	20.11	52.70	1
2						29.16	25.75	59.06	33.79	33.17	17.99	35.90	2
3						16.06	37.01	56.42	30.32	16.69	35.81	32.12	3
4						33.18	28.28	61.22	55.63	27.18	29.94	48.19	4
5						21.06	21.22	68.81	29.27	19.59	29.23	39.81	5
6						23.85	23.83	35.40	18.67	38.53	15.82	27.55	6
7						22.23	41.13	44.36	25.79	36.05	20.83	33.94	7
8						35.63	40.12	21.19	16.55	21.84	29.78	38.39	8
9						30.18	40.01	27.46	19.24	23.98	26.30	30.31	9
10						48.86	38.45	38.49	16.75	23.30	43.80	32.12	10
11						28.45	62.05	28.43	25.10	25.23	22.18	34.66	11
12						45.27	49.98	12.78	19.24	19.22	17.98	30.59	12
13						45.59	56.78	33.17	23.93	13.02	15.69	35.52	13
14						39.07	24.94	17.31	15.00	21.63	13.25	29.28	14
15						52.05	32.17	24.57	32.10	36.06	19.27	36.00	15
16						57.57	26.44	33.84	33.57	52.02	23.05	44.60	16
17						62.13	44.25	26.65	17.85	34.82	22.47	48.92	17
18						46.28	39.06	20.17	23.88	25.75	30.02	44.62	18
19						29.43	44.41	31.56	23.42	43.60	24.30	48.04	19
20						25.27	39.64	23.88	17.69	45.86	21.76	42.28	20
21						22.66	27.35	32.07	12.35	24.66	45.63	42.38	21
22						22.92	52.29	22.14	58.51	29.47	37.76	55.65	22
23						52.02	58.31	25.12	31.81	25.46	34.38	44.55	23
24						41.94	11.12	25.12	21.19	40.52	33.59	45.43	24
25						35.59	85.58	31.60	28.99	28.94	22.78	38.33	25
26						26.50	38.75	28.33	31.89	27.10	33.47	27.48	26
27						20.95	49.98	17.19	28.96	24.08	33.16	28.75	27
28						28.90	54.52	27.67	21.01	27.99	47.18	34.20	28
29						20.70	45.56	21.96	23.63	26.35	68.62	29.94	29
30						30.46	61.93	30.13	25.20	20.76	66.85	59.80	30
31							56.07	25.32		18.47		50.90	31
Total	N	N	N	N	N	1,031.37	1,282.01	1,024.03	784.54	853.59	903.00	1,222.96	
Mean						34.38	41.36	33.03	26.15	27.54	30.10	39.45	

Annual Total ( )

Year 1963 UNIT km

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	38.46	49.88	62.26	33.58	61.60	51.64	32.87	36.14	27.30	26.36	29.66	38.08	1
2	54.80	47.78	39.95	45.18	49.50	52.57	50.29	35.44	24.32	23.87	36.58	36.73	2
3	40.68	68.95	30.41	52.44	65.35	85.77	45.44	41.97	22.59	25.06	32.21	46.48	3
4	29.88	60.94	32.49	49.22	65.04	52.17	32.92	15.65	31.56	28.77	35.24	53.25	4
5	55.00	57.36	49.80	49.66	63.89	59.00	34.81	28.16	30.47	16.80	37.10	40.63	5
6	65.26	59.32	41.08	109.07	61.74	65.81	61.81	34.01	25.54	22.10	33.24	38.24	6
7	49.08	37.40	60.25	30.28	53.85	30.83	65.08	39.87	48.59	17.82	29.81	32.09	7
8	51.90	40.45	57.70	104.20	31.88	45.47	53.22	47.12	54.32	26.29	27.11	30.60	8
9	50.51	30.08	41.81	104.10	52.59	42.13	42.74	53.11	57.29	24.18	35.94	27.92	9
10	53.85	32.11	51.20	98.15	68.41	40.52	66.19	54.71	41.40	20.90	33.02	36.47	10
11	42.73	44.62	50.09	54.76	65.25	41.06	61.88	43.91	41.53	16.58	28.02	61.68	11
12	47.45	39.53	40.85	50.32	63.35	33.94	39.33	36.51	45.96	20.83	49.97	34.31	12
13	45.57	80.11	58.24	62.26	45.53	57.82	32.58	46.19	41.24	19.83	35.66	35.30	13
14	85.58	74.15	84.51	61.60	62.67	50.00	37.83	38.77	43.66	15.76	31.03	25.95	14
15	57.98	36.02	77.52	76.21	61.85	60.11	59.29	29.17	22.07	28.80	34.38	27.21	15
16	45.96	94.17	103.78	66.62	63.71	31.89	34.54	42.71	19.82	23.50	31.37	31.22	16
17	49.46	57.56	86.49	64.53	62.63	61.88	48.92	30.60	20.20	21.14	35.79	34.43	17
18	42.39	73.46	45.96	68.35	71.23	38.80	46.29	42.05	30.94	17.59	35.15	39.72	18
19	42.27	50.57	48.16	63.90	60.21	43.18	55.78	19.95	23.63	24.22	31.46	70.70	19
20	33.93	46.41	48.98	72.65	50.52	23.79	41.96	18.08	18.57	49.08	27.38	45.17	20
21	41.83	78.54	47.28	80.04	38.79	42.53	64.25	28.83	28.21	30.57	59.20	47.41	21
22	60.76	95.38	55.80	62.64	40.23	40.69	37.90	31.12	16.11	32.12	34.44	35.42	22
23	66.08	93.61	27.02	58.25	37.50	42.74	35.86	30.29	35.52	30.17	69.15	36.13	23
24	58.26	78.79	49.56	47.34	52.06	43.70	28.46	17.41	27.70	27.64	30.30	34.80	24
25	75.37	51.17	46.44	54.93	22.49	40.85	37.88	31.50	23.50	32.37	31.60	35.59	25
26	66.98	89.99	46.83	51.69	48.64	27.82	29.75	22.46	17.50	38.06	34.43	78.73	26
27	50.18	105.80	44.51	46.71	61.26	37.79	33.61	21.38	25.02	32.79	42.44	77.07	27
28	51.59	105.34	67.47	49.25	42.79	24.03	31.35	36.11	18.86	32.48	42.67	11.44	28
29	46.31		53.13	55.39	42.06	44.56	23.38	30.83	13.46	23.74	41.47	43.10	29
30	63.97		40.61	55.01	46.67	46.43	44.41	31.66	25.80	24.66	40.63	39.87	30
31	42.69		31.64		51.07		36.14	33.16		31.76		43.65	31
Total	1,606.78	1,779.39	1,628.90	1,881.63	1,654.39	1,359.52	1,346.77	1,038.87	892.60	975.78	1,086.44	1,259.39	
Mean	51.83	63.55	52.55	62.72	53.37	45.32	43.44	33.51	29.76	31.48	36.21	40.63	

Annual Total ( )

Year 1964 UNIT km

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	42.67	72.55	54.88	54.74	75.71	29.08	81.95	64.13	24.66	16.87	32.42	19.00	1
2	40.86	77.89	43.47	72.34	49.04	35.77	76.82	51.34	20.01	26.65	21.12	25.83	2
3	56.72	103.68	53.45	64.95	52.93	40.43	70.11	62.36	18.86	16.58	17.28	32.44	3
4	70.52	53.28	55.35	77.77	27.89	28.05	32.13	44.19	29.74	17.70	16.56	35.57	4
5	49.85	61.06	50.23	56.53	42.27	39.92	14.49	76.45	24.08	24.08	16.93	28.13	5
6	56.98	55.72	43.85	50.87	49.26	44.49	23.15	54.35	33.10	14.40	25.26	26.84	6
7	58.72	38.28	64.12	84.53	15.74	51.33	35.61	61.54	21.16	9.85	20.09	18.72	7
8	56.41	40.52	81.46	54.13	33.86	23.60	22.99	63.04	28.55	25.81	45.62	22.10	8
9	58.97	32.37	106.14	40.90	31.54	50.59	23.30	38.57	35.11	15.52	55.50	24.23	9
10	56.36	67.73	111.02	52.55	38.68	27.82	31.17	24.43	27.62	23.24	31.71	14.76	10
11	52.31	90.15	116.29	50.65	40.32	23.62	28.85	31.90	34.23	17.68	44.21	19.64	11
12	51.34	91.22	111.85	54.41	44.79	20.08	32.51	27.62	32.82	12.99	24.42	7.42	12
13	36.85	95.31	94.32	53.29	53.21	36.46	27.36	32.09	19.88	15.77	30.01	27.36	13
14	29.97	93.32	104.25	51.08	24.28	46.02	28.91	42.16	56.63	10.85	29.05	28.56	14
15	31.11	70.95	55.15	46.62	37.81	36.89	32.08	56.33	35.03	24.82	32.08	36.90	15
16	31.37	79.31	44.76	52.63	34.60	38.39	27.53	47.55	27.53	20.14	42.00	40.87	16
17	41.06	69.11	37.38	53.38	35.71	27.28	17.77	54.02	27.07	13.70	20.70	38.79	17
18	75.09	68.43	45.35	53.32	37.75	30.43	26.52	53.05	27.59	16.93	19.67	29.34	18
19	70.74	47.67	45.93	57.14	33.43	34.34	26.77	47.77	25.30	20.66	13.61	21.28	19
20	76.80	94.45	44.78	54.12	42.47	41.16	29.49	50.49	34.23	19.73	20.69	21.44	20
21	47.18	99.03	62.40	86.40	34.19	31.14	18.89	54.51	65.55	17.87	29.31	26.35	21
22	32.71	93.07	43.09	31.74	41.18	34.39	21.14	46.40	64.39	14.53	20.27	23.24	22
23	31.04	89.72	49.43	30.55	32.49	33.14	30.98	40.55	49.80	29.55	22.03	27.13	23
24	35.48	115.99	55.92	40.42	32.31	39.05	33.16	23.12	35.44	20.45	21.63	32.34	24
25	39.77	143.82	121.01	58.45	39.98	20.35	23.81	24.28	19.95	24.21	34.32	31.71	25
26	30.69	128.47	106.47	42.06	48.34	38.85	20.79	38.08	13.57	24.02	21.77	35.18	26
27	44.45	75.71	95.31	40.08	34.94	37.55	13.17	24.87	33.43	29.64	27.89	44.52	27
28	60.13	58.44	62.69	63.09	43.86	36.32	21.67	21.14	21.76	20.75	19.94	33.05	28
29	60.46	50.61	55.61	36.01	53.32	41.03	26.26	26.00	13.69	24.03	17.33	21.75	29
30	43.98		69.52	35.38	39.84	55.28	36.41	23.67	26.06	24.59	16.62	32.21	30
31	41.17		70.65		26.53		31.86	21.51		23.61		30.92	31
Total	1,511.76	2,257.94	2,156.13	1,600.43	1,228.27	1,080.86	967.65	1,327.60	926.84	607.22	790.04	857.72	
Mean	48.78	77.86	69.55	53.35	39.62	36.03	31.21	42.82	30.89	19.58	26.33	27.66	

Annual Total

(to be continued)

A-13 Daily Wind Movement (Stung Treng)

Year 1965 UNIT km

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	DATE
1	27.0	70.4	50.0	58.5	56.1	18.2	12.2	18.2	27.2	13.5	26.1	24.9	1
2	21.3	59.8	40.5	55.2	58.9	36.3	27.9	31.1	15.9	12.2	25.8	14.0	2
3	31.0	63.1	40.6	58.2	36.1	35.5	18.2	32.6	29.6	23.4	19.3	25.3	3
4	28.7	50.0	21.7	42.9	46.7	31.4	25.6	21.5	23.3	15.9	18.1	20.6	4
5	24.1	35.2	42.6	53.6	46.7	38.1	31.9	27.4	25.4	15.2	17.7	30.2	5
6	22.3	54.1	62.5	58.2	28.2	41.4	40.1	25.1	26.4	9.1	16.5	29.7	6
7	22.1	53.8	67.0	37.4	29.2	37.2	45.6	22.4	19.6	9.2	14.5	18.7	7
8	24.1	35.4	74.1	41.7	34.4	26.8	33.8	18.5	14.9	17.2	13.8	17.3	8
9	46.9	37.9	75.0	52.9	34.9	48.8	29.6	17.3	20.9	5.4	13.8	30.1	9
10	38.7	38.4	67.6	31.2	34.1	53.4	41.5	14.7	27.7	20.7	17.6	21.8	10
11	54.3	31.6	45.1	47.2	27.8	61.9	38.7	18.4	26.4	22.7	11.6	28.9	11
12	24.7	37.2	38.4	49.5	39.3	40.7	55.8	12.9	23.2	12.5	15.1	43.9	12
13	50.3	51.0	38.7	55.7	35.2	41.9	42.8	17.0	16.8	23.1	14.8	32.7	13
14	77.7	45.3	33.5	55.0	32.5	25.6	33.8	17.8	11.7	20.0	14.1	30.1	14
15	37.5	43.9	60.6	38.9	27.7	30.3	70.2	25.5	9.8	19.6	18.4	30.0	15
16	42.9	29.7	56.7	42.0	26.9	26.8	35.3	18.7	18.7	20.1	24.0	30.1	16
17	42.8	49.8	42.6	49.4	21.0	29.3	16.8	16.1	25.9	25.9	31.6	58.1	17
18	41.2	45.9	37.9	47.8	27.2	20.0	26.3	18.4	16.9	11.0	25.8	59.6	18
19	46.4	35.6	39.7	52.8	23.7	22.5	28.9	24.3	23.6	21.7	22.3	19.1	19
20	33.3	37.0	43.3	50.9	15.8	33.3	29.1	27.0	28.7	18.8	31.2	20.3	20
21	39.4	34.0	42.2	51.6	29.6	28.9	51.0	16.3	15.6	19.6	57.8	26.6	21
22	40.4	40.1	56.2	50.5	28.5	33.0	39.5	21.6	26.2	20.8	24.4	25.2	22
23	40.6	55.1	49.6	53.1	22.8	43.3	30.9	25.6	12.5	24.4	17.2	21.6	23
24	39.3	40.7	61.8	67.0	18.8	21.8	62.0	20.9	8.7	21.5	20.1	18.3	24
25	39.3	38.8	65.0	41.2	31.4	11.6	52.7	31.2	12.8	18.2	30.4	40.1	25
26	31.7	52.1	70.8	45.7	36.5	24.5	15.9	24.6	13.3	19.4	40.5	37.8	26
27	41.9	62.7	56.6	41.8	33.6	11.5	15.0	38.0	22.3	19.4	34.1	52.0	27
28	41.2	69.0	18.3	53.3	31.3	33.3	30.4	29.2	17.4	22.7	34.5	32.5	28
29	35.5		35.7	46.3	19.5	34.4	32.5	23.1	14.3	9.1	23.8	13.0	29
30	59.8		37.3	63.1	20.3	17.8	19.8	22.0	10.3	17.1	44.0	65.3	30
31	56.7		42.7		8.7		29.4	22.7		24.3		71.7	31
Total	1,205.1	1,297.6	1,534.3	1,492.6	963.4	959.5	1,060.2	700.1	586.0	553.7	718.9	989.5	
Mean	38.9	46.3	49.5	48.1	31.1	32.0	34.2	22.6	19.5	17.9	24.0	31.9	

Annual Total ( )

A-14 Wind Direction

Stung Treng EL 54 m
N 13°31' E 105°58'

Item / Month	Atmospheric Pressure (mb)	Wind Speed (m/sec)	Wind Direction at 13 hr (%)									Stormy Day
			Calm	N	NE	E	SE	S	SW	W	NW	
Jan.	1014 1	(A) N4 0	28	29	20	11	0	2	1	0	9	0
Feb	1012 3	-	-	-	-	-	-	-	-	-.	-	-
Mar	1011 2	-	-	-	-	-	-	-	-	-	-	-
Apr.	1009 8	S4 0	25	19	15	4	1	4	6	7	19	0
May	1008 8	-	-	-	-	-	-	-	-	-	-	-
Jun.	1008.0	-	-	-	-	-	-	-	-	-	-	-
Jul.	1008 3	W4 0	46	0	0	2	3	10	31	7	1	0
Aug	1007 7	-	-	-	-	-	-	-	-	-	-	-
Sep.	1008.8	-	-	-	-	-	-	-	-	-	-	-
Oct.	1011 0	NW4 0	57	10	18	7	0	0	3	2	3	0
Nov	1012 5	-	-	-	-	-	-	-	-	-	-	-
Dec	1014 1	-	-	-	-	-	-	-	-		-	-

(A) Direction of the most strong wind and its mean velocity

Phnom Penh EL 12 m
N 11°33' E 104°51'

Item / Month	Atmospheric Pressure (mb)	Wind Speed (m/sec)	Wind Direction at 13 hr. (%)									Stormy Day
			Calm	N	NE	E	SE	S	SW	W	NW	
Jan.	1013.1	(A) N6 0	32	27	29	3	2	3	0	0	4	1
Feb.	1012 1	-	-	-	-	-	-	-	-	-	-	-
Mar.	1010 7	-	-	-	-	-	-	-	-	-	-	-
Apr	1009 7	SW4.0	50	4	4	7	18	12	5	0	0	0
May	1008.4	-	-	-	-	-	-	-	-	-	-	-
Jun.	1007 9	-	-	-	-	-	-	-	-	-	-	-
Jul.	1007 9	W6 0	23	2	1	0	2	9	41	19	3	5
Aug	1007 8	-	-	-	-	-	-	-	-	-	-	-
Sep	1008 6	-	-	-	-	-	-	-	-	-	-	-
Oct	1010 2	W6 0	41	16	18	2	1	2	4	5	11	1
Nov	1011 2	-	-	-	-		-	-	-	-	-	-
Dec	1012 6	-	-	-	-	-	-	-	-	-	-	-

(A) Direction of the most strong wind and its mean velocity

A 15 Maximum Wind Speed in Vietnam

Unit m/sec

Location / Year / Month	Saigon	Dalat	Vungtau	Rachgia	Hatien
	1950 - 1962	1948 - 1962	1950 - 1962	1957 - 1962	1930 - 1939
Jan.	11	16	19	12	4
Feb	10	16	19	9	4
Mar.	14	18	19	12	4
Apr.	11	16	19	9	4
May	14	13	19	12	4
Jun.	16	18	19	12	4
Jul.	18	16	16	12	4
Aug	23	18	19	12	3
Sep.	15	15	16	12	5
Oct	16	14	19	16	4
Nov.	19	16	19	9	5
Dec.	15	16	9	9	5

A 16 Maximum Wind Speed in Cambodia

Unit m/sec

Location / Year / Month	Phnom Penh	Siem Reap	Battambang	Stung Treng	Kampot	Sihanouk Ville	Kompong Cham
	1959 1963	1959 - 1963	1959 - 1963	1959 - 1963	1959 - 1963	1959 - 1963	1959 - 1963
Jan	19	18	18	14	19	20	18
Feb	18	12	18	12	17	16	18
Mar	18	16	19	13	18	16	14
Apr	14	12	16	13	17	16	16
May	18	17	30	10	19	18	18
Jun	18	16	19	15	19	22	18
Jul	31	19	18	13	17	21	16
Aug	24	17	24	14	17	20	18
Sep.	21	12	13	19	17	18	14
Oct	19	16	16	9	19	24	26
Nov.	17	12	23	13	19	16	16
Dec.	18	10	16	13	19	20	16

A 17 Frequency of Thunderstorm in Vietnam

Location / Year / Month	Qung-Tri	Hoang-Sa	Hue	Da-Nang	Quang-Nage	Qui-Nhon	Tuyhoa	Phan-Thiet	Saigon	Rach-Gia	Khant-Hung	An-Xuyen	Phu-Quoc	Can-Son	Pleiku	Banmethot	Dalat
	1959 - 1962	1950 - 1962	1950 - 1962	1950 - 1962	1957 - 1962	1956 - 1962	1956 - 1962	1956 - 1962	1950 - 1962	1956 - 1962	1950 - 1962	1957 - 1962	1957 - 1962	1950 - 1962	1958 - 1962	1955 - 1962	1950 - 1962
Jan.	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0 0	0 6	0 1	0 1	0.4	0.0	0 1	0 0	0 0	0.7
Feb.	0 0	0.0	0.3	0.4	0 4	0 2	0 2	0 0	0 4	1.0	0.1	0 4	0.0	0 0	0.2	0 1	1.4
Mar.	2.6	0.2	2 4	1.4	0.8	0 3	0.3	0 6	1 4	6 8	0.6	2 8	1.6	0 1	4.1	2.5	4.8
Apr	6.9	0.9	6.9	4.5	1.8	2 7	2.7	3 0	8 2	11 8	6.6	12.8	7.4	1.1	11.0	9.5	15.6
May	15.9	1 7	14.3	11.2	11.6	7.5	5 7	9 0	17.6	26 4	17 0	21.6	12 5	6.3	12.5	18 6	22.8
Jun.	4.4	2.1	9.1	9.4	14 2	4.0	3.8	8 5	15.2	11 4	14.7	14.8	3 7	5.9	7 1	14.0	14 0
Jul.	7 2	1.0	11 1	8 0	12 5	5.2	4.0	6.0	11.4	11 0	13 7	9 8	3.7	4 8	5.3	9 4	11.7
Aug.	3.0	2 1	10 0	8.3	12.5	4.6	2 8	6.7	10 0	8.0	8 9	8.6	3 4	3.4	3.3	7.5	10 8
Sep.	3.7	3 1	7.3	7.6	11 1	8.2	4 3	7 6	10.2	6 6	8.9	8 4	1.2	3 9	7.1	8 2	10.5
Oct.	2 0	0.9	1 9	2 4	4 3	2 7	-0.7	4 7	11 6	10 6	6 0	8.8	3.8	3 6	7.6	4.7	8 8
Nov	0 5	0 0	0.1	0 2	0 2	0 4	0 2	0 1	4 6	8.6	1 7	3.4	1 1	0.4	0 4	0.1	1.6
Dec.	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0.6	0 9	0.1	1.4	0 6	0.0	0 0	0 0	0 1

A 18 Frequency of Thunderstorm in Cambodia.

(unit time)

Month \ Location		Phnom Penh	Sen Reap	Kampot	Stung Treng	Rottam Bang	Krakor	Sihanouk Ville	Kompong Cham	Svay Rieng
1959	Jul.	6	13	4		1				
	Aug.	8	1			4				
	Sep.	3	2							
	Oct.	4	1	5						
	Nov.	11	7	5	4	8	4	7	3	6
	Dec.	2	2	1			1	3		
Total		34	26	15	4	13	5	10	3	6
1960	Jan.									
	Feb.		2	2		3		2		
	Mar	16	19	9		9		8	3	3
	Apr.	15	9	17		13	3	13	5	2
	May	22	13	22		16	5	10	8	
	Jun.	13	11	5		5		7	1	2
	Jul	7	21	8		20		8	1	2
	Aug	6	11	3		12	1		2	
	Sep.	19	15	14	1	14			3	1
	Oct.	21	12	10		6	1	3	2	1
	Nov	17	15	10		4		2	1	
	Dec.	4		2						
Total		140	128	102	1	102	10	53	26	11
1961	Jan.							1		
	Feb.	5								
	Mar.	13	15	2		9		3	1	1
	Apr.	17	11	2		14	2	2	6	3
	May	22	15	5	12	8	1		5	5
	Jun.	14	8	4	1	13		2	10	2
	Jul	9	6	2		11			2	
	Aug.	17	9			6			3	
	Sep.	22	13	4		9	6		5	1
	Oct.	28	20	15	1	12	1	1	7	1
	Nov.	24	7	17	4	21			6	
	Dec.	10		5		8				
Tottal		181	104	56	18	111	10	8	45	13
1962	Jan.	1		1						
	Feb.		1	1		3	1			
	Mar.	8	2	2	6	13	9		6	1
	Apr.	8	1	3	5	16	7		1	2
	May	20	16	18	20	22	19	2	20	17
	Jun.	13	2	4	19	19	16	1	18	13
	Jul.	20	18	11	24	11	18		23	11
	Aug	16	10	10	11	22	18		24	13
	Sep.	17	17	9	20	20	16		19	12
	Oct	26	14	18	19	21	22	3	25	18
	Nov	26	12	21	18	20	23		20	17
	Dec.	3		3	3		1		2	3
Total		158	93	101	145	167	150	6	158	107
1963	Jan.	1				1				
	Feb.	2				4			1	
	Mar	11	10	1		10		1	1	3
	Apr.	21	13	16		18	9	7	1	15
	May	25	15	21		26	18		5	24
	Jun.	18	10	12		22	14		3	14
	Jul.	9	9	9		17	6		1	7
	Aug	19	18	11	7	17	21	2	1	16
	Sep.	22	14	6	16	19	19		4	13
	Oct.	25	15	21	18	21	9	2	14	16
	Nov.	13	3	8	5	3	7		7	9
	Dec.	3				1			3	1
Total		169	107	107	46	159	103	12	41	118

A-19 The Nam Ngum Project Reservoir Operation

(Unit cu m.s.)

Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total	Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total
1925/26					Mar.	49	0	253	253
Oct	326	93	225	318	Apr.	47	0	266	266
Nov.	125	0	224	224	May	86	0	280	280
Dec.	84	0	230	230	Jun.	411	0	283	283
Jan	59	0	237	237	July	1,006	0	256	256
Feb.	46	0	247	247	Aug	794	212	235	447
Mar.	38	0	260	260	Sept.	609	371	231	602
Apr.	36	0	275	275	1928/29				
May	59	0	292	292	Oct.	273	41	224	265
Jun.	332	0	302	302	Nov.	129	0	224	224
Jul.	580	0	290	290	Dec	81	0	229	229
Aug.	1,290	0	249	249	Jan.	49	0	237	237
Sept.	987	688	239	927	Feb.	39	0	248	248
1926/27					Mar.	32	0	261	261
Oct.	356	122	226	348	Apr.	34	0	276	276
Nov.	190	0	223	223	May	79	0	294	294
Dec.	122	0	226	226	Jun.	503	0	295	295
Jan.	74	0	232	232	July	1,009	0	262	262
Feb.	53	0	240	240	Aug.	1,569	858	252	1,110
Mar.	41	0	251	251	Sept.	1,073	826	240	1,066
Apr.	45	0	264	264	1929/30				
May	127	0	277	277	Oct.	352	118	226	344
Jun.	560	0	273	273	Nov	116	0	225	225
Jul.	784	0	249	249	Dec.	86	0	230	230
Aug.	1,181	610	243	853	Jan.	61	0	237	237
Sept.	872	629	236	865	Feb.	46	0	248	248
1927/28					Mar.	38	0	260	260
Oct.	510	272	229	501	Apr.	49	0	275	275
Nov.	170	0	224	224	May	135	0	288	288
Dec.	109	0	227	227	June	588	0	284	284
Jan.	72	0	233	233	July	663	0	261	261
Feb.	56	0	242	242	Aug.	1,248	390	245	635

(Unit cu m.s.)

Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total	Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total
Sept.	935	691	238	929	Feb.	36	0	259	259
1930/31					Mar.	27	0	273	273
Oct.	324	91	225	316	Apr.	25	0	292	292
Nov.	115	0	225	225	May	52	0	302	302
Dec.	81	0	230	230	June	401	0	298	298
Jan.	54	0	238	238	July	830	0	297	297
Feb.	43	0	248	248	Aug	942	0	256	256
Mar.	35	0	261	261	Sept.	752	147	239	386
Apr.	36	0	277	277	1933/34				
May	69	0	294	294	Oct.	266	34	223	257
June	205	0	306	306	Nov.	111	0	225	225
July	367	0	305	305	Dec.	73	0	230	230
Aug.	745	0	290	290	Jan.	51	0	239	239
Sept.	844	0	256	256	Feb.	35	0	249	249
1931/32					Mar.	30	0	263	263
Oct.	219	0	242	242	Apr.	32	0	279	279
Nov.	80	0	247	247	May	53	0	298	298
Dec.	48	0	266	266	June	234	0	304	304
Jan.	39	0	272	272	July	679	0	301	301
Feb.	29	0	290	290	Aug.	1,051	0	260	260
Mar.	27	0	301	301	Sept.	883	243	237	480
Apr.	32	0	287	287	1934/35				
May	53	0	272	272	Oct.	287	55	224	279
June	347	0	266	266	Nov.	116	0	225	225
July	663	0	281	281	Dec.	74	0	230	230
Aug.	740	0	303	303	Jan	56	0	238	238
Sept.	1,040	0	267	267	Feb.	39	0	249	249
1932/33					Mar.	34	0	262	262
Oct.	580	0	238	238	Apr.	33	0	277	277
Nov.	142	0	232	232	May	79	0	295	295
Dec.	95	0	238	238	June	380	0	301	301
Jan.	64	0	246	246	July	475	0	291	291

(to be continued)

A 19 The Nam Ngum Project Reservoir Operation

(Unit cu m.s.)

Year	Natural Flow	Regulated Flow			Year	Natural Flow	Regulated Flow		
		Spill	Power	Total			Spill	Power	Total
Aug.	1,181	0	255	255	Jan.	79	0	236	236
Sept.	825	339	235	574	Feb.	54	0	245	245
1935/36					Mar.	50	0	256	256
Oct.	404	169	227	396	Apr.	54	0	270	270
Nov.	189	0	223	223	May	182	0	280	280
Dec.	104	0	226	226	June	793	0	267	267
Jan.	68	0	233	233	July	963	76	239	315
Feb.	52	0	242	242	Aug.	1,364	1,113	246	1,359
Mar.	40	0	253	253	Sept.	1,188	939	243	1,182
Apr.	48	0	266	266	1938/39				
May	100	0	280	280	Oct.	463	226	228	454
June	588	0	276	276	Nov.	185	0	228	228
July	719	0	253	253	Dec.	113	0	226	226
Aug.	1,058	386	240	626	Jan	82	0	232	232
Sept.	1,206	957	243	1,200	Feb.	59	0	241	241
1936/37					Mar.	49	0	251	251
Oct.	239	8	223	231	Apr.	53	0	264	264
Nov.	89	0	225	225	May	124	0	276	276
Dec.	60	0	232	232	June	719	0	267	267
Jan.	44	0	241	241	July	1,139	217	243	460
Feb.	35	0	252	252	Aug.	1,438	1,185	247	1,432
Mar.	31	0	266	266	Sept.	1,065	818	240	1,058
Apr.	27	0	283	283	1939/40				
May	77	0	303	303	Oct.	442	206	228	434
June	401	0	305	305	Nov.	148	0	224	224
July	790	0	286	286	Dec.	109	0	228	228
Aug.	1,241	66	245	311	Jan.	75	0	234	234
Sept.	1,292	1,041	245	1,286	Feb.	55	0	243	243
1937/38					Mar.	45	0	255	255
Oct.	339	105	225	330	Apr	43	0	268	268
Nov.	123	0	224	224	May	103	0	282	282
Dec.	107	0	229	229	June	546	0	280	280

(Unit cu.m.s.)

Year	Natural Flow	Regulated Flow			Year	Natural Flow	Regulated Flow		
		Spill	Power	Total			Spill	Power	Total
July	808	0	255	255	Dec.	85	0	229	229
Aug.	1,167	498	243	741	Jar.	61	0	237	237
Sept.	1,021	775	239	1,014	Feb.	43	0	247	247
1940/41					Mar.	39	0	259	259
Oct.	266	34	223	257	Apr.	43	0	274	274
Nov.	110	0	225	225	May	76	0	290	290
Dec.	78	0	230	230	June	380	0	296	296
Jan.	55	0	238	238	July	601	0	281	281
Feb.	47	0	249	249	Aug.	1,100	0	247	247
Mar.	35	0	262	262	Sept.	1,195	832	243	1,075
Apr.	34	0	277	277	1943/44				
May	79	0	295	295	Oct.	416	180	227	407
June	493	0	296	296	Nov.	117	0	225	225
July	635	0	276	276	Dec.	78	0	230	230
Aug.	1,051	0	243	243	Jan.	60	0	238	238
Sept.	1,292	974	245	1,219	Feb.	48	0	248	248
1941/42					Mar.	37	0	260	260
Oct.	574	335	230	565	Apr	32	0	276	276
Nov.	179	0	223	223	May	88	0	293	293
Dec.	109	0	227	227	June	397	0	297	297
Jan.	75	0	233	233	July	808	0	275	275
Feb.	51	0	242	242	Aug.	935	0	241	241
Mar.	39	0	253	253	Sept.	1,013	699	239	937
Apr.	38	0	267	267	1944/45				
May	115	0	280	280	Oct.	341	107	225	332
June	521	0	278	278	Nov.	155	0	221	224
July	1,148	0	245	245	Dec.	88	0	228	228
Aug.	1,653	1,341	252	1,593	Jan.	64	0	235	235
Sept.	909	665	237	902	Feb.	49	0	245	245
1942/43					Mar.	41	0	257	257
Oct.	266	34	223	257	Apr.	45	0	271	271
Nov.	130	0	224	224	May	115	0	285	285

(to be continued)

A-19 The Nam Ngum Project Reservoir Operation

(Unit: cu.m.s.)

Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total	Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total
June	482	0	284	284	Nov.	149	0	224	224
July	802	0	261	261	Dec.	101	0	228	228
Aug.	1,463	677	250	927	Jan.	74	0	235	235
Sept.	1,326	1,074	245	1,319	Feb.	56	0	244	244
1947/48					Mar.	43	0	255	255
Oct.	416	180	227	407	Apr.	38	0	269	269
Nov.	147	0	224	224	May	88	0	284	284
Dec.	86	0	229	229	June	264	0	293	293
Jan.	64	0	236	236	July	639	0	281	281
Feb.	47	0	246	246	Aug.	875	0	251	251
Mar.	40	0	258	258	Sept.	849	282	236	518
Apr.	42	0	272	272	1950/51				
May	115	0	286	286	Oct.	266	34	223	257
June	433	0	288	288	Nov.	107	0	225	225
July	833	0	264	264	Dec.	77	0	230	230
Aug.	1,107	283	242	525	Jan.	63	0	238	238
Sept.	1,274	1,023	244	1,267	Feb.	48	0	248	248
1948/49					Mar.	33	0	261	261
Oct.	485	248	229	477	Apr.	34	0	277	277
Nov.	173	0	224	224	May	73	0	294	294
Dec.	107	0	227	227	June	630	0	291	291
Jan.	74	0	233	233	July	744	0	263	263
Feb.	53	0	242	242	Aug.	1,191	340	244	584
Mar.	42	0	253	253	Sept.	950	706	238	944
Apr.	52	0	267	267	1951/52				
May	119	0	279	279	Oct.	389	154	226	380
June	336	0	282	282	Nov	115	0	225	225
July	728	0	265	265	Dec.	87	0	230	230
Aug.	875	0	236	236	Jan.	65	0	237	237
Sept.	1,013	760	239	999	Feb.	42	0	247	247
1949/50					Mar.	38	0	260	260
Oct	457	221	228	449	Apr.	35	0	275	275

(Unit cu.m.s.)

Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total	Year	Natural Flow	Regulated Flow Spill	Regulated Flow Power	Regulated Flow Total
May	80	0	292	292	1954/55				
June	268	0	302	302	Oct.	283	51	224	275
July	673	0	288	288	Nov.	110	0	225	225
Aug.	1,223	0	247	247	Dec.	79	0	230	230
Sept.	1,362	1,065	246	1,311	Jan.	56	0	238	238
1952/53					Feb.	39	0	249	249
Oct.	386	151	226	377	Mar.	30	0	262	262
Nov.	113	0	225	225	Apr.	34	0	278	278
Dec.	56	0	231	231	May	68	0	296	296
Jan.	49	0	239	239	June	295	0	307	307
Feb.	38	0	250	250	July	827	0	286	286
Mar.	26	0	264	264	Aug.	1,290	122	247	369
Apr.	30	0	281	281	Sept.	1,214	965	243	1,208
May	85	0	299	299	1955/56				
June	332	0	306	306	Oct.	190	0	223	223
July	629	0	293	293	Nov.	138	0	226	226
Aug.	826	0	263	263	Dec.	82	0	231	231
Sept.	917	116	237	353	Jan.	57	0	239	239
1953/54					Feb.	35	0	249	249
Oct.	224	0	223	223	Mar.	26	0	263	263
Nov.	111	0	225	225	Apr	23	0	280	280
Dec.	77	0	231	231	May	58	0	299	299
Jan.	52	0	239	239	June	338	0	305	305
Feb.	32	0	250	250	July	481	0	301	301
Mar.	25	0	263	263	Aug.	1,132	0	264	264
Apr	28	0	280	280	Sept.	909	246	237	483
May	71	0	299	299	1957/58				
June	316	0	305	305	Oct.	289	57	224	281
July	481	0	301	301	Nov.	65	0	225	225
Aug.	910	0	272	272	Dec.	42	0	233	233
Sept.	1,135	226	243	469	Jan.	32	0	244	244
					Feb.	26	0	256	256

(to be continued)

A 19 The Nam Ngum Project Reservoir Operation

(Unit cu.m.s.)

Year	Natural Flow	Regulated Flow Spill	Power	Total	Year	Natural Flow	Regulated Flow Spill	Power	Total
Mar.	21	0	271	271	Sept.	1,026	20	240	260
Apr.	24	0	290	290	1960/61				
May	56	0	303	303	Oct.	314	81	225	306
June	259	0	296	296	Nov.	135	0	224	224
July	651	0	303	303	Dec.	79	0	229	229
Aug.	824	0	278	278	Jan.	50	0	237	237
Sept.	724	0	247	247	Feb.	42	0	248	248
1958/59					Mar.	32	0	260	260
Oct.	199	0	236	236	Apr.	35	0	276	276
Nov.	96	0	241	241	May	68	0	293	293
Dec.	60	0	250	250	June	328	0	302	302
Jan.	43	0	262	262	July	633	0	288	288
Feb	40	0	278	278	Aug.	707	0	262	262
Mar.	38	0	298	298	Sept.	1,466	610	250	860
Apr.	37	0	298	298	1961/62				
May	81	0	285	285	Oct.	636	397	231	628
June	440	0	283	283	Nov.	197	0	223	223
July	574	0	295	295	Dec.	108	0	226	226
Aug.	1,151	0	281	281	Jan	71	0	232	232
Sept.	1,271	359	246	605	Feb.	48	0	241	241
1959/60					Mar.	36	0	252	252
Oct.	277	45	224	269	Apr.	39	0	266	266
Nov.	121	0	225	225	May	83	0	280	280
Dec.	71	0	230	230	June	343	0	286	286
Jan.	53	0	239	239	July	586	0	274	274
Feb	36	0	250	250	Aug.	854	0	247	247
Mar.	23	0	263	263	Sept.	539	54	229	283
Apr.	16	0	280	280	1962/63				
May	38	0	301	301	Oct.	285	53	224	277
June	126	0	299	299	Nov.	141	0	224	224
July	450	0	298	298	Dec.	86	0	229	229
Aug.	1,064	0	285	285	Jan.	57	0	236	236

(Unit. cu m.s.)

Year	Natural Flow	Regulated Flow Spill	Power	Total	Year	Natural Flow	Regulated Flow Spill	Power	Total
Feb.	41	0	246	246	Aug.	717	457	233	690
Mar.	38	0	259	259	Sept.	578	341	231	572
Apr.	32	0	274	274	1965/66				
May	58	0	291	291	Oct.	304	71	224	295
June	294	0	302	302	Nov.	187	0	223	223
July	1,006	0	276	276	Dec.	99	0	227	227
Aug.	1,382	461	249	710	Jan.	71	0	233	233
Sept.	1,088	841	241	1,082	Feb.	55	0	242	242
1963/64					Mar.	37	0	253	253
Oct.	330	97	225	322	Apr.	41	0	267	267
Nov.	248	17	223	240	May	163	0	279	279
Dec.	130	0	224	224	June	607	0	272	272
Jan.	85	0	229	229	July	1,078	19	241	260
Feb.	60	0	237	237	Aug.	1,539	1,284	249	1,533
Mar.	46	0	247	247	Sept.	955	711	238	949
Apr.	53	0	259	259					
May	107	0	271	271					
June	532	0	268	268					
July	633	0	250	250					
Aug.	752	99	234	333					
Sept.	906	662	237	899					
1964/65									
Oct.	370	136	226	362					
Nov.	175	0	223	223					
Dec.	102	0	227	227					
Jan.	69	0	234	234					
Feb.	57	0	242	242					
Mar.	39	0	254	254					
Apr.	45	0	267	267					
May	94	0	281	281					
June	751	0	272	272					
July	969	0	239	239					

(to be continued)

A-19 The Nam Ngum Project Reservoir Operation

(Unit. cu.m.s.)

Year	Natural Flow	Regulated Flow			Year	Natural Flow	Regulated Flow		
		Spill	Power	Total			Spill	Power	Total
1945/46					1956/57				
Sept.	1,326	1,074	245	1,319	Sept	909	246	237	483
Oct.	284	49	226	275	Oct.	207	0	226	226
Nov.	110	0	225	225	Nov.	70	0	225	225
Dec.	85	0	230	230	Dec.	51	0	230	230
Jan.	61	0	238	238	Jan.	45	0	238	238
Feb.	44	0	248	248	Feb.	37	0	248	248
Mar.	36	0	260	260	Mar.	31	0	260	260
Apr	41	0	275	275	Apr.	29	0	275	275
May	114	0	290	290	May	60	0	290	290
June	594	0	291	291	June	251	0	291	291
July	757	0	276	276	July	519	0	276	276
Aug.	1,200	368	252	620	Aug.	409	0	252	252
Sept.	1,536	1,289	241	1,530	Sept.	508	0	241	241
1946/47									
Oct.	484	249	226	475					
Nov.	176	0	225	225					
Dec.	100	0	230	230					
Jan.	74	0	238	238					
Feb.	56	0	248	248					
Mar.	44	0	260	260					
Apr.	44	0	275	275					
May	110	0	290	290					
June	501	0	291	291					
July	1,127	0	276	276					
Aug.	1,213	771	252	1,023					
Sept.	1,305	1,058	241	1,299					
1947/48									
Oct.	416	180	227	407					

Note; The figures on this page were prepared by EPDC on the basis of the data provided by Nippon Koei CO., LTD.

A 20 Pa Mong Reservoir Operation (EL = 230 m)

(Unit 10^6 cu m)

Year Month	Mekong River Inflow	Regulated Flow: Laos Irr. Demand	Regulated Flow: Thailand Irr Demand	Regulated Flow: Power Release	Regulated Flow: Spill
1953					
Jan.	3,164	311	1,649	4,617	-
Feb	2,910	260	1,121	4,334	-
Mar.	2,430	192	1,070	4,991	-
Apr	2,509	131	906	5,110	-
May	4 189	0	0	5,510	-
June	7,246	2	12	5,295	-
July	16,266	77	523	4,991	-
Aug.	26,019	110	379	4,582	17,812
Sep	26,690	60	157	4,363	22,157
Oct.	12,051	77	402	4,507	7,024
Nov.	8,285	58	135	4,363	3,597
Dec.	5,711	27	77	4,507	962
Total	117,470	1,305	6,431	57,170	51,552
1954					
Jan	4,009	311	1,649	4,568	-
Feb	2,541	260	1,121	4,273	-
Mar.	2,281	192	1,070	4,926	-
Apr.	2,359	131	906	5,040	-
May	3,536	0	0	5,450	-
June	6,924	2	12	5,286	-
July	12,433	77	523	5,118	-
Aug	28,644	110	379	4,688	16,335
Sep.	32,117	60	157	4,363	27,584
Oct	15,030	77	402	4,507	10,003
Nov.	8,247	58	135	4,363	3,559
Dec	5,898	27	77	4,507	1,149
Total	124,019	1,305	6,431	57,089	58,630

A 20 Pa Mong Reserver Operation (EL = 230 m)

(Unit 10^6 cu m)

Year Month	Mekong River Inflow	Regulated Flow: Laos Irr. Demand	Regulated Flow: Thailand Irr. Demand	Regulated Flow: Power Release	Regulated Flow: Spill
1955					
Jan	4,297	311	1,649	4,561	-
Feb	2,957	260	1,121	4,247	-
Mar.	2,669	192	1,070	4,870	-
Apr.	2,804	131	906	4,929	-
May	3,404	0	0	5,288	-
June	6,458	2	12	5,146	-
July	21,159	77	523	4,854	3,256
Aug	39,312	110	379	4,507	34,363
Sep.	34,119	60	157	4,363	29,586
Oct	10,295	77	402	4,507	5,268
Nov.	10,195	58	135	4,363	5,507
Dec	6,052	27	77	4,507	1,303
Total	143,721	1,305	6,431	56,142	79,283
1956					
Jan	4,388	311	1,649	4,561	-
Feb	2,796	260	1,121	4,247	-
Mar.	2,402	192	1,070	4,878	-
Apr	2,026	131	906	4,988	-
May	2,944	0	0	5,421	-
June	7,399	2	12	5,267	-
July	12,456	77	523	5,083	-
Aug	36,578	110	379	4,674	24,825
Sep.	26,956	60	157	4,363	22,423
Oct.	11,064	77	402	4,507	6,037
Nov.	5,156	58	135	4,363	468
Dec	3,834	27	77	4,527	-
Total	117,999	1,305	6,431	56,879	53,753

(to be continued)

A 20 Pa Mong Reserver Operation (EL = 230 m)

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1957					
Jan	3,375	311	1,649	4,631	-
Feb	2,766	260	1,121	4,348	-
Mar	2,727	192	1,070	5,016	-
Apr.	2,399	131	906	5,128	-
May	3,031	0	0	5,602	-
June	5,429	2	12	5,568	-
July	13,464	77	523	5,392	-
Aug	12,750	110	379	4,839	-
Sep.	14,700	60	157	4,363	7,608
Oct	15,384	77	402	4,507	10,357
Nov.	5,017	58	135	4,363	329
Dec.	3,384	27	77	4,540	0
Total	84,426	1,305	6,431	58,297	18,294
1958					
Jan	2,648	311	1,649	4,674	-
Feb	2,139	260	1,121	4,433	-
Mar.	2,063	192	1,070	5,188	-
Apr	2,130	131	906	5,413	-
May	2,843	0	0	6,063	-
June	5,697	2	12	6,167	-
July	16,813	77	523	5,719	-
Aug	26,702	110	379	4,816	10,141
Sep	21,488	60	157	4,363	16,955
Oct	10,737	77	402	4,507	5,710
Nov.	7,239	58	135	4,363	2,551
Dec.	4,565	27	77	4,513	-
Total	105,064	1,305	6,431	60,219	35,357

A 20 Pa Mong Reservoir Operation (EL = 230 m)

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow Laos Irr. Demand	Thailand Irr Demand	Power Release	Spill
1959					
Jan	3 432	311	1,649	4,596	-
Feb	3,070	260	1,121	4,300	-
Mar	3,256	192	1,070	4,918	-
Apr.	3,022	131	906	4,954	-
May	4,003	0	0	5,288	-
June	9,645	2	12	4,997	-
July	14,797	77	523	4,733	665
Aug	29,534	110	379	4,507	24,585
Sep	31,173	60	157	4,363	26,640
Oct.	19,460	77	402	4,501	14,433
Nov	10,375	58	135	4,363	5,687
Dec	5,932	27	77	4,507	1,183
Total	137,699	1,305	6,431	56 033	73,193
1960					
Jan.	4,380	311	1,649	4,561	-
Feb	3,689	260	1,121	4,227	-
Mar	2,850	192	1,070	4,816	-
Apr.	2,246	131	906	4,872	-
May	2,997	0	0	5,260	-
June	6,262	2	12	5,137	-
July	15,382	77	523	4,918	-
Aug.	34,678	110	379	4,568	27,079
Sep	30,975	60	157	4,363	26,442
Oct	16,647	77	402	4,507	11,620
Nov	8,753	58	135	4,363	4,065
Dec.	6,447	27	77	4,507	1,095
Total	135,306	1,305	6,431	56,099	70,904

(to be continued)

A 20 Pa Mong Reservoir Operation (EL =230 m)

(Unit 10^{6}cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr Demand	Power Release	Spill
1961					
Jan.	4,171	311	1,649	4,568	-
Feb	3,189	260	1,121	4,247	-
Mar.	2,882	192	1,070	4,854	-
Apr	3,421	131	906	4,888	-
May	4,449	0	0	5,161	-
June	10,963	2	12	4,816	-
July	14,952	77	523	4,638	4,267
Aug	28,893	110	379	4,507	23,944
Sep.	35,502	60	157	4,363	30,969
Oct.	24,577	77	402	4,507	19,550
Nov.	11,104	58	135	4,363	6,416
Dec	7,586	27	77	4,507	2,837
Total	151,689	1,305	6,431	55,419	87,983
1962					
Jan	5,139	311	1,649	4,541	-
Feb	3,595	260	1,121	4,195	-
Mar.	3,281	192	1,070	4,762	-
Apr.	3,072	131	906	4,768	-
May	4,606	0	0	5,032	-
June	11,598	2	12	4,677	-
July	16,910	77	523	4,568	9,064
Aug.	30,489	110	379	4,507	25,540
Sep	24,242	60	157	4,363	19,709
Oct.	16,177	77	402	4,507	11,150
Nov	8,529	58	135	4,363	3,841
Dec	5,385	27	77	4,507	636
Total	133,023	1,305	6,431	54,790	69,940

A 20 Pa Mong Reservoir Operation (EL = 230 m)

(Unit: 10^6 cu.m.)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1963					
Jan	3,895	311	1,649	4,575	-
Feb	2,912	260	1,121	4,267	-
Mar.	2,876	192	1,070	4,886	-
Apr.	2,513	131	906	4,963	-
May	3,004	0	0	5,363	-
June	6,312	2	12	5,248	-
July	20,174	77	523	4,902	888
Aug	35,571	110	379	4,507	30,622
Sep	25,452	60	157	4,363	20,919
Oct.	16,760	77	402	4,507	11,733
Nov.	18,823	56	135	4,363	14,135
Dec.	8,135	27	77	4,507	3,386
Total	146,472	1,305	6,431	56,451	81,683
1964					
Jan	5,146	311	1,649	4,540	-
Feb.	3,686	260	1,121	4,188	-
Mar	3,459	192	1,070	4,770	-
Apr.	3,435	131	906	4,737	-
May	5,595	0	0	4,950	-
June	7,833	2	12	4,677	-
July	25,503	77	523	4,624	15,576
Aug	30,304	110	379	4,507	25,355
Sep	31,598	60	157	4,363	27,065
Oct.	22,199	77	402	4,507	17,172
Nov.	11,250	58	135	4,363	6,562
Dec	7,773	27	77	4,507	3,024
Total	157,781	1,305	6,431	54,733	94,754

(to be continued)

A-20 Pa Mong Reservoir Operation (EL = 230 m)

(Unit: 10^6 cu.m.)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1965					
Jan.	5,340	311	1,649	4,540	–
Feb.	3,830	260	1,121	4,182	–
Mar.	3,410	192	1,070	4,733	–
Apr.	2,990	131	906	4,730	–
May	3,510	0	0	5,024	–
June	10,100	2	12	4,745	–
July	20,500	77	523	4,624	10,502
Aug.	26,100	110	379	4,507	21,151
Sep.	24,900	60	157	4,363	20,367
Oct.	17,600	77	402	4,507	12,573
Nov.	19,600	58	135	4,363	14,912
Dec.	9,670	27	77	4,507	4,921
Total	147,550	1,305	6,431	54,825	84,426
1966					
Jan.	6,280	311	1,649	4,513	–
Feb.	4,230	260	1,121	4,125	–
Mar.	3,560	192	1,070	4,652	–
Apr.	3,240	131	906	4,632	–
May	4,450	0	0	4,870	–
June	11,000	2	12	4,553	–
July	22,900	77	523	4,523	17,191
Aug.	41,900	410	379	4,507	36,951
Sep.	46,200	60	157	4,363	41,667
Oct.	23,300	77	402	4,507	18,273
Nov.	13,600	58	135	4,363	8,912
Dec.	8,980	27	77	4,507	4,231
Total	189,640	1,305	6,431	54,112	127,225

A-21 Pa Mong Reservoir Operation (EL = 240 m)

(Unit 10^6 cu m.)

Year Month	Mekong River Inflow	Regulated Flow Laos Irr. Demand	Thailand Irr Demand	Power Release	Spill
1953					
Jan	3,164	311	1,649	6,075	0
Feb	2,910	260	1,121	5,683	0
Mar	2,430	192	1,070	6,558	0
Apr.	2,509	131	906	6,677	0
May	4,189	0	0	7,170	0
June	7,246	2	12	7,110	0
July	16,266	77	523	7,004	0
Aug	26,019	110	379	6,268	3,142
Sep	26,690	60	157	5,697	20,839
Oct.	12,051	77	402	5,894	5,624
Nov	8,285	58	135	5,697	2,219
Dec.	5,711	27	77	5,909	0
Total	117,470	1,305	6,431	75,742	31,824
1954					
Jan	4,009	311	1,649	5,995	0
Feb.	2,541	260	1,121	5,583	0
Mar	2,281	192	1,070	6,446	0
Apr	2,359	131	906	6,548	0
May	3,536	0	0	7,091	0
June	6,924	2	12	6,985	0
July	12,433	77	523	7,036	0
Aug	28,644	110	379	6,338	3,076
Sep.	32,117	60	157	5,697	26,266
Oct	15,030	77	402	5,894	8 603
Nov.	8,247	58	135	5,697	2,181
Dec.	5,898	27	77	5,902	0
Total	124,019	1,305	6,431	75,212	40,125

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1955					
Jan	4,297	311	1,649	5,979	0
Feb	2,957	260	1,121	5,560	0
Mar	2,669	192	1,070	6,383	0
Apr	2,804	131	906	6,442	0
May	3,404	0	0	6,939	0
June	6,458	2	12	6,854	0
July	21,159	77	523	6,645	0
Aug	39,312	110	379	6,059	24,769
Sep	34,119	60	157	5,697	28,268
Oct.	10,295	77	402	5,894	3,862
Nov.	10,195	58	135	5,697	4,129
Dec.	6,052	27	77	5,902	0
Total	143,721	1,305	6,431	74,051	61,034
1956					
Jan.	4,388	311	1,649	5,979	0
Feb	2,796	260	1,121	5,552	0
Mar	2,402	192	1,070	6,383	0
Apr.	2,026	131	906	6,480	0
May	2,944	0	0	7,016	0
June	7,399	2	12	6,941	0
July	12,456	77	523	6,971	0
Aug	36,578	110	379	6,312	12,048
Sep	26,956	60	157	5,697	21,105
Oct.	11,064	77	402	5,894	4,637
Nov	5,156	58	135	5,712	0
Dec.	1 834	27	77	5,979	0
Total	117,999	1,305	6,431	74,936	37,790

(to be continued)

A-21 Pa Mong Reservoir Operation (EL = 240 m)

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr Demand	Thailand Irr. Demand	Power Release	Spill
1957					
Jan.	3,375	311	1,649	6,133	0
Feb.	2,766	260	1,121	5,739	0
Mar.	2,727	192	1,070	6,635	0
Apr.	2,399	131	906	6,770	0
May	3,031	0	0	7,440	0
June	5,429	2	12	7,512	0
July	13,464	77	523	7,589	0
Aug	12,750	110	379	7,113	0
Sep.	14,700	60	157	6,423	0
Oct.	15,384	77	402	6,200	0
Nov.	5,017	58	135	5,826	0
Dec.	3,384	27	77	6,116	0
Total	84,426	1,305	6,431	79,496	0
1958					
Jan	2,648	311	1,649	6,321	0
Feb	2,139	260	1,121	5,991	0
Mar	2,063	192	1,070	7,047	0
Apr.	2,130	131	906	7,385	0
May	2,843	0	0	8,404	0
June	5,697	2	12	8,935	0
July	16,813	77	523	8,864	0
Aug.	26,702	110	379	7,250	0
Sep.	21,488	60	157	5,977	2,178
Oct.	10,737	77	402	5,894	4,310
Nov	7,239	58	135	5,697	1,173
Dec.	4,565	27	77	5,925	0
Total	105,064	1,305	6,431	83,690	7,661

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr Demand	Power Release	Spill
1959					
Jan.	3,432	311	1,649	6,051	0
Feb	3 070	260	1,121	5,644	0
Mar.	3,256	192	1,070	6,483	0
Apr	3,022	131	906	6,548	0
May	4,003	0	0	7,047	0
June	9,645	2	12	6,812	0
July	14,797	77	523	6,694	0
Aug.	29,534	110	379	6,166	10,543
Sep.	31,173	60	157	5,697	25,322
Oct.	19,450	77	402	5,894	13,033
Nov.	10,375	58	135	5,697	4,309
Dec.	5,932	27	77	5,894	0
Total	137,699	1,305	6,431	74,627	53,207
1960					
Jan.	4,380	311	1,649	5,972	0
Feb.	3,689	260	1,121	5,538	0
Mar.	2,850	192	1,070	6,330	0
Apr.	2,246	131	906	6,395	0
May	2,997	0	0	6,908	0
June	6,262	2	12	6,833	0
July	15,382	77	523	6,804	0
Aug	34,678	110	379	6,200	14,105
Sep.	30,975	60	157	5,697	25,124
Oct	16,647	77	402	5,894	10,220
Nov.	8,753	58	135	5 697	2,687
Dec	6,447	27	77	5 894	265
Total	135,306	1,015	6,431	74,162	52,401

(to be continued)

A 21 Pa Mong Reservoir Operation (EL = 240 m)

(Unit 10⁶cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1961					
Jan.	4,171	311	1,649	5,972	0
Feb.	3,189	260	1,121	5,538	0
Mar.	2,882	192	1,070	6,347	0
Apr.	3,421	131	906	6,376	0
May	4,449	0	0	6,794	0
June	10,963	2	12	6,509	0
July	14,952	77	523	6,374	0
Aug.	28,893	110	379	6,027	15,851
Sep	35,502	60	157	5,697	29,651
Oct.	24,577	77	402	5,894	18,150
Nov.	11,104	58	135	5,697	5,038
Dec.	7,586	27	77	5,894	1,404
Total	151,689	1,305	6,431	73,119	70,094
1962					
Jan.	5,139	311	1,649	5,956	0
Feb.	3,593	260	1,121	5,493	0
Mar.	3,281	192	1,070	6,268	0
Apr.	3,072	131	906	6,276	0
May	4,606	0	0	6,674	0
June	11,598	2	12	6,367	0
July	16,910	77	523	6,191	0
Aug	30,489	110	379	5,925	22,404
Sep.	24,242	60	157	5,697	18,391
Oct	16,177	77	402	5,894	9,750
Nov.	8,529	58	135	5,697	2,463
Dec.	5,385	27	77	5,909	0
Total	133,023	1,305	6,431	72,347	53,008

(Unit: 10⁶ cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr Demand	Thailand Irr. Demand	Power Release	Spill
1963					
Jan.	3,895	311	1,649	6,011	0
Feb	2,912	260	1,121	5,598	0
Mar.	2,876	192	1,070	6,428	0
Apr.	2,513	131	906	6,509	0
May	3,004	0	0	7,047	0
June	6,312	2	12	7,008	0
July	20,174	77	523	6,814	0
Aug.	35,571	110	379	6,133	17,763
Sep	25,452	60	157	5,697	19,601
Oct.	16,760	77	402	5,894	10,333
Nov.	18,823	58	135	5,697	12,757
Dec	8,135	27	77	5,894	1,953
Total	146,427	1,305	6,431	74,730	62,407
1964					
Jan.	5,146	311	1,649	5,956	0
Feb	3,686	260	1,121	5,493	0
Mar.	3,459	192	1 070	6,251	0
Apr.	3,435	131	906	6 249	0
May	5,595	0	0	6 606	0
June	7,833	2	12	6,376	0
July	25 503	77	523	6,200	4,817
Aug.	30,304	110	379	5,894	21,984
Sep	31,598	60	157	5,697	25,747
Oct.	22,199	77	402	5,894	15,772
Nov	11,250	58	135	5,697	5 184
Dec.	7,773	27	77	5 894	1,591
Total	157,781	1,305	6 431	72,207	77,095

(to be continued)

A 21 Pa Mong Reservoir Operation (EL = 240 m)

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1965					
Jan	5,340	311	1,649	5,948	0
Feb	3,830	260	1,121	5,478	0
Mar.	3,410	192	1,070	6,243	0
Apr.	2,990	131	906	6,249	0
May	3,510	0	0	6,684	0
June	10,100	2	12	6,442	0
July	20,500	77	523	6,208	0
Aug	26,100	110	379	5,894	19,495
Sep	24,900	60	157	5,697	19,049
Oct.	17,600	77	402	5,894	11,173
Nov.	19,600	58	135	5,697	13,534
Dec.	9,670	27	77	5,894	3,488
Total	147,550	1,305	6,431	72,328	66,739
1966					
Jan	6,280	311	1,649	5,925	0
Feb	4,230	260	1,121	5,435	0
Mar.	3,560	192	1,070	6,166	0
Apr.	3,240	131	906	6,153	0
May	4,450	0	0	6,530	0
June	11,000	2	12	6,240	0
July	22,900	77	523	6,100	6,392
Aug.	41,900	110	379	5,894	35,580
Sep.	46,200	60	157	5,697	40,349
Oct.	23,300	77	402	5,894	16,873
Nov.	13,600	58	135	5,697	7,534
Dec.	8,980	27	77	5,894	2,798
Total	189,640	1,305	6,431	71,625	109,526

A 22 Pa Mong Reservoir Operation (EL = 250 m)

(Unit 10^6 cu m)

Year Month	Mekong River Inflow	Regulated Flow: Laos Irr. Demand	Regulated Flow: Thailand Irr Demand	Regulated Flow: Power Release	Spill
1953					
Jan.	3,164	311	1,619	6,908	0
Feb.	2,910	260	1,121	6,399	0
Mar.	2,430	192	1,070	7,332	0
Apr.	2,509	131	906	7,364	0
May	4,189	0	0	7,854	0
June	7,246	2	12	7,725	0
July	16,266	77	523	7,780	0
Aug	26,019	110	379	7,188	0
Sep.	26,690	60	157	6,569	16,099
Oct	12,051	77	402	6,725	4,777
Nov.	8,285	58	135	6,509	1,358
Dec.	5,711	27	77	6,748	0
Total	117,470	1,305	6,431	85,111	22,234
1954					
Jan.	4,009	311	1,649	6,851	0
Feb.	2,541	260	1,121	6,330	0
Mar.	2,281	192	1,070	7,250	0
Apr.	2,359	131	906	7,278	0
May	3,536	0	0	7,780	0
June	6,924	2	12	7,652	0
July	12,433	77	523	7,822	0
Aug	28,644	110	379	7,259	0
Sep	32,117	60	157	6,569	21,278
Oct.	15,030	77	402	6,725	7,756
Nov	8,247	58	135	6,509	1,320
Dec.	5,898	27	77	6,748	0
Total	124,019	1,305	6,431	84,773	30,354

(Unit: 10^6 cum)

Year Month	Mekong River Inflow	Regulated Flow: Laos Irr Demand	Regulated Flow: Thailand Irr Demand	Regulated Flow: Power Release	Spill
1955					
Jan.	4,297	311	1,649	6,843	0
Feb.	2,957	260	1,121	6,307	0
Mar.	2,669	192	1,070	7,205	0
Apr.	2,804	131	906	7,204	0
May	3,404	0	0	7,678	0
June	6,458	2	12	7,570	0
July	21,159	77	523	7,530	0
Aug.	39,312	110	379	6,973	17,308
Sep.	34,119	60	157	6,509	27,473
Oct	10,295	77	402	6,725	3,021
Nov.	10,195	58	135	6,509	3,268
Dec.	6,052	27	77	6,740	0
Total	143,721	1,305	6,431	83,793	51,170
1956					
Jan.	4,388	311	1,649	6,827	0
Feb.	2,796	260	1,121	6,299	0
Mar	2,402	192	1,070	7,205	0
Apr.	2,026	131	906	7,232	0
May	2,944	0	0	7,749	0
June	7,399	2	12	7,631	0
July	12,456	77	523	7,770	0
Aug.	36,578	110	379	7,161	4,823
Sep.	26,956	60	157	6,509	20,310
Oct	11,064	77	402	6,725	3,940
Nov.	5,156	58	135	6,539	0
Dec	3,834	27	77	6,835	0
Total	117,999	1,305	6,431	81,482	29 073

(to be continued)

A-22 Pa Mong Reservoir Operation (EL = 250 m)

(Unit 10^6 cu.m.)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr Demand	Thailand Irr Demand	Power Release	Spill
1957					
Jan	3,375	311	1,649	6,990	0
Feb.	2,766	260	1,121	6,485	0
Mar	2,727	192	1,070	7,434	0
Apr.	2,399	131	906	7,480	0
May	3,031	0	0	8,048	0
June	5,429	2	12	8,021	0
July	13,464	77	523	8,229	0
Aug.	12,750	110	379	7,939	0
Sep.	14,700	60	157	7,383	0
Oct	15,384	77	402	7,295	0
Nov.	5,017	58	135	6,956	0
Dec.	3,384	27	77	7,322	0
Total	84,426	1,305	6,431	89,582	0
1958					
Jan	2,648	311	1,649	7,579	0
Feb.	2,139	260	1,121	7,154	0
Mar	2,063	192	1,070	8,418	0
Apr	2,130	131	906	8,793	0
May	2,843	0	0	10 001	0
June	5,697	2	12	10,765	0
July	16,813	77	523	11,102	0
Aug	26,702	110	379	9,452	0
Sep	21,488	60	157	7 843	0
Oct	10,737	77	402	7 628	0
Nov.	7,239	58	135	7 335	0
Dec.	4,565	27	77	7,678	0
Total	105,064	1 305	6,431	103,748	0

(Unit 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr Demand	Thailand Irr Demand	Power Release	Spill
1959					
Jan	3,432	311	1,649	7,949	0
Feb	3,070	260	1,121	7,543	0
Mar.	3,256	192	1,070	8,935	0
Apr.	3,022	131	906	9,406	0
May	4,003	0	0	10,910	0
June	9 645	2	12	11,627	0
July	14,797	77	523	11,989	0
Aug.	29,534	110	379	10,001	0
Sep	31,173	60	157	7,735	0
Oct.	19,460	77	402	7,126	0
Nov	10,375	58	135	6,638	0
Dec.	5,932	27	77	6,827	0
Total	137,699	1,305	6,431	166,662	0
1960					
Jan	4,380	311	1,649	6,924	0
Feb.	3,689	260	1,121	6,375	0
Mar	2,850	192	1,070	7,277	0
Apr.	2,246	131	906	7,297	0
May	2,997	0	0	7,822	0
June	6,262	2	12	7,736	0
July	15,382	77	523	7,843	0
Aug	34,678	110	379	7,161	3,098
Sep	30,975	60	157	6,509	24,329
Oct	16,647	77	402	6,725	9,373
Nov	8,753	58	135	6,509	1,826
Dec	6,447	27	77	6,733	0
Total	135,306	1,305	6,431	84,911	38,626

(to be continued)

A 22 Pa Mong Reservoir Operation (EL = 250 m)

(Unit 10^6cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr Demand	Release	Spill
1961					
Jan	4,171	311	1,649	6,819	0
Feb.	3,189	260	1,121	6,292	0
Mar.	2,882	192	1,070	7,170	0
Apr	3,421	131	906	7,150	0
May	4,449	0	0	7,559	0
June	10,963	2	12	7,302	0
July	14,952	77	523	7,313	0
Aug	28,893	110	379	6,940	8,497
Sep.	35,502	60	157	6,509	28,856
Oct	24,577	77	402	6,725	17,303
Nov	11,104	58	135	6,509	4,177
Dec.	7,586	27	77	6,725	522
Total	151,689	1,305	6,431	83,018	59,355
1962					
Jan.	5,139	311	1,649	6,787	0
Feb	3,595	260	1,121	6,232	0
Mar	3,281	192	1,070	7,083	0
Apr.	3,072	131	906	7,043	0
May	4,606	0	0	7,453	0
June	11,598	2	12	7,186	0
July	16,910	77	523	7,135	0
Aug	30,489	110	379	6,843	15,674
Sep	24,242	60	157	6,509	17,596
Oct	16,177	77	402	6,725	8,903
Nov	8,529	58	135	6,509	1,602
Dec.	5,385	27	77	6,756	0
Total	133,023	1,305	6,431	82,261	43,775

(Unit. 10^6 cu.m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr Demand	Thailand Irr. Demand	Power Release	Spill
1963					
Jan	3,895	311	1,649	6,867	0
Feb	2,912	260	1,121	6,337	0
Mar	2,876	192	1,070	7,241	0
Apr.	2,513	131	906	7,250	0
May	3,004	0	0	7,749	0
June	6,312	2	12	7,652	0
July	20,174	77	523	7,638	0
Aug.	35,571	110	379	7,024	10,540
Sep.	25,452	60	157	6,509	18,806
Oct	16,760	77	402	6,725	9,486
Nov.	18,823	58	135	6,509	11,896
Dec.	8,135	27	77	6,725	1,071
Total	146,427	1,305	6,431	84,226	51,799
1964					
Jan	5,146	311	1,649	6,787	0
Feb	3,686	260	1,121	6,232	0
Mar.	3,459	192	1,070	7,075	0
Apr.	3,435	131	906	7,026	0
May	5,595	0	0	7,406	0
June	7,833	2	12	7,204	0
July	25,503	77	523	7,066	0
Aug	30,304	110	379	6,740	22,172
Sep.	31,598	60	157	6,312	24,949
Oct.	22,199	77	402	6,728	14,922
Nov.	11,250	58	135	6,512	4,320
Dec.	7,773	27	77	6,728	706
Total	157,781	1,305	6,431	82,016	67,069

(to be continued)

A-22 Pa Mong Reservoir Operation (EL = 250 m)

(Unit 10^6 cu m)

Year Month	Mekong River Inflow	Regulated Flow			
		Laos Irr. Demand	Thailand Irr. Demand	Power Release	Spill
1965					
Jan.	5,340	311	1,649	6,780	0
Feb.	3,830	260	1,121	6,218	0
Mar.	3,410	192	1,070	7,066	0
Apr.	2,990	131	906	7,026	0
May	3,510	0	0	7,444	0
June	10,100	2	12	7,232	0
July	20,530	77	523	7,152	0
Aug	26 100	110	379	6,819	12,797
Sep	24,900	60	157	6,509	18,254
Oct.	17 600	77	402	6,725	10,326
Nov.	19 600	58	135	6,509	12,673
Dec	9 670	27	77	6,725	2,606
Total	147,550	1,305	6 431	82 205	56,656
1966					
Jan.	6,280	311	1 649	6 772	0
Feb	4 230	260	1,121	6,188	0
Mar.	3,560	192	1 070	7,015	0
Apr	3,240	131	906	6 956	0
May	4,450	0	0	7 350	0
June	11,000	2	12	7,087	0
July	22 900	77	523	6 974	471
Aug.	41,900	110	379	6,725	34 766
Sep	46,200	60	157	6,509	39,554
Oct.	23,300	77	402	7 625	15 126
Nov	13,600	58	135	6 509	6,673
Dec.	8,980	27	77	7 625	1 016
Total	189,640	1 305	6 431	83,335	97 606

APPENDIX B. GEOLOGICAL SURVEY

APPENDIX B. GEOLOGICAL SURVEY

B-1 Background

Prior to the geological surveys conducted by EPDC, geological explorations were carried out by the Australian Team in the dry seasons of 1960–61 and 1961–62 in accordance with the request made to the Government of Australia at the 15th Session of the Committee for the Coordination of Investigations of the Lower Mekong Basin. The Australian Team conducted basic geological investigations of the entire project area and also carried out geological surveys and studies of foundations of hydraulic structures along the dam axes selected by the Team and of natural construction materials.

With the purpose of supplementing the abovementioned survey of the Australian Team, EPDC, as a part of the Japanese Government Sambor Team, carried out additional explorations in the First, Second and Third Field Surveys.

In undertaking the investigations, the accomplishments of the Australian Team were very valuable and it was possible to obtain satisfactory results.

The geological surveys of EPDC were conducted of the foundations of hydraulic structures and natural construction materials. The investigations of foundations of structures were made with emphasis on the center lines of the various alternative dam sites and their vicinities which are fundamental to obtain basic data for the design of structures. For natural construction materials, especially rock materials, an area as wide as possible was explored. This Appendix B consolidates the results of geological surveys of proposed alternative center lines of the dam.

B-2 Description of Field Investigations

The investigations consisted of geological observations made by core borings, auger borings and test pits as well as seismic sounding of river bed sections, areas covered thickly with surface deposits and areas where it was necessary to know the depth of weathered rock. Results of seismic sounding were supplemented by borings and test pits. Also, where it was considered important to know the geological conditions for purposes of designing structures, permeability tests were carried out.

Soil profiles obtained by core boring, auger boring and test pits are included in this appendix in geologic logs (Vol. VIII).

Boring cores, have been placed at Kratie in the custody of Travaux Publics. The explorations executed by the Australian Team are indicated in Table B-1, while the locations of explorations by EPDC are given in Sheet Nos. 1 and 2 of Dwg. No. HO-0201 and Sheet No. 1 of Dwg. No. HO-0202.

Table B–1 Description of Geological Investigation Works

	Core Boring		Auger Boring		Test Pit		Seismic Survey	
	Holes	Length (m)	Holes	Length (m)	Holes	Length (m)	Measured Lines	Length(m)
EPDC	78	1,483	55	159	287	772	23	28,390
Australian Team	17	943	Holes, Pits 269, Total Length 768				—	—
Total	95	2,426	Holes, Pits 611, Total Length 1,699				23	28,390

Regarding stratigraphy and geological structure, there is a detailed report of the Australian Team made prior to the EPDC survey. Therefore, a summary of the report and a general description of the relation with the dam center line will be given in this report. (Fig. B-1)

B-3 General Geologic Features of the Proposed Sites around Hydraulic Structures

(1) Stratigraphy: The Indochinian Formation, which comprises the bedrock of the dam site and its vicinity, is divided into the Tmor Moykbyk Bed distributed on the right bank and the Samboc Group distributed on the left bank with the Cha Sorowoo Fault as the boundary.

The Tmor Moykbyk Bed with infrequent thin limestone interbeds is a formation more than 2000 m thick of sandstone, siltstone and shale, and as a whole it is calcareous. The sandstone is gray and is mostly of medium-sized or fine grains which is found in strata several centimeters to several meters thick, but sometimes massive. The siltstone is gray to dark gray with distinct bedding. The shale is gray to dark gray and generally is ghighly exfoliative.

On the other hand, the Samboc Group seen macroscopically can be divided into three formations.

Lowermost Formation: The upper part is of Kampi conglomerate with a thickness of 350 m, and the lower part is Chang Krang shale more than 100 m thick.

Kampi conglomerate consists of well-rounded medium-sized particles to small pebbles of siliceous rock, limestone, andesite and shale filled in a dense matrix of sandy material, and occupies both wings of the anticlinal axis running NNE-SSW in the vicinity of 4 km upstream from the estuary of Prek Kampi.

It is distributed from the vicinity of Test Pit E45 to F47.shown in Fig. B-3.

Chang Krang shale is an exfoliative rock exposed at the top of the abovementioned anticline.

Middle Formation: This is called the Chaik Tom bed and is approximately 740 m thick. It is mostly alternating strata of siltstone and shale with thin interbeds of sandstone, and at the basal part it has limestone strata or calcareous layers of not more than 1 m thickness. It is distributed on both wings of the Kampi conglomerate and at the river section between Cha Sorowoo Fault and the Karng Preah sandstone to be described later.

Uppermost Formation: This is a formation predominantly of sandstone more than 430 m thick sandwiching a siltstone stratum approximately 100 m thick. The lower sandstone layer is called Karng Preah sandstone and is of medium-sized grain, gray-green color, massive and calcareous, and is approximately 100 m thick. This sandstone, although broken by small faults, strikes roughly north-south, and is distributed in the river bed about 500 m from the left bank.

The middle layer siltstone, called the Kakot Formation, is calcareous, gray colored and exfoliated.

The top layer is called Kbal Cheour sandstone, and is mainly sandstone of fine to medium-sized grains, which is gray to green in color, and has thin interbeds of shale strata. This formation is exposed at the center of the basin structure which is widely developed on the left bank.

The Kbal Cheour Formation is distributed horizontally in a roughly elliptical shape, with a major axis of 5.5 km and a maximum width at the middle of almost 2 km, and extends from the estuary of the Prek Kampi, along the synclinal axis of basin structure, crossing a point approximately 200 m upstream in a roughly NNE-SSW direction. Its southern limit is in the vicinity of Samboc Village which is approximately 1.4 km downstream of the dam axis.

As for igneous rock, several dikes of porphyrite 1 m to 5 m wide are seen at the left bank of the river bed. The strike approximates that of the strata most of which are steeply inclined, but there are some strikes which are orthogonal. The porphyrite is fine-grained, presents a dark green color and is extremely hard. It is in most cases bonded tightly or fused to the country rock, and deterioration by intrusion cannot be seen.

(2) Geologic Structure

Folding: The Moykbyk Bed is folded densely with repeated local anticlines and synclines. The fold axis is N5°-30°E and the dip is generally steep at more than 60° either to the east or to the west.
On one hand, the Samboc Formation is comprised of two basin structures joined by the Pnong anticlinal axis. One of these is the Barang Basin on the left bank of the Mekong-River, and the direction of the

fold axis is roughly N10°E with the central portion occupied by Kbal Cheour sandstone. This basin presents a comparatively simple basin structure in the central portion. But as it gets away from the center, the folds become more pronounced and shift to the Pnong anticline in the east, while in the west they adjoin the Moykbyk Bed by the Cha Sorowoo Fault. The eastern side of the Pnong anticlinal structure again becomes a synclinal structure.

Faults: The fault of greatest magnitude in the vicinity of the dam site is the Cha Sorowoo Fault comprising the boundary between the Moykbÿk Bed and the Samboc Formation. This fault can be traced from the western end of Samboc Rapids to approximately 6 km upstream. The strike is generally N5°-10°E, at times leaning to N 10°W, while the dip is close to vertical. The width of the sheared zone of this fault is estimated to be approximately 100 m at the Samboc Rapids. The sheared zone is comprised of crushed rock, a well-compacted fissile zone of concentrated cracks, and a material consisting of fault breccia of 1 mm to 10 mm in length cemented by clay or silt. There are also veinlets of calcite which are developed in a network manner facilitating healing.

Besides the above, there is the Quorng Fault which can be traced for approximately 2 km in a northeasterly direction from the vicinity of the right bank river section of ©' and the Australian Line crossing Samboc Rapids diagonally towards the left bank.

The scale of this fault is far smaller than that of Cha Sorowoo Fault. There are a number of other faults which can be seen, but the widths of sheared zones are not more than 1 m in most cases while deterioration from shearing action is not prominent.

Joints: Joints are classified into two groups. One has a strike of N 30°-70°E with a dip of more than 50° to the northeast, while the other has a strike of N 60°-80°W and a dip of more than 50° to the northeast.

Joints are in most cases tight or filled with veinlets of calcite not more than 1 mm thick. However, near the surface, there are joints which surfaces are tainted by limonite adhered in iron-chain form, and some joints which have been slightly opened, and where the filling of thin calcite veins has been dissolved presenting a powdered or paste form.

Other than at faults and special locations, the spacing of joints is not greatly different from that of ordinary sedimentary rock.

Surface Deposits: Rock is exposed widely over the river bed section and river deposits are thin. The deposits are chiefly comprised of fine sand, but in small areas there are thin deposits having mixture of small pebbles of 1 cm diameter which are mainly quartzite. The flood plains on both banks have deposits of plastic clay and silty materials. Mountainsides are covered widely with thin weathered residual soil and there are few outcrops.

Of the surface deposits, the most prominent is the one in the former river bed which is 2 km wide. The thickness of this deposit as shown in Section J-J, Sheet No. 5 of Dwg. No. HO-0231, is more than 30 m at the middle section of the former river bed near the proposed dam axis. They mainly consist of fine sand, silt and clay, and also some coarse sand and rounded quartzite pebbles of about 1 cm in diameter. It is deposited in a fairly compacted condition.

B-4 Survey of Various Alternative Dam Axes

As the result of consultations with the Mekong Committee Technical Advisory Group at Kratie in November 1963, it was decided that the various alternative dam center lines which were being compared at that time would be limited to the four shown in Fig. B-1 for the purpose of survey.

© Line: A concrete gravity dam, spillway and power plant to be constructed in the river bed section and connected to both banks by fill dams.

©' Line: Considering the special features of the hydrology and topography of this site, the power plant and concrete spillway are to be constructed on the right bank tableland with a rock-fill dam in the river bed section connected to both banks by earth dams.

Ⓓ Line: An alternative proposal to Ⓒ' Line with partial changes in the center lines of the rock-fill dam in the river bed section and the left bank earth dam.

Phnom Samboc Line:

A new center line selected for investigation as a result of the previously mentioned consultations with the Mekong Committee Technical Advisory Group. As a result of surveys of the four lines mentioned above, it was decided that Ⓒ'Line should be adopted at this stage. A comparison of the four center lines with the one proposed by the Australian Team is as follows:

(a) Ⓒ' Line is slightly different from the Australian Line at the right bank, but is almost the same at the right bank, while it is completely identical in the river bed section.

(b) Ⓒ Line at the left bank is roughly identical to the south alternative line selected by the Australian Team.

(1) Ⓒ Line (See Fig. B-1)

Methods of Survey:

Of the dam center line, the river bed section, connected by Borings DH 4100 and 4101, and the former river bed on the right bank connected by RIP 1 and RIP 2, were subjected to seismic sounding. Besides this, core borings and test pits were executed as shown on Fig. B-2.

The quantities of explorations made by EPDC on Ⓒ Line are shown on Table B-2. It should be noted that the investigations from RIP 2 on the dam center line at the right bank to the wing are identical to those for Ⓒ' Line.

Table B-2 Result of Ⓒ Line Survey

	Seismic Sounding		Core Boring		Test Pit		Permeability Test		Auger Boring	
	Measured Lines	Length (m)	Holes	Length (m)	Holes	Length (m)	No. of Tests	No. of Tests Cross Section	Holes	Length (m)
River bed	1	2,140	1	10			1	2		
Left bank			4	88	26	53	5	5	26	63
Right bank	2	3,871	16	270	35	142	11	20	20	73
Total	3	6,011	21	368	61	195	17	27	46	136

Results of Survey:

(a) River Bed: Bedrock was almost all submerged even in the dry season. As shown in Section I-I, Sheet No. 7 of Dwg. No. HO-0232, the elevation of the bedrock according to information obtained by seismic sounding is roughly about 5 m and is covered with river deposits of more than several meters, while there were approximately 10 trench-like eroded zones reaching below EL 0 m.

The largest trough which exists towards the right bank is comprised of 2 trench-like bands as shown in Fig. B-4. In other words, the one nearer the center of the river channel has a maximum depth of EL–10m and with rock rising to a height of EL 0 m as a boundary, the other trench-like band lies on the right bank side with a maximum depth of EL–7 m. The width of this unsymmetrical W-shaped trough zone at EL 0 m was measured to be approximately 130 m. Further, on examination of the results of seismic prospecting and observation data obtained with sounding apparatus, it is estimated that bedrock is exposed at the river bottom in this trough zone.

The bedrock of the river bed consists of shale, siltstone andsandstone, or complex of these rocks. From observations of boring cores recovered from both banks and the river bed, and from the velocity of seismic sounding, the rock is judged to be fresh, hard and suitable as a foundation for structures.

(b) Left Bank: The bedrock is deep in the area near the mainstream of the Mekong River as shown in Section P-P, Sheet No. 9 of Dwg. No. HO-0232. It is more than 14 m and at Boring 6326 it was more than 17 m.

However, weathering has not progressed deep into the interior of the rock.

From EL 20 m and higher to the wings, the thickness of surface deposits is small, being generally 2 m or less. The surface deposits are compacted silty clay or clay, and the underlying material is generally more cohesive and strong bonded to completely weathered rock.

The thickness of weathered rock is approximately 1.50 m according to Boring 6333.

Permeability tests were conducted on the surface deposits using test pits, and a high degree of watertightness was indicated.

(c) Right Bank: As shown in Fig. B-1 and Section K-K of Sheet No. 4 and Section J-J of Sheet No. 5 of Dwg. No. HO-0231, the dam axis crosses the former river bed. By seismic sounding and investigation by boring, it was found that the surface deposit in this former river bed was abnormally thicker than elsewhere, and as indicted in Sections K-K and J-J, there is a trough zone as deep as EL–10 m in the middle.

At this former river bed, material consisting mostly of fine and medium-sized particles is deposited in a comparatively dense state, as described in B-3 (2) surface deposits. This deposit in the former river bed, the underlying bed rock and the boundary between the two, were thought to be possible channels of permeability from the reservoir after construction of the dam, but upon carrying out permeability tests it was found that the permeability was comparatively small.

According to the results of investigation of the upstream part of © Line conducted by the Australian Team, the thickness of the deposit is 6 m to 11 m, and it is reported that permeability test conducted in auger holes also showed the deposit to be comparatively impermeable.

As a part of the investigation of the bedrock underlying the deposit, reconnaissance was made of the upstream end of the former river bed. As indicated in Sheet No. 3 of Dwg. No. HO-0231, the observations of the upstream end showed repeated folds of fresh, hard sandstone, siltstone and shale complex, and there were no especially large-scale soft and weak sections. Core borings on © Line also showed the thickness of the weathered surface zone of the bedrock to be 2 m to 3 m under which the recovered cores showed strata of fresh shale, siltstone and sandstone, the same as at the upstream end of the former river bed. The area from RIP 2 to the wing section of the dam is covered with weathered residual soil 1 m to 4 m thick.

Macroscopically speaking, the bedrock on the right bank is composed of homogeneous soil, and not only is the earth produced by weathering of uniform property, but the thickness of seam at the concentration of laterite nodules is constant at around 50 cm.

The weathered residual soil covering the bedrock is a product of calcareous rock and is very dense. The results of permeability tests show a high degree of watertightness.

(2) ©' Line (See Fig. B-3, Figs. E-1 to E-8 in Vol. III)

Methods of Survey:

In the river bed section, seismic soundings and core borings were carried out, in addition to geological observation of outcrops. The Australian Team has also made detailed geological studies of the ground surface besides investigating the condition of the interior of the bedrock by core boring.

On both banks, in the area where alluvium is deposited thickly near the river, core boring was executed. While in the areas of elevations higher than 20 m, where the alluvium was thin, test pits spaced at approximately

500 m were excavated. Also, on the right bank, seismic prospectings were carried out along the center line of the concrete spillway, while the condition of the foundation was investigated by core boring and test pits.

The quantities of investigations conducted by EPDC on Ⓒ' Line are indicated in Table B-3 and location of explorations are shown in Fig. B-3.

Table B-3 Result of Ⓒ' Line Survey

	Seismic Sounding		Core Boring		Test Pit		Permeability Test		Auger Boring	
	Measured Lines	Length (m)	Holes	Length (m)	Holes	Length (m)	No. of Test Locations	No. of Test Cross Section	Holes	Length (m)
River bed	1	2,317	2	60			1	3		
Left bank			7	95	51	108	4	4	5	17
Right bank	11	9,520	34	613	100	332	11	25	10	42
Total	12	11,837	41	746	151	440	16	32	15	59

Results of Survey:

(a) River Bed: Bedrock is exposed widely in the dry season and except for the portion near the right bank, the river can mostly be forded. Using a 1/2,000 scale topographical map, a study of the ground surface and outcrops was carried out, and a geological map as shown in Sheet No. 1 of Dwg. No. HO-0231 was prepared.

The elevation of the bedrock is generally about 10 m, and the thickness of river deposit is generally small with bedrock almost entirely exposed, especially at the left bank.

The bedrock, except for surface layers loosened by erosion from flowing water, is extremely fresh and hard. Most faults and sheared zones have comparatively little deteriorated portions. Dykes are usually less than 50 cm in width and are hard while the country rock has not been damaged.

The results of seismic soundings are given in Section C-C, Sheet No. 1 of Dwg. No. HO-0231. According to this information, there are about seven locations where the bottom is a trough zone of elevation of lower than 0 m, most of which appear to be deposited with fine sand. Two of these, the one at the center of the river bed and the one near the right bank, are of larger scale with almost no deposits at the bottom and apparently bedrock is exposed. According to information obtained through seismic soundings, there are extremely few layers of markedly low velocities and their widths are also narrow. Taking into consideration the results of ground surface and outcrop investigations, it appears there are no soft and weak rocks due to faults and other causes of a large scale in the river bed.

As result of seismic soundings and measurements by devices, the shape of the largest-scale trough zone near the right bank was determined to be as shown in Fig. B-4.

This trough zone is divided into two sections down the middle by a rise in the bedrock to an elevation of approximately 3 m with the bottom of the trough near the center of the river channel at EL-12 m, and the bottom of the one near the right bank at EL-10 m. Material thought to be fine sand is deposited thinly on the slope close to the right bank. In the river bed, the Australian Team made two borings, one each around the surface of the Cha Sorowoo Fault and of the Quorng Fault, while EPDC supplemented these with two borings to the east of the Cha Sorowoo Fault.

As the result of investigations by these four borings, it was found that the bedrock was generally hard with no loosening and watertight.

Weak zones such as sheared zones and jointed zones in fissile form caused by folding action were in most cases reconsolidated, but at parts of the inclined borings DH 4112 made by the Australian Team against the Quorng Fault, weak sheared zones of widths of under 50 cm were observed.

(b) Right Bank:

The structures which will rest on ©' Line are comprised of power plant, concrete spillway and earth dam. The part west of RIP 2 on the center line of the dam on both wings is identical to © Line.

Foundations of powerhouse, spillway, training levee and tailrace were investigated by seismic sounding, borings and test pits.

The bedrock around the powerhouse and spillway is sandstone, shale and alternations of these strata with predominantly shale in between. The thickness of surface deposits is generally thin being about 5 m or less at deepest points, except for the area corresponding to the eastern edge of the former river bed. The condition of undulations of the basal rock including weathered zones are shown in the geological profiles in Sheets No. 5 and 6 of Dwg. No. HO-0232 (See Sheet No. 3 of Dwg. No. HO-0232 for location of section), and in the contour map of Sheet No. 4 of Dwg. No. HO-0232 which were prepared on the basis of this information. According to this map, at the vicinity of the spillway outlet to the south of coordinate X 1,391 km, the elevation of the bedrock surface drops abruptly. The weathered zone of the bedrock is only about 2 m to 3 m around the powerhouse site, but at the trailrace the surface deposits are generally deeper than 4 m at the thinnest place. The interior of the rock is fresh and hard, and deep-seated weathering cannot be seen. However, as a foundation for concrete structures, it is believed suitable treatment would be necessary for localized sheared zones and badly cracked folded zones.

From the western end of the spillway an earth dam will be built and as shown in Fig. B-1, the part west from RIP 2 is identical to the center line of © Line. The center line of the earth dam of ©' Line crosses the former river bed, for approximately 2.5 km, from near the west end of the flood discharge channel. The geologic condition of the former river bed is considered to be the same as in the case of © Line.

(c) Left Bank:

Investigations were carried out by borings and test pits along the dam center line.

In the First Field Survey, the geologic conditions along the center line were investigated by borings and test pits at spacings of approximately 1 km and 500 m respectively for the entire length of the dam from the river bank to EL 35 m. In the Second Field Survey, investigations by test pits and auger borings were executed at the downstream side of the dam center line to supplement the investigations of the dam center line and to conduct material surveys. Also, utilizing some of the test pits lower than EL 35 m, permeability tests of the ground were conducted.

The flood plain near the Mekong River is covered with thick deposits, the surface layer being dark gray humus 10 cm to several meters thick.

At Boring DH 4106 made by the Australian Team at EL 19 m on the river bank, there is an alluvial silt layer of 10.1 m under which there is basal rock consisting of alternating layers of sandstone interbedded with shale.

The bedrock is fresh, but joints are developed locally and there are places at which the walls of drill holes collapsed at depths of 28 m to 34 m during boring operations. In the permeability tests of rock utilizing these holes, the permeability at depths between 11 m and 13.5 m was great, while some permeability was seen between 13.5 m and 24.5 m, and below 34 m the permeability was extremely small.

At Boring D-6' made by EPDC at EL 20.7 m near the middle of the flood plain, the depth of the alluvial deposit was only about 4 m under which was bedrock of coarse sandstone. This rock was severely weathered to a depth of almost 4 m while slight weathering reached as deep as 10 m. The geologic condition of the left bank given in Section H-H, Sheet No. 5 of Dwg. No. HO-0231, Sheet No. 9 of Dwg. No. HO-0232, reveals that, except for the portion near the river bank where it is especially thick, the surface deposit is only 1 m to 3 m and it is particularly thin in the section east of Test Pit E 38 on the center line of the dam. The properties and condition of the surface soil and the bedrock are generally similar to the left bank center line of © Line, but the surface from Test Pit E 45 to around E 47 is covered with large to small pebbles produced from weathered conglomerate.

Fresh conglomerate could not be reached in any of the test pits in the area where the pebbles are distributed. Also, fresh conglomerate could not be reached in test pits in the highland covered with pebbles approximately 2 km south of the dam center line. Weathered residual conglomerate consists of coarse-particled sand matrix holding a large amount of large and small pebbles of siliceous rock, shale, sandstone and rhyolite. The pebbles are round to breccia-like in shape. The matrix is calcareous in parts and is thought to be highly watertight.

(3) Ⓓ Line (See Fig. B-3)

This line as shown in Fig. B-3 differs from Ⓒ' Line over the entire river bed and a part of the right bank. The method of survey as in the case of Ⓒ' Line consisted of surface and outcrop investigations of the river bed in the dry season, as well as seismic soundings of two measurement lines (1,836 m and 1,976 m, total 2,812 m) along the dam center line and 1 boring. On the left bank, Boring D-6 (depth 20 m) at the river bank and Boring D-7 (depth 15 m) near the intersection of Ⓓ Line and Ⓒ' Line, and a test pit between the above 2 borings were executed.

As the result of investigations, as shown in Sheets No. 1 and No. 2 of Dwg. No. HO-0231, the river bed from the left bank towards the right bank for 1,300 m is cut in places by trench-like zones produced by erosion from water, but bedrock is exposed over a wide area. The bedrock is sandstone, shale, siltstone and alternation of these rocks, and is fresh and hard as in the case of Ⓒ' Line.

However, as shown in Section A-A, Sheet No. 1 of Dwg. No. HO-0231, the information obtained from seismic soundings indicate the presence of a considerable number of low-velocity zones in the river bed near the right bank which are thought to be due to faults and sheared zones. In the river bed of Ⓓ Line, there are 3 trough zones which have bottom below EL 0 m. The one along the right bank shown in Fig. B-4 is the largest with a maximum depth to EL-8 m and a width at EL 0 m of approximately 100 m. Upstream of this trench, bordered by a rise in the bedrock of EL 4 m, there is another trough with an elevation of approximately -3 m and a width at EL 0 m of approximately 40 m.

Boring 6301 made by the Australian Team in the river bed was inclined 4.5^{o} towards the Cha Sorowoo Fault and the length of the hole is 44.5 m. This boring showed that 2.4 m from the surface is river bed sand, 2.4 m to 21.65 m is fine-grained sandstone, and beyond 21.65 m is shale. According to observations of the core, the spacing of joints in the rock is close, while most of the rock from 30.60 m to the bottom of the hole is disturbed. Parts escaping disturbance were of small particles having slickensides, but there was hardly any weathering and they were judged to be dense.

The geological condition from the river bank on the left bank to the intersection with Ⓒ' Line is shown in Section J-I, Sheet No. 5 of Dwg. No. HO-0231. It will be noted that the depth of the surface deposit is fairly great in comprison to Ⓒ' Line. At Boring D-6 (depth 20 m) executed near the river bank at EL 22.7 m, the depth of the surface deposit consisting of silty soil was 6.6 m, and the sandstone lying under it showed development of joints. Down to a depth of 9.4 m, weathering was severe with parts having been changed to clay. Weathering was seen up to a depth of 13.10 m.

The geologic conditions of the center lines of the wing sections of both banks are identical to Ⓒ' Line.

(4) Phnom Samboc Line (See Fig. B-2)

As seen in Fig. B-2, seismic prospectings were conducted in the river bed section and parts of both banks, and core borings, auger borings and test pits were executed on both banks.

This line crosses with Ⓒ Line on the left bank near Test Pit LP 33, and with Ⓒ' and Ⓒ Lines on the right bank at RIP 2. The dam center line near the wings is identical with the other lines. The investigations made of the Phnom Samboc Line are shown in Table B-4. The investigations on the wings of the earth dam duplicate investigations of Ⓒ and Ⓒ' Lines.

Table B-4 Result of Survey on Phnom Samboc Line

	Seismic Sounding		Core Boring		Test Pit		Auger Boring	
	Measured Lines	Length (m)	Holes	Length (m)	Holes	Length (m)	Holes	Length (m)
River bed	1	2,880	1	15				
Left bank			5	92	18	40	18	36
Right bank	1	500	13	207	33	128	9	34
Total	2	3,380	19	314	51	168	27	70

Result of Survey:

The appearance of the river bed differs with Samboc Rapids, and broad sand bars consisting mainly of fine sand are exposed on the right bank in the dry season, but islets reefs and outcrops of bed rock are not found in the channel section. The geology of the river bed and the dam center line of the river bank area are shown in Sheet No. 7 of Dwg. No. HO-0232. According to seismic sounding, river bed deposits 5 m deep at most places cover the river bed, while at the river bank on the left bank and between the sand bars to the river bank on the right bank the depth of river bed deposits and alluvium is even greater reaching 20 m to 30 m.

The velocity of the bed rock observed in the seismic prospectings is 4.5 km/sec to 5.8 km/sec, and according to Boring 6305 drilled at the sand bars on the right bank of the river bed, river deposits approximately 9.2 m deep directly cover fresh, hard bed rock consisting of siltstone and shale interbedded at places with sandstone 10 cm thick or less, and it is thought the river bed is generally good bedrock such as found in the core recovered from Boring 6305.

The elevation of the bedrock is generally 0 m, and in the river bed near the left bank, and on land on both banks near the river bank there are troughs of great widths and deep bottoms.

According to seismic soundings, the trough towards the left bank was EL-10 m while the one on the right bank was EL-20 m.

On the left bank, with Phnom Samboc in between, core borings were executed on the dam center line. At Boring 6344 near the main stream, an alluvial layer of clay and silt, 15.4 m deep, covers alternation of fresh shale and siltstone in which fine veins of calcite are developed. Phnom Samboc is comprised of strata of shale, siltstone and sandstone, and the shale and siltstone are generally exfoliative. The stratum is dipped steeply, and as the topography is precipitous the surface layer of the bedrock is loosened, and weathering is thought to have penetrated fairly deep into the rock. In Core Boring 6345 executed east southeast of Phnom Samboc, the surface deposit of clay is 3 m deep, and the underlying bedrock has generally been subjected to shearing action with weathering extending down to a depth of approximately 9 m of which the upper 2.5 m has been completely weathered into a clayey material.

Also, from the geological survey data along the proposed route of a canal, the surface deposits in this area east of Phnom Samboc are 1 m to 4 m deep, and it is thought that the underlying bedrock has been considerably weathered.

The area from Core Boring 6345 to the intersection with © Line is covered with clayey silt containing fragments of weathered shale. The geology of this area is roughly similar to that of © Line.

On the right bank, the depth of the alluvial deposit becomes smaller as it gets away from the main stream as shown in Sheet No. 7 of Dwg. No. HO-0232. The top portion of the alluvial deposit is covered by an extremely thin layer of fine sand, but according to the results of core borings, the alluvial layer consists mainly of highly plastic clay.

Weathering has occurred in the bedrock to a depth of more than 5 m from the surface of which 1 m to 4 m has been changed into clay.

The vicinity of the spillway was investigated by seismic sounding, test pits and core borings. The results are shown in Sheet No. 8 of Dwg. No. HO-0232. At Core Boring 6338, the bedrock is covered by an alluvial deposit of more than 18 m deep consisting mainly of fine sand. Therefore, it is thought excavation of a great amount of overburden will be necessary for the foundation of concrete structures. The depth of the alluvium increases in the direction of the tailrace, and at Core Boring 6325 it is as much as 34 m.

From near the west end of the spillway, the dam center line crosses the former river bed, and intersects Ⓒ Line and Ⓒ' Line at RIP 2.

B-5 Comparison of Various Alternative Dam Axes

(1) In the river bed during the dry season, outcrops are most extensively seen in Ⓒ' Line and next in Ⓓ Line. In Ⓒ Line the bedrock is almost completely submerged in water while no outcrops are found in the Phnom Samboc Line.

(2) The deposits on the river bed are generally thin in Ⓒ' Line, Ⓓ Line and Ⓒ Line, but in the Phnom Samboc Line the deposit is extremely deep.

(3) The bedrock of the river bed consists of shale, siltstone and shale, and alternation of these rocks which are generally hard, but there are faults and sheared zones in places. Most of the faults and sheared zones are compacted and frequently show mylonite or healing through filling of reinlet of calcite. Weak lines, which are recognized in ground surface and outcrop surveys and in seismic sounding, are more numerous in Ⓓ Line on the center line connecting △4 - △5 in Fig. B-1.

(4) Troughs formed through erosion by the mainstream water flow are found in all of the lines. The trough on the Phnom Samboc Line is of the largest scale, but the scale and number of troughs on the three other lines at Samboc Rapids are not greatly different.

(5) The geology of the left bank is roughly the same for all lines. The depth of alluvium on the flood plain near the river bank is the smallest in Ⓓ Line, being 6 m at the maximum. On the other hand, the alluvium on Ⓒ Line and the Phnom Samboc Line is as much as 15 m to 20 m deep in places.

From the east end of the flood plain to the dam wing, the topsoil of the Phnom Samboc Line and Ⓒ Line is much thinner than those of Ⓒ' Line and Ⓓ Line, being generally not more than 2 m.

(6) At the right bank, the spillway site of Ⓒ' Line and Ⓓ Line is thought to be generally good for foundation, if the surface deposits of not more than 5 m deep and approximately 2 m of weathered surface rock are excavated. However, near the spillway center line of the Phnom Samboc Line, the depth of the surface deposit is almost 20 m and special considerations would be necessary for structures.

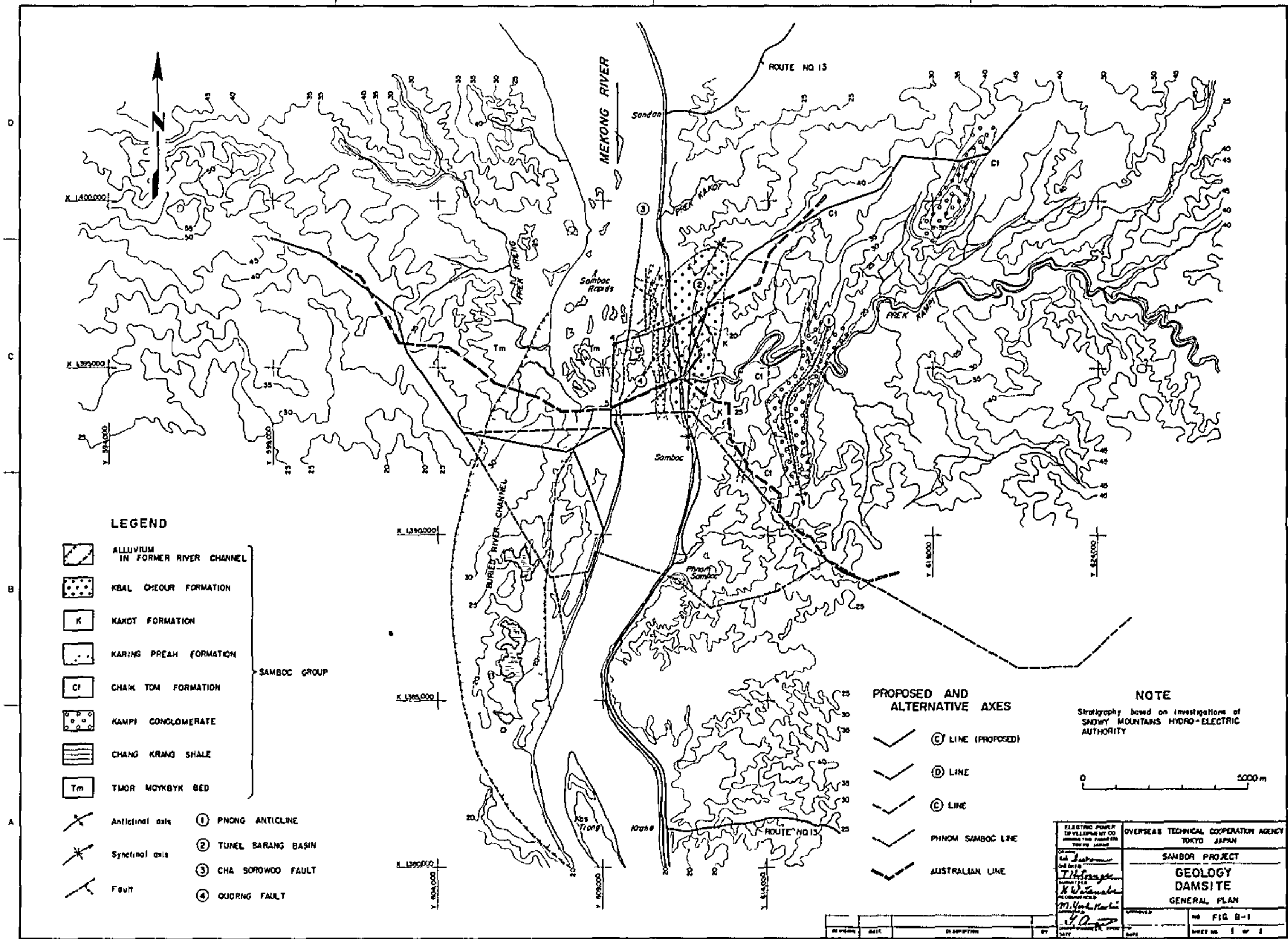
(7) An earth dam will be constructed across the former river bed on the right bank for all lines. The distance across the former river bed is roughly 2.5 km for Ⓒ, Ⓒ' and Ⓓ Lines, but if suitable treatment is executed of the alluvium deposit, it is considered that it would be acceptable as the foundation of the dam.

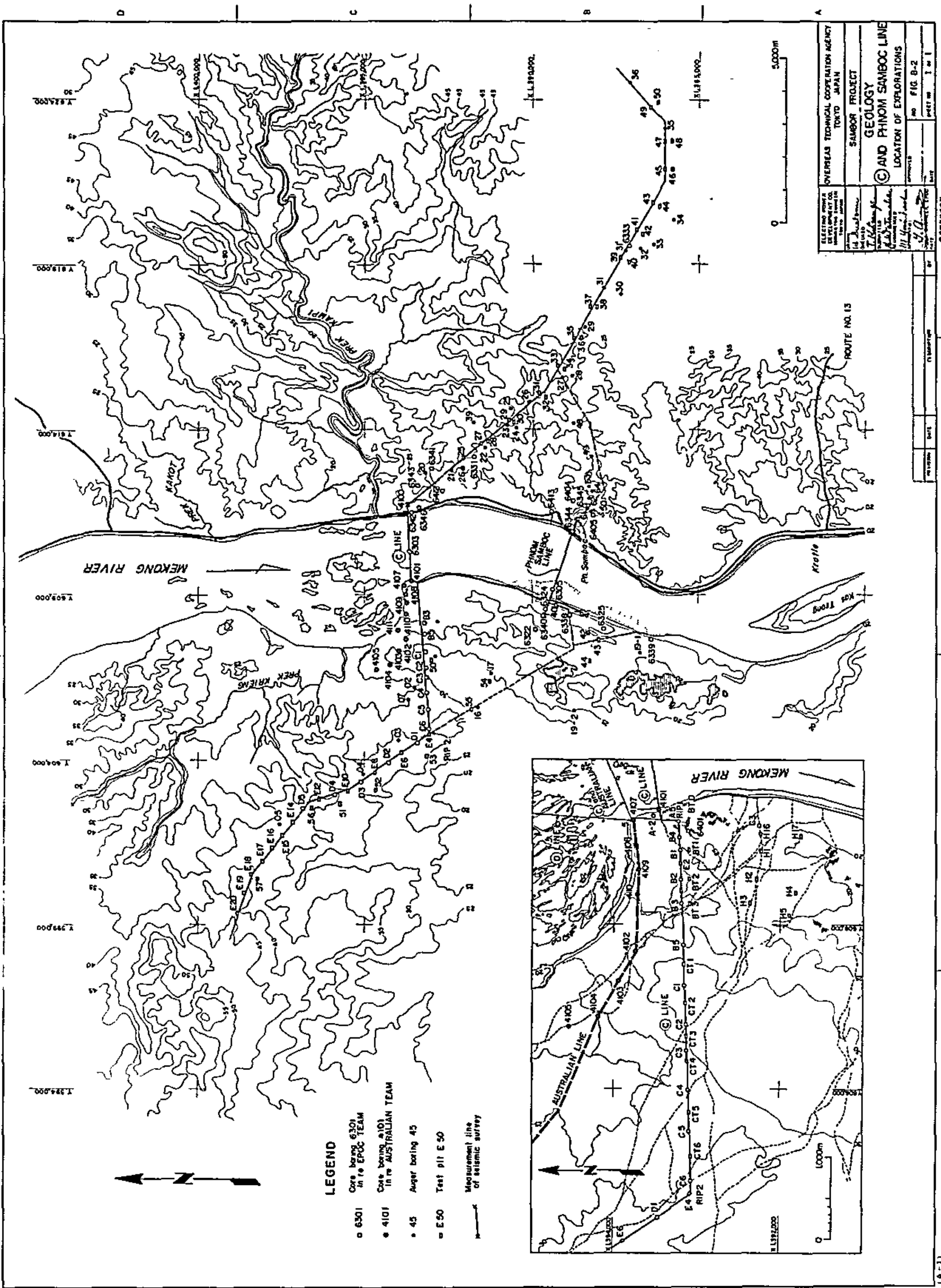
(8) At the proposed powerhouse site on Ⓒ' Line and Ⓓ Line, there is bedrock on which the structure can be constructed by excavating surface deposits of approximately 5 m deep and a very small amount of weathered rock. However at the Phnom Samboc Line, the depth of the surface deposit is more than 10 m.

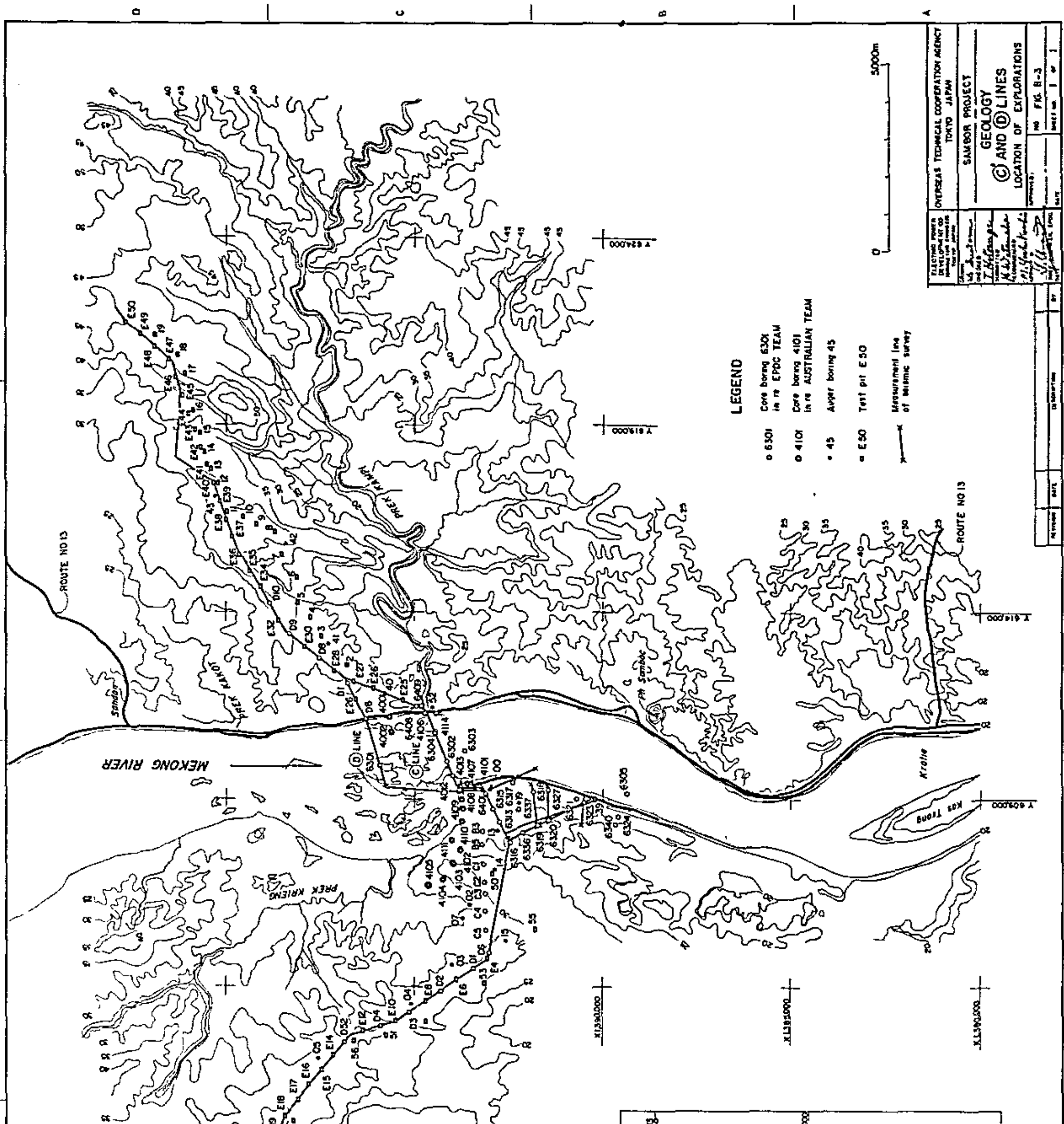
(9) In the case of Ⓓ Line the length of the rock-fill dam in the river bed is longer than in the case of Ⓒ' Line, and no particular advantage in respect to geology can be recognized.

(10) Ⓒ' Line is the site where natural materials are available close by for construction of the dam and takes full advantage of the topography around Samboc Rapids, so it is more desirable, rather than Ⓒ Line in which case a concrete dam would be constructed in the river bed.

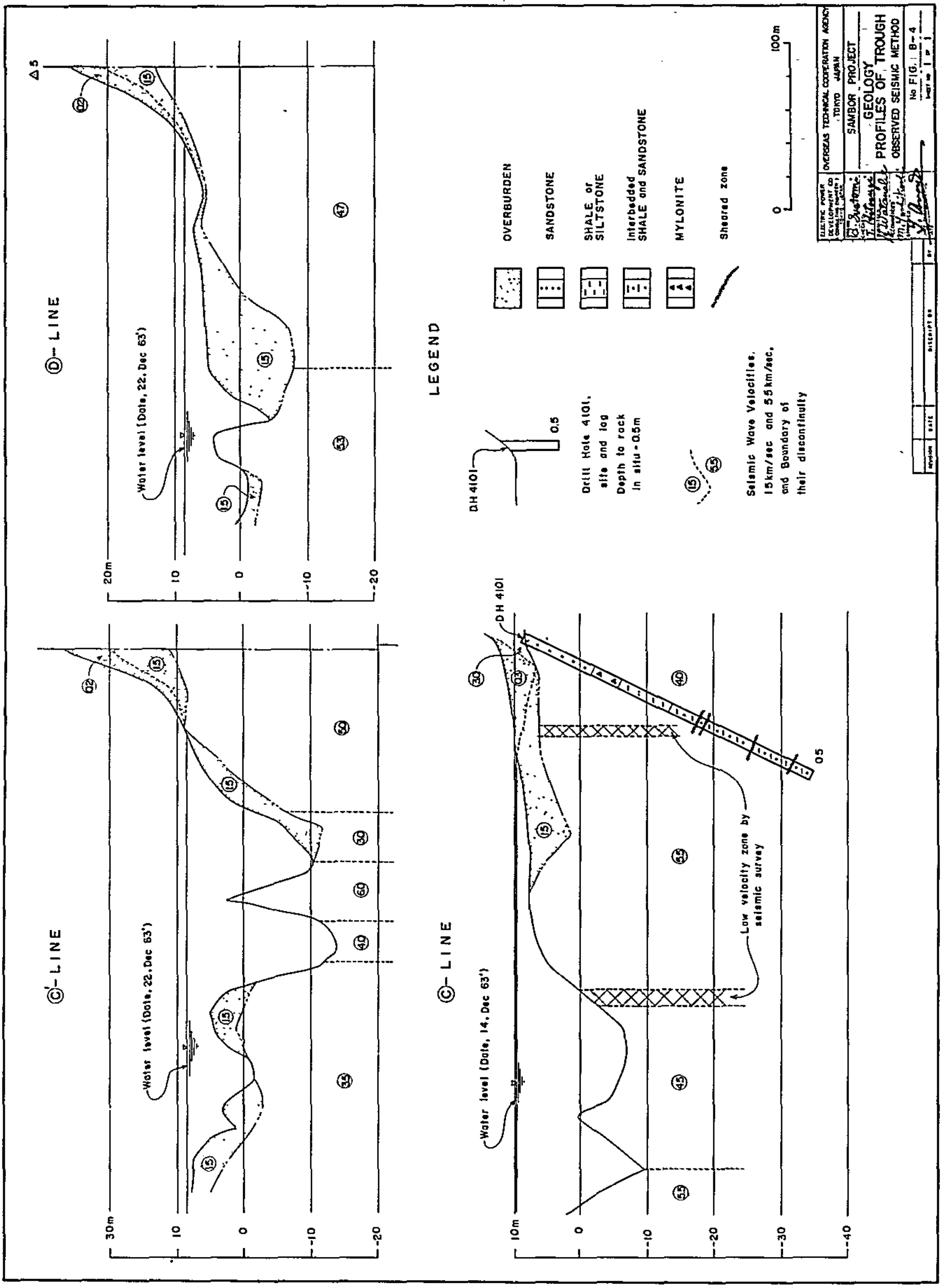
(11) Ⓒ' Line is identical to the dam center line selected by the Australian Team. This Ⓒ' Line proposes the construction of the powerhouse and spillway on the right bank, and the center line of the connecting earth dam aligned at an elevation as high as possible.


MEKONG RIVER
ROUTE NO 13
Sandan
PREK KAKOT
PREK KRIENG
PREK KAMPI
Sambor Rapids
Sambor
Phnom Sambor
BURIED RIVER CHANNEL
Kbs Trong
Kratie
LEGEND
ALLUVIUM IN FORMER RIVER CHANNEL
KBAL CHEOUR FORMATION
KAKOT FORMATION
KARING PREAH FORMATION
CHAIK TOM FORMATION
KAMPI CONGLOMERATE
CHANG KRANG SHALE
TMOR MOYKBYK BED
SAMBOC GROUP
Anticlinal axis
Synclinal axis
Fault
① PNONG ANTICLINE
② TUNEL BARANG BASIN
③ CHA SOROWOO FAULT
④ QUORNG FAULT
PROPOSED AND ALTERNATIVE AXES
C' LINE (PROPOSED)
D LINE
C LINE
PHNOM SAMBOC LINE
AUSTRALIAN LINE
NOTE
Stratigraphy based on investigations of SNOWY MOUNTAINS HYDRO-ELECTRIC AUTHORITY
0
5000 m
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN
SAMBOR PROJECT
GEOLOGY DAMSITE
GENERAL PLAN
FIG B-1


OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN
SAMBOR PROJECT
GEOLOGY
AND PHNOM SAMBOC LINE
LOCATION OF EXPLORATIONS
FIG. B-2
LEGEND
Core boring 6301 in re EPDC TEAM
Core boring 4101 in re AUSTRALIAN TEAM
Auger boring 45
Test pit E 50
Measurement line of seismic survey
MEKONG RIVER
PREK KAMPI
PREK KAKOT
PREK KRIENG
PHNOM SAMBOC LINE
Pt. Sambor
Kratie
Koh Trong
ROUTE NO. 13
AUSTRALIAN LINE
5,000m
1,000m



LEGEND
Core boring 6301 in re EPDC TEAM
Core boring 4101 in re AUSTRALIAN TEAM
Auger boring 45
Test pit E50
Measurement line of seismic survey
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN
SAMBOR PROJECT
GEOLOGY
Ⓒ AND Ⓓ LINES
LOCATION OF EXPLORATIONS
FIG. B-3
MEKONG RIVER
ROUTE NO 13
PREK KRIENG
PREK KAKOT
Kratie
VICINITY OF POWERHOUSE AND SPILLWAY
Ⓒ LINE
Ⓓ LINE
MEKONG R.
SCALE
5000m


D – LINE
Water level (Date, 22, Dec 63')
C' – LINE
Water level (Date, 22, Dec 63')
C – LINE
Water level (Date, 14, Dec 63')
DH 4101
Low velocity zone by seismic survey
LEGEND
OVERBURDEN
SANDSTONE
SHALE or SILTSTONE
Interbedded SHALE and SANDSTONE
MYLONITE
Sheared zone
DH 4101
Drill Hole 4101, site and log
Depth to rock in situ - 0.5m
Seismic Wave Velocities, 1.5 km/sec and 5.5 km/sec, and Boundary of their discontinuity
0
100m
ELECTRIC POWER DEVELOPMENT CO
OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN
SAMBOR PROJECT
GEOLOGY
PROFILES OF TROUGH
OBSERVED SEISMIC METHOD
No FIG. B-4

APPENDIX C. MATERIALS SURVEYS AND TESTS

APPENDIX C. MATERIALS SURVEYS AND TESTS

C-1 General (Concrete Aggregate Materials)

This is a consolidated report of four series of tests performed at EPDC's Civil Engineering Laboratory on aggregates to be used for concrete in structures to be constructed at the Sambor site on the Mekong River in Cambodia.

Samples tested may be summarized as given below. The locations where samples were taken are indicated in Fig. C-1.

Series 1:	Collected 1961 (1 sand specimen)
Series 2:	Collected 1962 (5 sand specimen)
Series 3:	Collected 1963 (3 sand and 1 rock specimens)
Series 4:	Collected 1964 (5 sand specimens)

As the result of tests, the physical properties of river sand were good in all cases and there are no problems concerning quality. However, the grading of river sand sampled in Series 1 and 2, were found to be extremely fine and unsuitable as concrete aggregates. On the other hand, the gradings of samples taken in Series 3 and 4 were generally suited for concrete aggregate. Rock was argillite sandstone which when unweathered offers no problem as a concrete aggregate as judged from various test results. Weathered rock has extremely poor physical properties and are considered to be not suitable as concrete aggregate.

C-2 Test Samples and Testing Principles

C-2-1 Test Samples

The locations from which test samples were collected are indicated in Fig. C-1. The samples were roughly as follow:

The sample of Series 1 was taken from a sand bar on the right bank of the Mekong River approximately 2 km downstream of the proposed site of the Sambor Dam. Approximately 50 kg was taken for laboratory tests.

The samples of Series 2 were taken from five test pits slightly downstream of the site where Series 1 sample was taken. From each pit 50 kg of samples was taken and forwarded for laboratory tests.

The samples of Series 3 consisted of sand and rock. The sand was taken from three places on a sand bar near a point 3 km downstream of Kratie City. From each place 150 kg of samples were taken and sent to the laboratory for tests. Approximately 1.5 tons of rock was taken from an outcrop of argillite sandstone on the right bank immediately downstream of the dam site and sent to the laboratory for tests.

The samples of Series 4 were taken from locations roughly the same as the locations of Series 3 by excavating five test pits, each 5 m deep, and approximately 100 kg from each pit were forwarded to the laboratory for tests.

C-2-2 Testing Principles

Physical Tests of Aggregates: The tests conducted are listed below, all being performed according to Japanese Industrial Standards.

1) Specific gravity and absorption

2) Organic impurities

3) Durability

4) Weight loss from washing

5) Weight loss from abrasion (crushed stone)

6) Grading tests

Strength Tests of Mortar Using Fine-Particled Sand and Standard Grading Sand: The sample of Series 1 (F.M. 0.29) and Sagami River sand of standard grading (F.M. 2.89) were used to make mortar of the proportions indicated below and the two specimens were tested.

Mix.Proportion of Mortar

Flow (mm)	Cement (g)	Sand (g)
200+5	900	1,850

Test of Rock: Prior to testing, the rock was separated into weathered rock and hard rock. Crushing and sand-manufacturing tests of hard rock were conducted followed by concrete tests. The physical tests listed above were performed of these crushed rock, manufactured sand and weathered rock.

C-3 Petrographic Nature of Aggregates

The petrographic nature of the sands taken from the various deposits were almost all the same with quartz material the matrix and containing a fair amount of mica, but as a whole the sands were hard. The rock sample was argillite sandstone and the parts exposed above ground were considerably weathered.

C-4 Physical Properties of Sand

The physical properties of the sands taken from the various deposits, as indicated in Table C-1, all should be good results and physically excellent as concrete aggregates.

Table C-1 Physical Properties of Sand

Test Unit	Test item / Sample	Specific gravity	Absorption (%)	Weight loss from washing by use of 88 μ sieve (%)	Organic impurities (Satisfactory or Not satisfactory)	Weight loss from decomposition of sodium sulfate (%)
1	F-0	2.61	1.20	2.15	satisfactory	-
	F-1	2.59	1.21	7.50	"	1.9
	F-2	2.60	1.01	3.00	"	2.4
2	F-3	2.59	1.01	5.80	"	2.5
	F-4	2.60	0.81	3.30	"	3.8
	F-5	2.58	1.32	3.90	"	2.4
	Upstream	2.59	1.29	2.82	"	3.4
3	Midstream	2.59	1.35	2.50	"	2.4
	Downstream	2.60	1.15	0.98	"	5.8
	F-6	2.60	1.10	1.17	"	3.7
	F-7	2.60	0.77	1.46	"	3.5
4	F-8	2.59	1.11	1.81	"	3.5
	F-9	2.59	0.95	2.70	"	3.8
	F-10	2.60	0.97	0.59	"	3.9
	Sagami River	2.61	1.90	0.80	"	10.6

C-4-1 Specific Gravity and Absorption

The specific gravities were 2.59 to 2.61 for all series, being on the heavy side for sand in general with little variation in specific gravities for different samples.

Absorption rates were good, being 0.77% to 1.35% for all series which is extremely low for sand in general.

C-4-2 Organic Impurities

The tests for organic impurities were conducted by observing coloring produced by 3% sodium hydroxide solution. Samples of all series met requirements and showed hardly any coloring.

C-4-3 Weight Loss from Washing

Weight loss from washing differed according to the samples with Series 1, 3 and 4 being low at a range between 0.59% to 2.82% while the sample of Series 2 showed a somewhat high loss of 3.00% to 7.50%.

C-4-4 Durability

Since the matrix of the sand consisted of hard quartzite grains, the soundness of samples of all series were good with weight loss from decomposition by sodium sulfate being not more than 5.8%.

C-5 Results of Grading Tests of Sand

The grading of the sands were as shown in Table C-2, indicating the samples of Series 1 (F.M. 0.29) and Series 2 (F.M. 1.28 to 2.24) to be extremely fine and unfit as fine aggregate for concrete as described later. On the other hand, samples of Series 3 (F.M. 2.82 to 3.28) and Series 4 (F.M. 2.51 to 2.92) were close to standard grading (F.M. 2.75) and were considered suitable as fine aggregates for concrete.

C-6 Strength Tests of Mortar Using Fine-Particled Sand and Standard Grading Sand

Since the sample of Series 1 was extremely fine-particled sand (F.M. 0.29), comparisons were made by mixing mortar using this fine-particled sand and standard grading sand (Sagami River, see Table C-1 and C-2).

The results are given in Table C-3 and Fig. C-2, showing that for making mortar of the same flow, the fine sand required 72% more water. Therefore, the compressive strength of the fine-particled sand mortar was extremely low, being at most about 40% of the strength of mortar containing sand of standard grading.

Due to the above, if fine-particled sand (Series 1 sample) were to be used in concrete, the strength would be extremely poor with the same cement content and is thus uneconomical. Judging by the above, it was considered the strength would be considerably low also in the case of samples of Series 2.

C-7 Test of Rock

The rock assayed and separated into weathered rock and hard rock by hammering were tested for crushing properties and manufacturing of sand by using a jaw crusher and a rod mill. However, the weathered rock was not subjected to sand-manufacturing tests. For hard rock, concrete tests were also conducted.

C-7-1 Crushing Tests

Setting the jaw crusher at 50 mm (on the closed side) and feeding rock of 100 mm to 250 mm sizes, the grading almost entirely fell into the range of 30 mm to 80 mm as shown in Table C-4. Rock powder under 5 mm was approximately 4%. Flatness and elongated ratio were 0.51 and 1.80 respectively as shown in Table C-4.

C-7-2 Sand Manufacturing Tests

The sand manufacturing tests were performed with a rod mill (ϕ750 x 1,500 mm, rod quantity 800 kg). The size of the rock fed was not greater than 20 mm, and the test was conducted at valve concentration of 70% resulting in 98% to 99% passing a 5 mm sieve at a feed rate of 1.4 ton/hr. The fineness modulus of sand discharged directly from the rod mill was 2.52 as indicated in Table C-5 with 25% being fine sand of 0.15 mm or smaller. If about 15% of this fine sand were to be washed away in the crusher to leave a balance of 11%, the fineness modulus would become 2.88 making possible manufacture of sand close to standard grading.

C-7-3 Physical Test of Crushed Stone and Crushed Sand

These tests were performed on the crushed stone and crushed sand described above. Designating weathered rock as (B) and hard rock as (A), the results, given in Table C-6, are briefly described below.

Specific Gravity and Absorption: Crushed Stone (A), Crushed Stone (B) and Crushed Sand (A) had specific gravities of 2.66, 2.54 and 2.61 respectively with Crushed Stone (B) failing to meet standard specifications for dam concrete. Absorption was 1.27%, 3.07% and 2.14% respectively, with Crushed Stone (B) indicating high absorption.

Abrasion Loss: Abrasion losses by the Los Angeles Machine were 19.2% and 25.6% respectively for Crushed Stone (A) and Crushed Stone (B) which are values which do not indicate any problems.

Soundness: The results of soundness tests using sodium sulfate were 11.6%, 17.7% and 4.9% for Crushed Stone (A), Crushed Stone (B) and Crushed Sand (A) respectively indicating that Crushed Stone (B) did not pass the tests.

C-7-4 Concrete Tests of Rock

Using the crushing equipment mentioned above, aggregates were produced from hard rock. Concrete of the mix proportions and aggregate grading indicated in Table C-7 was mixed and strength tests were carried out. The fine aggregate showed fineness to be somewhat too fine, but this is due to the fact that the quantity of the rock available was limited to produce the required grading.

The results of the tests are given in Table C-7 showing strengths at 28 days to be 318 kg/sq.cm at a cement content of 240 kg/cu.m and 224 kg/sq.cm at a cement content of 180 kg/cu.m. Judging from these test results, it is considered that the rock is suitable for concrete aggregates.

C-8 Conclusions

1) The matrix of the river sand is quartzite and hard. The physical properties are good and results of all tests conducted where within the standard allowable limits of the Specification for Dam Concrete established by the Japan Society of Civil Engineers.

2) The grading of river sand was extremely fine in the samples of Series 1 and 2, and the use of this sand in concrete will reduce its strength markedly. The grading of samples of Series 3 and 4 are roughly equal to the standard grading and are considered to be suitable.

3) The samples of Series 3 and 4 are good both in physical properties and grading and are suitable as aggregates for concrete. The samples of Series 1 and 2 present no problems in respect of physical properties, but are because of their extremely fine size economical concrete cannot be produced.

4) Rock is argillite sandstone with parts exposed above ground being considerably weathered and the physical properties are greatly impaired. Thus it is unfit as aggregate for concrete. Rock in the interior has been weathered very little and the physical properties can be said to be satisfactory.

5) The shape of crushed stone shows a tendency to be somewhat flat and elongated due to the composition of the rock, but this is of no special problem as aggregate for concrete.

6) It was judged that this rock crushed to manufacture sand showed resistance to crushing to be somewhat on the low side.

7) The strength tests of concrete made from crushed rock showed strengths to be approximately 300 kg/sq.cm at the age of 28 days which strength-wise means the aggregate is suitable.

8) It is judged unweathered rock is satisfactory as rock for concrete aggregates.

C-9 General (Soil Materials)

This report summarizes the results of investigations and tests of soil materials conducted of the Sambor Site on the Mekong River, Cambodia up to July 1965 and describes the distribution and nature of soil materials.

C-10 Distribution of Soil Materials

Investigations of soil materials were conducted on four occasions from 1961.

These investigations were mainly conducted along the proposed dam axis while part of the studies were of locations selected to evaluate possible borrow areas. These investigations were performed by excavating test pits and by auger borings.

According to the investigations and results of tests, within the areas investigated, similar materials are distributed at each area. The distribution of materials by area are given in Fig. C-3 while the test results of representative materials by area are indicated in Table C-8.

C-11 Properties of Materials by Area

The results of surveys and tests of soil materials and the materials by area along the dam axis are described with the view to construct the dam at the respective areas by utilizing available material along the particular dam axis.

C-11-1 Left Bank (Area A to M)

Area A (LP-46, 47 and 48, AH-35 and 36) is the area at the farthest point from the river bank of ③ Line. This area is composed of approximately 2.5 m of yellow to yellowish-brown silty clay of high cohesiveness of shale origin underlying a laterite stratum approximately 0.6 m thick. Below this is bedrock of shale which is not greatly weathered.

The maximum particle size of this material is 30 mm and belongs to CH according to the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

Area B (LP-39, 42 and 43, AH-30, 31, 33 and 34) is adjacent to Area A on ③ Line. This area is composed of approximately 0.3 m of brownish silty fine soil under which is a layer of dark brown laterite sandy clay approximately 0.2 m to 0.7 m thick and containing small pea-sized rock. Underneath this zone, there is a somewhat cohesive silty soil approximately 2.0 m to 3.0 m deep. The material at the bottom belongs to CL according to the Unified Soil Classification Method and A-6 in the Revised PR Method.

Area C (LP-38, AH-28, 29 and 31) is located near the middle of ③ Line. In this area is found a yellow to yellowish-brown clayey silt of medium plasticity about 2.3 m to 3.4 m deep containing pieces of weathered sandstone and reaching down to weathered sandstone. This material belongs to SC or CL in the Unified Soil Classification Method and A-6 (4) in the Revised PR Method.

Area D (LP-29, 33 and 36, AH-23, 24, 25, 26, 27 and 39, L No. 1 to No. 5) is on ③ Line and encompass an area extending about 4 km from the river bank. The geology of the area is yellow to yellowish-brown weathered residual soil of medium plasticity with shale as the mother rock. The depth is 1.1 m to 2.5 m and extends to bedrock of shale. The soil belongs to SC or CL in the Unified Soil Classification Method and A-6 (3 to 9) according to the Revised PR Method.

Area E (LP-28, LQ 2-8, 18 and 24, AH-22 and 38) is on ③ Line near the river bank. The soil of this area is yellow to yellowish-brown, highly cohesive silty clay 1.6 m to 2.6 m deep and under which is shale. This belongs to CH in the Unified Soil Classification Method and A-7-6 (12 to 20) in the Revised PR Method.

Area F(LP-26, LQ 2-10 and 17, AH-20, 21, 48, 49, 50, 51, 52 and 53) is on ③ Line adjacent to the river bank. AH-51, 52 and 53 along the river bank have a yellowish-brown silty clay of medium plasticity which is a fine material with 67% to 84% of particles under 0.075 mm. This material belongs to CL in the Unified Soil Classification Method and A-6 (15) in the Revised PR Method. The material of this area is similar to that of an area described later. Compared with material of Area S which is classified as A-7-6, this material is slightly coarser than A-6.

Spring water is found in this area and the ground water table is at 4.0 m to 4.8 m below ground surface.

At LP-26, LQ 2-10 and 17, AH-20, 21, 48, 49 and 50, a yellow to yellowish-brown, medium plasticity, clayey silt, 2.5 m to 4.0 m deep, overlies bedrock. This material belongs to CL in the Unified Soil Classification Method and A-6 (4 to 10) in the Revised PR Method. At AH-48 and 49, bedrock is found 1.0 m to 1.2 m from the ground surface.

Area G (LP-18 and 19, E-48 and 50) is on ① Line farthest from the river bank. Bedıock of shale is reached at 2.0 m to 2.7 m from the surface in this area which is covered with silty weathered soil formed by weathering of shale, but at places the overburden is laterite. The soil in this area is relatively distrubed. Its classification is CL of medium plasticity or CH of high plasticity according to the Unified Soil Classification Method or A-7-6 in the Revised PR Method.

Area H (LP-17 and LQ 1-8) is adjacent to Group G on ① Line. This area is covered wth coarse material of light brown, weathered conglomerate containing round pebbles of hard sandstone of a maximum particle size of 50 mm and with 27% to 37% of sizes under 0.075 mm. This belongs to GC in the Unified Soil Classification Method and A-2-6 or A-7-6 in the Revised PR Method. This weathered conglomerate is thought to extend to a depth of several meters from the ground surface.

Area I (LP-11, 13 and 15, AH-43) is sandwiched between Area J and Area H on ① Line. In this area, under topsoil of approximately 0.2 m, there are at places laterite strata of approximately 0.5 m thick and also there are places of yellow to yellowish-brown, highly cohesive silty clay originating from shale 1 m to 2 m deep. There are, however, many places where there are outcrops of weathered shale and this area cannot be considered a possible borrow area.

Area J (LP-4 to 8, AH-42 and 46, E-34) is the area approximately 4 km to 8 km from the river bank on ① Line. This area has a silty, fine-particled surface layer of 0.1 m to 0.4 m, under which there is a reddish-brown layer of laterite 0.7 m to 1.2 m deep. Underneath this zone, there is a light yellow to light brown, medium plasticity silty clay originating from shale which is 2.6 m to 3.2 m deep and extending to bedrock of shale that is very little weathered. This material is GC or CL according to the Unified Soil Classification Method and A-7-6 (5 to 7) in the Revised PR Method. The material is in a dry condition at LP-4 to 7 while at LP-8 to 11, it is in a somewhat moist condition. Where the above material is subject to extreme weathering, CL has transformed to CH.

Area K (LP-1 to 3, AH-41, E-26', 31 and 32) is the area on the ridge and flat land near the river bank on ① Line. At AH-4 and E-31, there is highly cohesive, yellowish-white, fine-particled silty clay in a moist condition to a depth of 0.8 m to 1.8 m from ground surface and below this there is yellow clayey silt formed from weathered sandstone to a depth of approximately 2.5 m from the surface extending to basal rock. The classification of these soils is CH for the former and CL for the latter in the Unified Soil Classification Method. In the Revised PR Method, both belong to A-7-6. At LP-3 and E-32, the above-mentioned highly cohesive, yellowish-white, fine-particled, silty clay is distributed 1.1 m to 2.0 m deep from the ground surface under which is silty clay of somewhat low cohesiveness and low plasticity to a depth of approximately 3.2 m. Underneath this zone is basal rock of weathered sandstone.

At LP-1 to 2 and E-26' there is a pale white, extremely fine-particled silty soil 0.2 m to 0.4 m below the ground surface underneath which is a yellow clayey sand of low cohesiveness down to approximately 2 m. This material belongs to CL in the Unified Soil Classification Method and A-6 (3 to 4) in the Revised PR Method. The basal rock is weathered sandstone, but in the case of LP-2 boulders of sandstone approximately 1 m in diameter were found.

Area L (AH-40, E-25 and 25') is the area closest to the river bank on ① Line. In this area is distributed a yellowish, fine particled clayey silt of low cohesiveness in a moist condition down to approximately 0.8 m from the surface. Below this, there is laterite at places about 0.3 m deep, but from approximately 1 m to 3 m or 5 m from the ground surface, it is a yellowish-brown, medium plasticity, clayey silt. This material is CL in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

Area M (LP-9, AH-37, 44, 45 and 47, L No. 1' to No. 5') is an area bout 6 km from the river bank, roughly parallel to the Mekong River and connecting ① Line and ③ Line. This area consists of weathered conglomerate and is a reddish-brown color. The material is GC in the Unified Soil Classification Method and A-2-6 (1) in the Revised PR Method.

C-11-2 Right Bank (Areas N to T)

Area N (RP-31, AH-01 and 06, E-2, H-16, AT-2) is the area closest to the river bank on ④ Line. To a depth of 0.4 m to 1.6 m from the ground surface the soil is a reddish-brown, silty fine sand, under which there is laterite in the form of a layer 0.3 m to 0.8 m thick. Under the laterite is a yellow-silty clay or clayey silt. This material belongs to CL in the Unified Soil Classification Method and A-6 in the Revised PR Method.

Area P (RP-2, 12, 13, 23 and 37) is the area adjacent to Area N on the downstream side. This area is silty soil to about 0.3 m from the surface. Underneath this zone, there is a yellow, highly plastic, silty clay about 2.0 m deep, and extends to weathered sandstone or weathered shale at 2.2 m to 2.8 m from the ground surface.

This material belongs to CH in the Unified Soil Classification Method and A-7-6 (18 to 20) in the Revised PR Method.

Area Q (RP-4, 50, 54 and 55, AH-02, 08, 13, 14, 16, 17, 18 and 19-2, No. 21 to 24) is the area located on the former river bed on ④ Line. At RP-50, 54, 55, AH-02, 14, 16 and No. 21 to 24, there is a pale yellow, silty fine sand down to 1.1 m to 1.6 m from the surface. Underneath this, there is laterite 0.4 m to 0.5 m thick and further underneath there is a reddish-yellow, highly cohesive, silty clay containing fine-particled sand which reaches down to a considerable depth. This material belongs to CH in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

At RP-4, AH-08, 13, 18 and 19-2, there is 0.5 to 0.6 m of silty soil under which the abovementioned materials are distributed.

Area R (RP-51, 52, 56 and 57, AH-03, 04, 05, 07, 09, 10, 11, 12 and 15, E-5, 13, 16, 18 and 20, No. 2, 3, 9 and 11) is the area more than 4 km away from river bank on ④ Line. In this area a top layer of find sand is distributed to a depth of 0.2 m to 0.5 m underneath which there is a reddish-brown laterite down to 0.8 m to 1.0 m. Further underneath, there is a yellowish-brown to bluish-white medium plasticity silty soil (SC in Unified Soil Classification Method, A-2-6 (0) in Revised PR Method) down to 2 m to 3 m or more from the surface extending to weathered shale or sandstone.

In this area, for about 1.5 km from RP-52 to 56, there is a highly plastic clayey soil which is CH in the Unified Soil Classification Method or A-7-6 (20) in the Revised PR Method.

Area S (RP-14, 26, 32, 43 and 44) is the area downstream of ④ Line and between the former river bed and the river bank. This area consists of a brown, medium plasticity, silty clay and is an extremely fine material containing 90% to 97% of fines under 0.075 mm. Subdividing this area, RP-14, 26 and 32 are highly plastic and belong to CH in the Unified Soil Classification Method and A-7-6 in the Revised PR Method while RP-43 and 44 are somewhat silty and belong to CL in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

The ground water level in this area is at 1.4 m to 1.7 m below the ground surface.

Area T (RP-39, 40 and 41, AH 19-1) is the area downstream of 4 Line closest to the river bank. This area consists of a dark gray to dark red, silty fine soil low in cohesiveness which belongs to SM or CL in the Unified Soil Classification Method and A-4 (0 to 8) in the Revised PR Method.

Area L (AH-40, E-25 and 25') is the area closest to the river bank on ① Line. In this area is distributed a yellowish, fine particled clayey silt of low cohesiveness in a moist condition down to approximately 0.8 m from the surface. Below this, there is laterite at places about 0.3 m deep, but from approximately 1 m to 3 m or 5 m. from the ground surface, it is a yellowish-brown, medium plasticity, clayey silt. This material is CL in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

Area M (LP-9, AH-37, 44, 45 and 47, L No. 1' to No. 5') is an area bout 6 km from the river bank, roughly parallel to the Mekong River and connecting ① Line and ③ Line. This area consists of weathered conglomerate and is a reddish-brown color. The material is GC in the Unified Soil Classification Method and A-2-6 (1) in the Revised PR Method.

C-11-2 Right Bank (Areas N to T)

Area N (RP-31, AH-01 and 06, E-2, H-16, AT-2) is the area closest to the river bank on ④ Line. To a depth of 0.4 m to 1.6 m from the ground surface the soil is a reddish-brown, silty fine sand, under which there is laterite in the form of a layer 0.3 m to 0.8 m thick. Under the laterite is a yellow-silty clay or clayey silt. This material belongs to CL in the Unified Soil Classification Method and A-6 in the Revised PR Method.

Area P (RP-2, 12, 13, 23 and 37) is the area adjacent to Area N on the downstream side. This area is silty soil to about 0.3 m from the surface. Underneath this zone, there is a yellow, highly plastic, silty clay about 2.0 m deep, and extends to weathered sandstone or weathered shale at 2.2 m to 2.8 m from the ground surface.

This material belongs to CH in the Unified Soil Classification Method and A-7-6 (18 to 20) in the Revised PR Method.

Area Q (RP-4, 50, 54 and 55, AH-02, 08, 13, 14, 16, 17, 18 and 19-2, No. 21 to 24) is the area located on the former river bed on ④ Line. At RP-50, 54, 55, AH-02, 14, 16 and No. 21 to 24, there is a pale yellow, silty fine sand down to 1.1 m to 1.6 m from the surface. Underneath this, there is laterite 0.4 m to 0.5 m thick and further underneath there is a reddish-yellow, highly cohesive, silty clay containing fine-particled sand which reaches down to a considerable depth. This material belongs to CH in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

At RP-4, AH-08, 13, 18 and 19-2, there is 0.5 to 0.6 m of silty soil under which the abovementioned materials are distributed.

Area R (RP-51, 52, 56 and 57, AH-03, 04, 05, 07, 09, 10, 11, 12 and 15, E-5, 13, 16, 18 and 20, No. 2, 3, 9 and 11) is the area more than 4 km away from river bank on ④ Line. In this area a top layer of find sand is distributed to a depth of 0.2 m to 0.5 m underneath which there is a reddish-brown laterite down to 0.8 m to 1.0 m. Further underneath, there is a yellowish-brown to bluish-white medium plasticity silty soil (SC in Unified Soil Classification Method, A-2-6 (0) in Revised PR Method) down to 2 m to 3 m or more from the surface extending to weathered shale or sandstone.

In this area, for about 1.5 km from RP-52 to 56, there is a highly plastic clayey soil which is CH in the Unified Soil Classification Method or A-7-6 (20) in the Revised PR Method.

Area S (RP-14, 26, 32, 43 and 44) is the area downstream of ④ Line and between the former river bed and the river bank. This area consists of a brown, medium plasticity, silty clay and is an extremely fine material containing 90% to 97% of fines under 0.075 mm. Subdividing this area, RP-14, 26 and 32 are highly plastic and belong to CH in the Unified Soil Classification Method and A-7-6 in the Revised PR Method while RP-43 and 44 are somewhat silty and belong to CL in the Unified Soil Classification Method and A-7-6 in the Revised PR Method.

The ground water level in this area is at 1.4 m to 1.7 m below the ground surface.

Area T (RP-39, 40 and 41, AH 19-1) is the area downstream of 4 Line closest to the river bank. This area consists of a dark gray to dark red, silty fine soil low in cohesiveness which belongs to SM or CL in the Unified Soil Classification Method and A-4 (0 to 8) in the Revised PR Method.

(Note) For details of the properties of the various materials refer to the information below.

Civil Engineering Test Report, Soil FSB-002, Tests of Soil Materials from Sambor Site, Mekong River, Cambodia, Sept. 1962.

Civil Engineering Test Report, Soil FSB-003, Tests of Materials from Sambor Site, Mekong River, Cambodia, Aug. 1963

Civil Engineering Test Report, Soil FSB-004, Test of Materials from Sambor Site, Mekong River, Cambodia, Jun. 1964

Civil Engineering Test Report, Soil FSB-005, Tests of Materials from Sambor Site, Mekong River, Cambodia, Jul. 1965

C-12 Conclusions

According to the surveys and results of tests, the nature of the soil materials are summarized as follows:

(1) Soil materials are distributed by area in the form of transported soil or residual soil.

(2) With the exception of the flat area along the river bank, the other areas on the left bank is a ridge of mainly weathered residual soil of shale or sandstone which is a comparatively coarse material belonging to SC or GC classification.

(3) Area A and G the farthest away from the river have highly cohesive clayey soil both belonging to the CH classification and are not suitable as soil material.

(4) Area I in general, the basal rock is near the ground surface and large volume of soil materials cannot be excavated.

(5) Area M is comprised of conglomerate which is thought usable as filter or rock material.

(6) In general, the areas along the upstream ① Line have lesser quantities of soil materials than along ③ Line on the downstream.

(7) In the flat area along the river bank on the left bank, Areas F and L consist of medium plasticity silty clay or clayey silt which are fine-particled materials belonging to CL classification.

(8) Area E is comprised of highly plastic, clayey soil belong to CH classification which is not suitable as soil material.

(9) Area R on the right bank consists of residual soil of mainly weathered shale and partly sandstone which is a medium-cohesive silty soil belonging to SC classification. In this area, material in the approximately 1.5 km sector from RP-52 to 54 is a highly plasticity clayey soil belonging to CH classification and is not suitable as soil material.

(10) Area Q which is flat zone in the former river bed is transported soil of a highly cohesive silty clay containing fine-particled sand which is distributed evenly down to a considerable depth from the ground surface. At the deeper part, underground water is found in places. The silty clay containing the fine sand is considered to be usable as soil material.

(11) Areas N and P near the river bank are island-like areas sandwiched between the river and the former river bed. The soil is clayey silt or silty clay. The material of the upstream Area N is of medium plasticity belonging to CL classification and is usable, but the material of the downstream Area P is highly plastic belonging to CH classification and is not suitable as a soil material.

(12) At Areas S and T along the river bank, transported soil consisting of fine-particled silty soil is distributed. The material of Area T is a medium plasticity, silty soil belonging to SM or CL classification while that of Area S is of medium to high plasticity belonging to CL or CH classification, both of these materials are not suitable as soil material. The latter is also seen on the opposite left bank at AH-51 and 53 along the river bank.

Table C-2 Grading of Sand

Test unit	Test item / Sample	Percentage of weight by grade size (%)						F.M.
		5 mm–2.5 mm	2.5 mm–1.2mm	1.2 mm–0.6mm	0.6 mm–0.3 mm	0.3 mm–0.15mm	0.15 mm–PAN	
1	F-0	0	0	0	2	25	73	0.29
2	F-1	0	1	6	30	46	17	1.28
	F-2	0	0	5	46	33	16	1.40
	F-3	0	1	6	48	29	16	1.47
	F-4	3	11	25	39	12	10	2.24
	F-5	0	1	8	42	31	18	1.43
3	Upstream	8	16	33	39	1	3	2.82
	Midstream	11	21	34	27	3	4	2.98
	Downstream	17	27	27	26	2	1	3.28
4	F-6	4	16	38	36	4	2	2.74
	F-7	3	9	34	48	2	4	2.51
	F-8	4	11	31	48	4	2	2.57
	F-9	7	16	34	38	2	3	2.79
	F-10	10	18	31	37	3	1	2.92
	Sagami River	16	20	26	26	9	3	2.97

Table C-3 Strength test of mortar using fine-particled sand and standard grading sand

	Quantity of cement (g)	Quantity of water (g)	Fine aggregate (g)	Water cement ratio (%)	Flow (mm)	Bending strength (kg/sq.cm)			Compressive strength (kg/sq.cm)		
						3 days	7 days	28 days	3 days	7 days	28 days
Sambor (First)	900	690	1,850	77	208	24.5	38,8	58.7	89	149	268
(F.M. 0.29)									(35)	(40)	(43)
Sagami River	900	400	1,850	44	204	52.5	66.9	84.0	258	377	618
(F.M. 2.97)									(100)	(100)	(100)

Notes: (1) The size of sample used for mortar test is 4 cm x 4 cm x 16 cm

(2) Figures under the line for compression test are the percentage of mortar strength for Sambor fine aggregates as against the mortar strength (100) for Sagami River fine aggregates.

(3) Grading of sand at Sambor (First F.M. 0.29) and Sagami River (F.M. 2.97) is shown in Table C-2.

Table C-4 Result of test on grading, flatness and elongation ratio of crushed stone

Sample	Item	Distribution of grading (mm)												Total	Average
		150 -100	100 -80	80 -60	60 -50	50 -40	40 -30	30 -25	25 -20	20 -15	15 -10	10 -5	5 or less		
A	Weight percentage for each group	0	2.9	14.0	24.1	22.4	12.3	3.5	4.9	2.3	5.6	3.8	4.2	100	
	Flatness ratio (%)	-	0.30	0.49	0.56	0.64	0.52	0.55	0.45	0.59	0.54	0.50	-	5.14	0.51
	Elongated ratio (%)	-	1.41	1.41	1.61	2.11	1.90	1.74	1.76	2.24	2.10	1.71	-	17.99	1.80

Notes: (1) Non-weathered aggregates were used for sample A.

(2) The size of rock fed was 100 mm - 250 mm.

(3) Jaw crusher was set at 50 mm (closing side)

(4) Values of flatness and elongation ratio is the mean value of 10 pieces of selected samples.

(5) Average is arithmetic mean.

(6) Standard deviation and weighted mean value are as follows:

At flatness ratio: M=0.52 =0.17
At elongation ratio:M=1.84 =0.70

Table C-5 Test result on grading of crushed sand

Hard rock (aggregates) was used for sample	Weight percentage for each group (%)							F.M.	Quantity of rock fed (t/hr)
	5 mm and over	5-2.5	2.5-1.2	1.2-0.6	0.6-0.3	0.3-1.5	0.15 or less		
Taken at rod mill discharge	1	14	23	18	11	8	25	2.52	1.4
When samples less than 0.15 mm were controlled by crushfire	1	14	26	23	14	11	11	2.88	1.4

Notes:
(1) Rod mill used was ϕ750 x 1,500 mm and the quantity of rod fed was 800 kg.
(2) Pulp concentration (density) tested was 70%
(3) Grading of rock (sample) is as follows.

20.mm-10 mm 52% 10 mm-5 mm 21% 5 mm or less 27%

Table C-6 Physical properties of crushed stone and sand

Sample	Specific gravity	Absorption (%)	Abrasion loss by Los Angeles machine (%)	Loss by decomposition of sodium sulfate (%)
Crushed stone A	2.66	1.27	19.2	11.6
Crushed stone B	2.54	3.07	25.6	17.7
Crushed sand A	2.61	2.14	-	4.9

Notes:
(1) Hard rock was used as sample A.
(2) Weathered rock was used as sample B.

Fig. C-1 Concrete Aggregates Sample Collecting Points (Location)

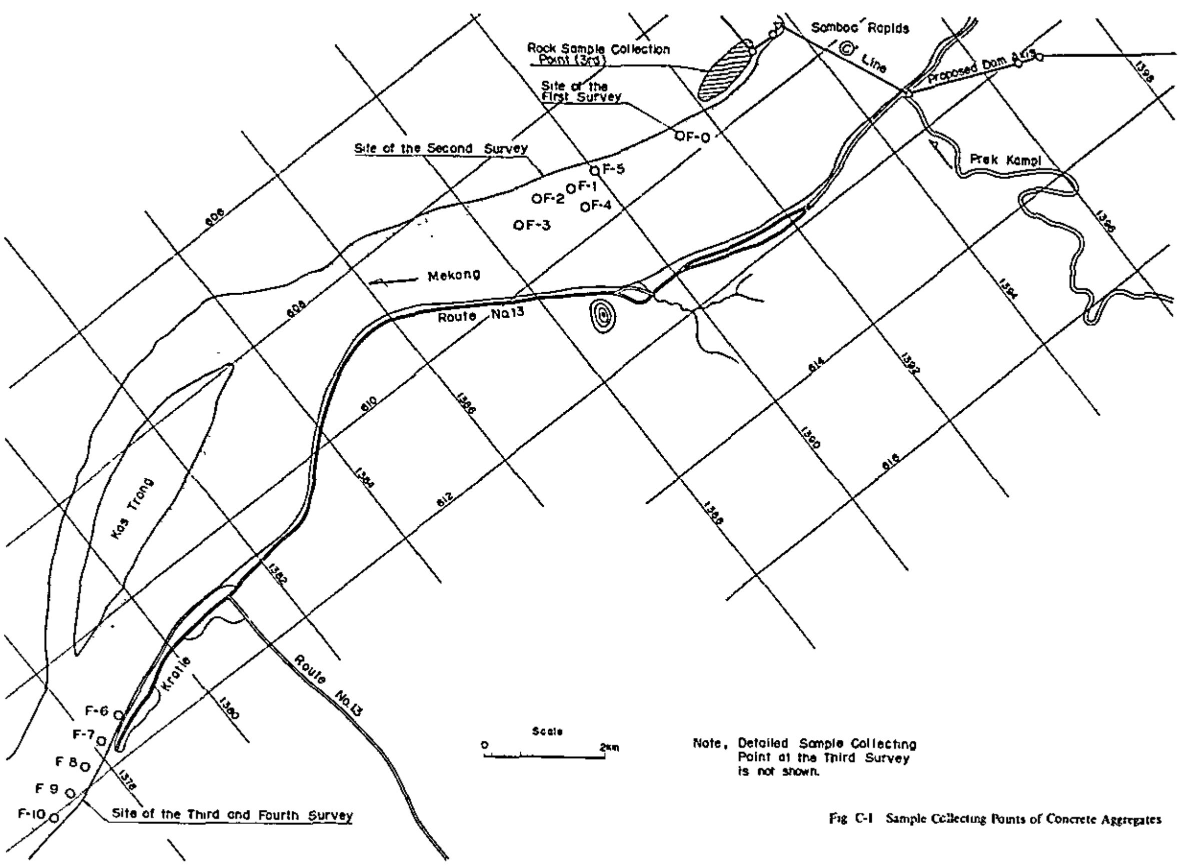


Fig. C-2 Test Result on Mortar Strength Using Fine Particled Sand and Standard Particled Sand

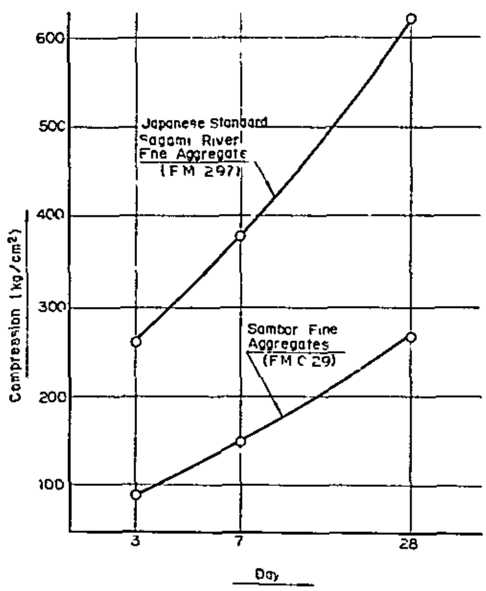


Table C-7 Test result on concrete mixture and compression strength

Mixing No.	Max. size of coarse aggregates (mm)	Basic quantity of Water (kg)	Basic quantity of Cement (kg)	Water cement ratio (%)	Absolute fine aggregates (%)	Basic quantity of fine aggregates (kg)	Basic quantity of coarse aggregates (kg)	Basic quantity of AE agent (g)	Slump (cm)	Air (%)	Tem-perature (°C)	Compression strength (kg/sq.cm)		Basic volume weight (kg)	
												7 days	28 days	7 days	28 days
240-A	150	121	240	50.4	25	509	1,553	50	3.0	2.4	17.5	237	318	2,320	2,330
180-A	150	115	180	63.9	27	553	1,553	60	3.0	3.8	17.5	167	224	2,310	2,310

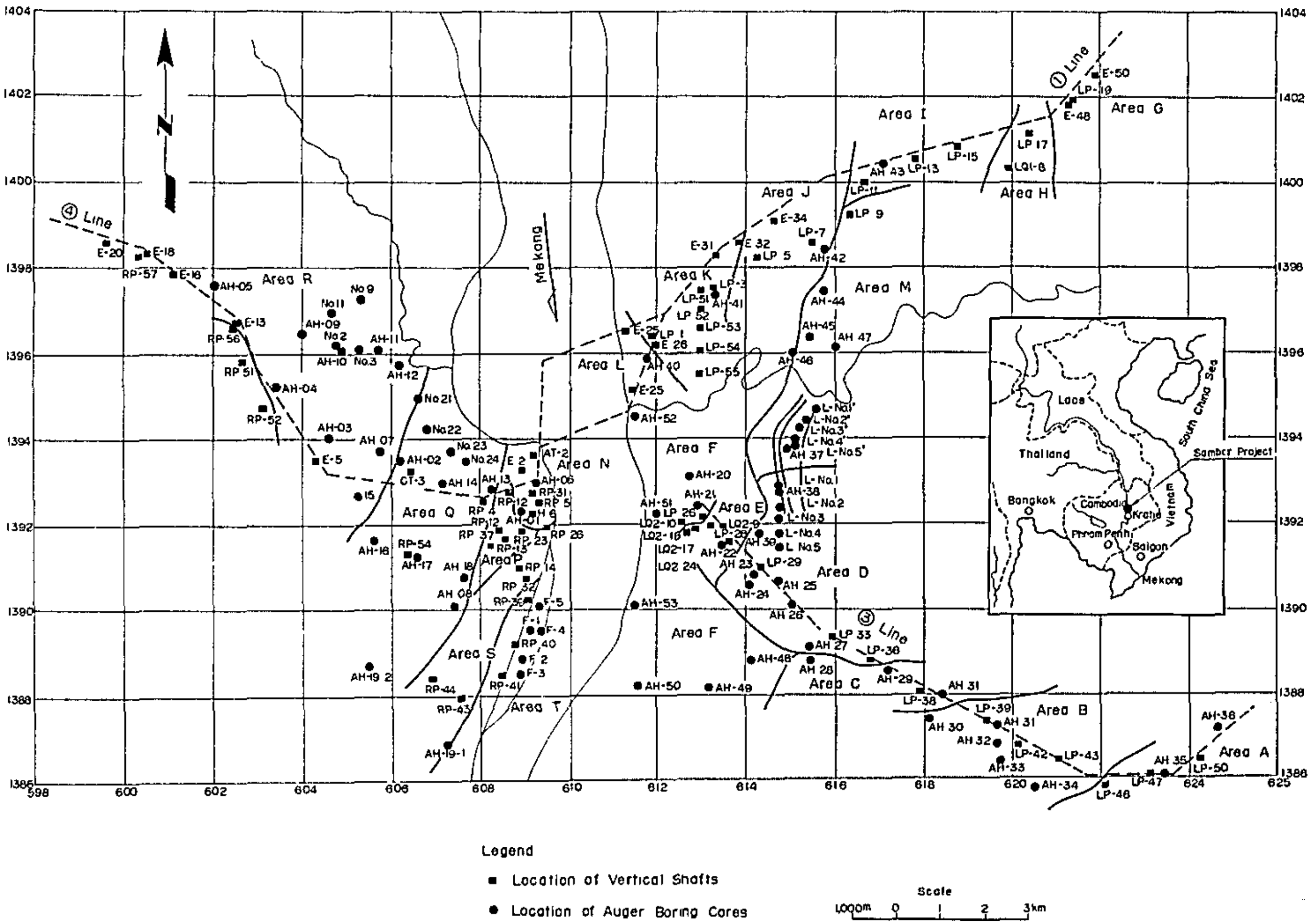
Note: (1) Mixing of concrete was made in two different manner according to the quantity of cement used (A indicates hard rock).
(2) Basic volume weight is calculated from samples of $\phi 15 \times 30$ cm.
(3) Cement used was portland cement.
(4) Aggregates used were as follows:

Coarse aggregates (%)					Fine aggregates (%)						
150-80 mm	80-40	40-20	20-10	10-5	5-2.5 mm	2.5-1.2	1.2-0.6	0.6-0.3	0.3-0.15	0.15 or less	F.M.
28	26	22	16	8	7	22	27	19	14	11	2.56

Table C-8 Material Test Results

Area	Depth sample taken (m)	Soil classification		Gradation analysis (%)			Atterberg limits			Compaction		Permeability	Triaxis			
		Unified	Revised PR	−15 mm	−4.8 mm	−0.075 mm	LL	PL	PI	Wopt	γ dry	Kmin (cm/sec)	W	C	ϕ	tan ϕ
A	0.3-2.0	CH	A-7-6 (12-20)	92-100	66-92	50-83	56-71	21-32	30-39	25-28	1.57	1.2×10^{-8}	26.3	0.864	6°-54'	0.121
B	0.5-2.0	CL	A-6 (0)	99-100	86-100	36-39	26-29	17	11-12	13-15	1.93-1.98	1.6×10^{-9}	13.4	0.494	11°-45'	0.494
C	1.0	SC	A-6 (4)	100	97	21	33	22	11	20	1.69	1.3×10^{-8}	17.1	0.700	16°-52'	0.303
D	1.0-1.5	CL SC	A-6 (3-9)	88-98	70-79	47-52	34-40	18-20	12-18	17-18	1.75-1.76	1.3×10^{-8}	17.1	0.700	16°-52'	0.303
E	0-1.5	CH	A-7-6 (12-20)	97-100	69-84	45-67	55-63	23-27	28-36	17-22	1.64-1.80	3.4×10^{-8}	16.7	0.521	18°-19'	0.331
F	0.2-1.5	CL	A-6 (6-10)	98-100	95-100	53-68	30-39	17-21	10-21	13-17	1.68-1.90	3.4×10^{-8}	16.7	0.521	18°-19'	0.331
G	0.8-2.0	CL CH	A-7-6 (6-20)	95-100	84-93	43-62	46-61	21-26	25-35	18-23	1.63-1.77	2.4×10^{-9}	-	-	-	-
H	0.4-2.0	GC	A-2-6 (1) A-7-6 (5)	74-83	52-60	27-37	37-68	17-20	19-48	17.2	1.71	-	-	-	-	-
I	0.4-2.0	CH	A-7-6 (14-17)	96-99	81-97	63-71	53-67	29-31	22-38	24-25	1.53-1.58	Impervious	19.5	1.564	6°-40'	0.117
J	0.5-2.5	CL GC	A-7-6 (5-6)	86-98	60-71	40-43	45-53	24	21-29	19-21	1.69-1.72	Impervious	15.2	0.591	12°-08'	0.215
K	1.5-3.0	CL	A-6 (4-8)	97-100	98-99	52-70	30-33	21-22	9-12	15-18	1.66-1.75	1.3×10^{-8}	17.1	0.700	16°-52'	0.303
L	2.0-2.5	CL	A-7-6 (13-14)	100	98-100	90-92	45	23-25	19-22	21-23	1.56-1.61	3.4×10^{-8}	16.7	0.521	18°-19'	0.331
M	0.5-2.5	GC	A-2-6 (1)	92-98	75-83	38-42	49-54	19-26	23-35	16	1.78	Impervious	-	-	-	-
N	0-2.5	CL	A-6 (2-12)	96-100	80-99	41-79	29-34	14-21	13-15	15-18	1.71-1.86	1.0×10^{-8}	21.4	1.488	10°-20'	0.182
O	1.0-3.0	CL	A-7-6 (16)	99	99	73	47	18	29	15	1.84	1.4×10^{-8}	15.2	1.497	29°-46'	0.572
P	0.3-2.0	CH	A-7-6 (15-20)	96-100	72-98	59-84	48-69	21-27	27-48	18-24	1.57-1.73	1.3×10^{-8}	21.4	1.488	10°-20'	0.182
Q	1.0-3.0	CH	A-7-6 (18-19)	100	98-100	70-95	53-55	19	34-36	18	1.73-1.76	1.3×10^{-8}	21.4	1.488	10°-20'	0.182
R	0.8-4.5	SC	A-2-6 (0)	83-100	23-70	11-46	33-38	17-23	13-20	11-15	1.83-2.18	8.0×10^{-8}	24.9	1.112	4°-28'	0.078
S	1.0-4.0	CH	A-7-6 (15-20)	100	98-100	89-96	48-58	24-27	24-30	21-24	1.57-1.66	1.1×10^{-8}	20.6	1.246	9°-12'	0.162
T	2.0-3.0	SM CL	A-4 (8)	100	100	75-80	24-28	18-22	3-10	15-18	1.61-1.83	1.4×10^{-8}	15.2	1.497	29°-46'	0.572

Fig. C-3 Soil Material Test Sample Collecting Points (Location)



APPENDIX D. HYDRAULIC MODEL TESTS

APPENDIX D. HYDRAULIC MODEL TESTS

When the hydraulic model tests of the spillway of the Sambor Dam were conducted, the flood discharge was still in the stage of study, and therefore, a design flood discharge of 70,000 cu.ms and an extraordinary flood discharge of 84,000 cu.ms which are given in "Report on Preliminary Investigation for Development of the Lower Mekong River Basin, October 1962" were used for the purpose of the model studies.

D-1 Introduction

This report describes the hydraulic model tests of the spillway of Sambor Dam conducted at EPDC's Civil Engineering Laboratory. Sambor Dam as proposed is to be constructed at the most downstream site on the mainstream of the Mekong River in Cambodia. The present tentative design, in view of the hydrologic and topographic features of the site, proposes the construction of a powerhouse and concrete spillway on the right bank tableland, with a rock-fill dam on both sides of these structures including the river bed section.

The spillway as planned will have an overflow section controlled by 53 gates of 15 m width to handle abnormal flood discharge of 84,000 cu.ms and design flood discharge of 70,000 cu.ms at reservoir water levels of 41.7 m and 40.0 m (normal water level) respectively (Fig. D-1).

Hydraulic model tests of the spillway were planned and conducted from September 1963 and with the recent completion of all experiments, the results are compiled in this report.

The tests that were conducted are listed blow:

(1) Studies of spillway capacity;

(2) Studies of direction of spillway and influence of discharge on opposite bank;

(3) Studies of direction of navigation lock and length of straining lever;

(4) Studies of water level during diversion and care of river and velocity of flow.

The results of principal tests are as follow:

(1) The reservoir water level in case of overflow. The design flood discharge was released at a reservoir water surface level of 39.71 m and therefore, the design flood discharge can be safely released at the design normal high water surface level of 40.0 m or lower.

(2) After construction of the dam, the condition of the river current at time of flood, as shown in Fig. D-6, will meander appreciably immediately downstream of the dam compared to the current before construction because the direction of the spillway will be diagonal to the river, but this influence disappears at a point about 7 km downstream from where the current returns practically to the natural condition. From this phenomenon, the influence of the discharge on the opposite bank and the condition of the current at the vicinity of the navigation channel to the lock can be observed.

(3) The relationship between water level at the time of final closure of the river and flow velocity is shown in Figs. D-9 and D-10.

The figures used in this Report, unless otherwise noted, are values for proto-type structures.

D-2 Law of Similitude, Model Apparatus and Methods of Test

D-2-1 Law of Similitude

The law of similitude for model in these tests were based on Froude's Law of Similtitude. It should be noted that the surface area of the river flow is wide while the depth is comparatively shallow and the model used was thus the "deformed" type with vertical and horizontal scales being unequal. The horizontal scale was 1/300 and the vertical 1/150. Therefore, the scale ratios of the various quantities were as are tabularized below.

	Length, Width	Height	Pressure	Time	Flow Velocity	Runoff
Scale Ratio	1:l	1:h	1:h	1:l $h^{-1/2}$	1:$h^{1/2}$	1:l $h^{3/2}$
	1:300	1:150	1:150	1:24,496	1:12,247	1:551,120

D-2-2 Model Apparatus

As shown in Fig. D-2, the model was prepared by forming the ground configuration with concrete inside a frame made of block and lined on the interior with mortar on which structures such as dam, spillway and powerhouse made of wood were provided.

The water circulation system consisted of lower tank —> pump-up pumps —> discharge gaging apparatus—> model —> return channel —> lower tank. The pumps used were one 50 HP, 120 l/sec-capacity pump and one 25 HP, 60 l/sec-capacity pump.

D-2-3 Methods of Test

The tests were conducted in the following manner:

(1) Gaging of Discharge: Discharge was gaged with three Venturi Tubes (range of measurement 3 l/sec to 140 l/sec).

(2) Water Level Downstream of Dam: In all tests, a gate installed at the end of the model for regulating downstream water level was used to maintain the relationship between the water level downstream of the dam and discharge as indicated in Fig. D-2. However, in the tests of the temporary diversion channel. the dam site water level – discharge relationship shown in the same figure was used.

(3) Measurement of Water Level and Wave Height

Measurements of water levels and wave heights were accomplished by a vernier point gage with 1/10 mm reading.

(4) Measurement of Flow Velocity

Measurements of flow velocities were made with two transistorized current meters (range 2 cm/sec to 80 cm/sec).

(5) Observation of Condition of Current

For all tests the conditions of the currents were directly observed and were recorded with fixed cameras and movie camera.

D-3 Results of Experiments

D-3-1 Studies of Spillway Capacity

The overflow section of the shape shown in Fig. D-3 safely released the design flood discharge of 70,000 cu.ms at the design normal high water level of 40 m or less. The relation between reservoir water surface level and overflow of water from spillway is shown in Fig. D-3. It will be noted in this figure that the upstream water levels at time of design flood and abnormal flood discharge are 39.71 m and 41.35 m respectively. Fig. D-3 shows the spillway overflow coefficient obtained from the Fig. D-3 line.

The water level along the training levee downstream of the spillway is shown in Fig. D-4. This figure shows the water levels of the afterbay of the spillway at design flood discharge of 70,000 cu.ms and 84,000 cu.ms for the case of original ground line and assumed rock line. According to test results, if the spillway afterbay is at the original ground line, water will spill over the training levees at places on both sides at a discharge of 70,000 cu.ms.

If the spillway afterbay is at the assumed rock line, as clearly seen in Fig. D-4, the water will not overflow the training levees.

D-3-2 Studies of Direction of Spillway and Influence of Discharge on Opposite Bank

The principle for studying these problems was to examine the influence of the discharge on the opposite bank by comparison of the natural condition of river flow before construction of the dam and the condition after the dam is built.

The results of tests are shown in Figs. D-5 to D-8. The discharges which were used in tests were the design flood discharge of 70,000 cu.ms and a discharge of 30,000 cu.ms. Fig.D-5 shows the direction of flow and flow velocity of the river channel before construction of the dam while Figs.D-6 to D-8 show the conditions after the dam is built. Figs. D-6 and D-7 give the conditions if the spillway afterbay is at the original ground line, while Fig. D-8 is the condition if the afterbay is at assumed rock line.

As the result of the tests, as shown in Fig. D-5, with runoff of approximately 50,000 cu.ms as the borderline, it appears that the river in its natural condition discharge runoff less than this volume down the lower section of the river bed while at larger runoff, the water will overflow to the tableland (flood plain). The flow velocity of the river is approximately the same for all cross sections. The runoff condition of the river in its natural condition and after a dam is constructed across it, at discharge of more than about 50,000 cu.ms, will cause water to flow down flooding the tableland. The condition of the current, as shown in Fig. D-6, when water is discharged diagonally into the river towards the opposite bank, branches into two, with one of the branches moving upstream to the immediate downstream of the dam. The other branch current while changing its direction downstream, flows at a comparatively high velocity along the left bank. Due to these currents, the river downstream of the spillway makes a fast winding flow as compared to its natural flow before a dam is built. However, this effect is almost completely lost at around 7 km downstream of the spillway and the river returns to its natural flow. At the design flood discharge of 70,000 cu.ms, the flow velocity of the bank opposite from the spillway after construction of the dam is from 1.6 m/sec to 3.0 m/sec as against the approximately 2 m/sec in the natural state. The conditions of flow at discharges of 10,000 cu.ms and 84,000 cu.ms are shown in Fig. D-7. Fig. D-8 shows the results of tests when the afterbay of the spillway is at the assumed rock line. The condition of the flow in this case, other than the fact that the water discharged from the spillway shows a tendency to be concentrated slightly towards the left bank, is roughly the same as in the case of the afterbay being at the original ground line (Photos D-1 to D-3).

D-3-3 Studies of Direction of Navigation Lock and Length of Training Wall

Experiments were carried out for the case of a training wall being constructed on the right bank as shown in Fig. D-1. The results of the tests are given in Figs. D-6 to D-8. Fig. D-6 is the case of the spillway afterbay being at the original ground line and Fig. D-8 the case of the afterbay being at the assumed rock line. As a result of the tests, the vicinity of the exit of the navigation channel and the section downstream along the right bank shows a comparatively low velocity and other than in the case of discharge of 10,000 cu.ms to 60,000 cu.ms, a back flow occurs. Also, in this figure, the results of measurements of wave height near the exit of the navigation channel are shown. With models, the effects of surface tension show up greater than in a proto-type and the law of similitude in the case of wave height is not thought to be very good, but within the scope of the tests the maximum wave height was approximately 60 cm.

D-3-4 Studies of Water Level During River Closure and Flow Velocity

Coffering of the river will be accomplished by dumping rock from only the left bank with final closure to be made by dumping rock in a 300 m wide opening to divert water into the temporary diversion channel in the powerhouse. Therefore, in the experiments, a model was made with an opening of 300 m in the river bed section and a temporary division tunnel, and the upstream water level and downstream flow velocity were measured while the floor of the river bed was gradually raised. The discharge used in the experiments were 3,500 cu.ms and 4,500 cu.ms and the hydrograph at the dam site was used to obtain the downstream water level. In the experiments, the height of the river floor in the unclosed river bed section was set at 4.0 m, 6.5 m, 9.0 m and 14.0 m and the material in the built-up section of the dam was considered impermeable. The results of the experiments are shown in Figs. D-9 and D-10. Fig. D-9 shows the relationship of the upstream water level, temporary diversion channel and the discharge through the unclosed river channel section, while D-9 shows the flow velocities for runoff of 4,500 cu.ms at river bed heights of 4.0 m and 14.0 m in the unclosed river channel section. Fig. D-9 shows the condition of the surface flow at the upstream for runoff of 4,500 cu.ms. From this figure the change in the condition of the flow accompanying progress in the final closure of the river can be judged.

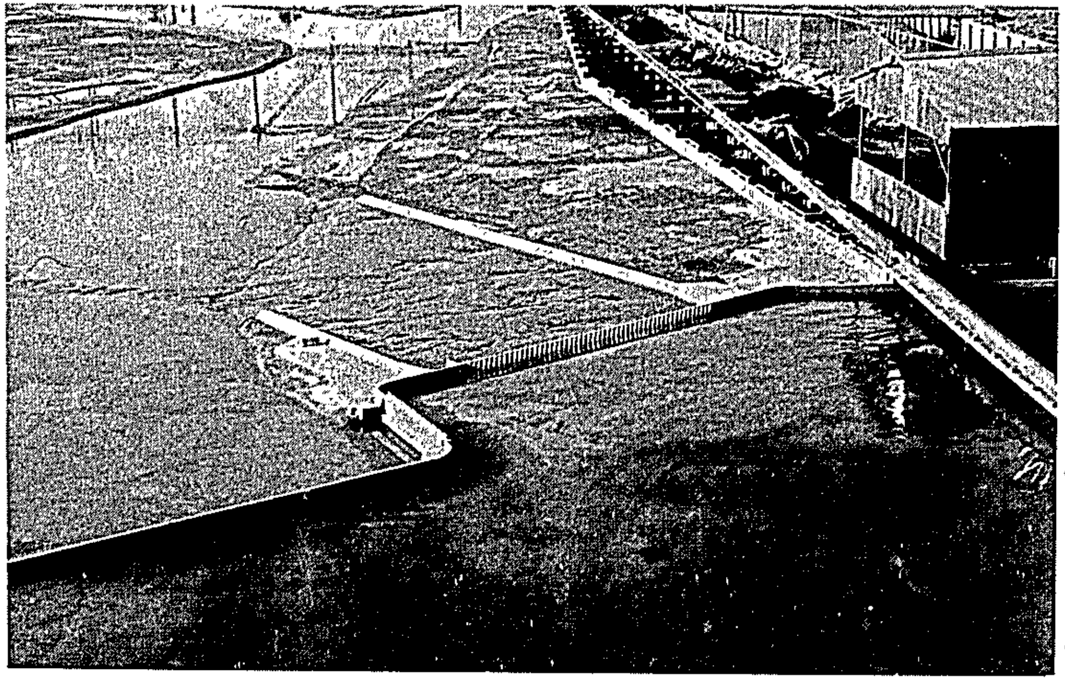


Photo. D-1 Model of the Sambor Dam showing Flood Discharge from Spillway (Downstream View) Q=10,000 cu.ms

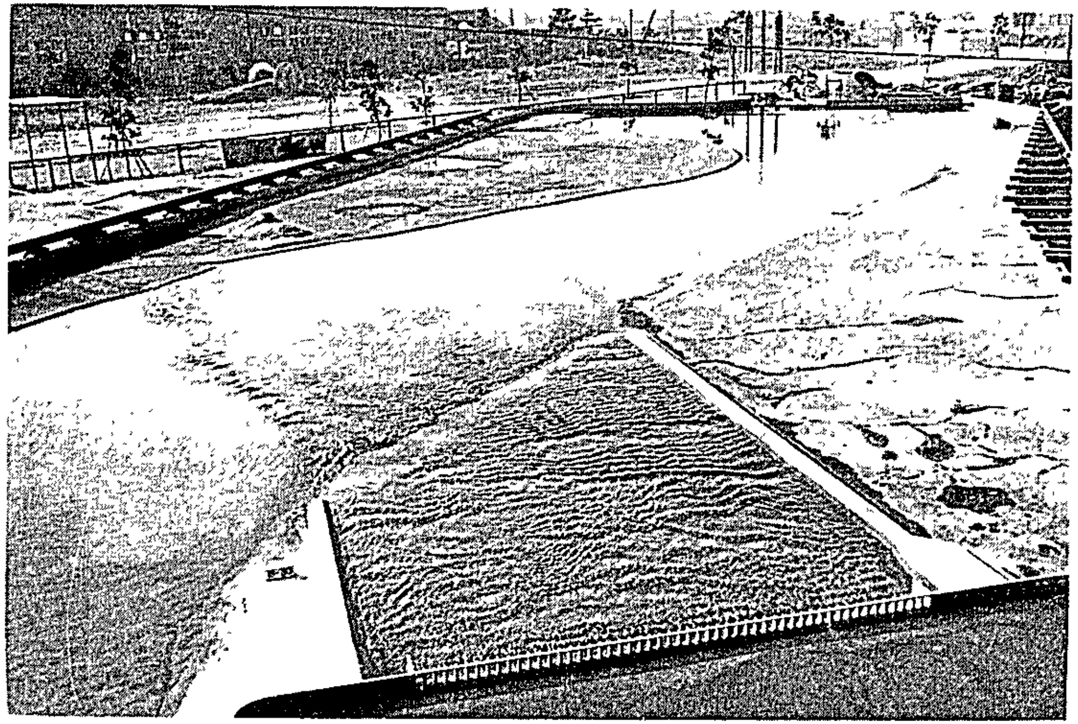


Photo. D-2 Model of the Sambor Dam showing Flood Discharge from Spillway (Downstream View) Q=30,000 cu.ms

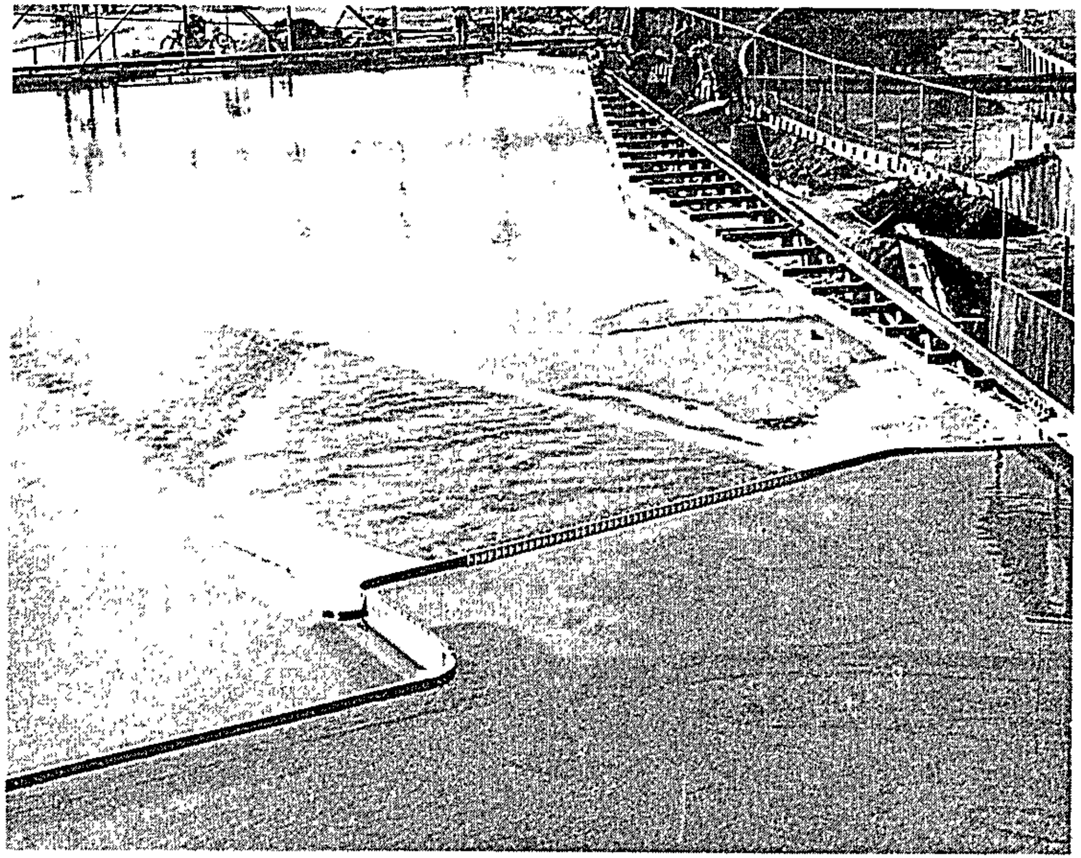


Photo. D-3 Model of the Sambor Dam showing Flood Discharge from Spillway (Downstream View) Q=70,000 cu.ms

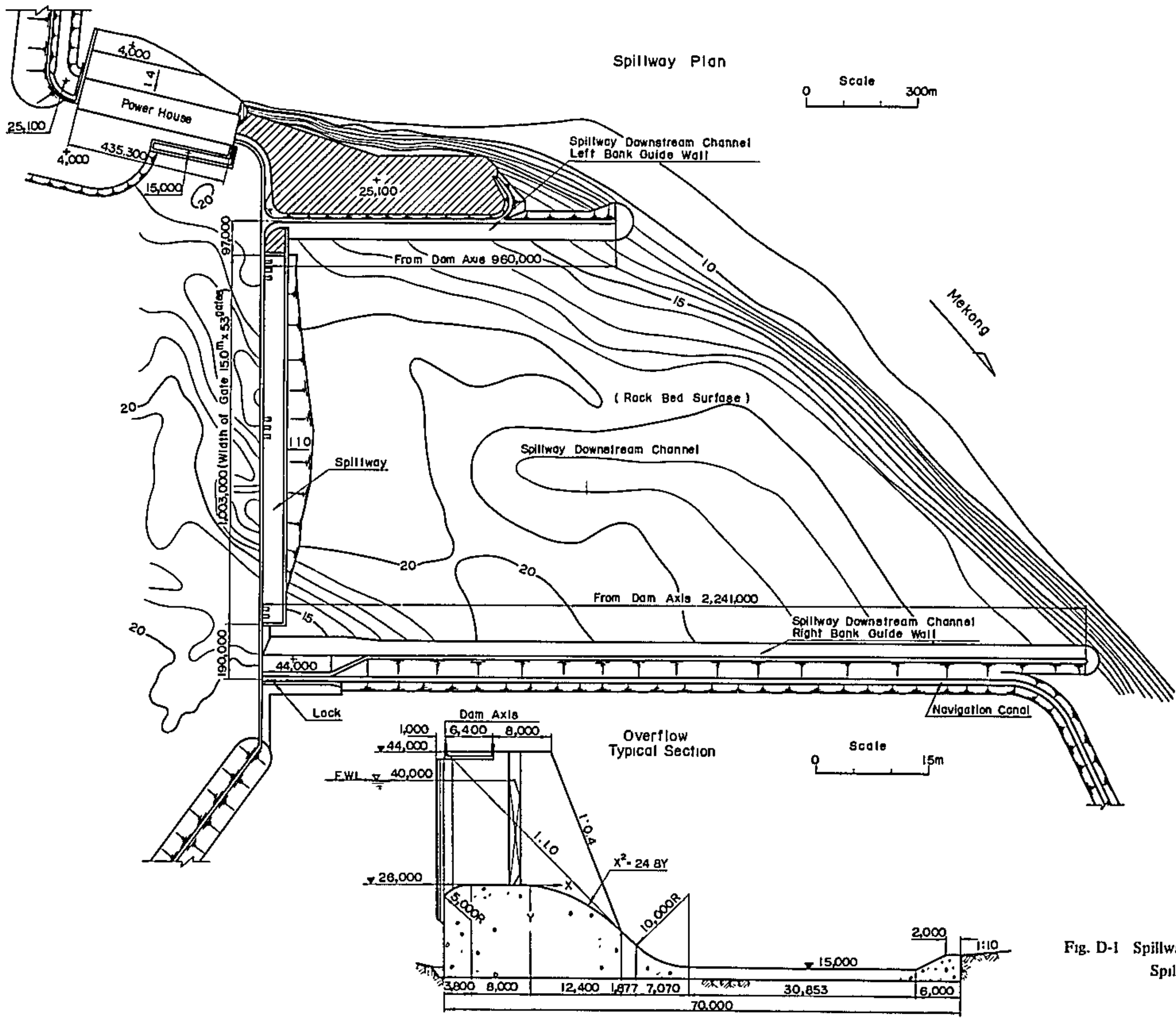


Fig. D-1 Spillway Hydraulic Model Test
Spillway General

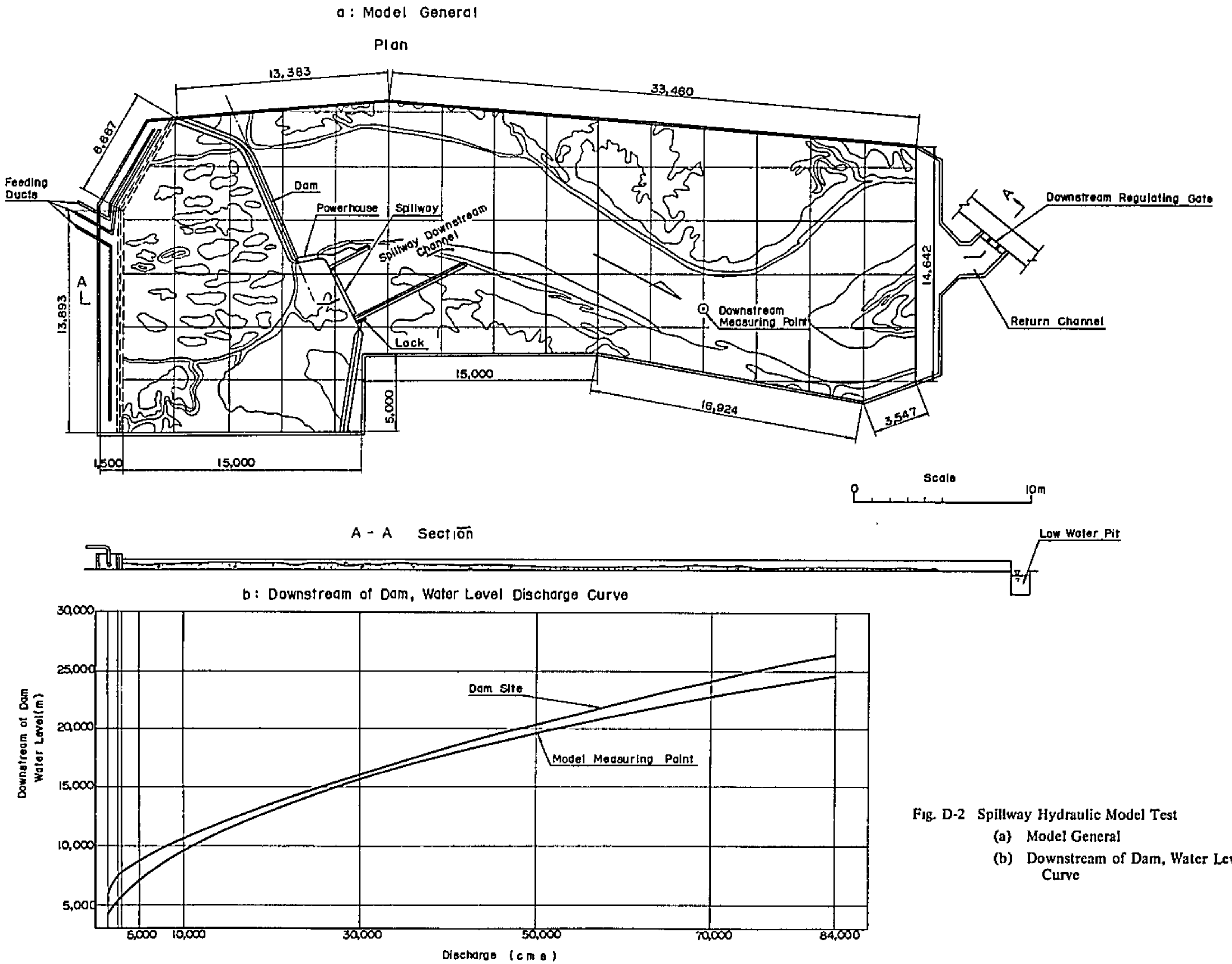


Fig. D-2 Spillway Hydraulic Model Test
(a) Model General
(b) Downstream of Dam, Water Level - Discharge Curve

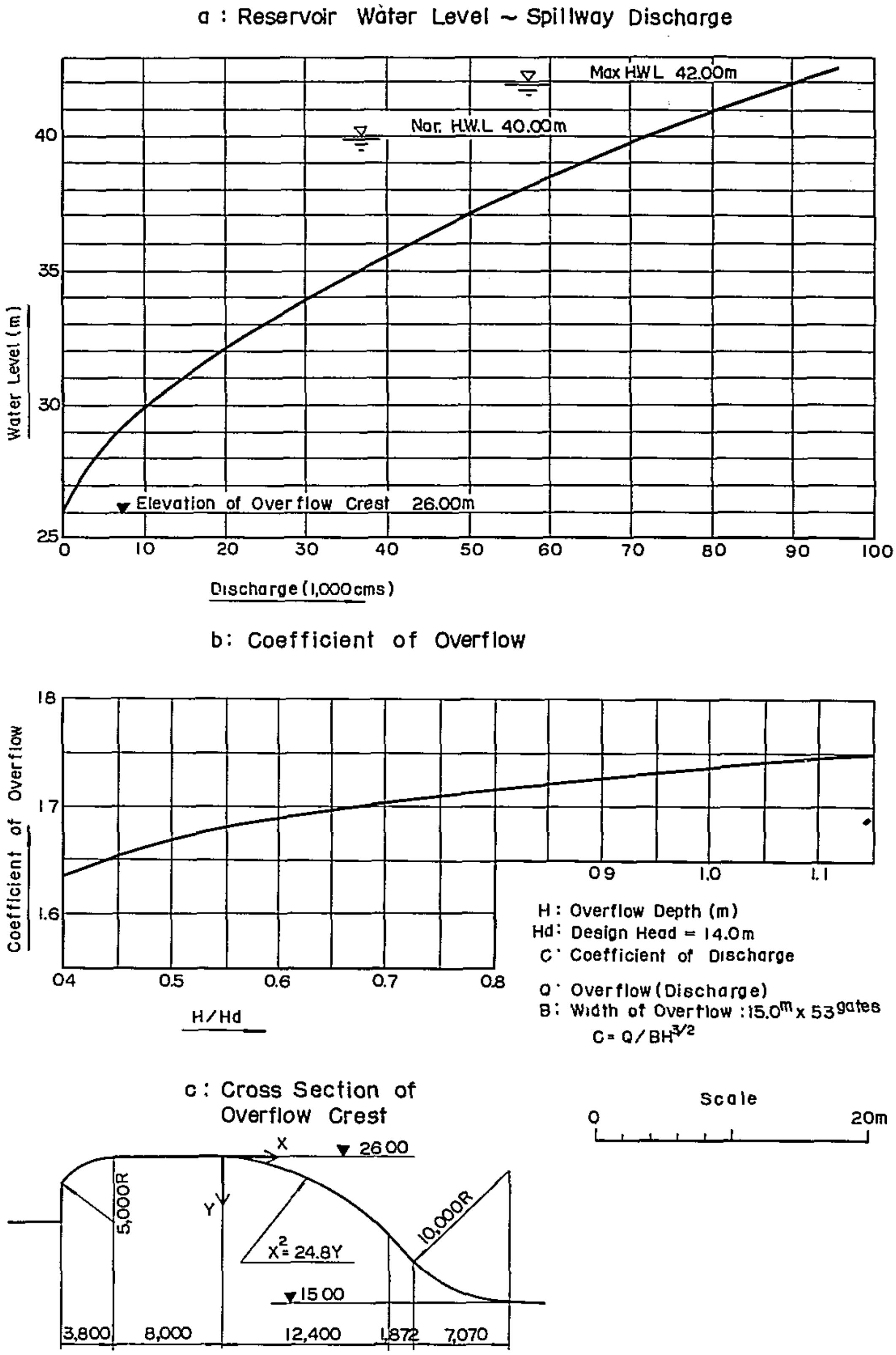


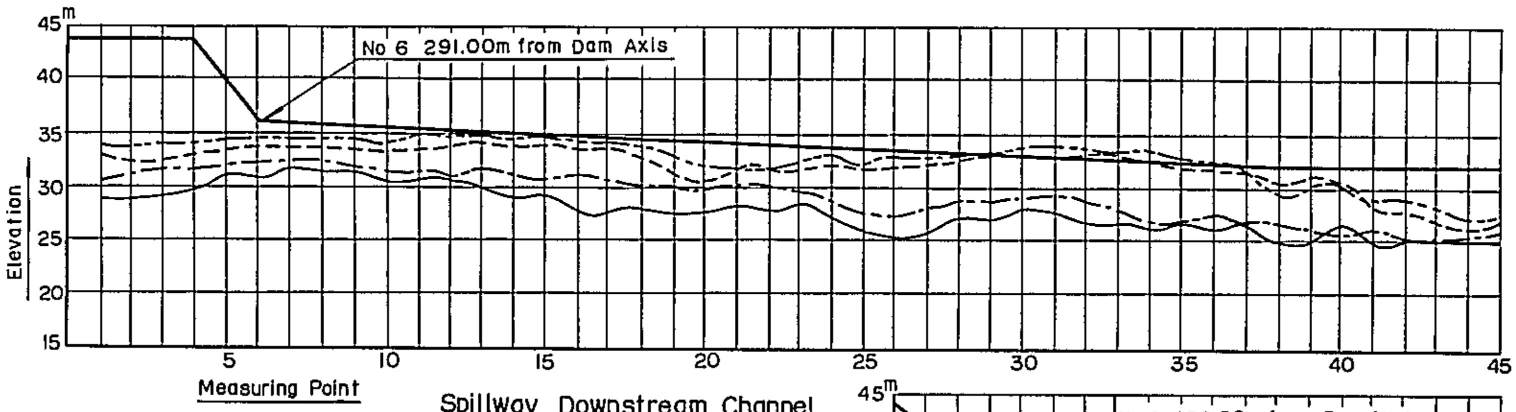
Fig. D-3 Spillway Hydraulic Model Test

(a) Reservoir Water Level - Spillway Discharge

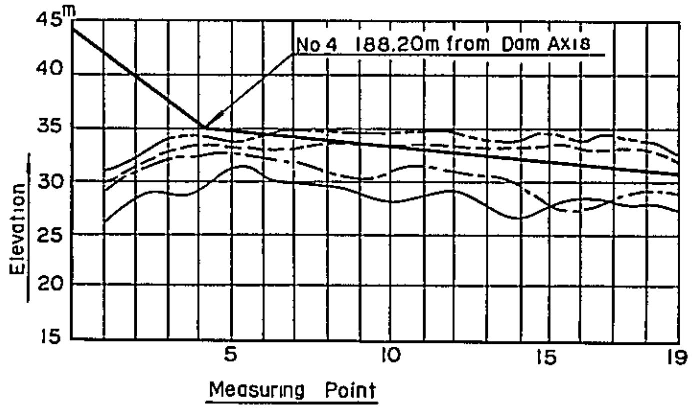
(b) Coefficient of Discharge

(c) Cross Section of the Base of Overflow Section

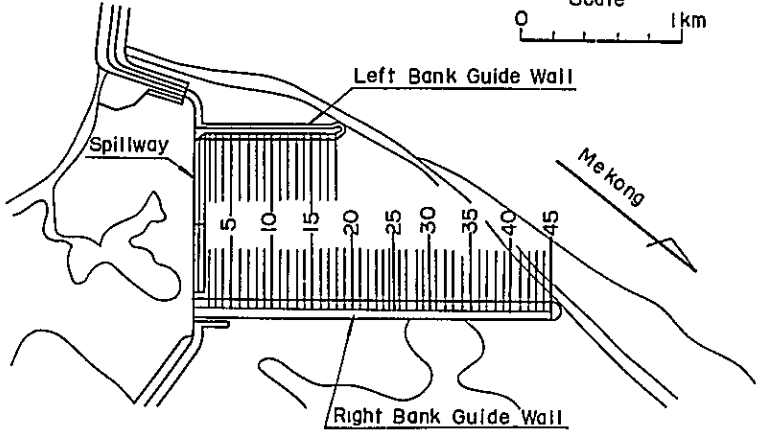
Spillway Downstream Channel
Water Level along the Right Bank Guide Wall



Spillway Downstream Channel
Water Level along the
Right Bank Guide Wall



Water Level Measuring Point along Spillway
Downstream Channel Guide Wall



Note;

Discharge	Elevation of Spillway Downstream Channel Bed: Ground Surface Line	Elevation of Spillway Downstream Channel Bed: The Base Line of Rock Bed
70000 cms	– – – – –	————
84,000 cms	—-·-—	—-·-—

Fig. D-4 Spillway Hydraulic Model Test
Water Level along Spillway Downstream Channel Guide Wall

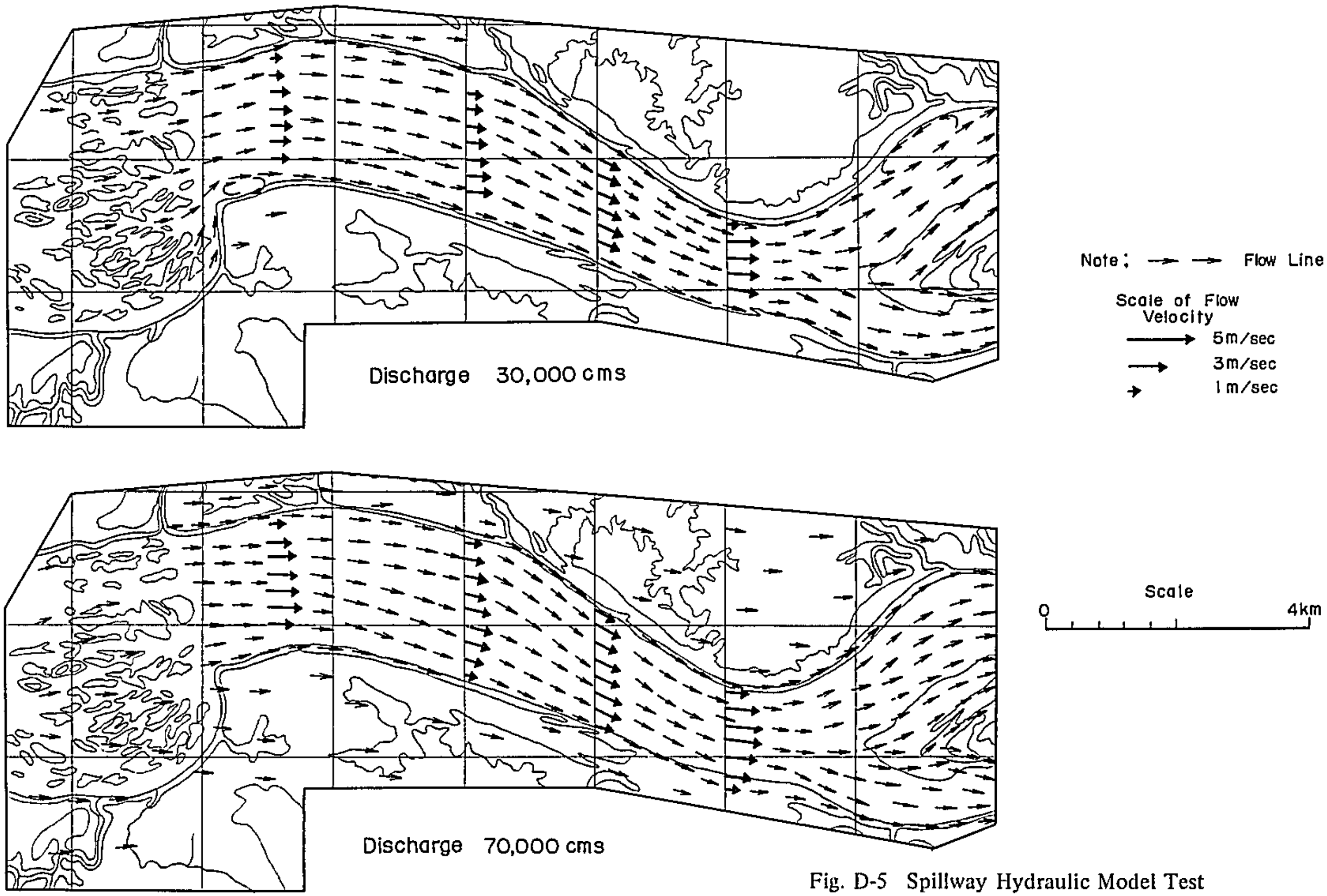
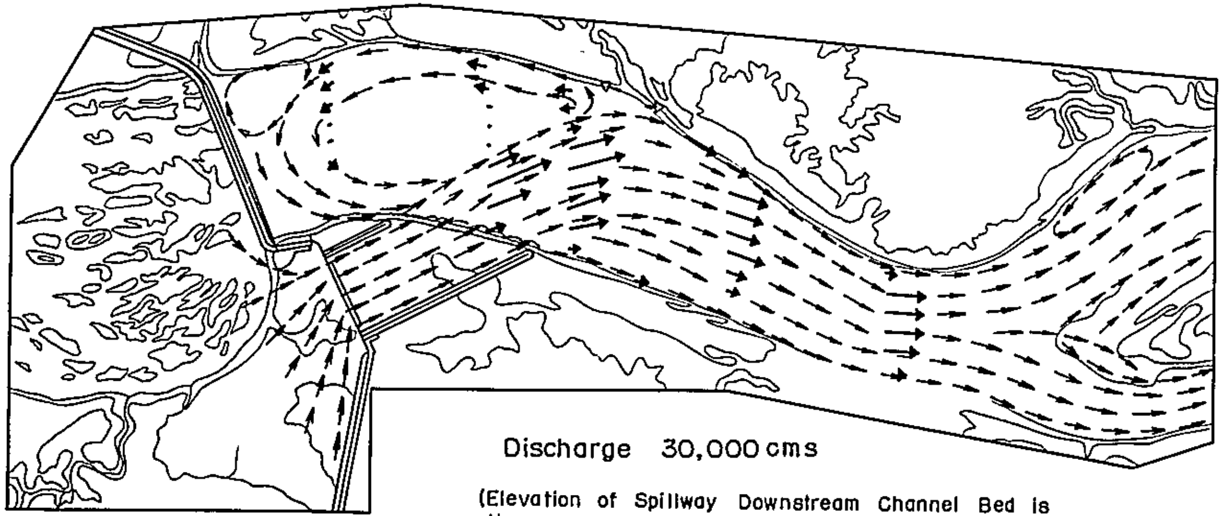
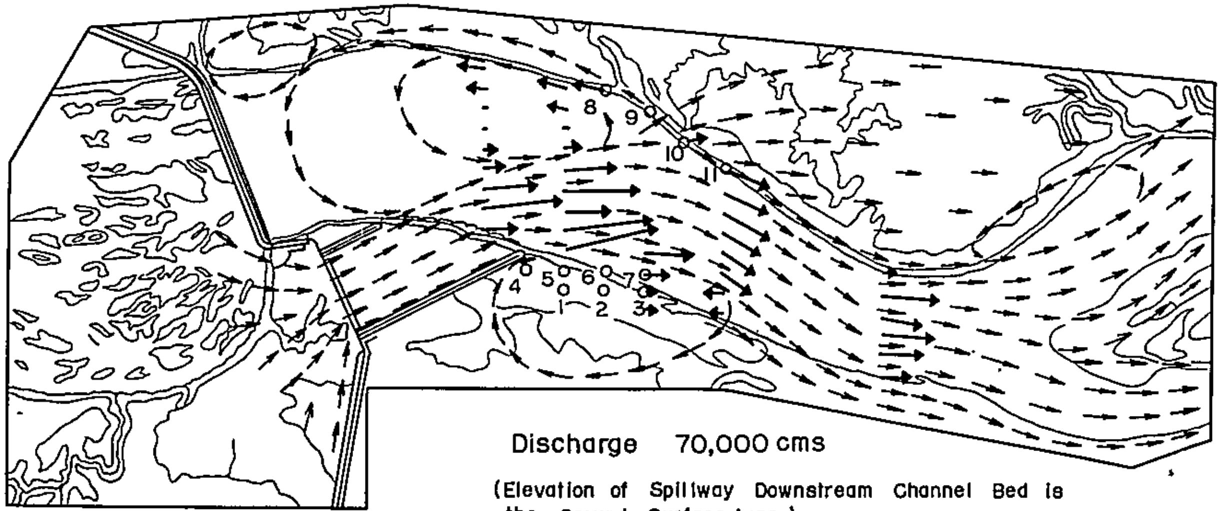


Fig. D-5 Spillway Hydraulic Model Test
Distribution of River Flow and State of Surface Flow - 1
(Before Construction of Dam)





Wave Height of the Discharge 70,00C cms

No.	Wave Height	No	Wave Height
1	0.20	7	0.41
2	0.30	8	0.17
3	0.45	9	0.17
4	0.18	10	0.23
5	0.30	11	0.42
6	0.47		

Note; → → Flow Line

o Measvring Point

Scale of Flow Velocity

→ 5m/sec

→ 3m/sec

→ 1m/sec

Scale

0 4km

Fig. D-6

Spillway Hydraulic Model Test

Distribution of River Flow Velocity and State of Surface Flow - 2
(After Construction of Dam - a)

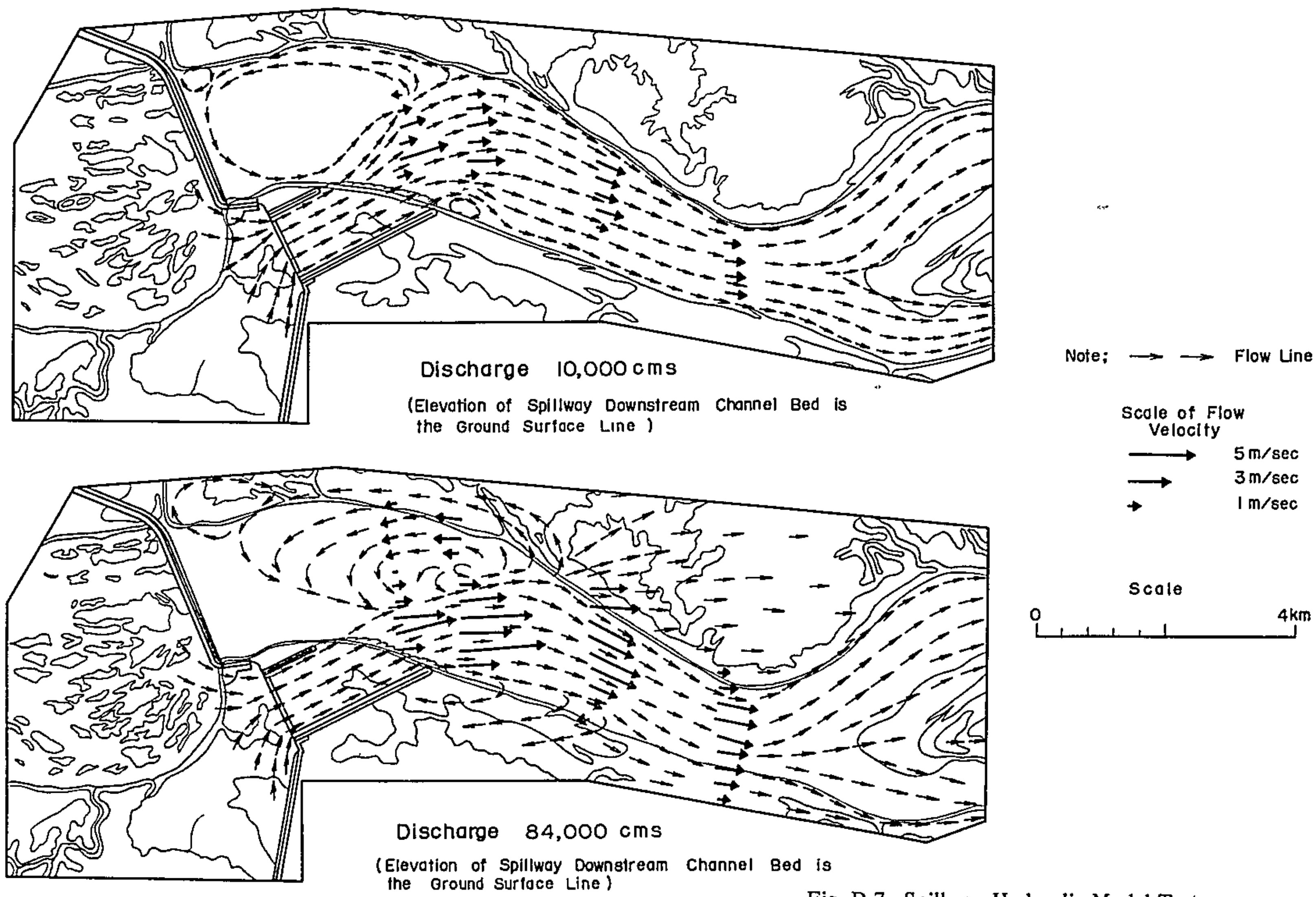
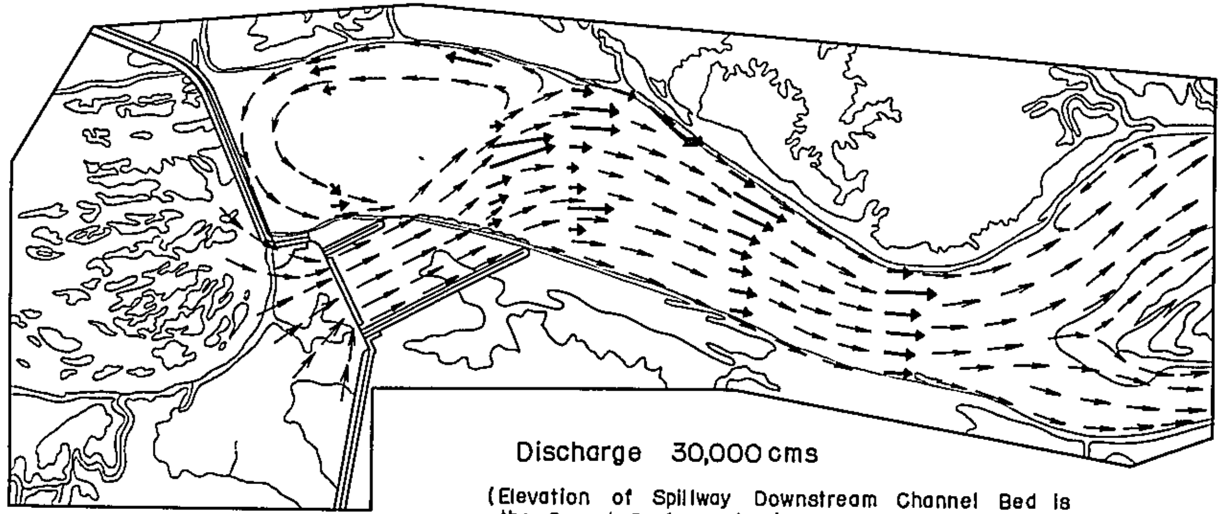
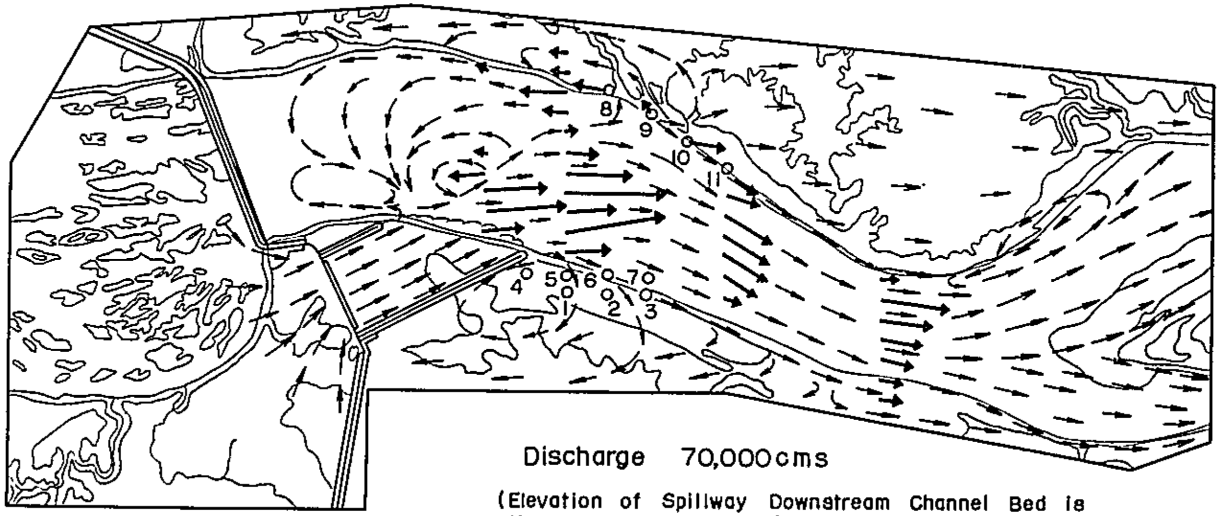


Fig. D-7 Spillway Hydraulic Model Test
Distribution of River Flow Velocity and State of Surface Flow - 3
(After Construction of Dam - D)



Discharge 30,000 cms

(Elevation of Spillway Downstream Channel Bed is the Ground Surface Line)



Discharge 70,000 cms

(Elevation of Spillway Downstream Channel Bed is the Ground Surface Line)

Wave Height of the Discharge 70,000 cms

No.	Wave Height	No.	Wave Height
1	0.34	7	0.18
2	0 36	8	0.45
3	0 23	9	0.62
4	0.30	10	0.40
5	0 56	11	0.12
6	0.49		

Note ; — → — → Flow Line

o Wave Height Measuring Point

Scale of Flow Velocity

→ 5 m/sec

→ 3 m/sec

→ 1 m/sec

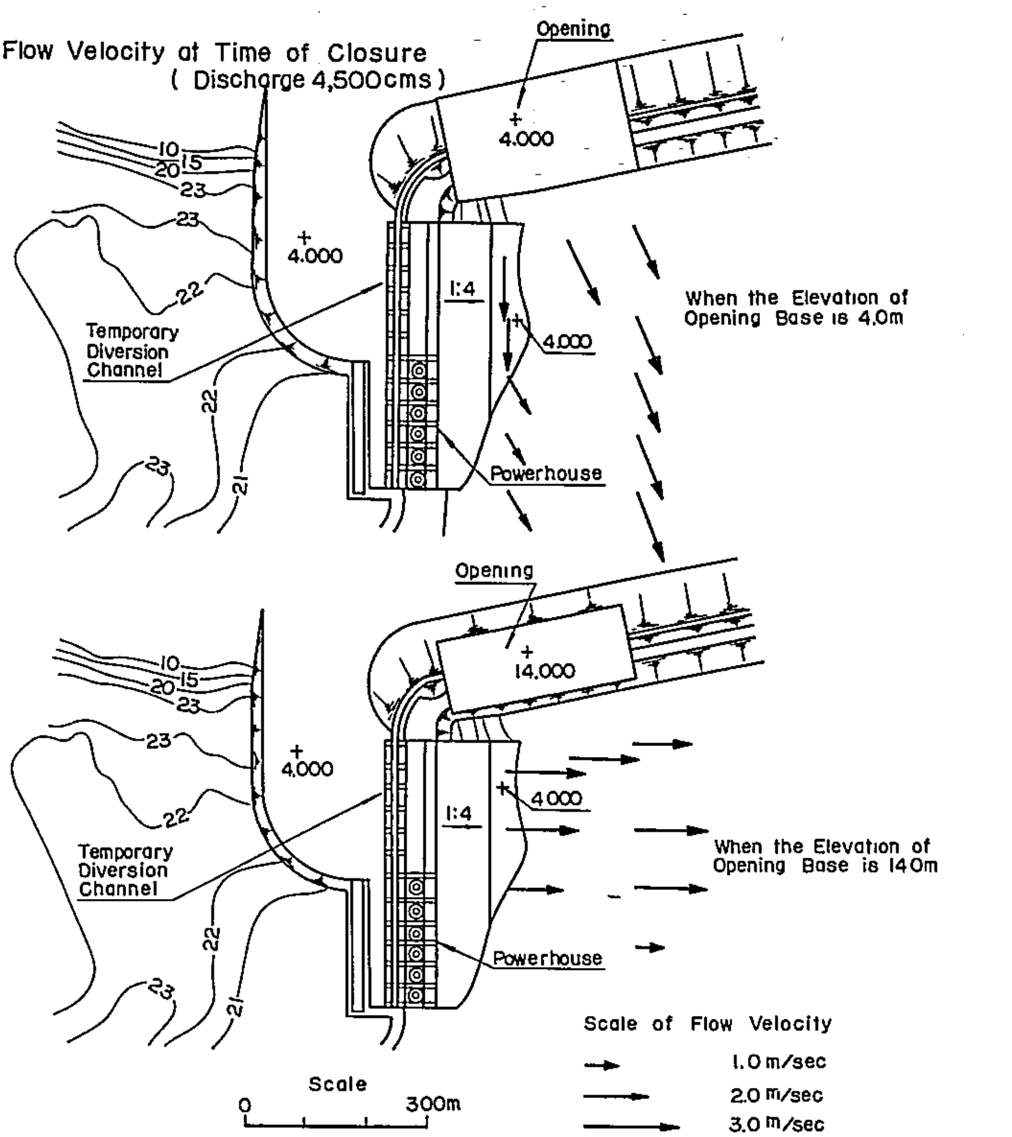
Scale

0 4km

Fig. D-8 Spillway Hydraulic Model Test

Distribution of River Flow Velocity and State of Surface Flow - 4 (After Construction of Dam - b)

a) Flow Velocity at Time of Closure
(Discharge 4,500cms)



b) Relation between Upstream Water Level at Time of Closure and Discharge

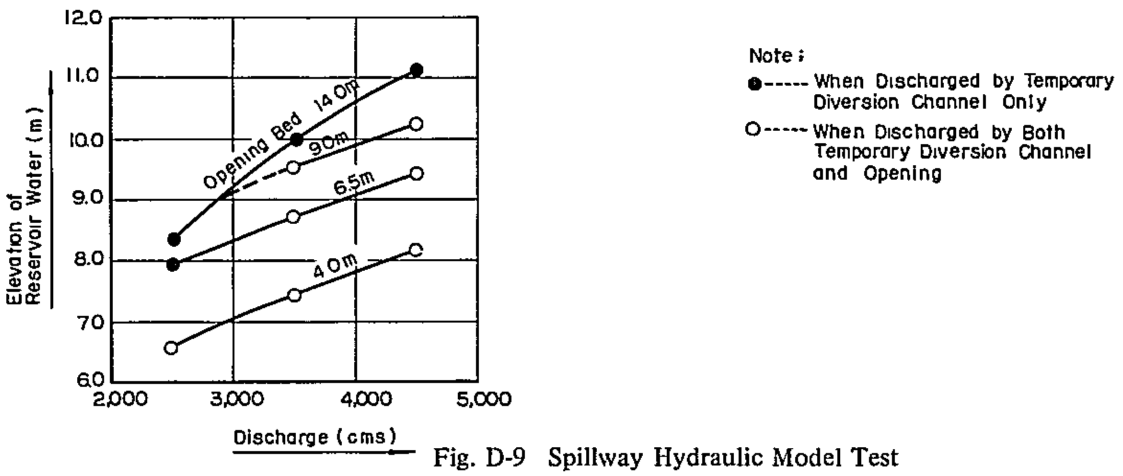
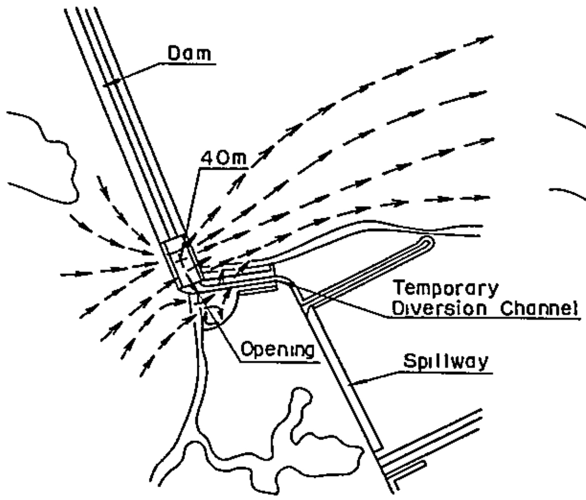


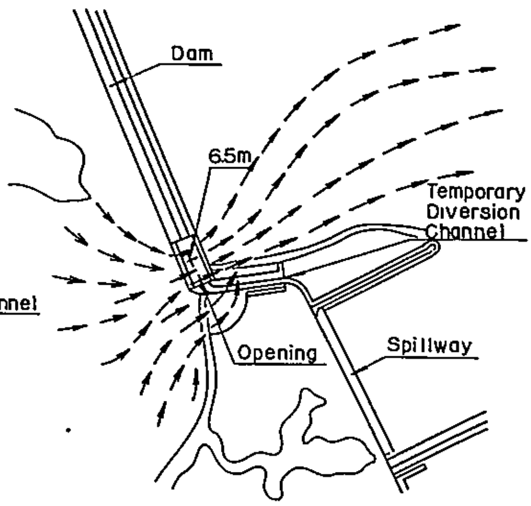
Fig. D-9 Spillway Hydraulic Model Test

(a) Flow Velocity at Time of Closure
(b) Relation between Upstream Water Level at Time fo Closure and Discharge

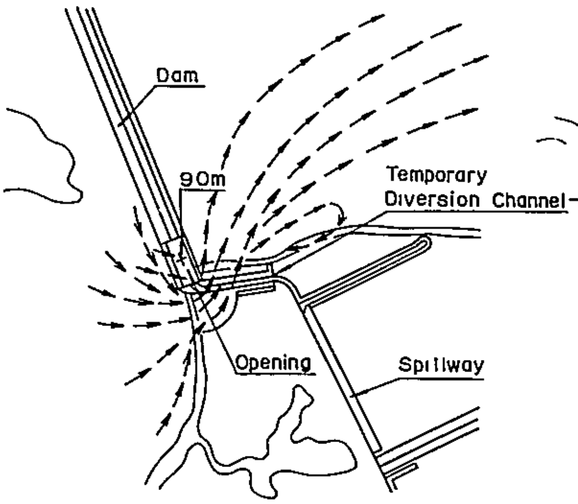
Elevation of Opening Bed : 4.00m



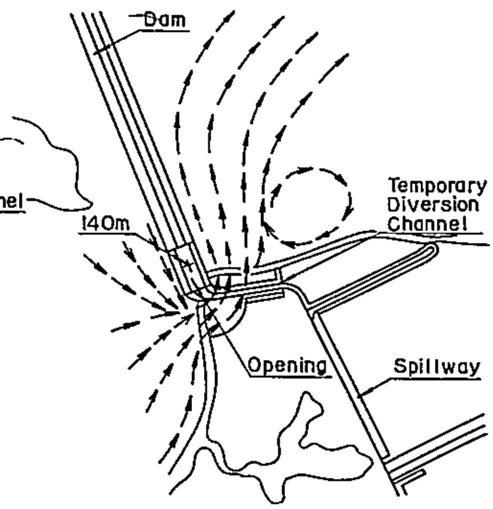
Elevation of Opening Bed:6.50m



Elevation of Opening Bed:9.00m



Elevation of Opening Bed:14.50m



Discharge 4,500cms

Fig. D-10 Spillway Hydraulic Model Test
Flow Line at Time of Closure

Scale

0 2km

APPENDIX E. SURVEY OF TRANSMISSION LINE ROUTES

APPENDIX E. SURVEY OF TRANSMISSION LINE ROUTES

(Simplified Penetration Tests)

The testing apparatus employed was a simplified penetrometer to roughly determine the hardness of ground from the surface to depths of about 10 m. It is used when a wide area is covered, such as transmission line routes, and is especially adapted to comparatively soft ground such as sandy or cohesive earth. Transportation and method of use is simple. The apparatus was manufactured on a trial basis by EPDC in 1954 for use in geological survey of foundations of transmission line steel towers and since has been adopted for regular use.

The major components and particulars of this simplified penetrometer are a 10 kg drop weight, drop height of weight 50 cm (constant), diameter of cone 4 cm, angle of tip of cone 30^{o}, diameter of rod 22 mm, length of rod 1.0 m, diameter and length of casing 37 mm and 1.0 cm respectively, length of tripod 3.0 m, total weight approximately 100 kg.

The test is comprised of counting the number of blows for each 5 cm of penetration, and obtaining the bearing strength of each layer of the ground by the correlation curve of the number of blows (penetration index) and the pre-set number of blows calibrated by standard penetration tests.

As reference, the relationship between penetration index, N, and allowable bearing strength is given below.

Penetration Index, N	3	5	10	15	20	30	40
	50	60	70	80	90	100	
Allowable Bearing Strength t/sq.m	5	7	12	16	20	27	35
	40	45	50	55	57	60	

The simplified penetration test outlined above is only for a rough determination of the geology of transmission line routes. In order to obtain data which will serve as a guide for the detail design, it is desirable to carry out standard penetration tests by boring and other detail tests of especially important locations and representative locations.

E-1 Results of Simplified Penetration Tests in 1964 Wet Season Survey

Table E-1 Summary Table of N-Value in Simplified Penetration Tests

(Wet Season)

Measuring Point \ Depth (m)	1	2	3	4	5	6	7	8
1	5	21	27	(3.65 m) 40				
2	30	(1.88 m) 41						
3	26	(1.44 m) 73						
4	36	9	14	13	(4.45 m) 73			
5	(0.97 m) 107							
6	28	8	9	18	23	22	28	14
7	29	11	12	15	10	13	10	(7.55 m) 15
8	4	6	6	7	13	16	16	10
9	32	(1.75 m) 73						
10	(0.5 m) 43							
11	(0.6 m) 50							
12	(0.9 m) 47							
13	11	26	(2.57 m) 67					
14	46	26	(2.80 m) 48					
15	(0.65 m) 69							
16	9	11	12	16	25	(5.8 m) 40		
17	7	9	26	23	(4.90 m) 62			
18	8	195						
19	46	41	20	23	30	18	20	(7.65 m) 17
20	7	8	16	13	16	20	26	27
21	10	33	96	(3.15 m) 99				
22	11	37	37	(3.40 m) 129				
23	6	6	15	21	17	22	27	(7.20 m) 25
24	5	4	4	8	5	(5.45 m) 25		
25	6	8	9	12	38	(5.40 m) 52		

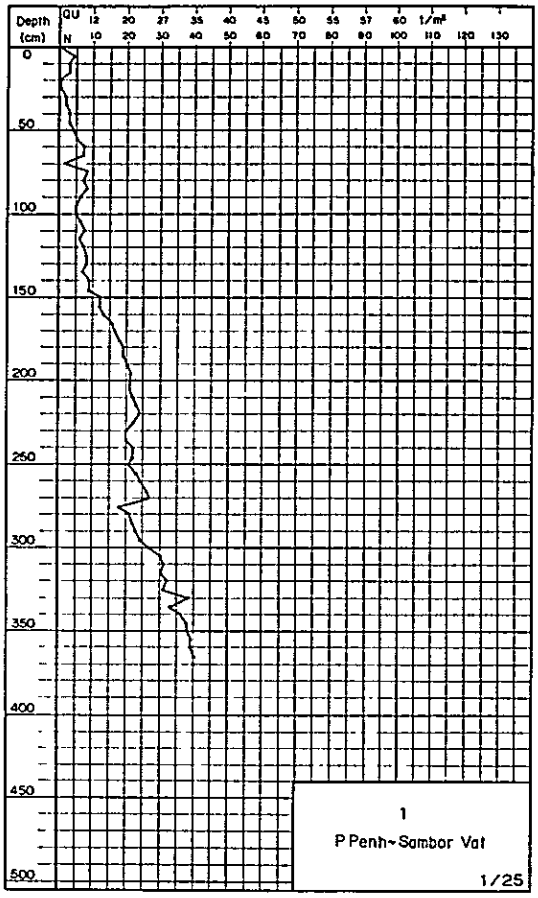
E-2 Results of Simplified Penetration Tests in 1964 Dry Season Survey

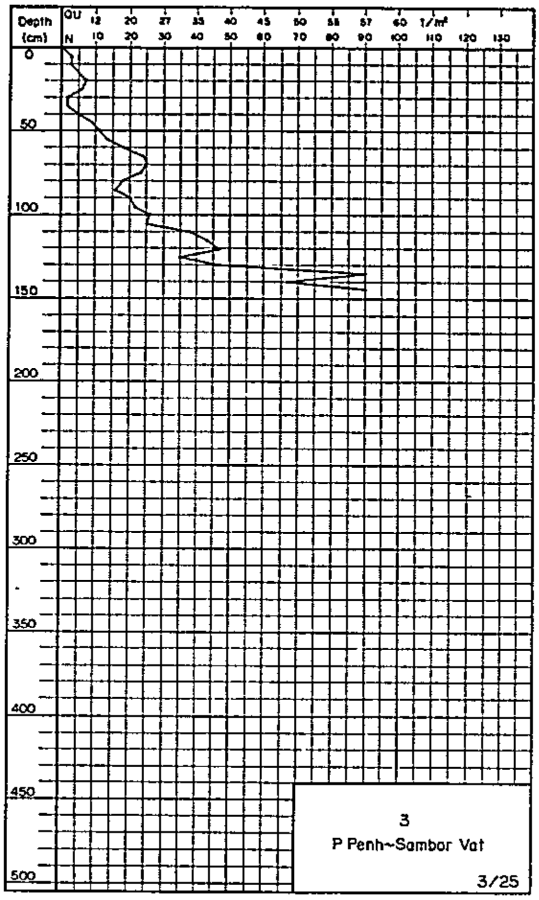
Table E-2 Summary Table of N-Value of Simplified Penetration Tests

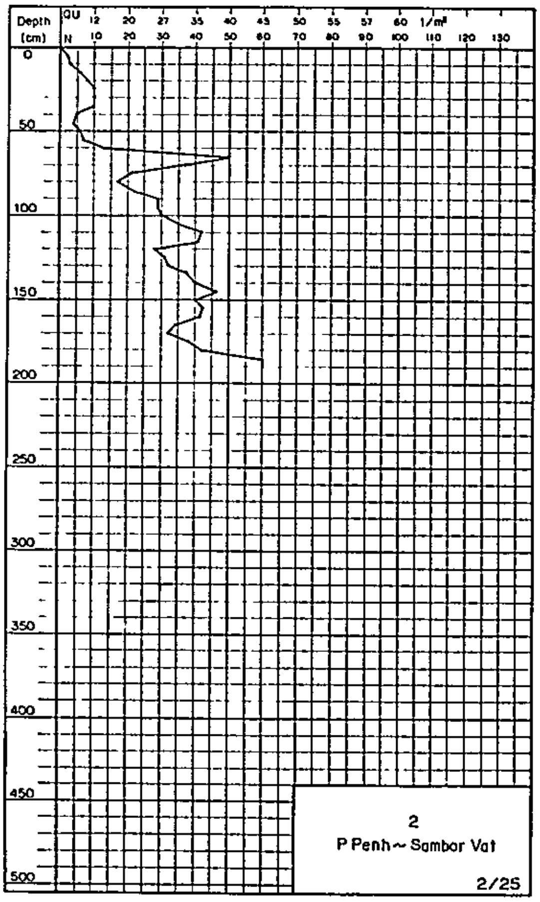
(Dry Season)

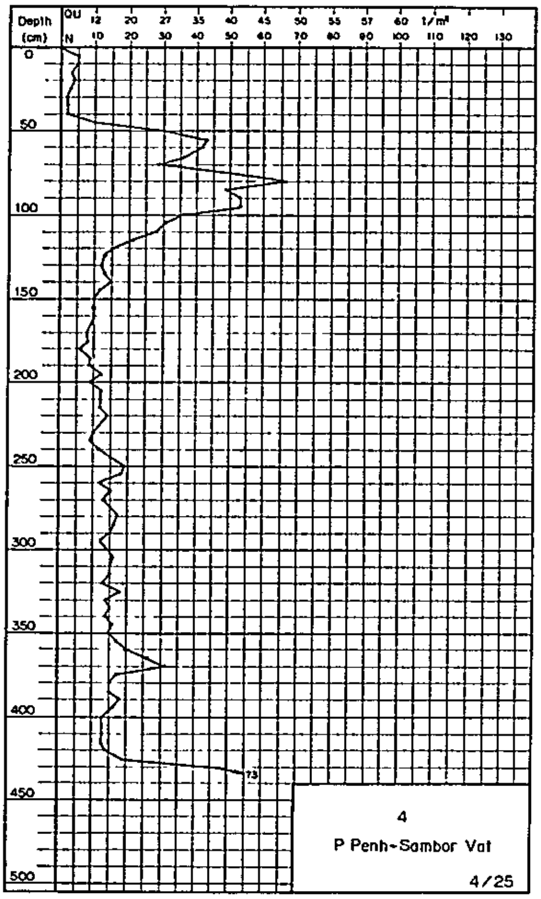
Depth (m) / Measuring Point	1	2	3	4	5	6	7	8	9	10
1′	7	17	31	38	(4.20 m) 222					
2′	18	9	6	14	16	31	14	44	14	(9.95 m) 243
3′	20	(1.45 m) 550								
4′	10	(1.05 m) 492								
5′	15	(1.55 m) 462								
6′	5	9	(2.30 m) 116							
7′	12	9	24	13	47	(5.30 m) 73				
8′	4	6	21	39	(4.90 m) 200					
9′	60	(1.60 m) 270								
10′	17	7	8	24	46	217				
11′	271	9	30	18	(4.85 m) 220					
12′	600									
13′	7	6	11	15	18	17	16	24	31	(9.80 m) 31
14′	4	8	24	(3.25 m) 181						
15′	4	8	10	6	9	12	17	20	18	(9.50 m) 27
16′	11	12	16	24	120	(5.05 m) 258				
17′	5	5	14	27	88	(5.70 m) 287				
18′	6	10	16	17	27	17	20	74	(8.25 m) 157	
19′	23	22	9	13	56	(5.15 m) 170				

Fig. E-1 Results of Simplified Penetration Test (Wet Season)









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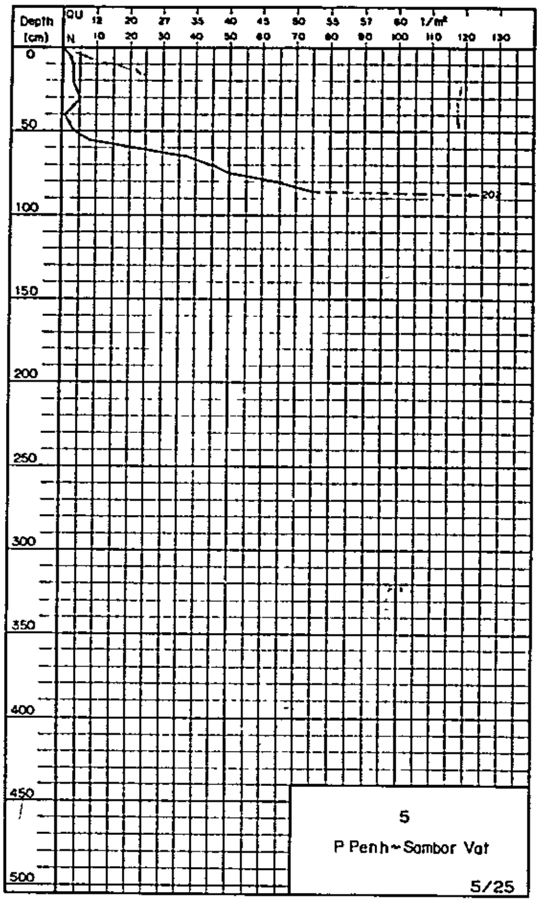

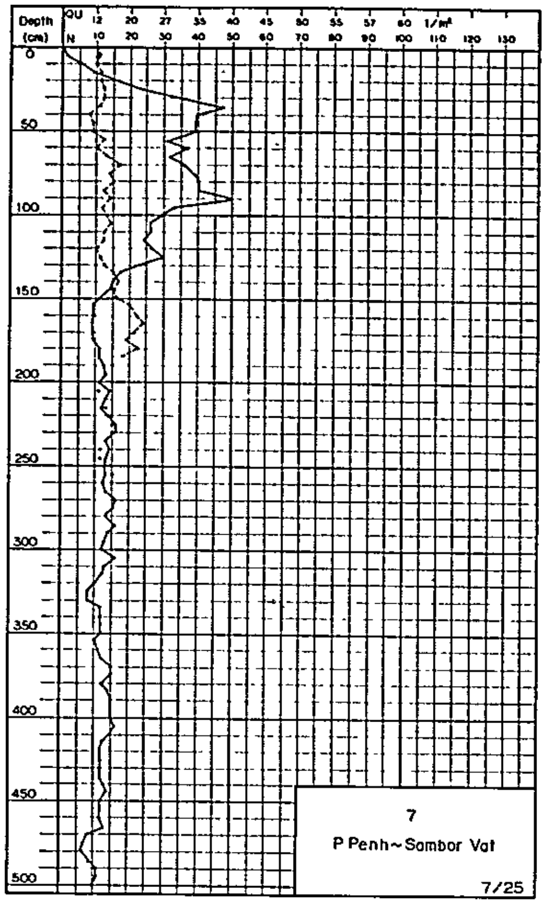

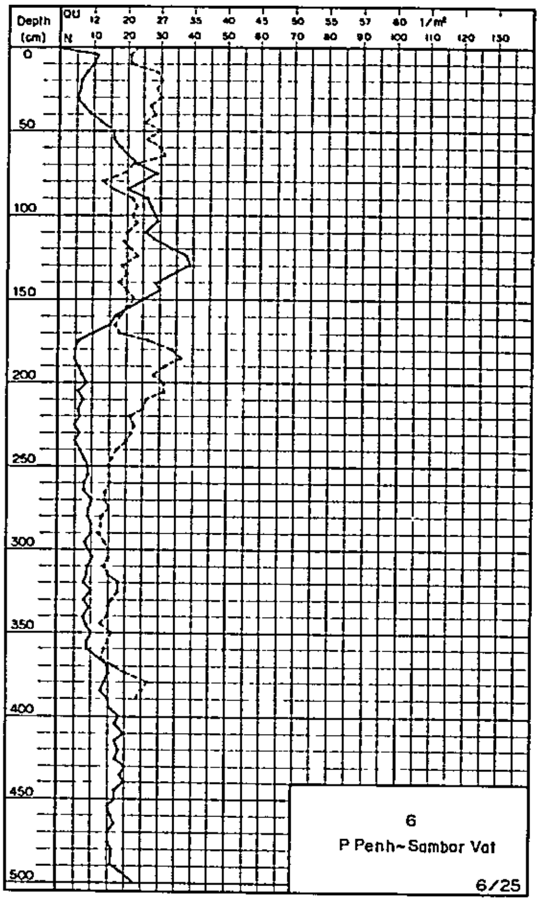

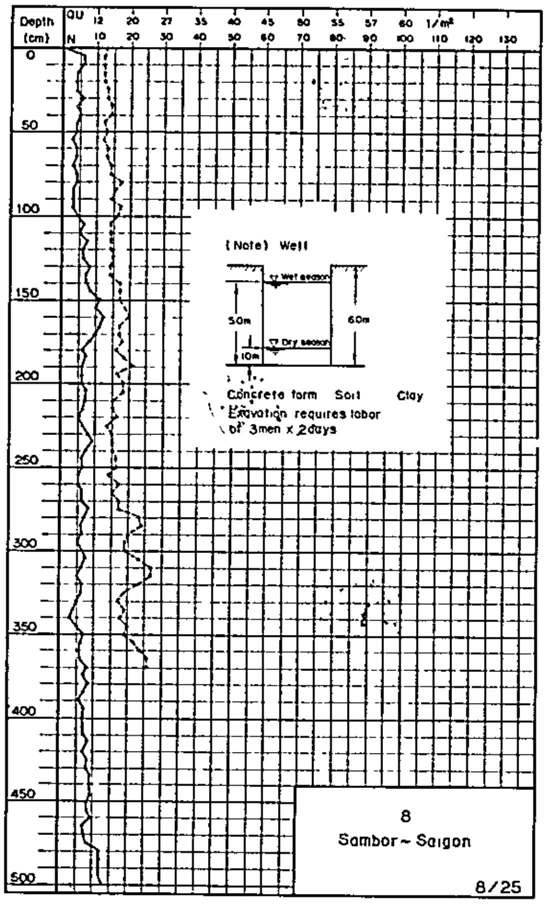

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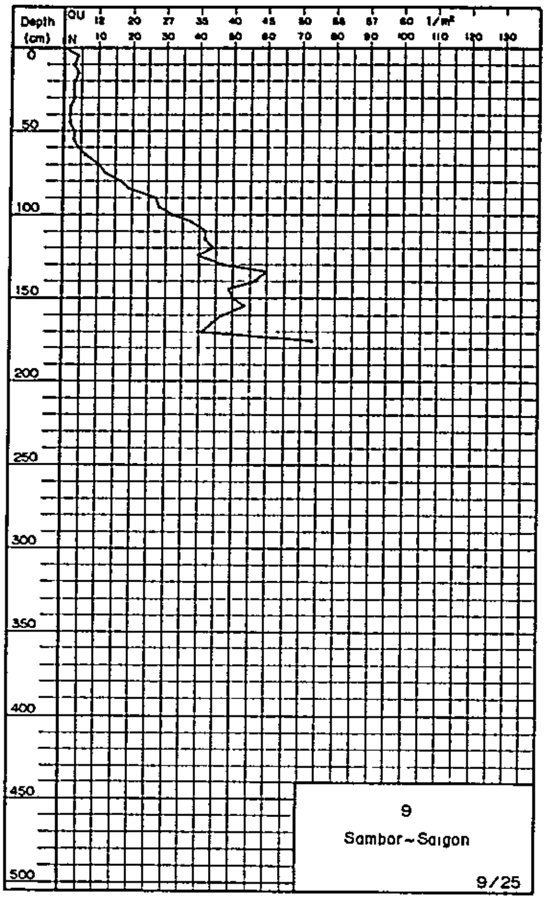

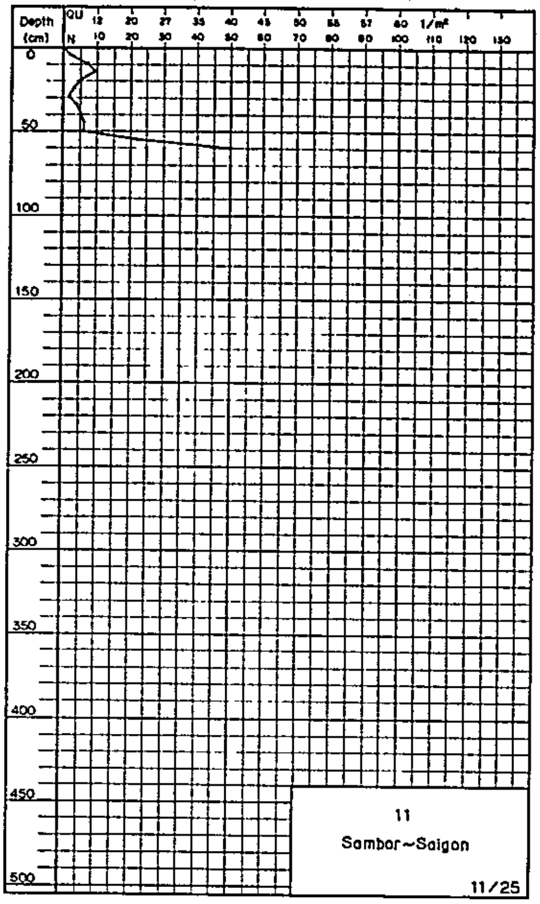

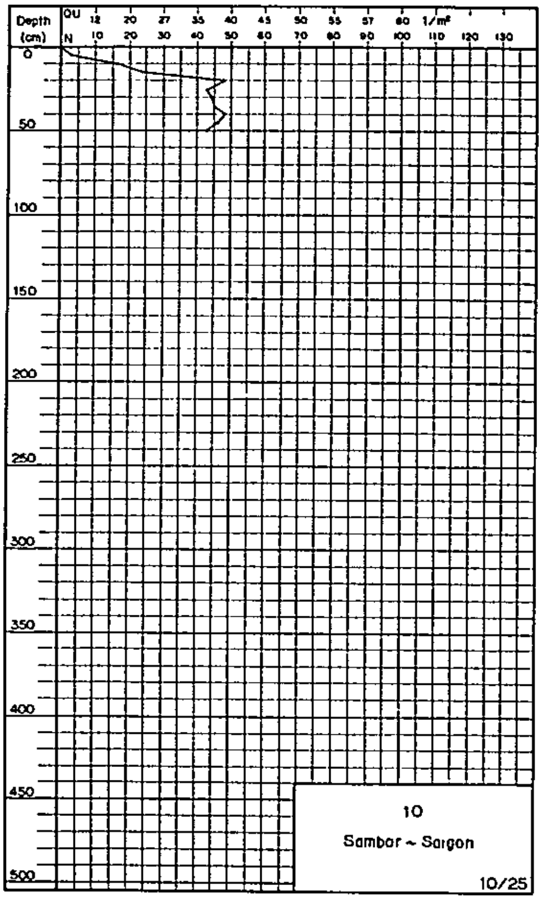

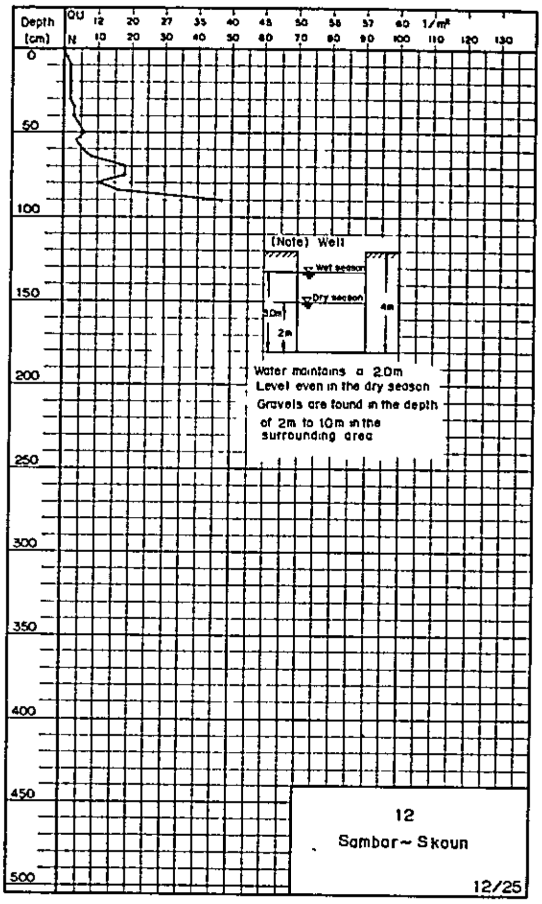

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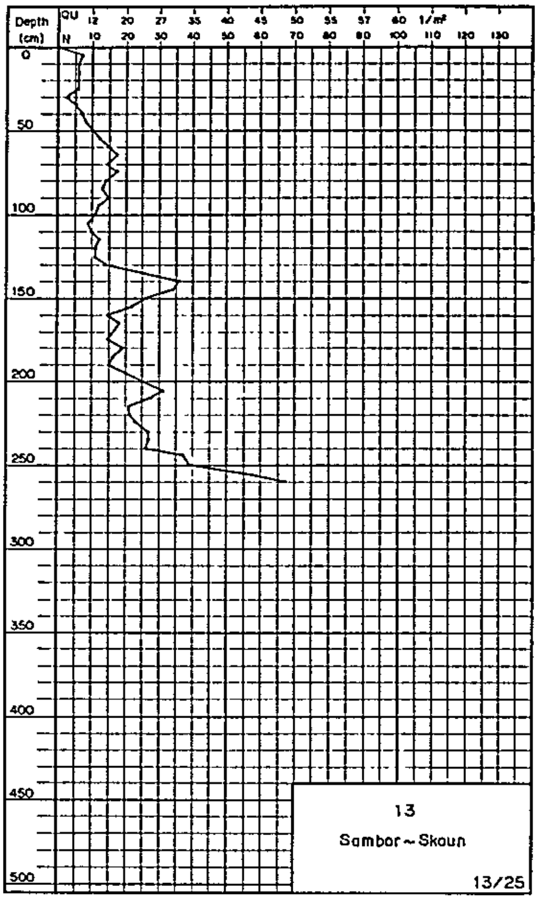

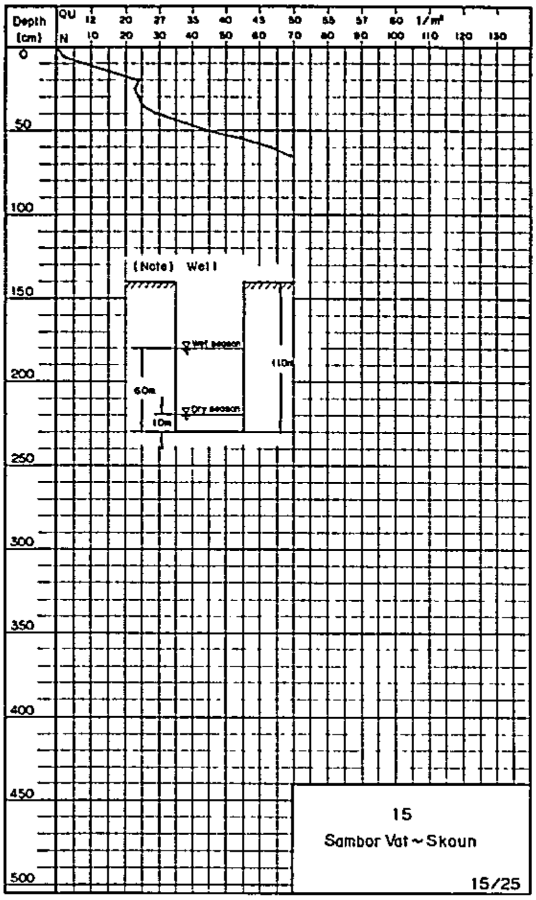

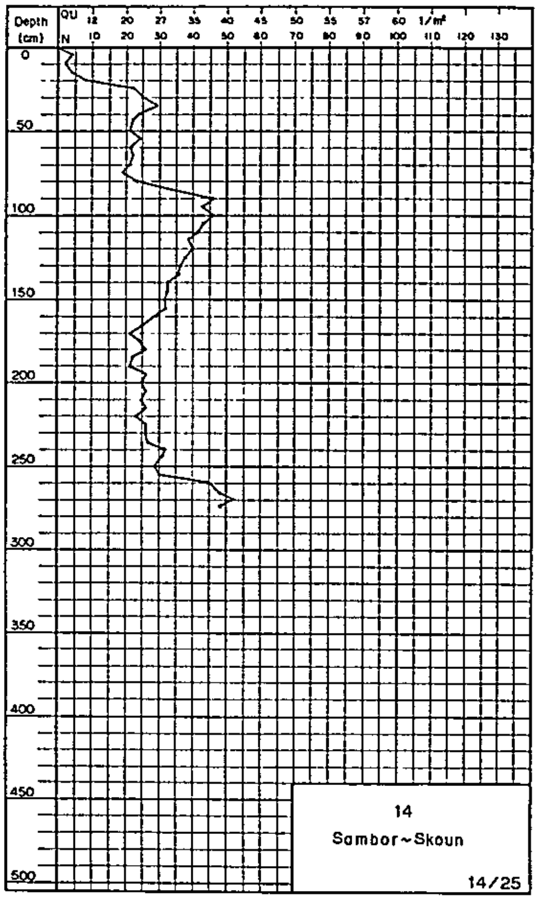

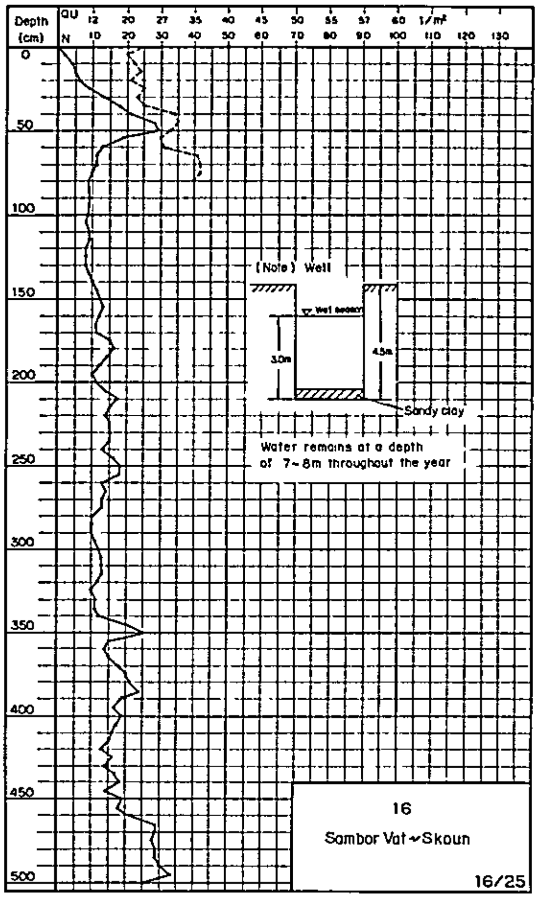

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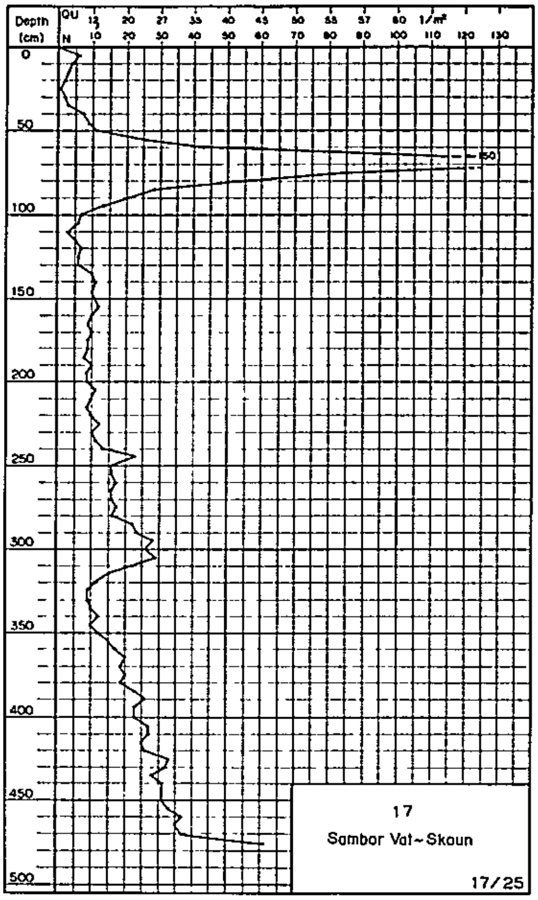

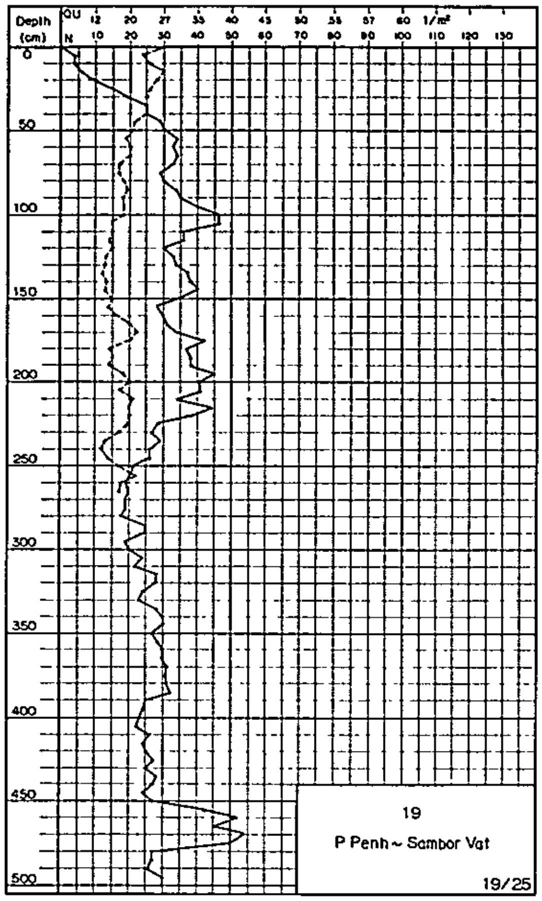

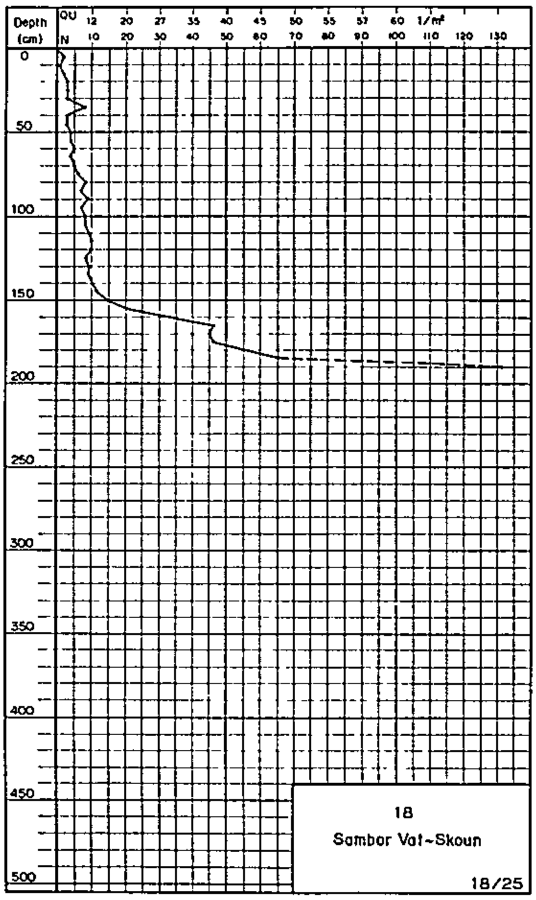

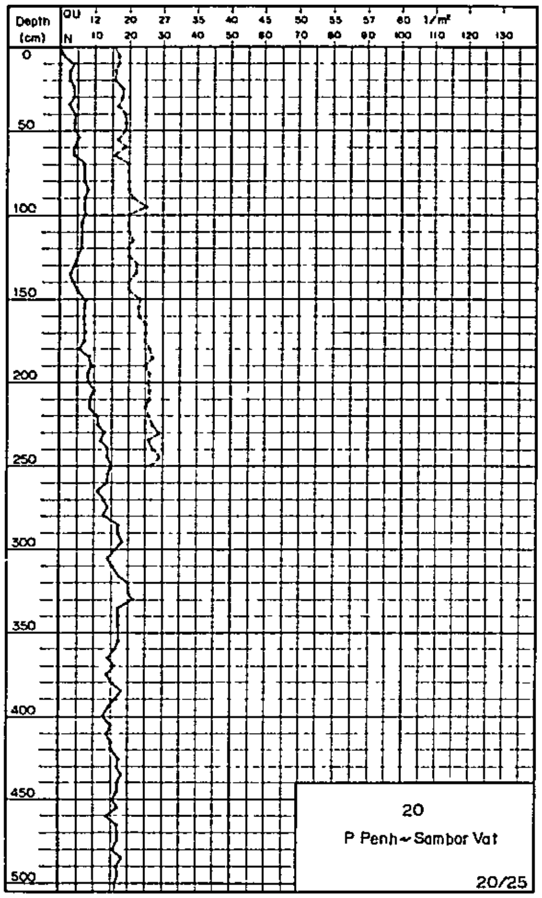

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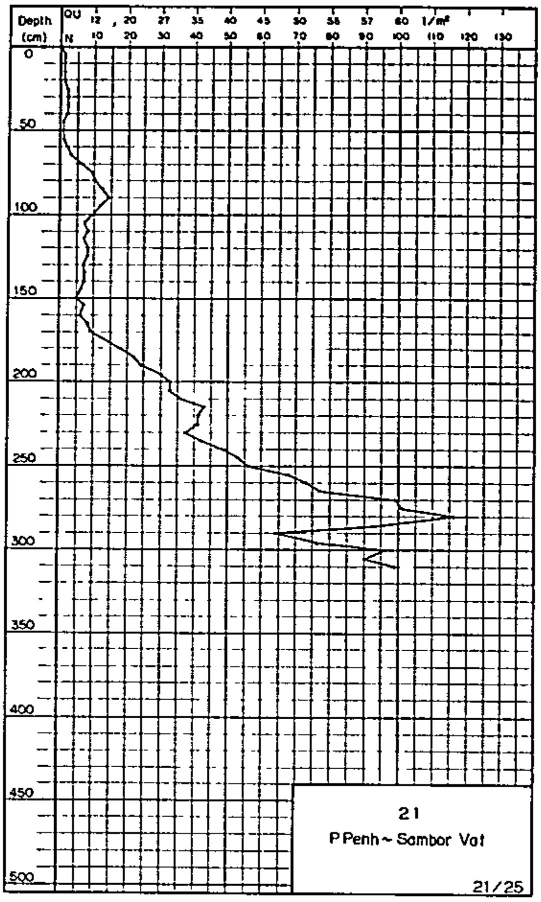

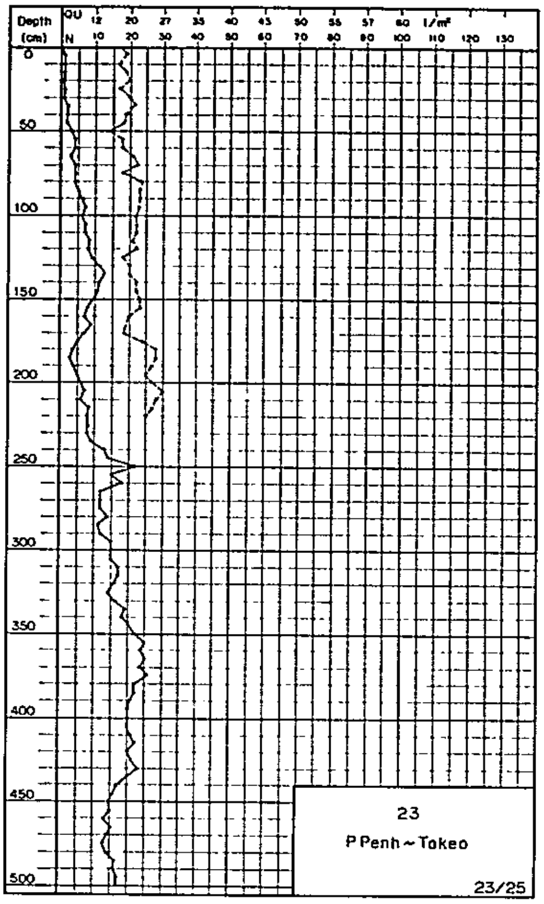

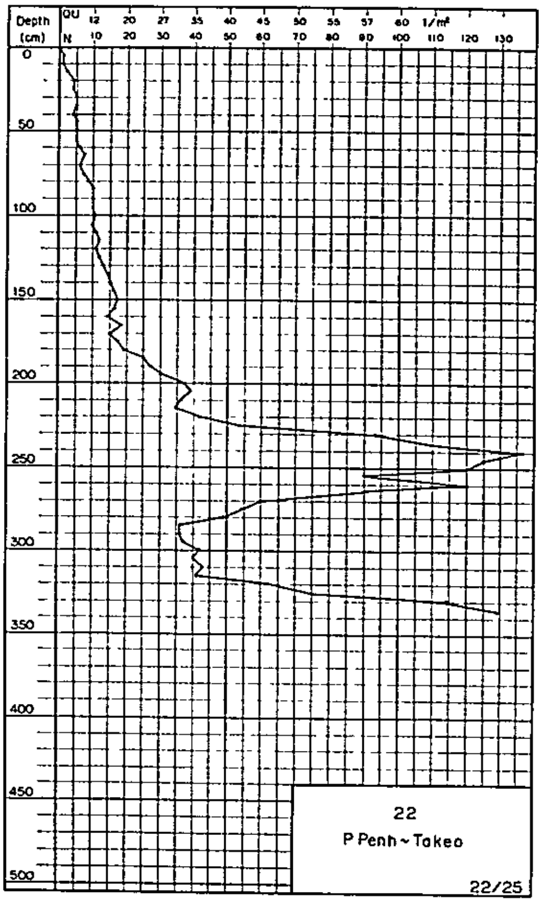

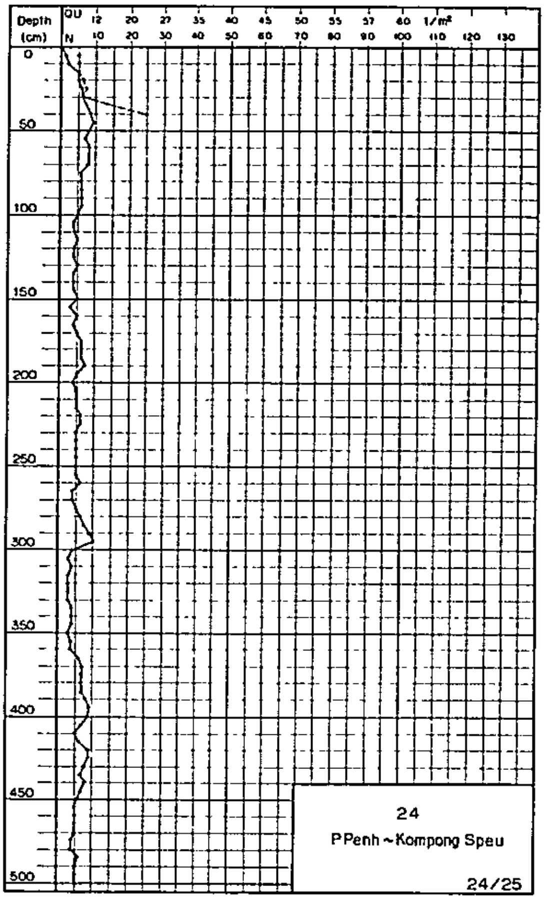

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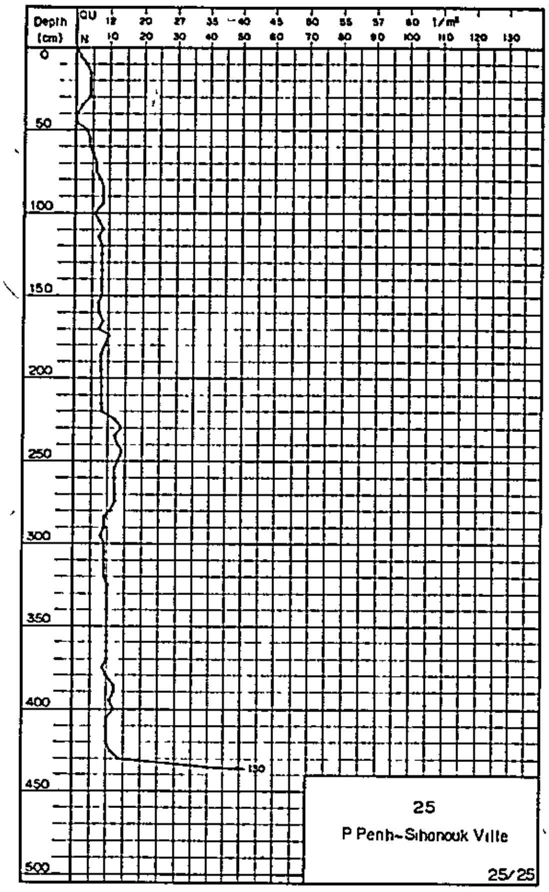

Depth (cm)
QU 12 20 27 35 40 45 50 55 57 60 t/m²
N 10 20 30 40 50 60 70 80 90 100 110 120 130
0
50
100
150
200
250
300
350
400
450
500
130
25
P Penh-Sihanouk Ville
25/25

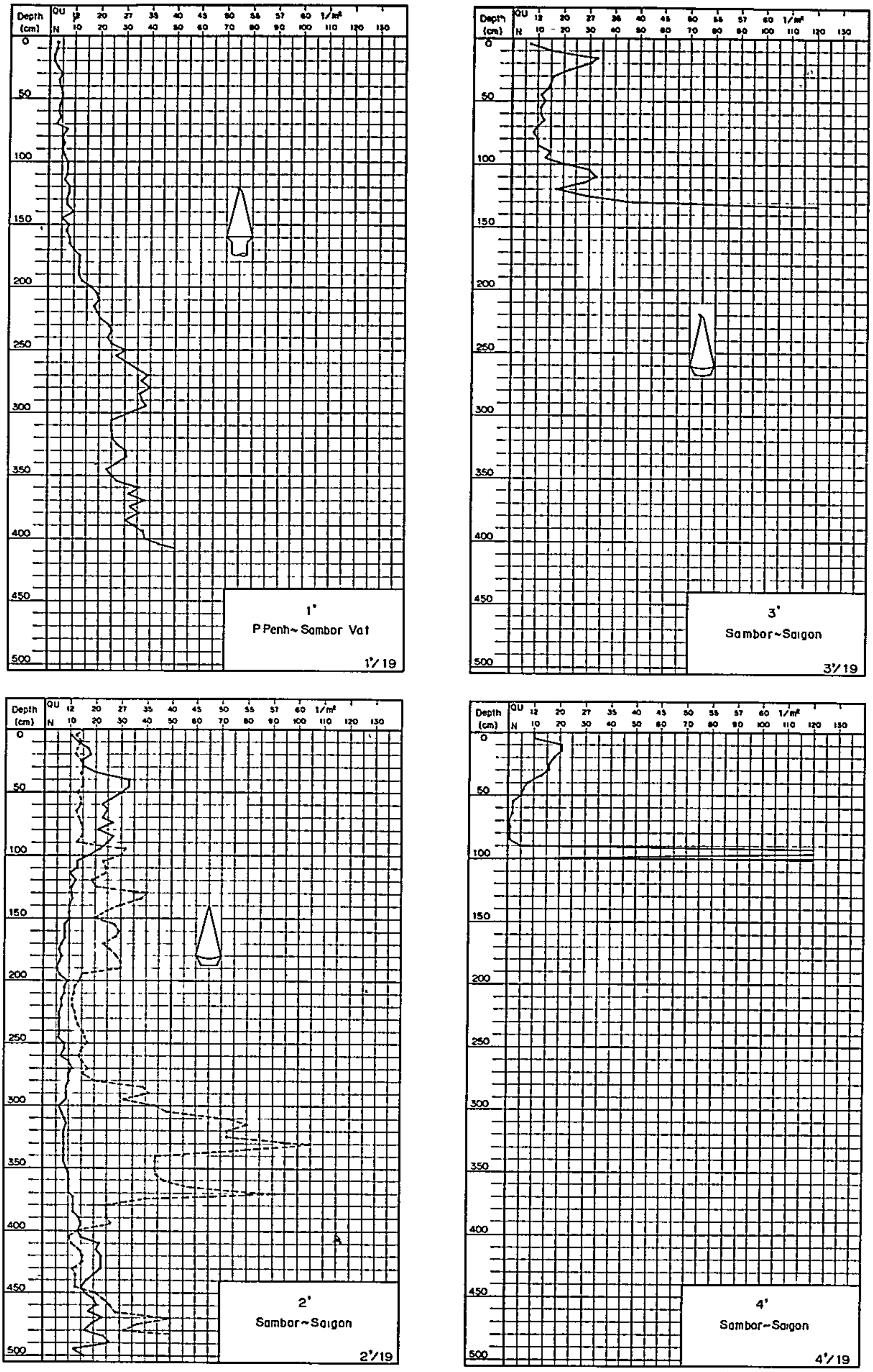
E-2 Results of Simplified Penetration Tests in 1964 Dry Season Survey

Table E-2 Summary Table of N-Value of Simplified Penetration Tests

(Dry Season)

Measuring Point \ Depth (m)	1	2	3	4	5	6	7	8	9	10
1'	7	17	31	38	(4.20 m) 222					
2'	18	9	6	14	16	31	14	44	14	(9.95 m) 243
3'	20	(1.45 m) 550								
4'	10	(1.05 m) 492								
5'	15	(1.55 m) 462								
6'	5	9	(2.30 m) 116							
7'	12	9	24	13	47	(5.30 m) 73				
8'	4	6	21	39	(4.90 m) 200					
9'	60	(1.60 m) 270								
10'	17	7	8	24	46	217				
11'	271	9	30	18	(4.85 m) 220					
12'	600									
13'	7	6	11	15	18	17	16	24	31	(9.80 m) 31
14'	4	8	24	(3.25 m) 181						
15'	4	8	10	6	9	12	17	20	18	(9.50 m) 27
16'	11	12	16	24	120	(5.05 m) 258				
17'	5	5	14	27	88	(5.70 m) 287				
18'	6	10	16	17	27	17	20	74	(8.25 m) 157	
19'	23	22	9	13	56	(5.15 m) 170				

Fig. E-2 Results of Simplified Penetration Tests (Dry Season)



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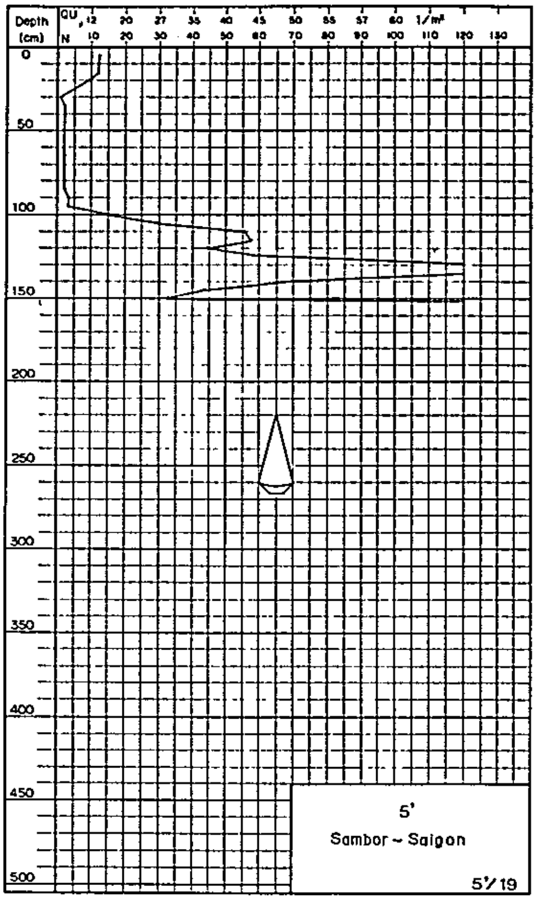

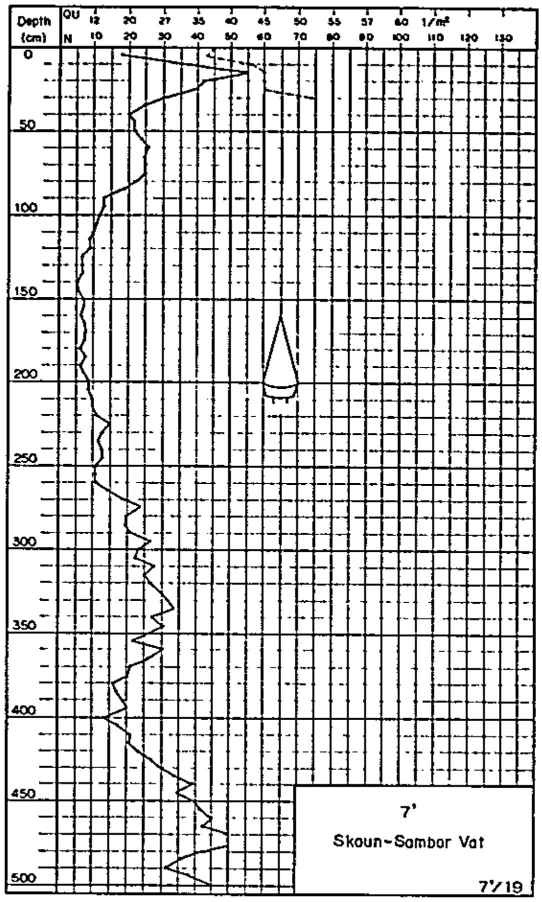

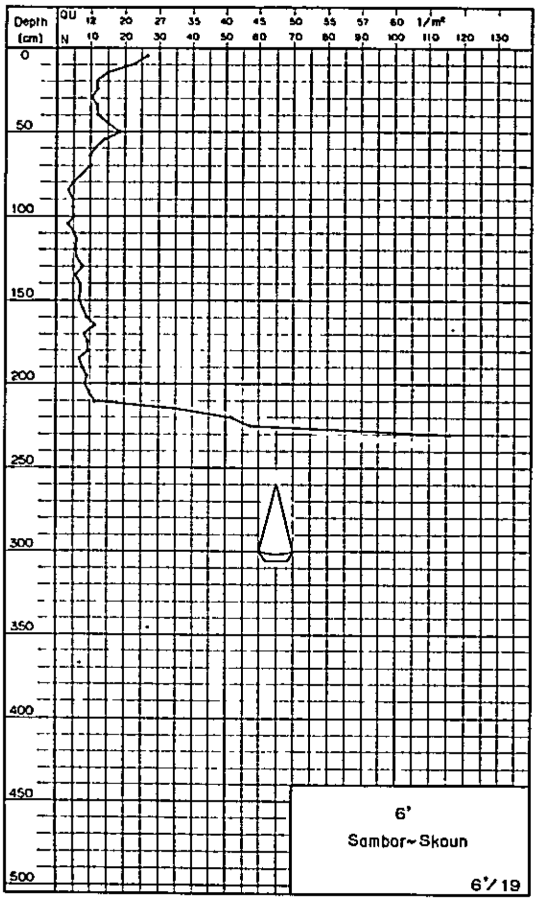

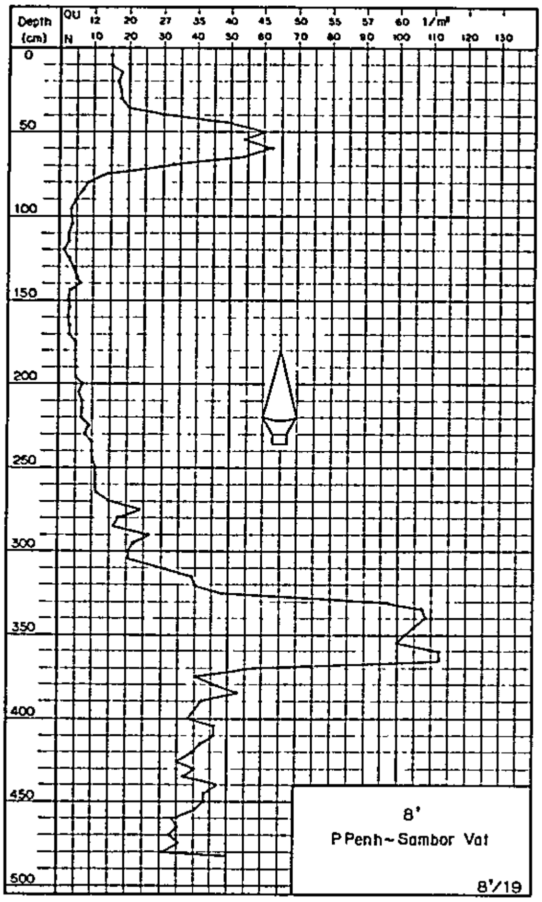

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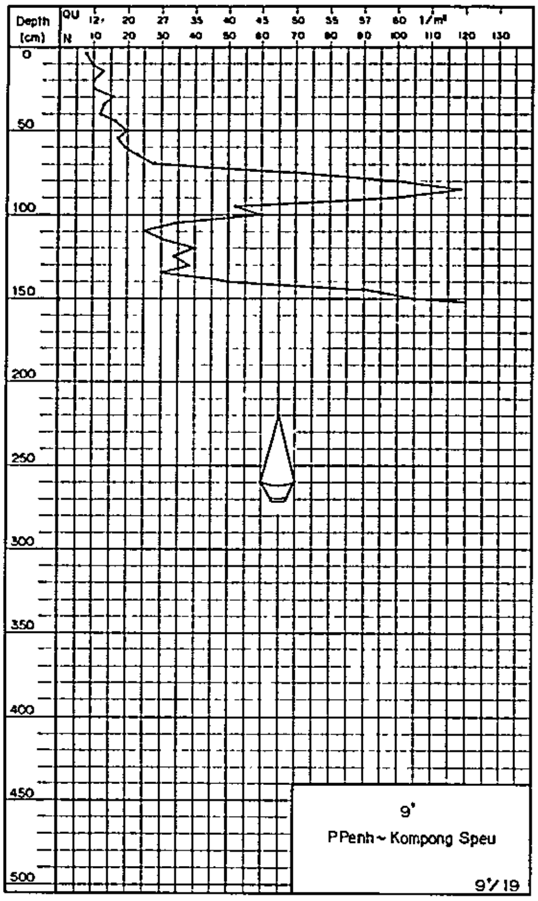

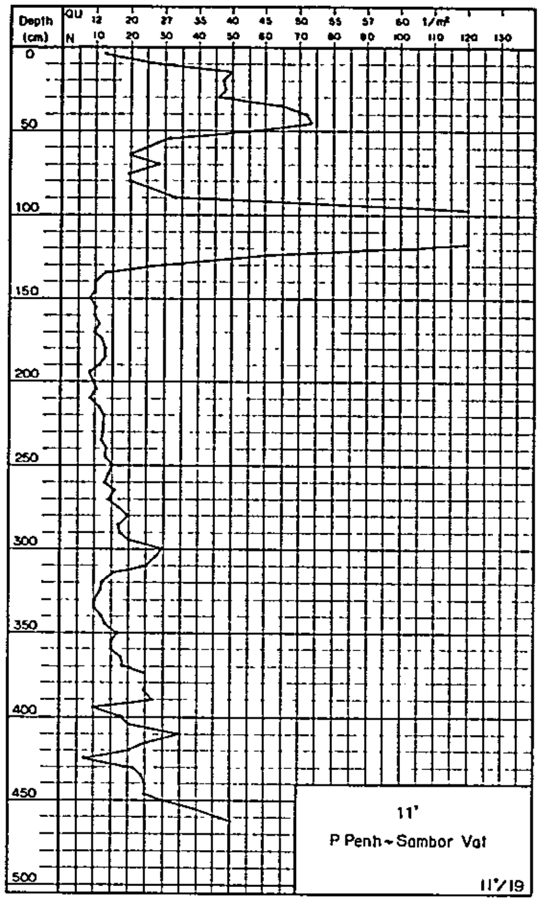

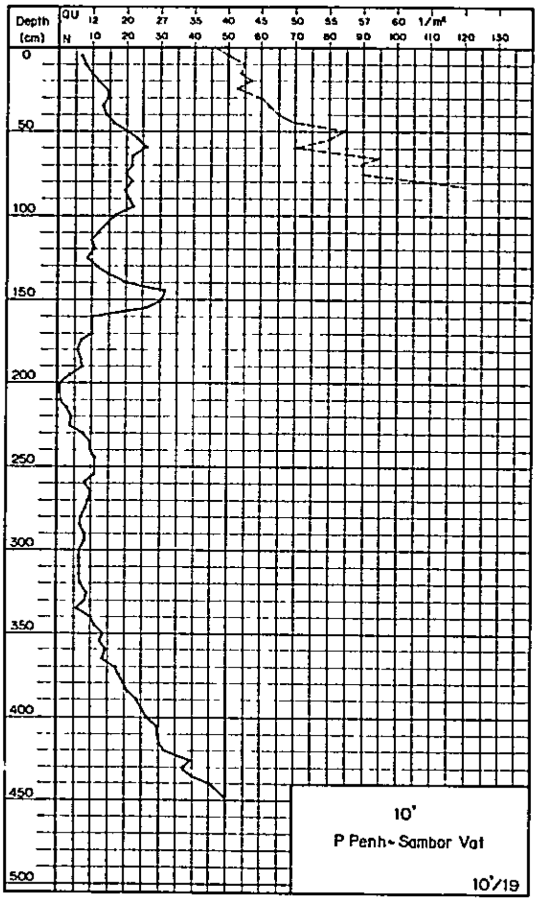

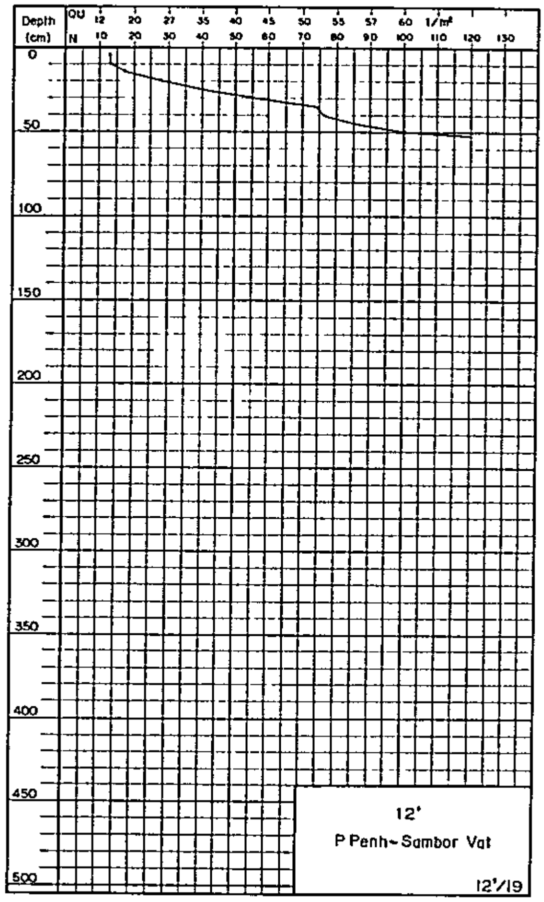

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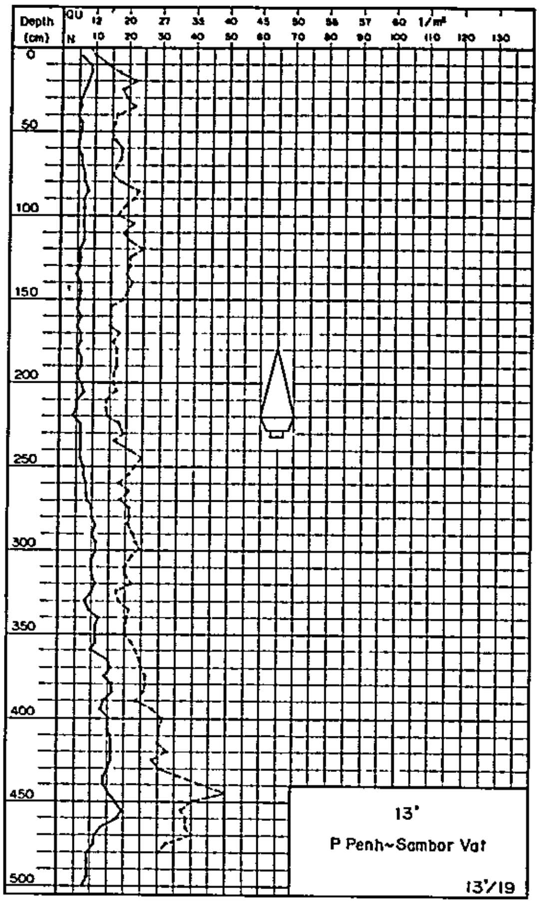

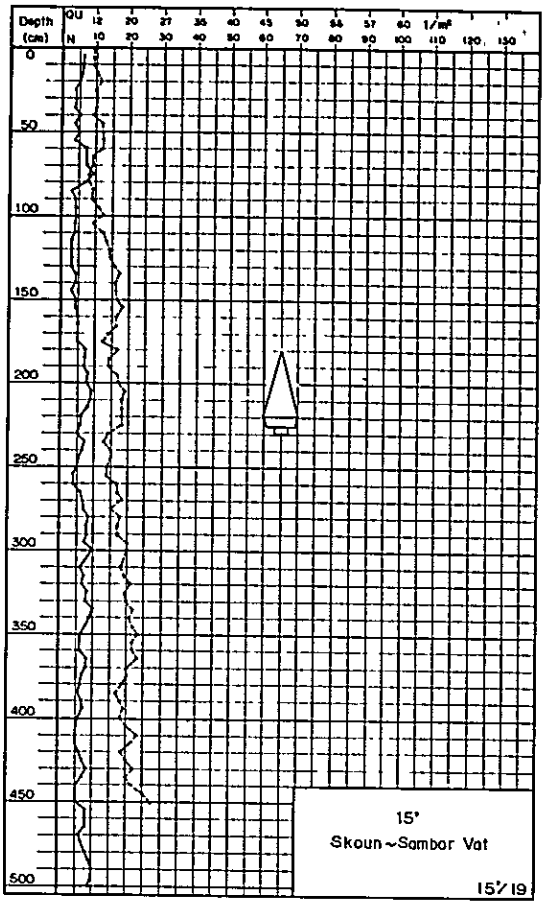

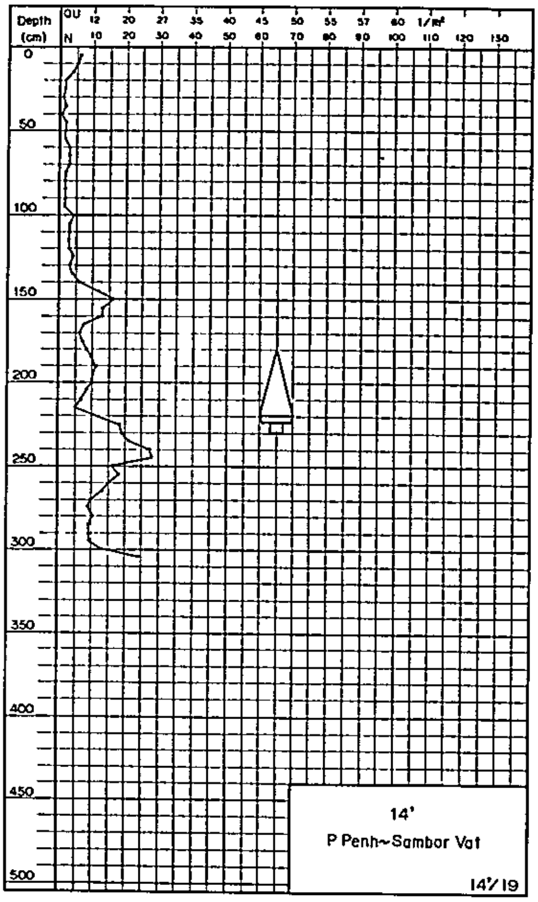

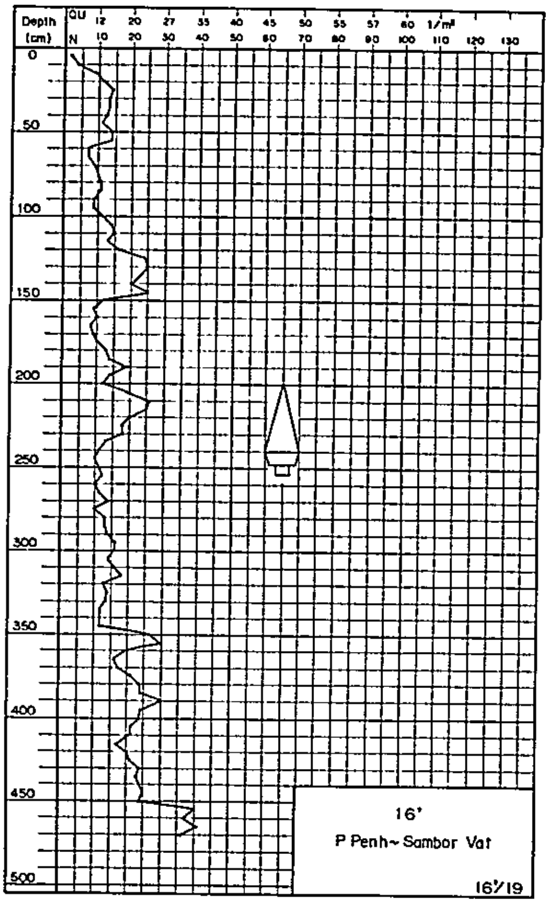

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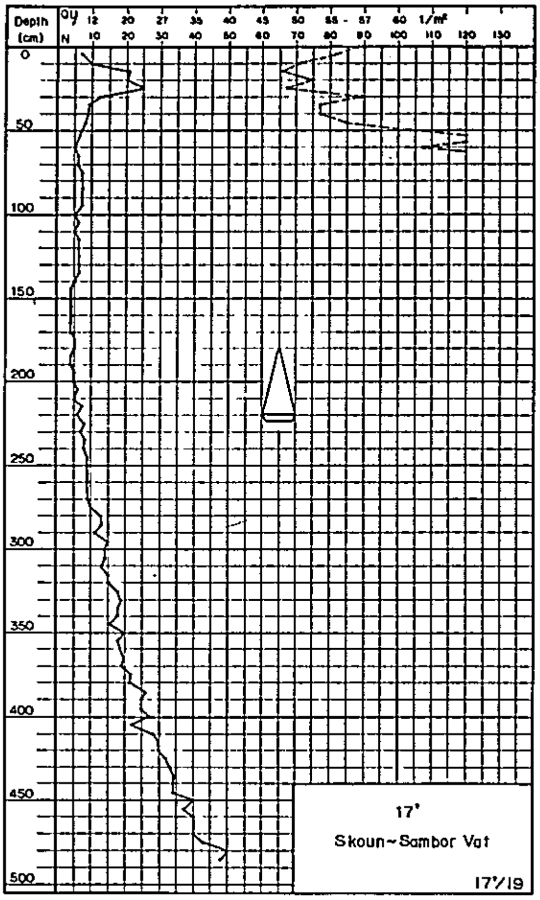
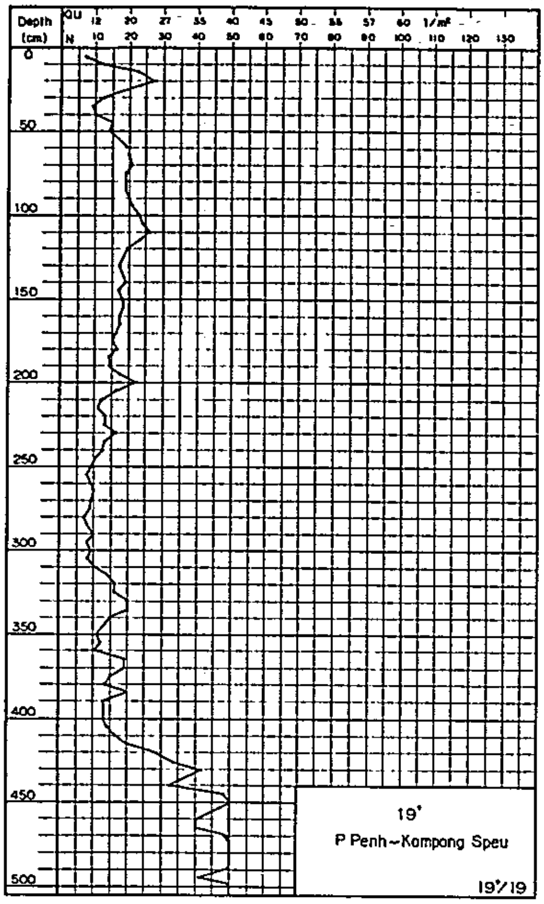
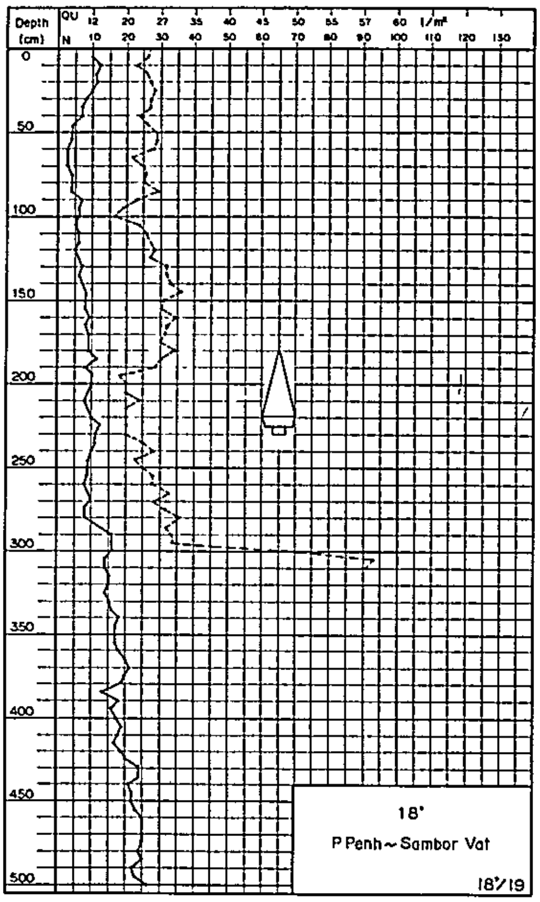
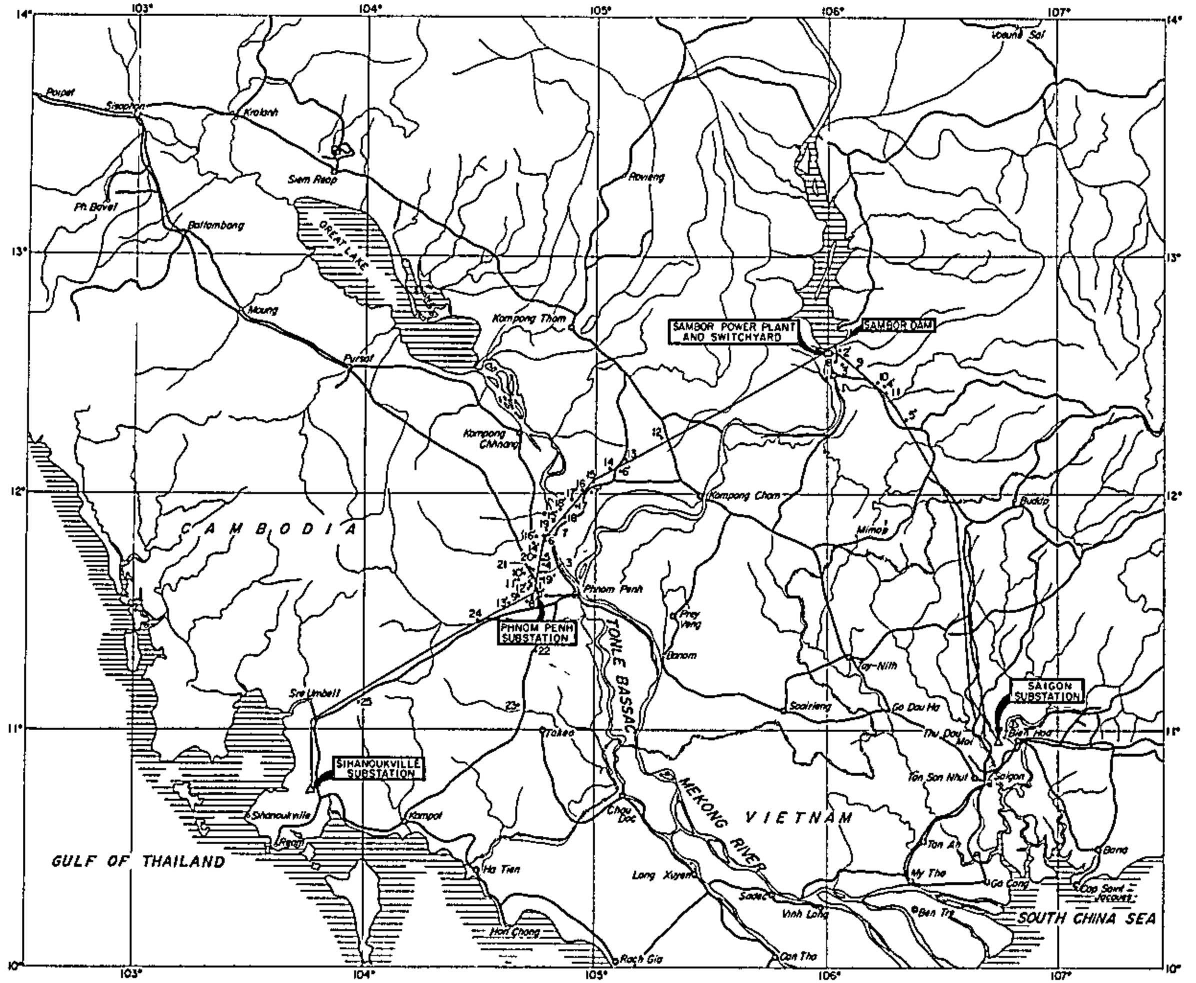

Depth
(cm)
QU
N
17°
Skoun ~ Sambor Vat
17°/19


Depth
(cm)
QU
N
19°
P Penh ~ Kompong Speu
19°/19


Depth
(cm)
QU
N
18°
P Penh ~ Sambor Vat
18°/19



ELECTRIC POWER DEVELOPMENT CO. | OVERSEAS TECHNICAL COOPERATION AGENCY TOKYO JAPAN

SAMBOR PROJECT

Location of Penetration Test

NO. FIG E-3

SHEET NO. 1 of 1

E-3 Major Communications Line Systems in Cambodia

1.	P. Penh – Kg. Speu – S. Ville	1 circuit	Transmission over Bare wire
2.	P. Penh – Kampot – S. Ville	2 circuits	
3.	P. Penh – Skoun – Kratie	4 circuits	
4.	Kg. Cham – Mimot – Kratie	1 circuit	voice only
5.	Skoun – Kg. Thom	2 circuits	voice only
6.	Kg. Thom – S. Reap	2 circuits	voice only
7.	P. Dahm – Kg. Chnnang	3 circuits	voice only
8.	Kg. Chnnang – Pursat	3 circuits	voice only
9.	Pursat – B. Bang	3 circuits	voice only
10.	B. Bang – Sisephon	2 circuits	voice only

Note: All routes shown above are along the roadways

Source: Telecommunication Bureau, Ministry of Industry, Royal Government of Cambodia.