2.8. Balance of Water Availability and Demand

The existing and proposed yields from surface water and groundwater are listed in Table A.II-43. As previously discussed, firm yield from surface waters of stream was estimated on the basis of the actual achievement of water production under the assumption that the lowest value observed in the past five years would correspond to the safe yield of order to 5-year return period. Firm yields from the storage reservoirs have been evaluated in detail through water balance computations. Production of groundwater was estimated from the individual well data and possible developments in future, and the safe yield was obtained multiplying average production by 80% taking into account the reduction of production during dry summer period.

The water demand is defined as the quantity of water to be supplied and consists of water consumption and losses. For both Islamabad and Rawalpindi, water demands have already been computed on the basis of unit water consumption, service population and estimated rate of leakage and wastage. Thus, mass water balance of average per day production and demand was studied as presented in Table A.II-44.

Taking into account the phasing plans of water resources development, which are discussed in detail in 4.3 of the main text, firm yields and demands by year are compared as shown in Figures A.II-27 and A.II-28 for Islamabad and Rawalpindi, respectively.

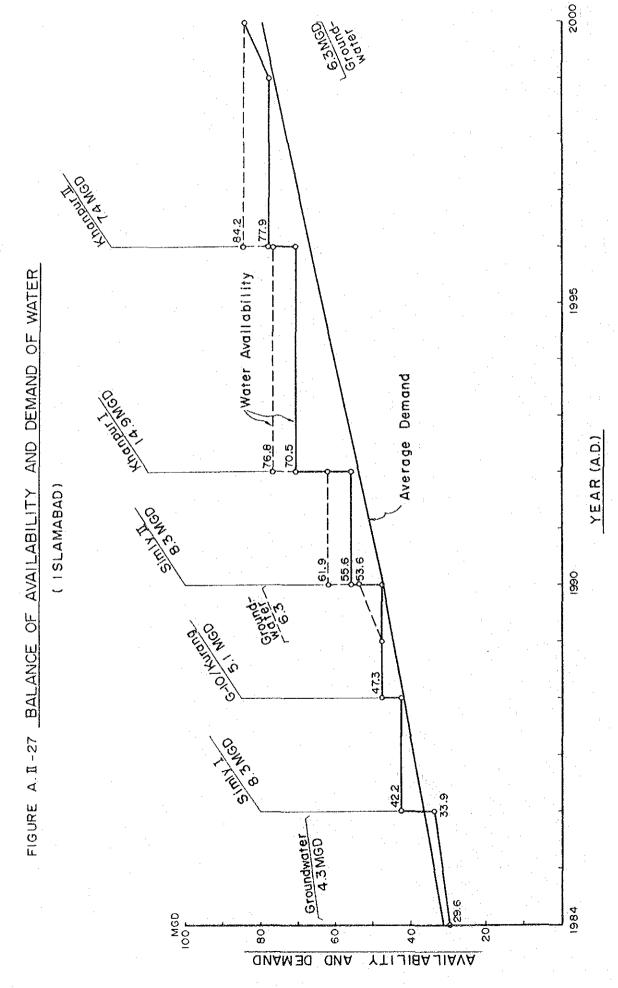
FIGURE A.II-26

AVAILABILITY OF RESERVOIR WATER : AFTER TREATED, IN A DRY YEAR WITH 5-YEAR PROBABILITY

(I) KHANPUR Safe Yield in 5-Year Losses Dry Year (MGD) Remarks Khanpur (33.0+69.37)x75%=76.8MGD Reservoir 76.8 (96.0) 76.8x125%(Peak)=96.0 Conveyance 73.0 (91.2) 5% Treatment 69.3 (86.6) 5% Plant 69.3 (86.6) Water Available f Islamabad 22.3 (27.9) Rawalpindi 47.0 (58.7) (2) SIMLY (Peak) 24.0MGDx160%=38.4MGD Simly 30.7 (38.4) 38.4/1.25=30.7 (Average) Reservoir Treatment 29.2 (36.5) 5% Conveyance 28.6 (35.8) Plant 2% 28.6 (35.8) + For Islamabad (3) RAWAL (Peak) Rawal 28.0x180%=50.4MGD Reservoir 40.3 (50.4) 50.4/1.25=40.3 (Average) Treatment 38.3 (47.9) 5% Plant 38.3 (47.9)

A.II-103

→ For Rawalpindi



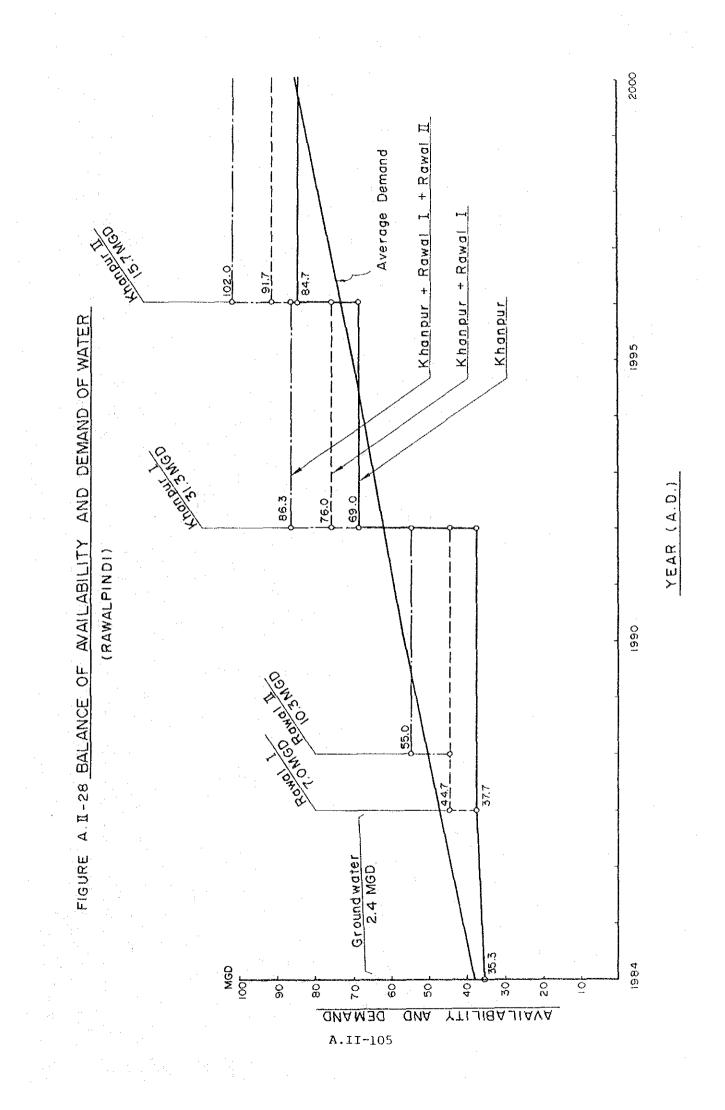


TABLE A.I-43

EXISTING AND PROPOSED YIELD OF WATER (Average per day)

Water Source	Present $\frac{2}{2}$	2000 A.D	Remarks
		·····	
Islamabad		·	
Shahdara H.W-	1.4	1.4	
Nurpur H.W	0.5	0.5	
Saidpur H.W	0,6	0.6	
Golf Course (Old)	2.1	2.1	
- do ~ (New)	1.7	1.7	
G-10 H.W	1.9	3.8	by the end of 1986
Kurang H.W.	-	3.2	by the end of 1986
Tube Wells in National			
Park Area	6.4	10.4	
Tube Wells in Sectoral Area	3.0	9,0	
Sub-total	17.6	32.7	
Rawalpindi	· · ·	· · ·	
Sohan Camp T.W ^{5/}	2.8	2.8	
	· ·	:	
PHED T.W	3.6	3.6	
RMC T.W	4.8	4.8	
CB T.W	2.0	4.4	in a few years
MES (Army) T.W	0.6	0.6	
MES (PAF T.W	0.5	0.5	
Sub-total	14.3	16.7	
Total	30.7	50.0	

Notes:

Unit in MGD. 1/

- 2/ As of July, 1984.
- $\frac{\overline{3}}{\overline{4}}$ Production of water from storage dams are excluded.

A.II-106

H.W.: Head works

T.W.: Tube wells

6/ Firm yield from surface water is estimated based on the actual achievement of water production, taking the lowest value observed in the past 5 years.

Firm yield from groundwater is taken as 80% of average 7/ production, taking into account the reduction of production in dry summer period.

BALANCE OF AVAILABILITY AND DEMAND OF URBAN WATER

TABLE A.II-44

year)

			(I I)	(In 5-year dry year
Water Source	Islamabad Present (1984) 2	1bad 2000 A.D.	Rawal Present (1984)	Rawalpindi 4) 2000 A.D.
Surface Water	(WGD)	(MGD)	(MGD)	(WGD)
Khanpur	1	22.3	ł	47.0
Simly Rawal	12.0	28.6	21.0	38, 3 38, 3
Streams	8.2	13 ° S	1.	t
Sub-tota1	20.2	64.3	21.0	85.3
Groung Water				
Sectoral Area	3.0	0.6	ł	ł
National Park Area PHED, RMC and MES	6.4	10.4	14.3	16.7
Sub-total	9.4	19.4	14.3	16.7
Total	29.6	83.7	35.3	102.0
Demand				
Up to Sector 10 Sector 11 - 15		54.3 25.4		
Total		79.7		84.6
Surplus		4.0		15.2

A.II-107

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(Discharge in 1,000 Gallon)

	Remarks			·			Turbine damaged.		Turbine damaged.	Not installed.								. '			•		
	Max 1mm 4/		430	600	600	946	ŧ,	946	ì	ı	ly 84			·.	864	540	946	540	946		540		360
scharge	ent Measured		F	ì	r	1		£.,	1	1	the last week of July 84	the years.	tve years.	six months	t.	ŀ		i I	1. 1	two months.	· • *		t
Daily Discharge	Fresent Estimated 2/ Me.		440	161	450	546	•	843	. 1	ī	nce the last or.	r the last f	r the last five years	r more than or.	638	(388)	867	470	470	the last	(388)	due to low discharge.	(257)
	Designed 2/	·	440	550	500	867	ı	867	I.	1	Operation since fault in motor.	in Operation for the last five years.	Operation for	in Operation for more than six months to fault in motor.	756	495	867	450	788	Not in operation for	495		330
Daily	Pumping Time (hr)		22	22	50	22	ı	22	i	ł	Not in C due to f	Not in C	Not in C	Not in C due to f	21	22	22	50	50	Not in c	22	Abandoned	22
	ent Measured		4	ş	8	s	\$	ı	ı	1	t	(t :	I	ı	1	ł	1	I	* . * 1	1	1	I
Hourly Discharge	Present Estimated Me		20	8.7	22.5	24.8	E	38.3	10.9	•	37.0	ŀ	9. 1	6. 9	30.4	(17.6)7/	39.4	23.5	23.5	23.5	(17.6) 7/		(11.7)
нон	Designed		18-20	25	25	39.4	۰.	39.4	22.5	·	39.4	. 1	1	22.5	36	22.5	39.4	22.5	39.4	22.5	22.5	· · · ·	15
:	Year Completed		1971	÷	Ŧ	÷	z	z	= .	ı	1971	• =		.	•	1	-	1977		116T	1977	1980	±
	Agency ame		rea TW l	્લ	ິຕ	4	ۍ ۱	ŵ	٢	Ø		D I	TT.	73	13	14	1.5	16	17	18	61	3 0	21
•	Operating Agency and Well Name	CDA 1/	National Park Area TW	ч со г	- do -	i do i	- do	1 00 1	1 1 1	1 00 1	ן 20 1	۱ نې ۲	ן גיס גיס	- go -	r do r	1 1 1	- do -	- do -	1 00 1	। ପୃତ୍ତ ।	r do r	1 001 1	г со г
	92 12		۲	2.	, m	् ष	ν.	e.	. 7	œ	6	10.	-77	13.	13.	14	1'S	16.	17.	18.	19.	20.	51.

TABLE A. I-45 DISCHARGE FROM TUBE WELLS

A.II-108

Contd.-

	(Discharge in 1,000 Gallon)	· · ·	Remarks		Site amended.				Not in operation.					·					Abandoned due to choke	· .	Not located in Sectoral Area.			
	(Discha	•	Maximum 4/			703		384	٢	600	9,995 = 10.0MGD	271	271	811	1,353 = 1.3MGD	540	271	406	ł	1,217 = 1.2MGD	360	504	163	·
			t Measured		·	ı		ł	ŧ	١	· .	3	\$	١		,	ş.	1	١	·	١	F .	\$.	
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Presen Estimated 3/		1	627	ow discharge.	249	•	256	7,080 = 7.1MGD = 6.5MGD <u>5/</u>	(158)	(158)	(521)	837 ≭ 0.8MGD	(347)	(158)	(237)		742 = 0,7MGD	136	260	ອ	
VELLS	• • •		Designed ^{2/}		ŧ	645	Abandoned due to low discharge	352	t	525	8,927 = 8,9MGD	226	226	744	1,196 ≂ 1.2MGD	495	226	338	1	1,059 • 1,1MGD	180	420	14	
DISCHARGE FROM TUBE WELLS			Pumping Time (hr)		1	22	Atando	22	ŧ	21	av.21.5	20	50	22	av.207	22	50	20	ł	av.20.7	12	20	ы	
ISCHARGE	·		nt Measured	•	1	1		T .	ŀ	1		ı	ı	i		ı	1	ı	F		ı	ı	ı	
А.П-45	• * • • • •		nourly piscuarge Present gned Estimated Me		\$	28.5	- F	11 3	. 1	12,2) <u>11</u> / ^{av.22.7<u>10/</u> (78%)}	(7.9) <u>8</u> /	(7.9) <u>8</u> /	(23.7) 8/	- (104)	(15.8) 8/	(7.9) <u>8</u> /	(11.8) 3/	ŀ	(20%)	C.11	13	4,4	
TABLE		2	Designed		1	29.3	, T	16	I	25	av.29.0 (av.27.5) <u>11</u> (100%)	11.3	11.3	33,8	av.18.8 (100%)	22.5	£.11	26.9	ł	av 20 2 (100%)	15	21	6.9	
		•	Year Completed			1980	I .	1971	2	z		1970	F			1970	Ξ	1978	2		1983	196£	1968	
	аны 	· · · · · · · · · · · · · · · · · · ·	Operating Agency and Well Name	CDA 1/ (Contd.)	National Park Area TW 22	1 do 1	1 do 1 24	- do -	Ц-3 , do	нао-	Sub-total (National Park Area)	Golf Course Area No.1	(New) No.2	NQ.3	Sub-total (New Golf Course)	Golf Course Area No.4	(01d) No.5	Na.6	No.7	Sub-total (Old Golf Course)	Gowal Colony	No. 36 F-8	No. 37 G-5/2	
•	•	 -	2		22.	23.	24	25	26.	27		26.	29.	on n	·	31.	32.	33.	34.		35.	36.	37.	

A.II-109

Contd.-

Daily Discharge.	Present ated 3/ Measured Maximum ^{4/} Remarks	96 - 173	86) - 173	218 - 350	273 - 360	in operation due to damage in turbine on first week of Aug. '84.	130 - 317	130 - 350	(249) - 432	12.3.1984.	- Turbine pulled out.	(209) - 360	(1.6) - 360	(190) - 360	Civil work in progress.	88) - 540	260 - 406	132 - 271	electric faults.	(260) - 403	78 - 703	Abandoned due to being filled with debris.	
40 	Designed ^{2/} Estimated	144	(144)	392	315	Not in operation due to the first week of Aug. '	264	292	396	Turbine pulled out since 12.3.1984	ł	330	30	300	Not in operation. Civil	(450)	338	226	Not in operation due to	(336)	135	ed due to being 1	
λητεα	Pumping Time (hr)	20	- -	50	21	Not in the fir	20	20	22	Turbine) 1 1	22	N	20	Not In	<u>ا</u> و	30	20	Not in	/1	ŵ	Abandon	
	sent Measured	i	ı	ı	ł		ı		ł	د. ۱	1	•	I	5	·		•	ł	с 1	1)	ı.	
Hourly Discharge	Present Estimated Me	4.3	4.3	10.9	£1	13	6.5	¢,5	12. (E, II)	(10.6)	(10.7) 3/	(9.5) 2/	(3.5)	(9.5) 3/	(8.2) <u>9</u> /	4.4	13	6.6	8.7	13	13	t	
HOUL	0900109C	7.2	F	14.6	15	16.9	13.2	, б. Д	9 -1	16.9	17	15	ŝŢ	15	13	22.5	16.9I	E.11	17	16.8	22.5		
	Year Completed	1964	5-1961	1980	1978	÷	1980	-	1861	626T	1980	.	=	z	, '	1970	2	÷	1980	•	1976	•	
	Cperating Agency and Well Name CDA 1/ (Contd.)	No. 38 G-7	No. 39 G-7/2	No. 40 G-8/1	No. 41 G-9/3	No. 42 G-9/4	No. 43 Markaz G-9	No. 44 G-9/4	No. 45 H-8	No. 46 H-9/3	No. 47 H-9	No. 48 H-9/1	No. 49 8-9/2	No. 50 1-8/1	No. 51 I-8/2	No. 52 I-9/1	No. 53 I-9/3	No. 54 I-9/4	No. 55 L-9/2	No. 56 I-9/4	No. 57 I-10/1	No. 58 I-10/2	
	2	. 38.	39	40.	÷1.	42.	÷.9.	44.	57 17	46.	47.	00 • •	49.	50.	51.	52.	53.	54.	55.	56,	57.	58.	

Contd. -

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TABLE A. I.-45 DISCHARGE FROM TUBE WELLS

:	(Discharge in 1,000 Gallon)	Remarks															Turbine not yet installed.	Excluding Gowala Colony Weil.	Contd
	(Discha:	Martimum ^{4/}	703	672	396	432	540	540	192		720		271		540	ŋġ	,	11,771 11.8%GD	
		scharge nt Measured	1	ł		ı	1	I	1	filled with debris.	1	nes choked	1	. progress.		ie to burning	I	N .	
		Daily Discharge Present Estimated3/ Measur	56	440	240	308	216	061	(120)		660	Not in operation due to water lines choked	(156)	Civil work in	(312)	Not in operation since 6-8-84 due of motor.	1	5,519 = 5.5MGD = 3.8MGD 5/ = 5.5MGD = 5.5MGD = 5.5MGD * 5	
STIS		Designed ^{2/}	5	560	(330)	396	450	450	160	Abandoned due to being	660	operation du	249	Not in operation.	495	operation si	ı	# 8,821 8,876D 0f	
DISCHARGE FROM TUBE WELLS		Daily Pumping Time(hr)	63	20	- 6	22	20	50	6	Abandon	22	Not 10	22	Not in	22	Not in op of motor.	ł	æv.17.4	
DISCHARGE		Measured	1	J	ı	ŧ	ı	ı	ı	•	1	,	:	ı	J	1	ı		
PABLE A.II-45		Hourly Discharge Present ed Estimated Me.	13	22	12	7 7	10.8	9°5	Q	ł	0	24	(1.1)	ł	(14.2) <u>9</u> /	i	•	av.11.7 <u>11/</u> (av.11.4) (63%)	·
TABI		Hour	29.3	26	16.5	18	22.5	22.5	00	ł	OE.	22	11.3	ı	22.5	22.5	3	av.18.7 (av.18.1) (100%)	
		Year Completed	1979	1981	-		Ŧ	Ŧ	÷	J	1982	0861	1982	r	1981	1982	r		
		Operating Agency and Well Name CDA ^{1/} (Contd.)	No. 60 I-11/2	No. 61 7/3-2	No. 62 G-8/1	No. 63 G-8/4	No. 64 F-8/1	No. 65 F-8/4	No. 66 G-9/3	No. 67 H-8/2	No. 68 H-8/4	No. 69 F-10/3	No. 70 F-9/4	No. 71 I-10/4	No. 72 G-9/1	No. 73 G-10/3	No. G-10/4	Sub-total (Sectoral Area)	
		2	60	61.	62.	63.	64	65.	66.	67 -	68.	69	70.	.11	72.	73	- 46		

Q.

TABLE A. I-45 DISCHARCE FROM TUBE WELLS

(Discharge in 1,000 Gallon)

1204400 00014 NO.	Remarks		Sxperimencally running.	1 0 1 1	For local water supply only.	ч ср г					·								t Area.					
	Max1mum4/		L	t.	. F	e De L		LO. OMGD	er ~1	l.2	11.8								latîonal Park	-				
-	Daily Discharge Present Estimated 3/ Measured		1 1	1	• •	t 1		7.1MGD	0.8	0.7	5.5 (3.8) <u>5</u> /				· . ·				ischarge assumed based on average estimated/designed discharge ratio in National Park Area			chown .		
·	Designed ^{2/}		ŧ -	ι	45			4.0	1.2	1.1	8.8			time.	time.				mated/designe		data to 11.	f which both designed and estimated discharge are known	•.	
:	Daily Pumping Time(hr)		ı	1	4	1								ly punping t	биташта уіг	, support			average esti	12 1	the similar	estimated di		
	ed Measured		ł	•	I.	•						•		lischarge multiplied by daily pumping	discharge multiplied by daily pumping time	ischarge multiplied by 24 hours		. •	ed based on	ed.	63% of designed discharge assumed based on the similar data to	esigned and		
	LELY Disch Estimat		E .	1	,	I			·.					tharge multi	charge mult	harge multi	mount in 1984.		harge assum	ischarge assumed.	harge assum	hich both d	own discharge.	
	Design		00 .	18	11.3	11.3			·		-	•	n by CDA.	\mathbf{T}		hourly disc	pplied amou	assumed.	signed disc	signed disc	signed disc	f data of w	f all known	
	Year Completed)	,	ci 1982	oi.					-	-	Data given by CDA	Designed Hourly	Estimated hourly	Designed hourly d	Really supplied a	20 hours assumed.	78% of designed d	70% of designed d	63% of de	Average of data o	Average of all kn	
	Operating Agency and Well Name	CDA L/ (Contd.)	No. 75 New Golf Course	No. 76 Old Golf Course	Model village Humak Sharki	Model village Humak Kharbi	Total (No.1 ~ No.74)	National Park Area	old Golf Course	New Golf Course	sectoral Area		Notes: 1/	2	्रेल	1	1		17	16	61	707	নি	
	2		75.	76	.77	78.												÷		·	1			

Contd. -

(Discharge in 1,000 Gallon)

TABLE A. IT-45 DISCHARGE FROM TUBE WELLS

Remarks

Operating Agency and Well Name	/ Year Completed	Hour	Hourly Discharge Prese	rge resent d Measured	Daily Pumping Time(hr)	Designed	Daily D.	Daily Discharge Present	2
						DETIFICED	#S CTURICED	Measured	Maximum-
•	1975-77	22.5 -28.1	л - - -	June 84	22		3,500	June '84	4,000
		:	····.	-			2,500 = 3.5MGD	- - -	4,000 = 4.0MGD
TW No.1 (Ashgar Mall)	1983	33.8	1	<i>[</i>]		рел Т		ı	811
(Dhok Khakka)	-	11.3	ı	t			÷		172
3 (Dhok Ratta)	*	16.9	1			1		I	406
4 (Dhok Kala Khan)	an) "	28.1	.	1				t	- 20 674
5 (D-Block, S/Town)	чт) (тмо	28.1	1			1		1	676
6 (A.Block, S/Town)	" (uwo	22.5	ı		16~ (20)	1	4,500	1	240
7 (R.M.C. Store)	"	16.9	1			·		1	406 406
8 (B.Block, S/Town)	" (uwc	33.8	1					ŀ	118
9 (Pindora, Saidpur R)	ipur R) "	22.5	ł					'	
10 (Mohin Pura)	1.984	16.9	ŗ			1			
ll (Pir Vadhí)	:	22.5	ı	ر ب					
		av.20.5					4,500 ≡ 4.5MGD	R	6.079 6.1MGD
							8,000 8,000	н	9,679 9.7MGD

A.II-113

Discharge for 24 hours running by designed capacity.

Data given by PHED.

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Notes:

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Contrd. -

(Discharge in 1,000 Gallon)

TABLE A. II-45 DISCHARGE FROM TUBE WELLS

	Remarks		• .			•	•	•					÷.							• .				
								÷		۰.												:		
· .	Max1mum-4/		336	336	288	(218)	(408)	(218)	(108)	(163)	144	120	(245)	(137)	(163)	(192)	(108)	(15)	(137)	(218)	120	9 6	408	144
scharge	ent. Measured	June 184	ı	1	ı,		I	ı	42	т	1	ı	41	·	e	•	•	t ·	22	26	1	19	I .	1 .
Daily Di	Fresent Estimated Measur		300	300	240	160	300	64	32	48	32	42	108	60	06	105	60	12	60	64	32	25	144	. 4
	Designed		280	280	240	(182)	(340)	(23)	(36)	(54)	4 8	60	(122)	(68)	(102)	(120)	(68)	(T4)	(68)	(23)	40	32	204	6
Daily	Pumping Time (hr)		202/	20	30	50	50	œ	00	œ	ວງ	12	12	12	15	S I	st	Ð	12	Ø	Ø	80	12	ω
	ent Measured	June '84	/i -	3	1	Ŧ.	•	I	5.2	•	35.5(?)	ł	3.4		0.2	•	1	ł	00 r-1	е. г	49,6(?)	2.4	ен В 3,	9,0
/ Dìscharge	Present Led Estimated Mea		15 3/	ង	12	a	15	an '	4	ŵ	4	3.5	თ	'n	s S	7	V	2°7	ŵ	œ	4	4	L2	5
Hourly	Designed		141/	14	12	(1.9.)	(17)	(1.9)	(4.5)	(6.8)	¢	ι Ω	(10.2)	(5.7)	(5,8)	(8)	(4.5)	(-1.7)	(5.7)	(7.6)	<u>ю</u>	4	(11)	۰ ۵
	Year Completed		1926	÷	=	1961	2978	1971	1978	1982	1968	1955	1956	1970	1958	1960	161	1972	1978	1975	1977	1978	1968	2.
	Operacing Agency and Well Name	R. M. C.	A.R.P. Plant (H/W/W)	- qo -	1 1 1	Hailey W/works	Percolation Well(H/W/W)	New Kacarlan	New Katarian Market	F-Block	Dhok Des Raj	7th Road	6th Road	D-Block	Children Park	Commercial Centre	Fire Brigade S/Town	Fire Brigade B-Block	Afandi Colony	Asghar Mall Scheme	Saidpur Scheme No.1	1 đo 1 2	Dhok Hukamdad	Millat Colony
	Ŷ		ч. Т	.,	ň	Ţ,	ŝ	ġ.	, r.	ы. В	, 61	10.	.11	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.

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		TABI	TABLE A.H-45	DISCHARGE	DISCHARGE FROM TUBE WELLS	STIB			(Disch	(Discharce in 1.000 Gallon)
			Hours I. Di schadza				Gradas (ofter	Girve de	UDST ()	DTT29 DDD'T WT SDIE
Operating Agency and Well Name	Year Completed	Designed	Estimated	Present ed Measured	Pumping Time(hr)	$\frac{2}{2}$	Estimated 3/	Sent	Maximum 4/	Remarks
					: • .					
	1972	ហ	00	One of	80	40	64	ı	120	
	0861	(T'6)	80	3.2	'n	(23)	64	36	(218)	
	1968	2	с у	1	22	154	132	ı	168	
	1977	σ		3.2	22	198.	132	70	216	
	1978	œ	ę	t	10	80	60	ı	192	·
	1976	œ	Q	1.1	μ2	96 5	72	13	192	
	161	4	3.5	3.4	22	88	77	75	96	
Liagat Bagh No.1	1954	18	15 LS	t; ; ;	TO	091-	150	1	432	
No.2	1956	4	m	three × -	10	40	OC .	5 .	96	
No.3	1983	(11)	27	n •	01 1	(310)	270	ŀ	(744)	
	1968	4.5	V	3,5	22	6 1 6	88	11	108	
Dhok Ratta School	÷	1.7	-1	ı	w	10	w	1	41	
	1982	(1.9.)	œ	2.3	12	(601)	96	28	(812)	
	1983	(1.6)	æ	. 1	e t	(164)	144	1	(218)	
	1981	(1.6)	Q	١	20	(182)	120	1 1	(218)	
G.Bus Stand No.2	1983	(1.6)	ω	ł	12	(601)	10 05	F	(218)	
		av.8.0 (100%)	av.7.0 5/ (av.7.5) <u>7/</u> (88%)		av.13.2	4,484 = 4.4MGD	3,926 * 3.9MGD * 6.0MGD 5/		7,842 ≈ 7.8MGD	
Alala	Data from WAPDA Report (1982). Figures in Data from R.M.C. Hourly discharge by R.M.C. Data from D H F D	WAPDA Report () R.M.C. Hourly o B H F D	1982). Figu Lischarge by	Figures in parenthesis estimated. ge by R.M.C. seems to be 70-90% of	nthesis est ms to be 70		the designed capacity.	city.		
मेर्च किस्ति	Designed discharge for 24 running. Designed discharge for 24 running. Data given by PHED. Difference between figuros by RMC and by PHED may be different estimation of daily pumping time. Average of data of which both designed and estimated discharge are known.	PHED DIFI PHED DIFI IMACION OF CA Which	or 24 running. Difference between fig of daily pumping time.	<pre>xr 24 running. Difference between figuras by RWC and by of daily pumping time. itch both designed and estimated discharge</pre>	by RMC and mæted disch	i by PHED ma Jarge are kn	PMED may be caused by a are known.	• • •	·	
-1	Average of al	L Known clist	charge.		÷					Contd

A.II-115

1,000 Gallon)	Remarks											·		-		
(Discharge in 1,000 Galion)	Maximmi 2/	0 4 8 0 4	540	Ite	540	271	540	540	3,782 = 3.8MGD			. •				
	reo .			2,5001/					2,500 3 = 2,5MGD =		700-1/	700 = 0.7MGD	/TOOT	1004	= 0.7MGD	•
	Daily Discharge Present Estimated Measu		•					·.					,			
۰.	Designed	450	450	676	450	226	450	338	3,040 = 3.0MGD				:			
•••	Daily 1/ Pumping Time(hr)	C N	20	20	20	50	20	15	av.19.3			-				
	scharge Present lated Measured					÷		:	·			5. 				
	Hourly Discharge Designed ¹ Estimated	s 66	22.5	33.8	22.5	11.3	22.5	22.5	av.22.5							m
	Year 1/ Completed	2 2 2 2	696T	1961	1970	1980	1961	1984	·						:	Data given by C.B.
	Operating Agency and Well Name	C.B. No. T. Carol Vandi			r do r	v Children Park	Shiham Village	Jhanda Chichi	Total	M.E.S. (ARMY) 3/	3 TW.	Total	M.E.S. (PAF) 3/	3 TW.	Total	Notes: 1/ Da
	Q	-		ŗ.	4	ŝ	ę.	4			1-3		••••	1-3		

DISCHARGE FROM TUBE WELLS

TABLE A. II-45

A.II-116

Designed discharge for 24 hours pumping. તે જે

Detailed data not given because of military ristriction.

	Slit Wicth (in.)	· · · · · · · · · · · · · · · · · · ·	i i,	1 5	T-T	I	1	1	1)	ł	1	I.	F.	ı	9	ł	ı	ł	I	1
	Material	Brass	 0 0 0 0 1 1	1 1 1 1 1 1 1 1 1	II OP FI	1	Brass	, do ,	i i co co co co co co co co co co co co co		- qo -		1 1 2 0 7 0 1 1	н фо	I do I	I op i	। पूर्व ।	ı	Brass	। ०२ ।
	(Screen) Type	Vertically Slotted	1 1 0 0 1 1	1 1 40 1 1	1 1 0 0 1 1		Vertically Slotted	1 0 0 1			1 00 1		ч ф с о	- op -	1 0 1	i D'	- ср -	₹	Vertically Slotted	1 00 1
3	Strainer Upper most Depth (ft.)	1	90 138	114 62	113	1	142	150	142	164	86	132	102	130	129	71	117	t, .	ເ ນ ໝີ່.	147
DIMENSIONS OF WELLS (1)	Total Length (ft.)	73	80 76	76 124	60 60	ţ. ·	0.4	72	96 5	57 61	64	72	9 Q 7 2	72	40	36	44	•	80	44
SNOISNEW	Dia- meter (in.)	Ø	<i>co</i> co	co co	00 00		හ	6 2	00 O	0 CG	30	60 (oo a	a	œ	8	00	: •	8,10	en L
	Wall Thick- ness (in.)	•	1 1	E . 1	• •		ł	ł	I	1 1	١	ı	11	ł	•	1	,	,	ı	1
тавие А.н46	Top Casing Length (ft.)	102	92 98	90 63	. 99 100 5	ŀ	5.96	66	116	101	88	100	103	100	108	111	116	i	131	122
TABLE	Dia- Meter (in.)	12	9 9	10 10	01 01	1 ¥.	10	10.	0.0	3 3	10	01	9 1	10	10	10	10	1	10	12
	Depth (ft.)	671 9	200 228	204 231	214 228))	208	250	250	1/4 256	168	234	273 250	207	271	249	229	ı	204	270
	Year Completed	161	z . 2	£ =		Not installed	161	T	• •	-	2	-	- 16T	1,971	1977	0861	1980	Site amended	0861	Abandoned
· .		-1 	n4 m	-4 VI	~ ~	- 70	a	10	71 3	7 61	14	<u>ज</u>	14	18	19	20	21	22	C2	4
	Operating Agency and Well Name	<u>CDA</u> National Park Area TW	1 1 9 9 1 1 1 1	ן ו ס ס ח מ ו ו ו	1 1 0 C 1 1	1 1 1 1	י סיט ו	- do -	d d d	1 1 0 0 1 1	- qo -	- do -	1 1 0 0 1 1	t do t	- do -	- do -	1 OD 1	i do i	- 00 -	- do -
· · · ·	[8	<u>े</u> न	э. с	4 5	9 -		Ф	0	. 11	13.	14.	15	12.	18.	.eı	20.	21.	22.	23.	24

Contd. -

TABLE A. I-46 DIMENSIONS OF WELLS (1)

																											·		
																							· .						
	Siit Width (in.)		1	ı	ı	١	l	۱.	l.	1	ł	r T	t	٦	I	ı	F	ı	1	'n	r.	1	ı	I	ı	1	٦Ľ,	ı	1
	Materia! Materia!		Brass	- do -	- 90 -	1 90 1	н ор 1	1 00 1	I do I	- qo -	ו סיט ו	ι φο ι	1 00 1	- op -	1 00 I	г do г	1 do 1	I ĜO I	г do г	1 00 1	- 90 -	i do i	- op -	- ço -	1 00 1	1 90 1	- 40 -	1 90 1	n Ö Î
Strainer (Screen)	e Q S		Vertically Slotted	v QQ I	1 0 1	1 0 7 1	۲ OD I	י סט י	i độ I	1 00 1	1 00 1	- 40 -	1 00	1 1		r op i	1 07 1	ι 001	ι ο <u>ρ</u> . γ	1 0 10	1 90 1	1 0 70 1	i op i	1 00	1 00 1	- do -	1 00 1	1 0 19 1	ч ср ч
5 t t a	Upper most Depth (ft.)		•	Ŧ	ı	ı	ı	ł	1	1	1	t	1	E	•	ł.	.	46	1	ı	•	208	F	⊂∎°	173	144	112	130	102
	Total Length (ft.)		1	I.	;	47	22.4	16.6	27.4	16.6	40	76	132	1	5 C	1 :	1	40	12	100	100	99	1	99	76	75	96	53	104
	Dia- meter (in.)		ĩ	1	•	1	•	ţ	ı	ļ	ı	1	t	۲.	1	ı	1	ı	i .	i.	ł	ŀ	'n	•	60	Ø	.00	1	ω
	Wall Thick- ness (in.)		3	I	ı	t	1	I	ŧ	ı	ı	1	ı	1	I	I	1 -	ł	۲.	ч Ц	ł	١	I	ł	3/16	1	3/16	1/8	3/16
Top Casing	Length (ft.)		š .	ı	I	, 1	F	I			ı	1	ł	I	1	ł	ł	I	ł	1	•	1	ı	° 1	125	142	OIT	128	100
τοp	Dia- meter (in.)		i	1	£	ţ	1	ī	ŗ	ı	1	ŧ,	Ľ	ŀ	1	4	, 1	'n	1	•	•	•	ł	1	10	07	10	0	то
	Depth (ft (250	250	250	147.7	115.4	TTT	101.4	111	102	131	265	600	120	•	ı,	148	264	400	285	300	375	270	340	360	390	195	298
	Year Completed		17971	2	÷	1970	E	=	×	=	1978	Abandoned	1983	1966	1968	1964	1964-5	1980	1978	T	1980	E .	1981	1979	1980	:		. =	ı
		1	I-M P	Ц-3	日-3	No.1	N	e	4	ŝ	ę	5					÷				•			:			•		
	Operating Agency and Well Name	(Chard)	vational Park Area W-I	r do r	1 07 1	Golf Course Area No.1	1 00 1	i do i	- do -	1 00 1	- op -	i do i	Gowal Colony	No. 36 F-8	No. 37 G-5/2	No. 38 G-7	No. 39 G-7/2	No. 40 G-8/1	No. 41 C-9/3	No. 42 G-9/4	No. 43 Markaz G-9	No. 44 G-9/4	No. 45 H-8	No. 46 H-9/3	No. 47 H-9	No. 48 E-9/L	No. 49 H-9/2	No. 50 I-8/1	No. 51 I-8/2
	2	2	25.	26.	27.	28.	29.	30.	31,	32,	33.	34. 34.	35.	36.	37.	38,	39.	40.	41.	42.	43.	44.	45,	46.	47,	48,	49.	50.	21,
																					-								

Contd.-

TABLE A. II-46 DIMENSIONS OF WELLS (1)

Slit Width (in.) 1/16 1/16 1/16 1/16 1/16 1/20 1/25 ı ł т ор т i op i Macerial н ор ч 1 00 ы р г - çç -- op ч ф 1 00 1 1 00 1 1 00 1 - da ч ср ч ч сор - op -1 02 7 망 י קסי Srass - 유 Brass 1 Brass 1 Vertically Slotted Vertically Slotted Vertically Slotted Strainer (Screen ı ço ı - op -- 90 -- op -- qo -I dd I - qo -- op -- op -- 00 -- op r op i + op г qo г 1 op -- qq -- dd -1 00 1 ı op -Type ţ ł 101.5 Upper most Depth (ft.) 166 138 54 118 112 165 86 125 1.63 50 70 56 120 85 48 42 Total Length (ft.) 58.6 56 22 100 49 35 132 100 96 80 72 60 80 22 00 35 60 64 48 88 22 00 70 Dia-meter (in.) 2 2 œ 9 â 2 2 10 ness (in.) Thiscki-Top Casing Wall 3/16 3/16 3/16 3/16 3/16 3/16 3/16 3/16 3/16 3/16 ł 1 1 1 Length (ft.) 911 150 L60 136 3118 156 101 120 119 .64 L26 123 Dia-meter (in.) 9 12 10 r0 12 14 2 75 2 12 20 ្អ ្អ ਼ 2 2 2 Depth (ft.) 300 240 148 293 310 233 175 445 300 255 219 163 290 400 202 387 261 259 285 270 272 243 304 Year Completed Abandoned handoned 1970 1976 1979 1982 1980 1980 1961 1982 1982 ÷ 2 1861 ÷ ī No. 75 New Golf Course No. 76 Old Golf Course Operating Agency and Well Name No. 61 G-7/3-2 No. 74 G-10/4 No. 60 I-11/2 No. 69 E-10/3 No. 71 I-10/4 No. 73 G-10/3 No. 57 I-10/1 No. 58 I-10/2 No. 59 I-11/1 No. 63 G-8/4 No. 70 2-9/4 No. 72 G-9/1 No. 65 F-8/4 No. 66 G-9/3 No. 67 H-8/2 No. 68 H-8/4 No. 53 I-9/3 No. 54 I-9/4 No. 55 I-9/2 No. 56 I-9/4 No. 62 G-8/1 No. 64 F-8/1 CDA (Contd.) No. 52 I-9/1 62. 53. 54. 56. 57. 58. 59. 64. 65. 66. -14 72. 73. 74. 67. 69 60. 61. 63 . . 70. 52. 75. 읽 68.

Contd.-

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TABLE A. II-46 DIMENSIONS OF WELLS (1)

NN NN												
				Dia-		Thick-	Dial	Total	upper most	upper Bost	-	Slit
	Operating Agency and Well Name	Year Completed	Depth (£t.)	meter (in.)	Length (ft.)	ness (in.)	meter (in.)	Length (ft.)	Depth (ft.)	Type	Material	Width (in.)
	CDA (Contd.)									· ·		
	Model Village Humak Sharki	1982	ŗ	r	٩	1	•	ł	ł	Vertically Slotted	Brass	I
78.	Model Village Humak Kharbı	-	ł	t	t	ı	ı	ı	ŀ	1 00 1	ו סיף נ	I
	RMC	•										
-	A.R.P. Plant (H/W/W)	1926	'	•	ţ	ì	ı	ł	I .	Vertically Slotted	Brass	1
2.	- do -	=	ı	ı	ţ	ï	ı	ı		1 00 1	1 op 1	ı
ń	1 00 1	2	•	r	ı	ı	ı	i	1	1 00 1	н Оран	:
4	Hailey W/Works	1981	450	12	t	1/4	гo	ł	•	ι οp ι	1 00 1	1/16
s.	Percolation Well (H/W/W)	1978	ı		ı		I.	1	I	Dug Well		1
9	New Katarian	1971		۴.,	ı	ţ	ï	1	1	Vertically Slotted	Brass	•
7.	New Katarian Market	1978		æ	ľ	1/4	Ś	1	ł	ו קס ו	ı op ı	. 1
в	F-Block	1982	450	12	t	3/16	10	ı	140	1 0 1	1 OD I	1/16
.6	Dhok Des Raj	1968	1	φ	ι	1/4	9	ł	1	ן 10 1	- cp -	TV16
10.	7th Road	1955		ì	ı	1	,	r	ı	- qo -	1 00 I	1
11.	6th Road '	1956 j	t	89	ł	1/4	้ง	1	t	1 90 1	۱ op	1/16
12.	D-Block	1970	1	· 1	ι	ı	ı		I	r do r	- op -	ı
13.	Children Fark	1958	i	IO	ł	1/4	Ø		ł	I do I	- do -	1/16
14.	Commercial Centre	1960.	1	ı	·	•	ı	í	,	н ор н	- çç -	I
15.	Fire Brigade S/Town	1971	ı	1	1	•	ı	ł	I	τ Ο Ό Ι	I QD I	1
16.	Fire Brigade B-Block	1972	1	1	1,	1	, 1 - ,	1	ì	н do ł	ι φ ι	1
17.	Afandi Colony	1978	1 1	Ŷ	1	1/4	9	I	ł	I do I	1 00 1	1/16
18	Asghar Mall Scheme	1975	•	10	ı	1/4	60	I	1	I do I	I GO I	91/1
19.	Saidpur Scheme No.1	1977	ı	80 1	ì	1/4	œ.	I	Ë.	н сор г	1 02 1	1/16
20.	+ do - No.2	1978	· •	DT	1	1/4	œ	1	T.	- do	i do i	1/16
21	Dhok Hukamdad	1968	,	10	i ji	1/4	00	·	ł	Гор Г	- do -	1/16

A.11-120

DIMENSIONS OF WELLS (1) TABLE A.II-46

Slit Width (in.) 1/16 1/16 1/16 1 - op -Material г do г - co.-- qo -1 t 1 - qo -ו ניס ו - qo -I do I г do г г бол 3145S Brass - go - do - do çğ I i ĝ р г р г р ч ор ор -Vertically Slotted Strainer (Screen) Vertically Slotted - do -I Go I - ço -- op -၊ တို ၊ 1 00 1 I ĜO I - 90 -1 00 1 ч ор ч н qo н I. י קס ו י קס ו - qo н ор т I đo I - qo -+ 02 + Type • 8 1 р + Upper most Depth (ft.) 200 190 ł 227 177 150 Total Length (ft.) 80.7 112 97 62 92 meter Dia-20 ្អ 2 ¢ Q ្ឋ œ ness (in.) Thick-3/16 3/16 3/16 3/16 3/16 4/1 1/4 47 1/4 Mall 1/4 1/4 1/4 7/4 1/4 1/4 1/4 1/4 Top Casing Length (ft.) 144.3 177 190 200 200 3 1 Dia-meter (in.) 0 3 ្អ 21 27 17 12 12 2 2 q Q 9 2 12 Depth (ft.) 1 348 445 409 354 310 400 450 4 401 519 Year Completed 1975-77 **1983** 1963 1972 1980 1968 1977 1978 1976 1971 1954 1956 1983 1968 1968 1982 1983 1981 1983 2 = z -do- 4 (Dhok Kala Khan) 5 (D-Block, S/Ton) -do- 2 (Dhok Khakka) TW No.1 (Ashgar Mall) 3 (Dhok Ratta) Operating Agency and Well Name C. Bus Stand No.2 Dhok Ratta School Liagat Bagh No.1 - do - No.2 - do - No.3 Sohan Camp TW Ghazni Colony Mahau Pura -do- No.2 Bag Saradaran Sher Pao No.1 Millat Colony Chahchi Park Purana Qilah G. Bus Stand RMC (Contd.) Civil Line New R/Works Dhok Dial 40 P CEHED 1.46 25. 26. 28. 29. 30. 33. 35. , r ۲0. 22. 27. 31. ģ 23. 24. 32. 34. 36. 37. 38. 11. ŵ φ.

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DIMENSIONS OF WELLS (1) TABLE A. I-46

											•								·	
	19.5	SPORT SPORT	(in.)		ł	ł	ı	I	1 -	· F			1/32	1/32	1/32	1/32	1/32	1/32	1/32	
			Material		Brass	- 00 -	I CO I	ו ס ו	1 00 1	і Ор I			Brass	1 40 1	۰ do	1 00 1	ו קס ו	г do г	1 00 1	
Strainer (Screen)	Į.,		Type		Vertically Slotted	1 00 1	- co	- 00 -	i do r	1 0 1			Vertically Slotted	ч do г	- 00 -	1 00 1	1 00 1	- do -	I do I	
Stre	Upper nost	Depth	(ff.,)		193	161	202	170	187	155	÷		. 1 - 14	t	ı	ı	,	,	I	
	Total .	Length	(ft.)		108	128	88.5	148	104	112			Г	÷	1 .	•	1	ŀ	ı	
	Dia-	тетег	(in.)		ng	03	ω	æ	00	8			10	01	10	10	10	10	10	
	Wall Thick-	ness	(in.)	÷	3/16	3/16	3/16	3/16	3/16	3/16			3/16	3/16	3/16	3/16	3/16	3/16	3/16	
		Length	(ft.)		169.5	159.2	160	1.68	169	144			320	220	180	220	194	148	253	
	Dia-	meter	(in.)		12	12	12	77	12	12			16	91	15	16	07	10	50	
		Depth	(ft.)		346 8	448.6	382	328	296.5	357			300	300	260	300	244	228	338	
		Year	Completed		1983	=	Ŧ	-	1984	-			1958	1959	1961	1970	1980	1981	1984	
		Operating Agency		PHED (Contd.)	TW NO.6 (A-BLOCK, S/TOWNO	-do- 7 (RMC Store)	-do- 8 (B-Block S/Town)	-do- 9 (Pindora, Said Pur R.)	-do- 10 (Mohin Pura)	-do- 11 (Pir Vadhi)		81	No. I Gawal Mandi	No.II - do -	No.H - do -	No.IV - do -	No. V Children Park	Shiham Village	Jhanda Chichl	
			201		22.	13.	. r.	15.	16.	. 17.			, 1	N	, m	4	5.	9	7.	

TABLE A. I. - 47 DIMENSIONS OF WELLS (2)

												υ																		
		Remarks										Not installed												·	Site amended		Abandonec .			Contá
U	ty.	cub.m)		280	430	Ĭ	870	ì	970	ř	۱	ı	١	ì	ı	•	÷	r	I	I	1	(062)	1	(560)	. •	290	,	ı	1	0
Specif	Capacity	(1000) (GPD/ft.)		81	-29	ł	ტ ს	1	65	1	1	1	ł	۱	I	ı	1	ŀ	ı	1	t	(53)	i	(38)	,	39	,	ı	ł	
		Date observed	:	6-8-84	8-8-84	ı	6-8-84	4	8-8-84	۲.	•	1	1	5-6-84	4-6-84	8-8-84	7-8-84	6-8-84	7-8-84	7-8-84	ı	8-8-84	2-6-84	8-8-84	3	6-8-84	ł	8-8-84.	I ,	
Water Level		Drawdown (ft.)		26,0	7.3	J	10.16	t	14.16	, 1	1	,	ī	t	ł	co measure)	Þ	measure)	(-	1	10.26	ı	9.55	ı	17.42	1	measure)	1	
Wat		<pre>Static (ft.)</pre>		17.4	15.0	I	0	Flowing	0	1	. t	,	ı	0	Flowing	(No hole to	9.75	(No hole to measure)	(do	, do	ı	Q	0	21.8	1	18.36	ì	(No hole to measure)	t	·
Motor	Year	Manufac- cured		1971	1971	1971	161	t	1970	ŀ	•	ł	ı	1	ı	1671	1983	1968	• 1	ı	ı	r	ı	ı	r	1977	r	1957	, 1	
MO	Hourse	Power (Hp)	•	35	30	40	40	;	50	ı	ł	,	ł	ı	ł	50	50	50	40	40	40	40	ı	50	ł	50	1	60	ŀ	
1.		Manufac- tured	•	1971	1971	1791	1791	r	1971	3	1	161	t	ł	1971	1980	1984	1971	1975	ı	ł	1975	ı	1982	ł	1677	۲	1791	ŧ	
*.	Delivery	Pipe Dia. (in.)		ហ	S	ъ.	ஸ்	ı	ហ	ស	ı	ŝ	1	,	ı	ŝ	ชา	و ،	Ś	մի	ı	ษา	S	ൾ	ł	ນາ	ł	w	1	
dwnd		Pipe Dia. (in.)	•	œ	1.	١.	ı	,	ı	ì	1	r	ı	·	1	ı	ı	,	ı	5	ı	•	ı	1	ł	,	Ŧ	,	1	
	Total	Head (ft.)		150	150	150	150	1	150	r	ı	ł	1	1	1	200	250	150	250	r	1	250	ł	250	ł	140-150	ı	180	ł	
	Actual	Capacity (1000 GPH)		20	8.7	22.5	24.8	ı	38.3	п	1	F.	ŗ	ı	4	30.4	I	39,8	23.5	23.5	23.5	,	,	ı	3	28.5	22	11.3	ŀ	
		Capacity (1000 GPH)	· .	20	25	25	19.4	•	39.4	ı	ş	: 1.		,	r T	36	22.5	39,4	22.5	39.4	ı	22.5	ł	15	,	29.3	ı	24	ŀ	
		00 00	e U	Ч	2.	e C	4	5,	.9	7.	ъ.	.6	.01	ц	12.	13.	14	72.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	

	Remarks						·			Abandoned.																:		·	1
·			220	ı	(470)	(1,520)	(870)	1	1	ग्ल्पूर -	530	190	ı. I	ı	t,	ſ	150	ı	1	100	(170)	, T	•	06	(130)	1	ı	150	Contá
Specific	Capacity 0 (cub.m) /ft. (D/m)		14		(12)	(102) (1,	(28) (1	١	١		35	12	,	ı	۲. ۲	1	10		١	1	(11) (·	 i) (9	9) (6	ŧ	. t	10	:
														<u>.</u>			÷							~		-			
	Date		7-8-84	4-8-64	4-8-84	4-8-84	5-8-94	5-8-84	29-5-84	ł	5-8-84	26-6-84	4,	16~8-84	F.	9-7-84	24-6-84	16-8-84	246-84	24-6-84	11-6-84	24-5-84	24-5-84	10-6-84	14-5-84	28-5-84		13-6-84	
Water Level	Drawdown (ft.)		20.23	measure)	8.61	7.97	9 25	measure)	(ı	7.70	25.02		J,	ı	to measure)	31.91	•	me&sure)	22.48	37.70	F	5	57.57	41.43	(อุมารธอน	1	10.35	
Wate	Static (ft.)		0	(No hole to	60'14	71.34	46.57	(No hole to measure)	(do	f	78.3	82.38	1	1	ı	(No hole to	40.9	44.77	(No hole to	35	36	21,25	54,42	38	57,46	(No hole to	1	40.75	
or	Year Manufac- tured		ı	1	ı	ı	I	1969	1	ı	1969	1977	2	1969	1	0861	1	•	6791	1979	3	1	ı	1	•	ı	ł	1	
51	Hourse Power (Hp)		40	20	20	20	30	51	30	ł	ı	50	e	10	ι,	30	40	50	30	30	30	•	۰ ر :	0C	30	30	30 .	40	
	Year Manufac- tured		1791	ı	1	1	1969	1969	1	r	C96T	1980	. 1	1964	•	1980	2961	Ŧ	0861	086T	1	1	. ! .	ţ	. 1		1	•	
	Pipe Dia.		S	S	u)	S	'n	m	S	,		ŝ	ŝ	ເ ກ	1	ហ	S	,	Ś	ŝ	S		ŝ	5	ŝ	• •	ŝ	. 1	
dund	Suction Pipe Dia. (in.)		ı	ı	,	ı		1	•	1	,	1	. 1	•	1	, 1	1	•	· 1	ł	•	ł	S	•	ŧ	1	ı	1	
	Total Head (ft.)		150	130	130	155	130	75	250	ı	260	300	270	130	ι	250	250	, I	250	250	250	ł	ı	250	250	250	250	250	
	Actual Capacity (1000 GPH)		12.2	ı		ı	Ì.	ſ	ł	ł	11.3	13	उ . प	رب ا	۲,4	10.9	13.0	13.0	6.5	6.5	3	1	.)	1	· 1	۱	١	4.4	
	Nominal Capacity (1000 GPH)	(Contd.)	25	11.3	11.3	33.8	22.5	E.11	16.9	1	15	12	6.8	7.2	ł	14.6	15	16.9	13.2	14.6	18	16-9	17	15	15	15		22.5	
·	2	CDA (27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39,	40.	41.	42.	43.	44.	45.	46.	47.	48,	49.	50.	51.	52.	

.I-47 DIMENSIONS OF WELLS (2)

TABLE A.I-47

				Remarks		-			•		Abandoned.					•				Abandoned.												Contd
		÷	ŢC	cub.m)		260	l T	1 	'	t	ł	۰.	1	160	t	260	i	ŀ	30	r	720	J	50	,	(280)	40	ı	ı	ı	210	1	8
•			Specif	Capacity (1000) (D) (GPD/ft. (D)	- - 	17	•	1	s	١	،	١	١	11	\$	17	1	١	ы	1	60 7	1	m.	ı	(39)	m	•	•	ł	(74)	ı	
				Date observed		13-6-84		•	ŀ	1	ı	,	ı	16-8-84	ł	9-7-84	ı		25-6-84	, I	10-6-84	27-5-84	25-6-84	1	24-6-84	9-7-84	24-5-84	ł	ł	36-8-8	8-8-84	
~1	:		Water Level	Drawdown (ft.)		18.10	ţ,	ł		١	L	١		50.03	ц	19.36	۱	· • ·	64.27	•	14.86	•	58.55	١	13.91	40.28	1	١	١	19.33	measure)	
S OF WELLS (2			Wat	Static (ft.)		38.25	. I	ì	1	. 1	1			15.5	I	24.92	t :	ŧ	31.50	1	62.05	12.5	12.13	ı	51.62	14.00	ı	ł	ı	30.67	(No hole to measure)	
DIMENSION			Motor	year Manufac- tured		,	ĩ	•	,	I		•	1.	1980	t		1980	1980	r	<u>,</u> 1	ı	۱	1982	1	1981	1981	I	ł	ı	1982	,	
4			WO	Hourse Power (Hp)		20	60	30	30	30	1	60	60	60	40	30	40	40	50	ì	60	t	20	30	ŝ	50	1	ŧ	ł	30.	or	
TABLE A.H				Year Manufac- tured	•	, ,	ł	•	i î	1	I	- 1	•	1981	ı	ı	1981	1961	ı	ı	ı	ı	1983	ł	1981	1861	ı	t	1	1982	ł,	
				Delivery Pipe Dia. (in.)		: M	ľ	ŝ	ហ	ı	ł	ľ	I,	ŝ	ı	5	ŝ	ហ	ı	ı	ų	ഹ	ŝ	ம	ł	S	ı	\$	ł	ហ	w	
	•			on Jia. (. 1	•	·	1	ł	ł	ţ	ı		ı	١	•	r	ı	ı	ł	1	1	,	ı	1	ı	4	'n	ł	T	
		•		Total Read (ft.)		175	300	250	250	250	ł	1	ł	250	250	250	250	250	250	.1	250	ł	175	200	250	250	1	I	ł	250	,	
:				Actual Capacity (1000 GPH)		13	6,6	8.7	13	IJ	ţ	8.7	1	22	12	14	10,8	9,5	õ	ł	30	24	60	ı	ł	4.2	,	,	1	١	ŧ	
				Nominal Capacity (1000 GPH)	CDA (Contd.)	16.9	,	ı	•	ı	ł	1	ł	37 8	ę	18	22 5	22.5	60	· . I	30	32	21.3	,	22.5	22.5	ł	ı	ı	11.3	,	
:			•.	No.	Ð	53.	54	55.	56.	57.	58.	59.	60.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.	71.	72.	73	74	75.	76.	77.	78.	

TABLE A. I-47 DIMENSIONS OF WELLS (2)

DIMENSIONS OF WELLS (2)

TABLE A. I-47

	Remarks														•														Contd."
ic	cub.m.		,	1		230	ŀ	ı	120	OII	06	I	160		120	ł	F	ł	6	180	011	071	320	08	220	140	t	011	ö
Specif	Capacity (1000 (cu (CPD/ft) (D		ŀ	1	1	16	ı	i	Ω.	æ	ų	ł	10	I	60	ł	I	1	Q	12	7	2	22	Ŷ	54	ĩo	ı	5	
	Date observed	:		í	1	1	. •		J.	і :	t,	1	ı	ł	. 1	I	ł	ł)	I	1	1	F	1	1	ł	ł	, I .,	·
Water Level	Drawdown (ft.)		1	ł		12.33	· . F	,	12	18.75	15.50	F.	20.75	1	18.0	ł	F.	,	19.0	15.58	13.25	13.33	13.33	21.33	13.25	20.0	ł	20.0	
Wac	Static (Ét.)		ı	.•		60	.1	ı	65.58	60.75	011		87.42		55.58	Ι.	ı	ı	80.42	60.42	58.92	15.50	80.25	59.75	13:25	20.0	1	86.33	·
or	Year Manufac- tured		ı	t	I	ì	1	1	ł		1		•	í	•	1	1	1	1	ł	1	1	ł)			ı	. 1	
Motor	Hourse Power (Hp)		25	25	25	25	30	40	ц5	.25	57	17	25	ц С	17	16	70	10	15	20	15	50	25	20	20	20	25	25	
	Year Manufac- tured		ł	ı	ı	ı	ı	,	,	ı	5	f	ı	ı	ı	•	1	1	1	t	i	ı	5	t T	y		 I	•	•
- 1	Delivery Pipe Dia. (in.)		S	មា	ŝ	'n	r-	ŝ	V	τŋ	4	מו	ຑ	5	vc	້ນາ	ŝ	m	* 7	აი	4	N.	S	vs	4	ŝ	so	ŝ	
dum d	Suction Pipe Dia. (in.)		S	ι Λ	ιp	S	5	'n	ষ	ŝ	ব	ŝ	.vn	m	ŝ	۱	m	m	4	ະກ	4	د د	ŵ	ŝ	च	ŝ	Q	vo	
	Total Head (ft.)		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
	Actual Capacity (1000 GPH)		. 51	. 15	12	co `	72	on.	₹ !	10	4	3.5	۰ ۵	ŧ٨	40	۴.	4	1.5	ŝ	00	प	ব	12	ហ	0	Ø	vo	ġ	
	Nominal Capacity (1000 GPH)		14	14	12	1 [.]	ı	F	ŧ,	,	9	S	,	ł	;	ł	;	'n	1	1	S	4	17	D	ເມ	:1	7	Φ	
	2	SMC		 	С	. । च	ي. •	6.	, <i>د</i>	æ	٠ ٣	lo.	11.	12.	13.	14.	15.	16.	17.	18.	19,	20.	21.	22.	23.	24 -	25.	26.	·

TABLE A. I-47 DIMENSIONS OF WELLS (2)

	Кенагкя									•	;																	
5 Lo	ty (cub.m) (D/m		1	150	60	ł	۱.	40	06	•	190	1	140	I			1	906	50	OIT	610	480	1,150	150	530	1,010	200	350
Specific	Capacity (1000 (GPD/ft)		•	10	থ	ı	ł	23	Q	,	13	I	. ወ	·			4.	60	m	æ	41	32	77	10	ЗС С	68	ET .	73
	Date observed		,	ı	F	ł	ŧ	ı	ı	ł	t - s		ł	ł			1	١	ŧ	ł	ı	ŧ	, I	ı	t.	:	1	I
Water Level	Drawdown (ft.)		I.	14.17	22.0	ं।		30.33	15.33		15.0	3	15.25	r			ŧ	13.44	86.0	54,0	16.6	21.0	7.0	40:0	23.0	8.0	31.0	23 (20)
Wai	Static (ft:)		ł	75,66	65.0	1	, I	140.0	60.0	ł	75.0		70.33	r			ı	53.12	32.92	26.0	71.8	40.0	65.0	45.0	55.0	40.0	45.0	45(61)
r.	Year Manufac- tured		t	ı	ı	I	y	1	Ι.	1	ł	1	і	,			•	1983	1983	1983	1983	1983	1983	1983	1983	1983	1984	1984
Motor	Hourse Power (Hp)		10	30 B	1.5	38.5	40	IO	01	5 T	25	25	20	52			,	60	25	30	50	50	40	35	60	40	05	40
	Year Manufac- tured		•		1	F.	ı	,	1	ı	ł	1	ı	ı			1	1983	1983	1983	1983	1983	1983	1983	1983	1983	1984	1984
• .	Delivery Pipe Dia. (in.)		ŝ	50	4	છ	чС Г	m	ភ	æ	. 1 9	vø	ŝ	ស			J	ი	Ś	ç	U	Q	•ø	'n	۰¢	Ŷ	ş	ø
dwnd	Suction Pipe Dia. (in:)		ஸ	Ś	4	ç	ŝ	ო	ານ	m	Ŷ	Q	Ś	Ś			I	ល	Ð	¢	Ŷ	w	9	ç	9	G	Q	Q
	Total Head (ft.)		200	200	200	200	200	200	200	200	200	200	200	200			1	200	220	200	200	200	200	250	200	200	200	200
	Actual Capacity (1000 GPH)		w	Q	3.5	15	27	'n	ব	гđ	. 00	æ	9	00			ı	r	1	1	ł	ı	ţ	J	ł	r	ı	1
	Nominal Capacity (1000 GPH)	(Contd.)	ŵ	60	4	18	ব	f	4.5	1.7	1	ı	ı	ı			ı	33.8	11.3	16.9	28.1	28.1	22.5	16.9	33.8	22.5	16.9	22.5
	NN	BMC (27	28.	29.	or	31.	32.	33.	34.	35.	36.	37.	38.	•	CIHE	1.ve	7.	സ	* 57	10.	11.	12.	13.	L4.	15.	16.	17.

Contd.-

TABLE A. X-47 DIMENSIONS OF WELLS (2)

Remarks (270) (270) (400) (270) ()130) (270) (270) (cub.m) Specific Capacity (1000 (CPD/ft) (18) (18) (18) (27) (18) 6) (18) Date observed Drawdown (ft.) Water Level 0 0 õ Ő g 8 R Static (ft.) 50 50 ŝ 30 30 30 ŝ Motor Hourse Year Power Manufac-(Ap) tured 1980 1981 1958 1958 1984 1 64 94 40 9 4 0 40 9 Delivery Year Pipe Dia, Manufac-(in.) tured 0861 1981 1984 1958 1970 1959 1961 ŝ Suction I Pipe Dia. F (in.) dund dund Total Head (ft.) 150 150 100 150 200 150 150 Actual Capacity (1000 GPH) ŗ Nominal Capacity (1000 GPH) 22.5 22;5 33.8 22.5 22.5 22.5 <u></u> ÷ ŝ ហ φ, 5 ., 7 'n 6

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TABLE A.I.-48(1) ANNUAL SUMMARY OF KHANPUR RESERVOIR OPERATION STUDY

00100	TRELOW			WAT	TER DEMAN	0								
	TRFLOW	ISLAMA	RAGALP	PAH	TAXILA	RLGRT	LIGRE- LEFT		L022	OIFFER	RESERVOI	R 0L.	SPILL	506
1040	(MCM)	CHEND	CHOR)	(MCM)	(1101)	(NCM)	(1101)	(NCM)	(NCN)	(MCM)	(FT)	(MCH)	(мсн)	CH
1961	433.160	54.779	115.152	24.889	22.400	49.134	29.511	295.865	43.316				43.632	0.0 11.8
1962	210.633	54.779	115,152	24.889	22.400	\$5.417	33.284	305.922	21.063				0.0	35.
1965	255,917	54 907	115,152	24.958	22.662	65.812	39.528	323.0847	23:592				0.0 0.0	100.1
1965	402.425	\$4.779	115.152	24.889	22.400	53.133	31,912	302.266	40.243				44.828	18.1
1956	261.736	54.779	115.152	24.889	22.400	53.569	32.174	302.964	28.174				0.0	33.0
1967	286.557	54,779	115,152	24.889	22.400	50.697	32.079	298.892	28 454				0.0	23.2
1969	164.154 323.927 383.446	54.779	115.152	24.889	22.400	58.699	35.255	311.175	16.415				0.0	163.
1970	323.927	54 779	115.152	24.889	. 22.400	53,525	32.148	302.894	32.393		÷		21.880	98.
1972	203.369	54 907	115,420	24.009	22.462	51.255	30.784	299.785	20:337				90.586	37. 72.
1973	203.369 459.627	\$4.779	115,152	24.889	22.400	53 787	32.305	303.314	45.963				59.070	12.
1974	126.891	54.779	115.152	24.889	22:400	59 201	35 603	325.427	12.689				0.0	
1976	829.396 484.248	54.907	115.420	24.958	22.462	45.626	28.004	292.376	\$5.910				0.0 213-986	
1977	484,248	54.779	115.152	24.889	22.400	59.188	35.549	311.957	48.425				120 228	0
1978	569 414 312.879	54.779	115.152	24.889	22.400	50,350	30,241	297.811	31 189				219.664	0.
1980	304 569	54,907	115.420	24.958	22.462	48.934	29.390	296.070	30.457				0.0	14.
MEAN	326.937	54,815	115,779	24.909	22.418	55.121	33.107	305.598	32:694				41.078	47.
RATEL	· ·	17,932	37.706	8-151	7.336	18.037	10.833	100.000	-			•	13,442	
				*-				~ 4 -		• • • • • • •				*****
RATES		100.000	100.000	100.000	105.000	100.000	100.000	100.000					100.000	100.
	-		i ar								·		-	
	SUMMARY (
6810D	INFLOW	-WATER SL	JPPLY -	NAT -INDUSTR	ER DEMAN	D -AGRICUL	TURE-	TOTAL	LOSS	ÐLFFER	RESERVOI	8	SPILL.	5H0
	(HCM)	15LAMA 	KAVALP (HCH)	WAN 	/NA12A		LEFF 				LEVEL V 	0L. 	· · · · · · · · · · · · · · · · · · ·	
1960	219.138	52.161	109.849	23.210	21.339	55.912	33.582	296.353	26.916	10507	1,41,4	(aca)	0.0	0.1
1961	433.160 210.633	52.040	109.395	23.645	21.280	45.677	28.035	281.072	43.316				58.582	0.
1962	210.633 233.917	52.040	109.395	23.645	21.280	52.646	31.620	290.625	21.063				0.0	17.
1964	260.719	52.141	109.393	23.243	21.200	22.502	37.551	306.931	52.035				0.0	91. 61.
1965	260.719	52.040	109.395	23,645	21.250	\$0.476	30.317	287.153	40.243				52.934	
1986	241.736	52.040	109.395	23,645	21.280	50.891	30.566	287.814	26.174				0.0	15.
1948	286.557	52.161	109.649	23,710	21.200	8.162	28.927	283.948	28.456				0.0	18.
1969	164.154	52.040	109.395	23.645	21.280	55.764	33.493	295.616	16.415				0.0	131.
1970	323.927	52.040	109.395	23.645	21.280	50.849	30.540	287.749	32.393				24.294	
1972	203.369	52.040	109.349	23.043	21.339	48.692	29.245	284.795	20.337				94.520 0.0	
1973	459.627	52.040	109.395	23.545	21.280	51.098	30.690	288.148	45.963				58.855	
1974	126.891	52.040	109.395	23.645	21.280	64 223	38.573	309.156	12.689				0.0 0.0	
1976	629.396	52.161	109.649	23.710	21.339	44.294	26.604	277.757	62.940				223.840	11.
1977	484 248	55.010	109.395	23.845	21.280	56.228	33.771	296.359	18.425				127.968	
1978	312.879	52.040	109.395	23:045	21.280	47-832	28.729	282.920	31 288				233.436 55.515	
1980	402.425 241.736 342.702 286.557 164.154 323.927 383.446 203.369 459.627 126.891 222.791 629.396 434.248 569.614 312.879	52.161	109.849	23.710	21.339	46.487	27.921	281.266	30.457				0.0	0_
								100 740						
RAAN					21-247									
RATEL	1	17:937	37.706	8.151	7.336	18.037	10.833	100.000					15.423	12.

KAIE2		95.000	VS_000	95.000			vs.000	43.000	••••••		• · · · • • - · · •		108.999	/ő.
	SURMARY (CASE =							
				WAT	ER DEMAN	D							SPILL	
													-	
	(NCN)	(MCN)	(HCH)	(HCH)	(NCN)	(HCH)	(RČN)	(нсн)	(NCN)	(HCH)	(FT)	(MCM)	(868)	0
1960	249.138	49.410	103.878	22.400	20.140	26.220	26.559	200.735	43.316				85.993	0. 0.
1962	210.833	49.301	103.637	22,400	20.160	49.875	29.956	275.330	21.063				0.0	ປ.
1963	233.917	49.301	103.637	22,400	20.160	49.833	29.93	275.262	23.392				0.0	31.
1945	200./19.	49.410.	103.437	22,400	20.216	47.820	28.721	272,040	20.072				0.0 61.041	. 38. 15.
1965	201.736	49.301	103.837	22.400	20.160	48 212	28.957	272.668	26.174				0.0	2
1957	342.702	49.301	103.437	22.400	20.160	48.069	28.371	272.438	34.270				0.0	10.
1969	164 154	49.301	103.417	22.402	20.210	52 829	31.710	280.058	16.415				0.0	0. 37,
1970	323.927	49.303	103.637	22.400	20.160	48.173	28.933	272.504	32.393				26.708	89.
1971	383.446	49.301	103.637	22.400	20.160	54.457	32.708	282.664	38.345				98.454	16.
19/2	203.369	19 301	103.437	22.462	20.216	40.129	27:706	207.806	45.943				0.0 .	33. 8.
1974	126.891	49 301	103.637	22,400	20,160	60.843	36.543	292.885	12.689				0.0	-108.
1975	222.791	49 301	103.637	22.400	20,160	53.362	32.050	280.911	22.279				0.0	85.
1978	629.396	49.416	103,878	22.462	20.216	41.963	23.204	203.138 280 741	62.940				233.794	5. 0.
1111	569.414	49.301	103.637	22.400	20,160	45.315	27.217	268,030	56.941				247.207	. o
1978	312.879	49.301	103.637	22.400	20.160	47.149	28.318	270.965	31.268				62.770	0.
1978		10 141	103.878	22.442	20.216	44.040	20.451	200.463	30.457				0.0	¢.
1978 1979 1980	304.569			والاستان والمراجع										
MEAN														
RATEI		17.937	37.706	8.151	7.336	18.037	10.833	100.000	*	••••••	·········		18.000	\$,

A 11-129

001934	៤ ភូមិ៖ សម	- WATER SL	PPLY	VAT VAT	1.41	- 4 G R I C U L	1085-	TOTAL	1055	DIFFER	RESERVO	018	SPILL	SHORT
		ISLANA	RAVALP	WAH 		B [G B]					LEVEL (ft)			
1.040	(HCH) 118 0.5	(8CS) 65.671	(NCN) 98.107	21,214	19.092	50.027	30.047	265.157	24.914	CACILO	(,.,	(19511)	1.936	0.0
1961	433.150	46.562	97.879	21.156	19.040	41.764	25.084	251.486	43.316				111.167	0.0
1962	210.533	46.562	97.879	21.156	19.040	47.104	28.292	259.970	23.392				0.0	53.55
1964	260.719	46.671	28.107	21.214	19.092	\$5.940	33.599	274.623	26.072				0.0	15.9
1955	402.425	46.562	97.879	21.156	19.040	45.163	27.126	256.926	26 176				0.0	14.4
1965	342.792	40.502	97.579	21.156	19.040	45.398	27.267	257.303	34.270				1.487	0.0
1948	284.557	46.671	98.107	21.214	19.092	43.092	.25.882	254 059	28.656				24,278	0.0 58.0
1969	323.927	40.502	97.879	21.156	19.040	45.496	27.126	257.480	32.393				29.197	20.99
1971	383.440	46.562	97.879	21.156	19.040	51.432	30.891	266.960	38.345				102.388	6.40
1972	203.309	48.671	98.107	21.156	19.092	45.719	27.460	257.817	45.963				88.414	6.7
1974	126.891	46.562	97.879	21 155	19.040	\$7.463	34.513	276.013	12.689				0.0	88.2
1975	222.791	43.552	97.879	21.154	19.040	· 50.398	23.803	265.505	62.279		1		247.630	0.0
1975	484.248	46.562	97.879	21.155	19.0-0	50.309	30.217	265.164	48.425				161.661	0.0
1978	569.414	46.562	97.879	21.156	19.040	42.797	25.705	253.140	56.941				260.979	0.0
1979	304.509	48.002	98.107	21.214	19.092	41.594	24.982	251.660	30.457				2.474	0.0
1								360 760				**	\$5.755	10 1
AC 44	320.931													
RATEL		17.937	37.706	A.151	7.338	18.037	10.933	100.000					21.464	
								85.000					135,730	
						1-			i			*	····	
	симмару (OF KNANPU	R RESERV	OIR OPER.	ATION	Ĺ	ASE = 1	;						
						-i D					RESERVO		* :	
E8100	INFLOW -	WATER SU	PPL7	- INDUSTR	IAL	-AGRICUL	1086-	TOTAL	1055	DIFFER		918 VOL.	SPILL	SHOR
		151 AMA		WAD						· •,•	LEVEL (F1)		••	
	(RCR)	(8(8)	(нсн)	(808)	(808)	(868)	(XCH)	(MCM).	(NCH)	(808)	(FD)	(MCM)	- (MCH)	0.0
1960	249.138	43.925	92.336	19.900	17.920	39.307	806.75	236.692	43.316				127.183	0.0
1962	210.635	43.823	92.122	19.911	17.920	44.334	26.627	244,738	21.063				0.0	0.0
1963	233.217	43.823	92.122	19.911	17.920	44.298 52 ASO	26.605	244.678	23.392				0.0	0.0
1984	492.425	43.823	92.122	19.911	17.920	42.506	25.530	241.813	40.243				77.720	6.3
1966	261.736	\$3.823	92.122	19.911	17.920	47.855	25.740	242.372	26.174				0.0	0.0
1967	342.702	43.823	92.122	19,911	17.920	42.720	27-003	239.114	28.656			1.00	37.808	0.0
1969	144.154	43.823	92.122	19.911	17.920	46.959	28.204	248.940	16.415				0.0	38.2
1970	323.927	43.823	92.122	19,911	17.920	42.820	25.718	242.315	32.393				109.867	0.0
1971	203.369	43.925	\$2.336	19.956	17.949	41.004	24.027	239.828	20.337				0.0	0.0
1973	459.027	43.823	92.122	19.911	17,920	43.030	25.844	242.651	45.965				99.300	0.0
1974	126.891	43,823.	92.122	19 911	17.920	47.433	28.489	249.699	22.279			•	0.0	68.5
1976	629.396	43.925	92.336	19.965	17.969	37.301	22.403	233.901	42.940				266:577	0.0
1977	484.248	43.823	92.122:	19 911	17.920	47.350	28.439	238.249	56.941				274.991	0.0
1979	312.879	43.823	92.122	19.911	17,920	41.910	25.172	240.859	31,288				80.388	0.0
1960 -	304.569	41.925	85.739	19.966	17.969	39.147	23.512	236.856	30.457				20.354	
MFAN	326.937	43.852	92.183	19.927	17,934	44.097						· · · ;	64.352	12.8
													26:322	
								100.000						
RATE2		90 000	20.000	80 000	80.000	80 000	80.000	80.000					156.657	
									· · ·	-				
				OIR OPER	4 [1 ß N	c	ASE = 0	5						
		• • • • • • • • •										•		
ER 100	INFLOW -	WATER SU	PPLI	- LNOUS 78	186	-YOULCH	1086-	JUTAC	(055	OLFFER	-RESERV	018 VÓL.	SPILL	SHOP
	• • • • • • •						(8)8)			(MCH)	(11)	. (HCM)	(MCM)	ĊĦC
1010	(RCR) Rfreve	(RCH) 41 180	(ML8) 84 565	18.718	16.840	44.141	26.512	233.963	24.914				24.929	0.0
1941	433.160	41.084	86.364	18.667	16.800	36.850	22.133	221.379	43.316				0.0	0.0
1962	210.633	41.084	66.364 AA 364	18.66/	14.800	41.528	24.942	229.386	23, 392				0.0 0.0 0.0	0.0
1964	260,719	41.180	86.565	18.718	16.846	49.359	29.646	221.379 229.442 229.386 242.315 226.700	26.072				0.0	0.0
1965	402.425	41.084	86.364	18.667	16.800	39.850	23.954	226.700	26.174				0.0	· 0.0
1966	361.735	41.084	86.364	18.467	16.800	40.057	24,059	227.032	34.270				64.809	0.0
1968	286.557	41.180	86.565	18.718	16.846	38.023	22.837	224 169	28.656	÷			51.458 0.0	17.4
1949	164.154	41.084	86,364 86,364	18.467	16.800	40.144	24.111	227.170	32.393				35.244	52.5
1971	383.446	41.084	86.354	18.667	16.500	45.381	27.257	235.553	38.345				123.748	0.0
1972	203.369	41.180	86.565	18.718	16.846	18.441 40.341	25.088	227.485	45.963				130.694	0.0
1973	439.62/	41.084	86.364	18.657	16.800	50,702	30.453	244.071	12.689				0.0	48.7
975	222.791	41.084	86 364	18 667	16.800	44.469	26.708	234.093	62.940				285.868	0.0
1976	629.394	41.180	86.365	18.667	16.800	44,391	26.662	233.968	48 425				285.868	0.0
1978	569.414	41.084	86 364	18.667	16.800	37.762	22.681	223.359	56.941			i.	290.004	0 (n (
1979	312.879	41.084	86.364	18.547	16.800	39,291	22:043	222.053	30 457				-0.940	
1980	504.569	*1.180 k-	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	10.710 				226.700 227.223 224.469 233.382 227.170 235.553 224.635 227.485 227.485 227.485 224.635 224.635 224.635 224.635 224.635 224.635 224.635 224.635 225.805 225.805 222.053	••••••	<u> </u>	والمتحد فالمرتجا			
MEAN														
MEAN RATE1		17.937	37.706	8.151	7.336	18.03/	10.833						32.770	3.1

TABLE A.I-48(3) ANNUAL SUMMARY OF KHANPUR RESERVOIR OPERATION STUDY

PCR100		-WATER S	RAVALP		TAXILA	-AGRICUL RIGHT	IURE- LEFI	TOTAL			RESERVOIR LEVEL VGL.	SPILE	\$2051
	(NCM) 249.138	(NCM)	(838)	(MCM)	(MCM)	(M(M)	(MCM)	(NCM)	(NCM)	(MCM3	CED (MCN)	CHCHD	(SCS)
1961	433.160	38.345	80.606	17.423	15.680	34.594	20.657	207.106	43.316			30.426	0.0 0.0
.1962	210.633 233.917	38.345	80.605	17:423	15.680	58.792	53.584	214.146	21.063			0.0	0.0
4011	3/0 710	70 . 70										0.0 6.293	0.0 0.0
1965	402.425	38.345	80.406	17.423	15.680	37.193	22.339	211.586	40.243			159.423	0.0
1967	342.702 286.557 164.154	38.345	80.606	17.423	15.680	37.387	22.459	211.895	34.270			1.153	0.0 0.0
1968	286.557	38.435	80.794	17.470	15.723	35.488	21.315	209.225	28.056			45.047	0.0
1970	323.927	38.345	80.606	17.423	15.480	37.467	22.504	212.026	32.393			0.0	0.0 40.333
1971	383.446	38.345	80.606 60.794	17.423	15.680	42.356	25.439	219.850	38.345			137.625	0.0
1973	459.627	38.345	80.006	17.423	15.680	37.651	22.614	212.320	45.963			0.0 162.151	0.0
1975	128.891	38.345	80.606	17 423	15.680	47.522	28,422	227.799	12.689			0.0	29.005 52.038
1976	\$29.395	38.435	80.794	17.470	15.723	32.638	19.603	204.663	62.940			305.266	0.0
1978-	569.414	38.345	80.606	17.423	15.680	35.245	24.884	218.370	56.941			210.755 305.155	0.0 0.0
1979	164.154 323.927 383.446 203.369 459.627 126.891 222.791 629.396 484.248 569.414 312.879 304.569	38.345	80.606	17.423	15.680	36.671	22.025	210.751	31.288			103.698	0.0
	·						20.373		30.457			52.435	0.0
MEAN	326.937	38.371	80.860	17.436	15.693	38.585	23.175	213.919	32.694			81,456	5.780
RATEL		17.937	37.706	8.151	7.336	18.037	10.833	100.000				40.883	2.702
84152	,,	70 000	70 000	20.000	70.000	20.000	70 000	70.000				212.901	
	••••••••••••••••••••••••••••••••••••••												
	SUMMARY (OIR OPER						-			
PERLOD	TRECON	WATER S	UPPLY RAWALP	- INDUSTR	TAXILA	-AGRICUL RIGHT	TURE-	TOTAL	LOSS	DIFFER	RESERVOIR LEVEL VOL.	5°icl	SHORI
		/ N/ N	·····										
1960	249.138	35.689	75.023	16.222	14.600	38.256	22.977	202.768	24.914	VACAD	(ET) (HCH)	-7.986	0.0
1961	433.160	35.606	74.849	16.178	14.560	31.937	19.182	192.312	43.315			177.205	0.0
1963	233.917	35.606	74.849	16.178	14.500	35.991	21.617	198.801	23.392			5.374	0.0
1964	260.719	35.689	75.023	16.222	14.500	42.778	25.493	210.004	26.072			30.995	0.0 0.0
1966	261.736	35.606	74.849	16.178	14.560	34.820	20.913	196.927	26.174			18.944	ŭ.ŭ
1968	286.557	35.689	75.023	16.222	14.800	32.953	19.792	194.280	28.556			108.736 78.637	0.0
1969	164.154	35.606	74.849	16.178	14.560	38.154	22.916	202.254	15.415			0.0	0.0
1971	323.927 383.446	35.606	74.849	18.178	14.560	39.330	23.622	204.146	33.345			42.141	0.615
1972	203.369 459.627	\$5.689	75.023	16.222	14:600	33.310	20:010	194.860	20.337			0.0	0.0
1973	126.891	35.606	74.849	16.178	14.560	43.942	20.999	211.528	12 369			193.839	
1975	222.791	35.606	74,849	16.178	14.560	38.539	23.147	202.380	22.279			0.0	3.771
1977	629.396 484.248	35.000	74.849	16.178	14.560	38.472	23.107	202.772	48.425			324.363 226.934	
1978	569.414 312.879	35.606	74.849	15.178	14.560	32.727	19.656	193.577	56.941			323.547 115.043	
1980	304.569	35.489	75.023	10.222	14.600	31.807	19.104	192.446	30.457			68.529	0.0
	326.937											\$9.823	
• - + - - • •			<i></i> .										
				8.151								50.253	
RATE2		65.000	\$5.000	65.000	65.000	\$5.000	45.000	65.000				243.008	
	SUMMARY (F KHANP	UR RESERV	OTR OPER	ATION	τ.	ASE =	9	.				
PERIOD	INFLOV	WATER SI	 UP₽LY	WAT	ER DEMAN TAL	-AGRICUL	 fure-	TOTAL	:055	DIFFER	RESERVOIR	SPILL	
			. -						-		LEVEL VOL.		
1960	(NCN) 249.138	(MCH) 32.944	- (MCM) 69.252	(MCN) 14.975	(HCM) 13.477	(NCN) 35.313	(NCN) 21,209	(MCS) 187.170	(MCH) 24.911	(868)	OED (MCN)) (HCH) 59.954	
1981	433.160	32.867	69.091	14.934	13.440	29.480	17.706	177.519	43.316			194.629	0.0
1963	233.917	32.867	69.091	14.934	13.440	33,222	19.954	183.508	23.392			23.273	0.0
1964	260.719	32.944	69.252	14 975	13.477	39.487	23.717	193.852	26.072			46.391 137.891	9.0 3.9
1966	261.736	. 32.867	59.091	14 934	13.440	32.141	19.305	181.779	25.174			36.725	ý.J
1967	342.702 286.557	32.867	59.091	14.934	13.440	32.046	19.247	181.626	34.270			122.40	
1969	164.154	32.867	69.091	14 934	13.440	35.219	21.153	186.705	15.415			0.0	0.0
1970	323.927 383.446	32.847	69.091 A9 091	14.934	13.440	32.115	19.289	181.736	32,393			04.915 265.341	
1972	203.369	32.944	69.252	14.975	13.477	30.753	18.471	179.871	20.337			ა.0	0.3
1973	459.627	32.867	69.091	14.934	13.440	32.272	19.383	181.988	45.963			225.129 0.0	0.0
1975	126.891 222.791 629.396	32.867	69.091	14.934	13.440	35.575	21.367	187.274	22 279			0.0	25.735
1976	629.396 484.748	32.944 32.862	69.252 89.091	14,975	13.477	27.975	16.302	1/5.426	62.940			344.051 243.112	0.3
1978	484.248	32.847	69.091	14 934	13.440	30 210	18.144	178.687	58 941			535.939	0.0
1980	304.549	32.944	69.252	14.975	13.477	29.360	17.034	177.642	30.457			127.141 93.971	6.0
1,00						-			*			t 4	
	326.937	32.889	69.137									113.100	
MEAN												A1 482	0.675
RATEI		17.937	37.706	9.151	7.336	18.037	10.835	100.000					
RATE1		17.937	37,706		60.000	40.000	60.000	60,000				275,329	2.593

ANNUAL SUMMARY OF KHANPUR RESERVOIR OPERATION STUDY

TABLE A. I-48(4)

				WAT	ER DENAN	D		1014	1058	0	RESERV	 .		
PENIOD	INFLOW	ISLAMA	RAVALP	VAN WAN	TAXILA	RIGHT	LEFT	IUTAL	(133	UIFFEN	LEVEL	VOL	SFILL	SHOR
	(NCH)	140.000	4 14 5 45 5	2 14 2 14 3	· / M.C.M.S.		10000	10000						(HC)
1960	249.138	30.199	63.481	13.727	12.354	32.370	19.442	171.575	24 914				71.922 -	0.0
1951	433.160	30.128	43.334.	13.689	15.350	27.024	16.231	162.726	43.316				211.853	0.0
1962	210.633	30.128	63.334	13.689	12.320	30.479	18.306	168.257	21.063		:		34.058	0.0
1963	233.917	30.128	63.334	13.689	15.350	30.454	18.291	168.216	23,392				.39.172	0.0
1964	260.719	30,199	63.481	13.727	12.356	34.197	.21.740	177.697	26.072				62.397	0.0
1965	402.425	30:158	\$3.334	13.689	15.350	29.223	17.552	166.246	40.243				202,117	0.0
1965	261.735	30.128	63.334	13.689	15.350	29.463	17.696	156.630	26.174				54.506	0.0
1987	342.702	30,128	63.334	13.689	12.320	29.375	17.643	166.490	34.270				136.244	0.0
1985	284.557	30.199	63.481	13.727	12.354	27.883	16.747	164.391	28.656			· · ·	105.816	0.0
1969	154.154	30.128	63.334	13.689	15 350	32.285	19.391	171.147	16.415				0.0	. 0.0
1970	752 . 855	30.158	63.334	13.689	12.320	29.439	17.681	166.592	32.395				98.304	0.0
1971	383.446	30.128	63.334	13.689	15.350	33.279	19.988	172.739	38.345				179.381	0.0
1972	203.369	30.199	63.481	13.727	12.354	28-190	16.931	164.882	20 337				7.017	0.0
1973	459.627	30.128	63.334	13.689	15-350	29.583.	17.768	1991852	45.963				249.403	0.0
1974	126.891	30.125	63.334	13.689	12 320	37.182	55.335	178.985	12.489				0.0	0.0
1975	222.791	30.128	63.334	13.689	15 250	32.610	19.586	171.668	22.279				0.0	0.0
1976	629.396	30.199	63.481	13.727	12.354	25.644	15,402	160.807	95.240				365.257	0.0
1977	484.248	30.128	\$3.334	13.489	12.320	32.553	19.552	171.577	48.425				259.440	0.0
1978	569.414	30.128	63.334	13.689	12.320	27.692	10.632	163,796	56.941				351.008	0.0
3979	312.879	30.128	63.534	13.689	12.320	28.813	17.308	145.590		· ·			139.435	0.0
1980	304.569	30.199	63.481	131727	12.354	20.914	16.165	162.839	30,457				99.016	0.0
MEAN	326.937	30.148	63.376	13.700	15:330	30.317	18.209	168.079	32.694				126.959	0.0
RATEL		17.937	37.706	8.151	7.336	18.037	10.833	100.000					75.535	0.0
RATE2		55.000	55.000	55 000	\$5.000	\$5.000	\$5.000	\$5.000					800.901	0.0

TABLE A. 1-49(1) ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

		-WATER SU	RAVALP	- ENDUS ER VAH	TAXILA	AGRICUL RIGHT	TURE- LEFT	IQIAL			RESERVOIR- LEVEL VOL			
		(HCH)	(MCN)	(MCM)	CHCMS	(NCN)	(NCH)	(HCH)	(HCM)	(MCM)	(FF) (H	CM3	(M(M)	(80)
1961	108.747	33.465	0.0	0.0	0.0	0.0	0.0	33.465	10.875			6	7.638	0.0 0.0
1962	53 350	33.445	0.0	0.0	0.0	0.0	0.0	33.465	51335				5.767 4.928	0.0
1984	66.665	33 \$43	0.0	0.0	0.0	0.0	0.0	33.543	6.666			2	5.140	0.0
1965	62.737	33.465	0.0	0.0	0.0	9.0 0.0	0.0	33.445	6.274.				5.893 1.960	0.0 0.0
1967	80.813	33.465	0.0	0.0	. 0.0	0.0	0.0	33.465	8.08;				4.729	0.0
1968	60.230	33.543	0.0	0.0	0.0	0.0	0.0	33.543	\$.023				6.330	. 0.0
1969	26.850	33 445	0.0	0.0	0.0	0.0	0.0	33.465	2.687				0.0 8.60\$	0.0
1971	117.865	33.465	0.0	0.0	0.0	0.0	0.0	33.465	11.785			7	5.129	0.0
1972	54.643	33.543	0.0	0.0	0.0	.0.0	0.0	33.543	5.464				2.794	0.0
1973	39 747	33.402	0.0	0.0	0.0	0.0	0.0	33.465	3.977				5,510	0.0
1975	113.582	33.465	0.0	0.0	0.0	0.0	0.0	33.465	11.358			5	5.738	0.0
1976	375.584	33.543	0.0	0.0	0.0	0.0	.0.0	33,343	17.558				3.167	0.0
1978	148.166	33,465	0,0	0.0	0.0	0.0	0.0	33.665	14 817				0.734	
1979	88.312	33.465	0.0	0.0	0.0	.0.0	0.0	(NCM) \$1.465 33.465 34.465 34.465 34.465 34.455 34.455 34.455 34.455 34.455 34.455	8.631				9,994	
										فحمحت أ			5.200	
					0.0								5.000	
RATEZ		100.000	0.0	0.0	0.0	0.0	0.0	100.000				10	0.000	0.0
~~~~*						۰		TOTAL						
PERIUD	INCLUM	ISLANA	RAWALP	VAH	TAXILA	RIGHT	LEFT				RESERVOIR LEVEL VO			
	(HCM)	(HCH)	(NCH)	(NCH)	(MCN)	(нси)	(MCH)	(N(H) (1, 3)(4 (1, 3)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)	CHCHD	(NCH)	(FT) (1	1043	(MEN)	141 0.0
1961	108 747	41.814	0.0	0.0	0.0	0.0	0.0	41.814	3.956				0.0	0.0
1963	53.350	41.814	0.0	0.0	0.0	0.0	0.0	41.814	5.335				4.583	0,2
1964	66.665	41.929	0.0	0.0	0.0	0.0	0.0	41.929	6.666				18.093	
1965	62.737	41.814	0.0	0.0	0.0	0.0	0.0	41.814	5.336				3.245	
1960	33.357	41.814	0.0	0.0	0.0	0.0	0 0	41.814	8.051			1	26.196	0.0
1948	60.230	41.929	0.0	0.0	0.0	0.0	0.0	41.929	6.023				18.311	
1969	26.850	) 41.814	0.0	0.0	0.0	0.0	0.0	41.814	11.754				54.551	
1971	117.865	41.814	0.0	0.0	0.0	0.0	0.0	41.814	11.285	÷.,			57.531	0.0
1972	54.643	41.929	0.0	0.0	010	0.0	0.0	(1.929	5.464				4,399 39,512	
1973	88 142	41.814	0.0	0.0	0.0	0.0	0.0	41.814	3.977				0.0	0.0
1975	113.582	41.814	0.0	0.0	0.0	0.0	0.0	41.814	11.358				56.674 14.610	
1976	175.584	41.929	0.0	0.0	0.0	0.0	0.0	41.929	15.810				97.935	
1978	148.166	41.814	0.0	0.0	0.0	0.0	0.0	41.814	14.817				92.385	
1979	88.312	41.814	0.0	0.0	0.0	0.0	0.0	41.814	8.831	<b></b> ,		k	42,626	0.0
ere ku	01.016	41,838		0.0	0.0	0.0	0.0	41.838		~ •			37.820	
RATE1	••	100.000	0.0		0.0	0.0	0.0	100.000					90.396 	
			0.0		0.0	0.0	0.0	124 960	:				83.473	0.0
·	SUMMARY					CA:			LOSS			4	<b>:</b> \$91:1	 SHQ
PERIOO		1 SL AMA	L RAVALP	. WAH	RIAL	R 101					LEVEL VØ	L.	•	
	(NCN)	(HCM)	(868)	(MCM)	(ACS)	(MCK)	(MCM)	(MCM) 36.511	(NCH)	(MCH)	6 (FT) (	X(M)	(8)8) 450.26	
1961	108.747	7 36.811	0.0			0.0	0.0	36.811	3.956				2.710	ο.
1965	39.556	5 36.811 5 36.811	0.0	0.0	0.0	0.0	0.0	36.811 36.811 36.897 36.811 36.811 36.811	5.335				11.48521.690	
1964.		5 36.897	7 0.0	0.0	0.0	0.0	00	36.897	6.666				22.835	ΰ.
1965	62.737	7 36.811	0.0	0.0	0.0	0.0	0.0	36.811	5.336				8.421	υ.
1967	53.357 80.813	3 36.811	r 4.4	0.0	0.0	0.0	0.0	36.811	8.081				31.284 23.148	
1968	- 50.23C	) 36.897	0.0	0.0	0.0	0.0	0.0	70.011	8.023 2.685				0.0	ð.
1969	26.850	D: 36.811 5 36.811	0.0	0.0		0.0	0.0	30.811	11.750				\$5.778	4.
1971	117 845	5 36.811	0.0	0.0	0.0	0.0	0.0	30.811	11.786				72.177	
1972	54.84	36.897	0.0	0.0	0.0	0.0	0.0	36.897 36.811	8.814				-4 602	0.
1973	88 14 39 74	2 36.811 7 36.811	1 0.0	0.0	0.0	0.0	0 0	36.811	3.977				2.156	
1075	113.58	2 36.811	0.0	0.0	0.0	0.0	0.0	36.811	11.358	5			62.188 19.729	
[3/3]	175.58	4 36.897	7 0.0	0.0	0.0	0.0	0.0	35.811	15.810	5		3	03.258	з Ф.
1976	168.14	5 36.811	1 0.0	0.0	0.0	0.0	0.0	36.811	14.817	•		÷	97.387	( Q.
1975		5 . KA 811	1 0.0	0.0	0.0	0.0	0.0	36.811	8.831 				42 129	
1976 1977 1978 1979	88.31	2 JU.UI	<u></u>										LZ 129	. 0.
			9 0.0	0.0				-	8,003			<b>-</b>		
RATEL	88.31	100.000	0.0	0.0		0.0 0.0 0.0	0.0	100.000				· - · • • • • • • • • • • • • • • • • •		) 0.

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TABLE A. II-49(2)

#### ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

				VAT	ER DENAN	0		·		· · · · · · · · · · · ·			
		<b>ESLANA</b>	RAGALP	VAN	TAXILA	81GH1	LEFT				RESERVOIR LEVEL VOL		SHORI
	(MCM)	(NCN)	(HCH)	(ACA)	(MCN)	(MCM)	(ACM)	(HOH)	(NCN)	(HCN)	(FT) (HCN)	(NCB)	(MCH)
	108 747		0.0	0.0	0.0	0.0	0.0	40.158	10.875			62.410	0.0
1963	53,350	40.158	0.0	0.0	0.0	0.0	0.0	40.158	3.956			0.0 7.895	
1964	65.565	40.251	0.0	0.0	0.0	0.0	0.0	40.251	6.666			18.239	0.0
1965 1960		40.158	0.0 0.0	0.0	0.0	0.0	0.0	40.158	6.274			19.777	0.0
1907		40.158	0.0	0.0	0.0	0.0	0.0	40.155	8.081			4.883 27,843	
1958	\$0.230	40.251	0.0	0.0	0.0	0.0	0.0	40.158	6.023	1. A. C. C.		20.007	0.0
1920	26.820	40.158	0.0	0.0	0,0	0.0	0.0	40.158	2.685			0.0	0.0
1971	117.865	40.158	0.0	0.0	0.0	0.0	0.0	40.251 40.158 40.158 40.158 40.251 40.158 40.158 40.158 40.158 40.158 40.158 40.158	.11.786			54.009	10.369
1972	54.543	40.251	0.0	0.0	0.0	0.0	0.0	40.251	5.464		4 C	6.076	0.0
1973	38.142	40.150	0.0	0.0	0.0	0,0	0.0	40.158	8.814			~1.,,,,,	0.0
1975	113.582	40.158	0.0	0.0	0.0	0.0	0.0	40.158	11.358			0.0	0.0
1976	175.584	40.251	0.0	0.0	0.0	0.0	0.0	40.251	17,558			116.278	0.0
1978	148.146	40.158	0.0	0.0	0.0	0.0	0.0	40.158	15.810			99.618	
19/9	88.312	40.158	0.0	0.0	0.0	0.0	0.0	40.158	8.831		:	94,041	
*****	87 052	10 128	0.0			·		40.178					
• • • • • •		• • • -						40.110				39.146	0.546
RATEL		100.000	0.0	0.0	0.0	0.0	0.0	100.000				97.434	1.358
		120.000	0.0	0.0	0.0	0.0	0.0	120.000			· · · · · · · · · · · · · · · · · · ·		
							· · · · · · ·					56.608	0.0
				÷ .									
	SUMMARY O		******	OPERATI	0.8	CASE							
											يهجب فيهيستين		******
				SATE	R DEMAND	AGRICHI T	196-	TOTAL		- 633310	RESERVOIR	SPELL	SHORT
ER 100		151 488	RAP AL P	WAH .	TAXILA	RIGHT	1111				τενεί νοι.		4.
										79693	(FT) (MCM)	(HCH)	
1041	(M(M)	- (NCN) / 1 50/	0.0	0.0	0.0	0.0	0.0	43.504	10.375		(FT) (MCM)	59.796	0.0
	39.556		0.0	0.0	0.0	0.0	0.0	43.504	3.956		1	0.0	0.0
1963	53.350		0.0	0.0	0.0	Ç.Q	0.0	43.504	2.332			4.122	2.905 0.0
	66.665 62.737		0.0	0.0 . 0.0	0.0	0.0	0.0	43.606	6.274			16.719	0.0
1965		43.504	0.0	0.0	0.0	0.0	0.0	43.504 43.504	5.336			1.344	0.0
1967		43.504	0.0	0.0	0.0	0.0	0.0	43.504 43.606	- 8.081 6.023			24 400	0.0
1968 1969	60.230 26.850			0.0	0.0 0.0		0.0	43.504	2.685			0.0	4.320
	117.535		0.0	0.0	0.0	0.0		43.504				53.484	12.159
	117.865		6.0	0.0	0.0	0.0	0.0	43.504	11.785			66.229 2.722	. 0.0
1972	54.643		0.0 0.0	0.0	0.0	0.0	0.0	43.606	5.444 8.814			37.717	0.0
1974		43.504	0.0	0.0	0.0	0.0	0.0	43.504	3.977		•	0.0	0.0
	113.582		0.0	0.0	0.0	0.0	0.0 0.0	43.504 43.606	11.358			56.034	5.036 0.0
1976	175.584	43,606 13 501	0.0	0.0	0.0			43.504				95.978	6.0
	140.166		0.0	0.0	0.0	0.0	0.0	43.504 43.504	14.817	· · · · ·	5. 	90.859	.0.0
	86.312		0.0	0.0	0.0	0.0	0.0.	43.504	8.831			41.249	0.0
	87.052	43.526	0.0	0.0	0.0	0.0	0.0	43.526	8.705		· · · ·	36.587	_ 1:28S
												84.058	2.953
ATEL		100.000	0,0	0.0		0.0		100.000					
14162						0.0	0.0	130.000			÷.,	80.945	0.0
		•••••											
									1.1			14.00	
4	SUMMARY O	F SIMLY A	ESERVOIR	OPERATI	ON	CASE		توالمعتدية والم		/	Sector de la contra de la contr		
				WATE	R DEMAND	• • • • • • • • •	·				·		
EN 100	191109	ATER SUP	PLY	14005791	AL	AGRICULI	1567	TOTAL	LOSS	OTHER -	RESERVOIR	SPILL	SHORT
											LEVEL VOL.		
	(864)	(NCM)	(MCM)	18683	(MCM)	(8,8)	(808)	(MCM)	(MCM)	(868)	(FE) (MCM)	(MCM) 57.183	(2)
1961 1962			0.0	9.0	0.0	0.0	0.0	46.851	. 10.075			0.0	0.0
1963	39.556 53.350 66.565 62.737 53.557	46.851	0.0					11 961	5 115			3.636	8.824
1954	66.565	48.960	0.0	0.0	0.0	0.0	0.0	46.851 46.851 46.851	6.666 . x 271			11.220	
1965 1956	02.737 53.597	46,851	0.0	0.0	0.0	0.0	0.0	46.851	5.336			0.0	0.899
1967	89.315	5.000	0.0	0.0	0.0	0.0	0.0	46.851	8.081			19.661	0.0
1968	66.230	46.960	0.0	0.0	0.0	0.0	0.0	45.960 46.851	0.025			13,876	0.0
1969	26.850	46.851 46.851	U.U	0.0				46.851	11.754			52.517	
1971	117.865	46,851	9.0	0.0	0.0	0.0	0.0	45.851	11.786			43.075	. 0.0
1975	54.643	16.960	0.0	0.0	0.0	0.0	0.0	46.960 46.851	0 417		1. Sec. 1	0.0 33.641	. 4.0
1973	88.142 39.767	40.001	0.0	0.0	0.0	0.0	0.0	46.851	3.977			0.0	1,525
1975	113.582	46.851	0.0	0.0	0.0	0.0	0.0	46.851	11.358		· · · · ·	55.355	9.430
1976	175.584	46.960	0.0	0.0	0.0	0.0	0.0	46.960	17.558		12 C	109.241 92.338	0 0
1977 1978	120.099	46.851	0.0	0.0	0.0	0.0	0.0	46.851	14.817		1 - C. A.	87.306	0.0
	88.312	46.851	0.0	0.0	0,0	0.0	0.0	40.031 40.031 40.851 40.960 40.851 40.851	8.831			-38.075	0.0
1979												34.279	
	A1 010			0.0	0.0	9.9	~.v					_	
MEAN	87.052				جد ولد د د م								
MEAN	87.052	100,000	0.0	0.0	0.0	0.0	0.0	100.000				73.131	4.858

### TABLE A. 11-49(3)

### ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

		-WATER SU	RAVALP	- INGUSTR Vah	TAL TAXILA	-AGRICUL RIGHT	TURE- LEFT	TOTAL			LEVEL	VOL.	SPILL	SHORE
	(MCM)		CHERS	(HCH)	(MCH)	(HCH)	(MCM)	ENCHE	(NCF)	(MCN)	( 1 1 3	(MCM)	(MCM)	1808
1961	108,747	50.197	0.0	0,0	0.0	0.0	0.0	50 197	10.875				54.559	0.0
1962	39.556	50.197	0.0	0.0	0.0				3.955				0.0	2.00
1963	\$3,350	50.197		0.0		0.0		50.197					3.149	
1964	66.665	50.314	0.0	0.0	0.0	0.0	0.0	50.31	4.055				7,882	0.1
1965	62.737	50.197 50.197	0.0	0.0	0.0	0.0			8.274				10.564	0.0
1986	53.357	50.197	0.0	0.0	0.0	0.0	0.0	50.197	5.336				0.0	8.8 0.0
		50.197	0.0	0.0	0.0 0.0	0.0	0.0	50.197					10.810	0.0
1968		50.314	0.0	0.0	0.0	0.0	0.0	50.314					0.0	13.2
1969		50 197	0.0	0.0	0.0	0.0	0.0	50.197 50.197	2.685				51.549	
1970	117.535	50.197	0.0	0.0 0.0	. 0.0			50 197					250.00	0.0
1971	117.865	50.197	. 0.0	0.0	0.0	0.0	0.0	50 117	11.700				0.3	. õ. õ
1972	54.643	50.31	0.0	0.0	0.0	0.0	<u>~</u>	50.197	5 817				26.822	0.0
1973	88.142	50.197	0.0	0.0	0.0	0.0	2.0	\$0.197	3 977				0.0	4.3
1974	24.101	50.197	0.0	0.0	0.0	0.0	0.0	50 192	11 358				54.577	
1912	113.384	50.197	0.0	0.0	0.0	0.0	0.0	50 314	17 558				105.894	0.0
1976	173.384	50.197 50.314 50.197 50.197 50.197 50.314 50.197 50.197 50.197	0.0	0.0	0.0	0.0	0.0	50.197	15.810				88.598	0.0
1977	130.097	50.197	0.0	0.0	0.0	0.0	0.0	50.197	16.817				81 753	. 0.4
1970	98 1120	50 197	0.0	. 0.0	0.0	0.0	0.0	50.197	8.831	-			35,222	ΰ.
		50.222						· · · · · · · · ·	8 705			*	32.107	
ومدمقيه						*******						*	· · · · · · · · · · · · · · · ·	~~~~
RATE1		100.000			<b></b>		******		·····			*	63.930	
RATE2		150,000	0.0	0.0	0.0	0,0	0.0	150.000					71.033	с.
		OF SIMLY		R OPERAT	10N	CAS	£= 9						······································	
		-WATER SU	IPPLY	R OPERAT	ION ER DEMAN	CAS 0 -AGRICUL	£ = 8 	TOTAL	LOSS	DIFFER -	#ESERV	018	SPILL	
	INFLOW	-WATER SU ISLAMA	SPPLY RAVALP	R OPERAT VAT -LNDUSTR VAH	ION ER DEMAN ILAL TAXILA	CAS 0 -AGRICUL RIGHT	E = 0  IURE- LEFT	TOTAL	LOSS	D(/FER -	#ESERV LEVEL	018 VQL.	SPILL	5+D: 
	INFLON (MCH)	-WASER SU ISLAMA (MCH)	SPPLY RAWALP	R OPERAT VAT VAT VAT  VAH 	ER DEMAN ILAL TAXILA	CAS 0 -AGRICUL RIGHI (NCM)	E = 0 IURE- LEFI (SCS)	TOTAL	LOSS	D(FFER -	#ESERV LEVEL	018 VQL.	3PILL (NCN)	(M
	(MCH) 108.747	-WATER SU ISLAMA (MCH) 53.544	RAVALP	R OPERAT WAT -LNBUSTR WAH 	ER DEMAN ILAL TAXLLA (MCM) D.D	CAS 0 AGRICUL RIGHI (NCM) 0.0	E = 0 IURE- LEFT (HCM) 0.0	TOTAL (MCM) 53.544	LOSS (H(M) 10.875	D(FFER -	#ESERV LEVEL	018 VQL.	3PILL (MCM) 51,955	(M 0.
PER100	ENFLOW (MCM) 108.747 39.555	-WASER SU ISL'AMA (MCN) 53,544 53,544	RAVALP	R OPERAT WAT -LNBUSTR WAH 	TAXLLA (HCN) 0.0	CAS 0	E = 8 IURE- LEFT (MCM) 0.0 0.0	TOTAL (MCM) 55.544	LOSS (H(M) 30.875 3.956	D(FFER	#ESERV LEVEL	018 VQL.	3PILL (MCM) 51.955 0.0	(M 0. 4.
ERIDO 1961 1962 1963	(MCH) (MCH) 108.747 39.554 53.350	-WATER SU ISLAMA (MCN) 53,544 53,544 53,544	RAVALP	R OPERAT WAT -LNBUSTR WAH 	10N FER DEMAN ILAL	CAS - AGRICUL RIGHI - (NCM) 0.0 0.0 0.0	E = 8 IURE- LEFT (NCM) 0.0 0.0	TOTAL (MCM) 53.544 53.544	LOSS (H(M) 10.875 3.956 5.335	0(/FER	#ESERV LEVEL	018 VQL.	SPILL (MCM) 51.955 0.0 2.663	(X 0. 4. 15.
ER100 1961 1962 1963 1964	(NFLOW (MCN) 108.747 39.555 53.350 65.665	-WATER SU ISLAMA (MCN) 53.544 53.544 53.544 53.544	RAVALP	R OPERAT WAT -LNBUSTR WAH 	10N EER DEMAN (ILAL TAXILA (NCN) 0.0 0.0 0.0 0.0	CAS - AGRICUL RIGHI (NCM) 0.0 0.0 0.0 0.0	E = 8 IURE- LEFT (MCM) 0.0 0.0 0.0	TOTAL (MCM) 53.544 53.544 53.649	LOSS (H(M) 10.875 3.956 5.335 5.366	D(/FER - (MCM)	#ESERV LEVEL	018 VQL.	3PILL (MCM) 51.955 0.0	(X 0 4 10 2
ERIDO 1961 1962 1963	[NFLOW (MCH) 108.747 39.554 53.350 66.665 62.737	-WATER SU ISLAMA (MCN) 53,544 53,544 53,544 53,649 53,649	(ACM) 0.0 0.0 0.0 0.0 0.0 0.0	R OPERAT WAT -LNBUSTR WAH 	10N EER DEMAN ILAL	CAS - AGRICUL RIGHI - (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	E = 0 IURE- LEFT (MCM) 0.0 0.0 0.0 0.0	10TAL (MCM) 53.544 53.544 53.640 53.640 53.650	LOSS (H(M) 10.875 3.956 5.335 6.366 6.772	DIFER -	#ESERV LEVEL	018 VQL.	3P1LL (MCM) 51.955 0.0 2.663 7.107 7.10	(X 0 4 15 2
ERIDO 1961 1962 1963 1964 1965 1966	INFLOW (MCM) 108.747 39.555 53.350 68.737 53.357	-WAIER SU ISLAMA (MCN) 53.544 53.544 53.544 53.544 53.544 53.544	(HCH) 0.0 0.0 0.0 0.0 0.0	R OPERAT	10N ER DEMAN I(AL	CAS - AGRICUL RIGHI (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 0 IURE- LEFI (NCM) 0.0 0.0 0.0 0.0	TOTAL (MCM) 53.544 53.544 53.640 53.640 53.544 53.544	LOSS (H(M) 10.875 3.956 5.335 6.566 6.274 5.336	017FER	#ESERV LEVEL	018 VQL.	5P1LL (NCN) 51.955 0.0 2.663 7.107	(X 0. 4. 10. 2. 0. 3.
1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[/FER	#ESERV LEVEL	018 VQL.	5P1LL (MCM) 51.955 0.0 2.663 7.107 7.410 0.0	(X 0 4 10 2 0 5 0
1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[/FER	#ESERV LEVEL	018 VQL.	SPILL (MCM) 51.955 0.0 2.663 7.107 7.410 0.0 11.611 7.745 0.0	(X 0. 4. 16. 2. 0. 5. 0. 0. 17.
1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	5P1LL (NCM) 51,955 0.0 2.663 7.107 7.410 0.0 11.611 7.745	(X 0. 4. 16. 2. 0. 5. 0. 17. 17.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	SPILL (MCM) 51,955 0.0 2,663 2,663 2,663 7,107 7,107 7,107 0.0 11,611 7,745 0.0 50,582 56,947	(X 0. 4. 16. 2. 0. 5. 0. 0. 17. 17. 17.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	5P1LL (NCM) 51,955 0.0 2.663 7.107 7.410 0.0 11.611 7.745 6.0 50.582 50.582 56.947 0.0	(X 0. 4. 18. 2. 0. 5. 0. 3. 17. 17. 17. 0.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	5P1LL (MCM) 51.955 0.0 2.663 7.107 7.210 0.0 11.611 7.745 0.0 50.552 56.947 4.0 20.025	(8 0. 4. 18. 2. 0. 5. 0. 17. 17. 0. 0.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	5P1LL (NCM) 51,955 0.0 2,663 7,107 7,-107 0.0 11,611 7,745 0.0 50,582 56,927 0.0 20,025 0.0	(8 0 4 18 2 0 5 - 0 17 - 17 - 17 - 0 , 0 5 - 0 , 17 - 0 , 0 , 0 5 - 0 , 0 5 - 0 , 0 5 - 0 , 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 5 - 0 - 1 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0
1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	5P1LL (MCM) 51,955 0.0 2.663 7,107 7,-10 0.0 11.611 7,745 6.0 50,552 56,947 0.0 20.025 0.0 53,998	(* 6. 2. 3. 3. 3. 3. 17. 17. 0. 5. 3. 16.
PER100 1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	SPILL (KCM) 51,955 0,0 2,663 7,107 7,-10 0,0 11,611 7,745 6,0 9,552 56,927 1,0 0,025 6,0 9,0 9,522 0,025 6,0,0 0,0 3,998 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 102,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10,112 10	(%) 0.5 18.5 0.5 0.5 0.5 0.5 0.5 17.1 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
1961 1962 1963 1964 1965 1966	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	SPILL (KCM) 51,955 0.0 2.663 7.107 7.107 7.107 0.0 1.611 1.611 7.745 6.0 50.582 56,942 20.025 56,942 0.0 20.025 1.0 20.025 1.0 20.025 1.0 3,998 1.0 21.12 8,095 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 1.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.0 20.025 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.007 2.0	(X 0. 4. 5. 0. 5. 0. 17. 17. 17. 17. 17. 16. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	SPILL (KCM) 51.955 0.0 2.663 7.107 7.410 0.0 11.611 7.745 6.9 5.955 26.927 1.0 20.025 5.928 102.128 85.057 81.712	(X 0- 18. 2. 0- 5. 0. 17. 17. 17. 17. 0. 0. 5. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
1961 1962 1963 1964 1965 1965	INFLOW (MCH) 108.747 39.554 53.350 65.455 62.737 53.357 80.813	-WASER SU ISLAMA (HCM) 53.544 53.544 53.544 53.649 53.544 53.544 53.544 53.544	(RCH) RAWALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT	10N CER DEMAN (LAL	CAS - AGRICUL RIGHT (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 8 IURE - LEFT (MCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	TOTAL (MCM) 53,544 53,544 53,669 53,544 53,544 53,544 53,544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0[FFER	#ESERV LEVEL	018 VQL.	SPILL (KCM) 51,955 0.0 2.663 7.107 7.107 7.107 0.0 1.611 1.611 7.745 6.0 50.582 56,942 20.025 56,942 0.0 20.025 1.0 20.025 1.0 20.025 1.0 3,998 102.113 85.057	(% 0- 16. 2. 0. 5. 0. 17. 17. 17. 17. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
1961 1962 1963 1963 1964 1965 1966 1967 1978 1970 1972 1975 1976 1977 1977 1977	1NFLOW (MCM) 108,747 39,555 53,350 645,665 62,2737 80,813 645,655 62,2737 80,813 645,655 64,647 84,847 117,555 117,865 54,647 39,767 113,586 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 117,555 1	-WATER SU ISLAMA (MCH) 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,5706 53,5706 53,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 54,5706 55	IPPLY - RAVALP (HCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT WAT 	10N TER DEMAN TATLLA TATLLA (NCN) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	CAS - AGRICUL RIGHI (NCN) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 0 IURE - LEFI (NCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	TOTAL (MCM) 53.542 53.542 53.542 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 54.544 54.544 54.544 54.544 54.544 54.544 54.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544 55.544	LOSS (H(M) 10.875 3.956 5.335 5.566 6.274 5.336 8.051	0(/FER - (%CM)	#ESERV LEVEL	018 VQL.	SPILL (KCM) 51.955 0.0 2.663 7.107 7.410 0.0 11.611 7.745 6.9 5.955 26.927 1.0 20.025 5.928 102.128 85.057 81.712	(X 0. 4. 16. 2. 0. 5. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
1961 1962 1963 1963 1964 1965 1966 1967 1978 1970 1972 1975 1976 1977 1977 1977	1NFLDW (MCH) 108.747 39.555 53.350 64.737 80.813 64.2737 80.813 64.2737 80.815 75.855 117.555 117.566 54.642 88.162 131.568 131.568 131.568 148.164 83.313 87.055	-WAIER SC ISLAMA (MCM) 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 53,544 54,545 54,545 55,546 54,545 55,546 55,546 54,545 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,546 55,5466 55,546 55,5466 55,5466 55,5466 55,5466 55,5466 55,5466 55,5466 55,5466 56,5466 56,54666 56,546666 56,546666 56,546666666666666666666666666666666666	(RCH) (RAVALP RAVALP RAVALP (RCH) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	R OPERAT 	10N TER DEMAN (IAL TATILA (NCN) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	CAS - A6R ICUL R IGH I (MCN) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	E = 0 IURE - LEFI (KCM) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	T07AL (KCM) 53.542 53.542 53.542 53.542 53.542 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544 53.544	LOSS (HCM) 10.875 3.956 5.306 6.274 5.336 8.031 6.023 2.365 11.756 11.756 5.316 8.317 7.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 15.810 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 17.555 15.557 15.557 17.555 15.557 15.557 17.555 15.557 17.555 15.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.557 17.5577 17.5577 17.5577 17.5577 17.5577 17.5577 17.5577 17.55777 17.55777 17.55777 17.55777 17.55777777 17.557777	0(/FER - (%CM)	#ESERV LEVEL	1014 VQL. (мсн)	SPILL (KCN) 51,955 0.0 2.643 7.107 7.410 0.0 11.611 7.745 0.5 50,552 56,942 0.0 20.025 56,942 0.0 20.025 1.0 33,998 102,114 85,057 81,712 52,550	(M 0. 4- 15. 2. 0. 2. 0. 0. 0. 17. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.

#### TABLE A.II-49(4) ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

PERIOD	LNF1.09	-WATER SU ISLAMA	IPPEY RAWALP	LNDUSTR WAH	ER DENAN IIAL IAXILA	- AGRIEUL RIGHT	TURE- L'EFT	TOTAL	LOSS	DIFFER	RESERVO LEVEL	1R VOL.		
	(SCID	(HEN)	(HCM)	(NCM)	(ЯСЯ)	сяснэ	(1101)	(NEM)	(нсн)	(MCM)	(fr)	(868)	(HCH)	снсн
1961	108.747 39.556 53.350	33.465	0.0	0.0	0.0	0.0	0.0	33 465	10.875				67.638	0.0
1945	39,556	33.465	0.0	0.0	0.0	0.0	0.0	33.465	5.335	1			16.928	0.0
1964	66.665	33,543	0.0	0.0	0.0	0.0	0.0	33.543	6.666				25.140	0.0
1965	62.737	33.445	0.0	u.o	0.0	V.V	0.0	11.401	0.414				23.693	0.0
1965	53.357	33,465 33,465	0.0	0.0	0.0			33.465 33.465					11,940 34,729	0.0
1967	A0 230	33,543	0.0		0.0			33.543					29.330	0.0
1969	26.850	33.465	0.0	0.0	0.0	0.0	0.0	33.465	2.645				0.0	0.0
1970		33.665	0.0					33 465					58.608	0.0
1971		33.655	0.0					33.465 33.543					75.129	0.0 0.0
													48.036	0.0
1976	39.767	33.465	0.0	0.0	0.0	0.0	0.0	33.465	3.977				5,310	0.0
1975	113.582	33.465	0.0	0.0	0.0	0.0	0.0	33,465	17 550				65,738 123,167	0.0
1976	158.099	33,465	0.0	0.0	0.0	0.0	ě.ě	33.465	15.810				106 399	. 0. 0
1978	148.160	33.485	0.0	0.0	0.0	0.0	0.0	33.465	14.817				100 734	9.6
1979	88.312	33.485 33.485 33.543 33.685 33.485 33.485 33.485	0.0	. 0.0	0.0	0.0	0.0	33.465	8.831				49 994	. 0.0
	87.052	33.481	0.0	0.0	0.0	0.0	0.0	33.481	8.705				45 200	9.0
RATE1		100.000		0.0		0.0		100.000					135.000	
RATEZ		100.000			0.0			100.000			*	* * *	100.000	
,	•			*						*				
		DE STRLY 8					E = 2							
	INFLOW -	WATER SUS	PPLY	WATT	ER DEMANO	AGRICUC	TURE-	TOTAL			RESERVOI		SPILL	SHORT
									/H/N				(HCH)	
1961	308 747	41.814	0.0	0.0	0.0	0.0	0.0	41.814	10.875	(aca)	(71)	(ALB)	61.355	0.0
1962	39.556	41.814	0.0	0.0	0.0	0.0	0.0	41.814	3.956		· .		0.0	0.0
1953	53.350	41.814	0.0	0.0	0.0	0.0	0.0	41.814	5.335				6.364	0.0
1964	66.665	41.929	0.0	0.0	0.0	0.0	0.0	41.929	6 666				16.571 18.093	0.0
1965	53.357	41.814	0.0	0.0	0.0	0.0	0.0	41.814	5.336				3.245	
1967	80.813	41.814	0.0	0.0	0.0	0.0	0.0	41.814	8.081					0.0
1948	60.230	41.929	0.0	0.0	0.0	0.0	0.0	41.929	6.023				18.31)	0.0
1989	26.850	41.814	0.0	0.0	0.0	0.0	0.0	41.814	11 75/				0.0 42.710	0.0
1975	117.865	41.814	0.0	0.0	0.0	0.0	0.0	41.814	11.786				67.531	0.0
1972	56.663	41.929	0.0	0.0	0.0	0.0	0.0	41.929	5.464		-		4.399	0.0
1973	88.142	41.814	0.0	0.0	0.0	0.0	0.0	41.814	8.814				39_512	0.0
1974	39.767	41.814	0.0	0.0	0.0	0.0	0.0	63.814 63.814	11.358				0.0 54 338	0.0
1976	175.584	61.929	0.0	0.0	0.0	0.0	0.0	41.929	17.558				114.610	0.0
1977	158.099	41.814	0.0	0.0	0.0	0.0	0.0	41.814	15.810	· · ·			97.936	0.0
1978	148.166	41.814	0.0	0.0	0.0	0.0	0.0	41.814	14.817			-	92.385 42.626	
	87 052	41.838	6.0	0.0.	0.0	0.0	8.0	41.838	8 705				37.062	
******		******								<b>-</b> *;*				
RAI{]		100.000	0.0	0.0		0.0		100.000			<b></b>		88,585	
RATE?		124.960	9.0	0.0	0.0	0.0		124.960					81.997	0.0
5	SUMMARI (	)F 51KLY	AESERVOI:	R OPERAT	1 Q N	CAS	Ex 3			• •				
				¥AII	ER DEMAND	)			-		· <b>-</b>	• • • •	<b>-</b> ****	
		WATER SU	PPLY	-INDUSTRI NAD	TAXILA	AGRICUL RIGHS	TURE- LEFT	TOTAL				101.	SPILL	SH081
	(n(n)	(8(8)	14647	(n(n)	(MCH)	(HLH)	(#(#)	(HCK)	(MCM)	(MCN)	(11)		(NCR)	(1)(1)
1961	108.747	36.81)	0.0	0.0	0.0	0.0	0.0 0 0	- 30.811 - 36 811	10.875	·			65.024 2.710	0.0
1962	53.356	36.811	0.0	0.0	0.0	0.0	0.0	36.811	5.335				11,485	
1964	66.665	36.897	0.0	0.0	0.0	0.0	0.0	36.897	6.665				21.690	0.0
1965	62.737	36.811	0.0	0.0	0.0	0.0	0.0	36.811	6.274				22.835	
1966	53.357 80 PT	36 811	0.0 0 A	0.0	0.0	0.0	0.0	36.811	8.081				31.284	
1948	60.230	36.897	0.0	0.0	0.0	0.0	0.0	36.897	6.023				23.168	0.0
1965	26.850	36.811	0.0	0.0	0.0	0.0	0.0	36.811	2.685				0.0	0.0
1970	117.535	36.811	0.0	0.0	0.0	0.0	0.0	56 811 36 811	11.754				51.425 72.177	0.0
1972	54.643	36.897	0.0	0.0	0.0	0.0	0.0	36.897	5.464			· .	9.430	0.0
	88.142	118.36	0.0	0.0	0.0	6.0	0.0	36.811	8.814				44.602	0.0
1973	35.767	36.811	0.0	0.0	0.0	0.0	0.0	36.811	3.977				2 154	0.0
1973	113.582	36 897	0,0 0 ^	0.0	0,0	0.0	0.0	36.897	17 554	1 .			62.188	0.0
1973	1 1 . 201	\$6.811	0.0	0.0	0.0	0.0	0.0	36.811	15.810				103.258	0.0
1973 1974 1975 1976 1976	158.099	14 011	0.0	0.0	0.0	0.0	0.0	36.811	14.817				97.387	0.0
1973 1974 1975 1976 1976 1978	158.09V 148.166	30.011		~ ~	0.0	0.0	0.0	36 811	8.831		100 A		47.134	0.0
1973 1974 1975 1976 1976 1978 1978	158.099 148.166 88.312	36.811	0.0	U.U 										
MEAN	87.052-	36.829	0.0	0.0	0.0	0.0		30.027	0.705				41,900	0.0
MEAN 	87.052	10.029	0.0 	0.0	0.0	0.0 	0.0	100.000	0.705			<b>i</b>	41.900	0.0

TABLE A.I-49(5)

# TABLE A. II-49(5) ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

		F SIMLY F			DN .	r 857	2 L							
		WATER SU		WATE	R DEMAND	AGRICULT	URE-	TOTAL		DIFFER	RESERVOIR	~ S		SHORT
-EK108		ISLAMA	RAVALP	WAH Secondaria	EAXELA.	*1681	L C F 1							
	(MCN)	(MCM)	INCHA	( 9 ( 8 )	CHCHO	(MCM)	(HCH)	(MCM)	(MCM)	(8(8)	(EL) (M	CH3	(HCM) 2.410	0.0 (RCM)
1961	108.747	40.158	0.0	0.0	0.0	0.0	0.0	40.158	3.950				0.0	0.0
1963	\$3.350	40.158	0.0	0.0	0.0	0.0	0.0	40.158	5.335 6.666				7.694	0.0
1964	60.005	40.253	6,Q 6 0	0.0	0.0	0.0	0.0	40.158	6.274				9.777	0.0
1044	\$3.357	40.158	0.0	0.0	0.0	0.0	0.0	40.156	5.336				4.887	0.0
1967	GA 841	10 158	0 0	0.0	6.0	0.0	0.0	40,158 40,251	8.081 6.023				0.007	0.0
1968	20.250	40.251	010	0.0	0.0	0.0	0.0	40,158	2.585				0.0	0.0 0.0
1970	117.535	40.158	0.0	0.0	0.0	0.0	0.0	40.158 40.158					9.225	0.0
1971								40.251	5.464				6.076	0.0
1973	88.142	40.158	0.0	0.0	0.0	0.0	0.0	40.158 -	8.814 3.977				0.0	6.0
1974								10.158	11 158				7.650	0.0
1976	175.584	40.251	0.0	0.0	0.0	0.0	0.0	40.251	17.558					0.0
1977	158.099	40.158	0.0	0.0	0.0	0.0	0.0	40.158	14.817			1	94.041	
1979	88.312	40.158 40.251 40.158 40.158 40.158	0.0	0.0	0.0	0.0	0.0	40.158	8.831				.4.274	
		40,178	0.0	0.0	0.0	0.6	0.0	40.178	8.705				38.501	
**												*	¥5.075	8.0
RATES		100,000		0.0										- <u></u> -
RATE?	•	150.000	0.0	0.0	0.0		0.0	120.000	1-			: *	85.401	в.o 
*												•		58081
PERIOD											RESERVOIA		<b>-</b>	
	(HCH)	(NCH)	CHCHD	(MCH)	(MCM)	(HCM)	( MCM)	(HEM)	(H(N)	. (NCM)	(FT) (	scay -	(KCN) 59.796	
1961	108.747	43.504	0.0 0.0	0.0	0.0 . 0.0	0.0	0.0	43,504	3.956				0.0	0.0
1963	53.350	43.504	0.0	0.0	0.0	0.0	0.0	43.504	5.335				1.216	0.0
1964	66.665	43.806	0.0	0.0	0.0	0.0	0.0	43.504	6.274		· · · ·		16.719	0.0
1965	53.357	43.504	0.0	0.0	0.0	0.0	0.0	43.504	5.336				1.343	0.0
1967	80.813	43.504	0.0	0.0	0.0	0.0	0.0	43.504	8.081		-		24.400	
1968 1969	40.230 26.850	43.606	0.0 D.0	0.0	0.0	0.0	0.0	43.504	2.685		:	· .	0.0	0.0
1970	117.535	43.504 43.504	0.0	0.0	0.0	0.0	0.0	43.504	11.754				41.842	41.63 Q.0
1971	117.865	43.504	0.0	6.C 0.0	0.0	0.0	0.0	43.000	5.464				2.722	0.0
1973	88.142	43.504	0.0	0.0	0.0	0.0	0.0	43.504	8.814				37.717	0.0
1974	39.767	43.504	0.0	0.0	0.0	0.0	0.0	43.504	11.358				0,0 50,997	0.0
1976	175.584	43.606	0.0	0.0	0.0	0.0	0.0	43.606	17:558			3	12.785 93.978	0.0
1977	158,099	43.504	0.0	0.0	0.0	0.0	0.0	43.504	14.817				90.859	0.0
1979	88.312	43.504 43.504 43.504 43.504 43.504 43.504 43.504 43.504 43.504 43.504	0.0	0.0	0.0	0.3	0.0	43.504	8.831				41.249	0.0
* MEAN	87.052	43.526	0.0	0.0	0.0	0.0	0.0	43.526	8.705				35.545	0.2
		100.000			0.0	0.0	0.0	100.000					81,665	0.5
								130.000					78.641	0.0
RATES	<b>.</b>	130.000	0.0			*-				- • • •				
	SUNNARY	OF STALT	RESERVO	IR OPERA	DN	CAS	SE. = 6					• -		
											RESERVOIR	2	SPILL	5409
PERIOD		ISLAMA	RAWALP	WAH	TAX I L A	RICHI	1.5							
<u> </u>				*		(N(X)	(MJM)	(80.8)	1711	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(573	(NCH)		
	108.74	7 46.851	<b>n</b> n ·	0.0									57,183 0.0	
1961	20 55	4 72 851	0.0	0.0	0.0	0.0	0.0	46.851 46.851 46.960 46.851	5.33	5			0.0	3.3
1962		n /A 851	0.0	0.0	0.0	0.0	0.0	46.960	6.65				5.032 13.661	0.0 A
1962 1963	53.35	5 46.940	0.0		0.0	0.0	0.0	46.851	6.27	5			13.661	0.0
1962 1963 1964 1965	53.35	5 46.960 7 46.851	0.0			0.0	0.0	40.076	8.08	¢.			18.762	0.0
1962 1963 1964 1965 1965	53.35 66.66 62.73	7 40.031	0.0	0.0	0.0	6.0	0.0	0.07	4 62	1				6.1
1962 1963 1964 1965 1966 1966 1968	53,35 66,66 62,73 53,35 80,81 60,23	7 46.851 3 46.851 0 46.960	0.0 0.0 0.0	0.0	0.0 0.0 0.0	0.0	0.0	46.960	0.02 2.64	5			0.0	10.
1962 1963 1964 1965 1966 1966 1967 1968	53,35 66,66 62,73 53,35 80,81 60,23 26,85	7 46.851 7 46.851 3 46.851 0 46.960 0 46.851	0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	46 851	2.68	5			0.675	
1962 1963 1964 1965 1966 1967 1968 1969 1970	53.35 66.66 62.73 53.35 80.81 60.23 26.65 117.53 117.86	7 (6.851 7 (6.851 3 (6.851 0 (6.960 0 (6.960 0 (6.851 5 (6.851 5 (6.851	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	46.851 46.851 46.853	2.68 11.75 11.78	5 6			40.675 63.075	
1962 1963 1964 1965 1966 1966 1967 1968 1969 1970 1971	53,35 66,66 62,73 53,35 80,81 60,23 26,65 117,53 117,53 117,54	7 (6.85) 7 (6.85) 3 (6.85) 0 (6.960 0 (6.960 0 (6.85) 5 (6.85) 5 (6.85) 3 (6.960	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	46.851 46.851 46.851 46.853	2.68 11.75 11.78 11.78 5.46 5.81	5 ( 6 (			40.675 63.075 0.0 33.641	0.0
1962 1963 1964 1965 1966 1966 1969 1969 1970 1971 1972 1973	53,35 66,66 62,73 53,35 80,81 60,23 26,65 117,53 117,53 117,86 54,64 88,14	7 (6.85) 7 (6.85) 3 (6.85) 0 (6.960 0 (6.960 0 (6.85) 5 (6.85) 5 (6.85) 3 (6.960 2 (6.85) 3 (6.960 2 (6.85) 3 (6.85) 5 (6.85) 5 (6.85) 5 (6.85) 5 (6.85) 6 (7) 6 (7)		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	46.851 46.851 46.851 46.851 46.960 46.951	2.68 11.75 11.78 5.46 8.81	5 6 6 6 7			20.675 63.075 0.0 33.641 0.0	0 0 0
1962 1963 1964 1965 1966 1966 1968 1969 1970 1971 1972 1973	53,35 66,66 62,73 53,35 80,81 60,23 26,65 117,53 117,53 117,86 54,64 88,14	7 (6.85) 7 (6.85) 3 (6.85) 0 (6.960 0 (6.960 0 (6.85) 5 (6.85) 5 (6.85) 3 (6.960 2 (6.85) 3 (6.960 2 (6.85) 3 (6.85) 5 (6.85) 5 (6.85) 5 (6.85) 5 (6.85) 6 (7) 6 (7)		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	46.851 46.851 46.851 46.851 46.960 46.951	2.68 11.75 11.78 5.46 8.81	5 6 6 6 7			20.675 63.075 0.0 33.641 0.0 24.201 109.243	0 0 0 0
1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976	53,35 66,66 62,73 53,35 80,81 60,23 26,65 117,53 117,86 54,64 88,14 39,76 113,58 113,58	7 (6.85) 3 (6.85) 3 (6.85) 0 (6.85) 0 (6.85) 5 (6.85) 5 (6.85) 3 (6.950) 3 (6.950) 2 (6.851) 2 (6.851) 2 (6.851) 2 (6.851) 2 (6.851) 3 (6.851) 3 (6.851) 4 (6.851) 3 (6.851) 4 (6.851) 5 (6.851) 7 (6.85		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.853 46.853 46.853 46.853 46.851 46.851 46.851	2.68 11.75 11.78 5.46 5.46 5.81 3.97 11.35 17.35 15.81	5 6 6 6 7			20.675 63.075 0.0 33.641 0.0 24.201 109.243 92.338	0 0 0 0 0
1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975	53,35 66,66 62,73 53,35 80,81 60,23 26,65 117,53 117,86 54,64 88,14 39,76 113,58 113,58	7 (6.85) 3 (6.85) 3 (6.85) 0 (6.85) 0 (6.85) 5 (6.85) 5 (6.85) 3 (6.950) 3 (6.950) 2 (6.851) 2 (6.851) 2 (6.851) 2 (6.851) 2 (6.851) 3 (6.851) 3 (6.851) 4 (6.851) 3 (6.851) 4 (6.851) 5 (6.851) 7 (6.85		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.853 46.853 46.853 46.853 46.851 46.851 46.851	2.68 11.75 11.78 5.46 5.46 5.81 3.97 11.35 17.35 15.81	5 6 6 7 8 8 0 7			20.675 0.0 33.641 0.0 24.201 109.243 92.338 87.806 38.095	0 0 0 0 0 0 0 0
1962 1963 1964 1965 1966 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978	53,35 66,66 62,73 53,35 80,81 60,23 26,85 117,53 117,53 54,64 88,14 39,76 113,58 175,58 158,09 148,16 88,31	<ul> <li>(6.85)</li> <li>(7.85)</li> <li>(7.85)</li></ul>			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.851 46.950 46.851 46.851 46.950 46.851 46.851 46.851	2.68 11.75 11.76 5.46 5.81 3.97 11.35 17.55 15.81 1.4.81 8.83	5 6 6 7 8 8 8 0 7 1			20.675 0.0 3.641 0.0 24.201 109.241 92.338 87.806 38.095	0.0 0.1 0.1 0.1 0.1 0.1
1962 1963 1964 1965 1964 1965 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978	53.35 66.66 62.73 53.35 80.81 60.23 26.65 117.53 117.84 54.64 39.76 54.64 39.76 113.58 175.58 158.09 148.16 88.31	7 (6,85) 3 (6,85) 3 (6,85) 0 (6,85) 5 (6,85) 5 (6,85) 5 (6,85) 3 (6,85) 3 (6,85) 7 (6,85) 7 (6,85) 7 (6,85) 6 (6,85) 6 (6,85) 6 (6,85) 6 (6,85) 6 (6,85) 7 (6,8			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.851 46.851 46.851 46.851 46.851 46.851 46.851	2.68 11.75 11.78 5.46 5.46 5.46 5.46 5.46 1.35 1.35 1.35 1.581 1.4.81 5.83	5 6 7 8 8 0 7 1		*-	40.675 63.075 0.0 33.641 0.0 44.61 103.243 92.338 67.806 38.095 32.568	0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1
1962 1963 1964 1965 1966 1967 1968 1970 1977 1978 1970 1973 1974 1977 1978 1977 1978	53, 35 66, 66 62, 73 53, 35 80, 81 60, 23 26, 65 117, 86 54, 64 54, 64 54, 64 54, 64 54, 64 54, 64 54, 64 54, 64 55, 64 65, 64 55, 64, 64 55, 64, 64 55, 64, 64, 64, 64, 64, 64,	7 (6.85) 3 (6.85) 3 (6.85) 0 (6.85) 5 (6.85) 5 (6.85) 5 (6.85) 7 (6.85) 7 (6.85) 7 (6.85) 6 (6.85) 6 (6.85) 6 (6.85) 6 (6.85) 6 (6.85) 7 (6.8			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.855 46.855 46.855 46.855 46.855 46.855 46.855 46.855 46.855 46.855	2.68 11.75 11.78 5.46 8.81 3.97 11.35 17.55 15.81 14.81 8.83 .8.70	5 6 6 7 8 8 8 0 7 1	••••		20.675 63.075 0.0 33.641 0.0 24.201 109.243 92.338 67.806 38.095 32.568	
1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1977 1978	53, 35 66, 66 62, 73 53, 35 80, 81 60, 23 26, 85 54, 64 54, 64 54, 64 13, 96 54, 64 13, 96 54, 64 54, 64 13, 96 54, 64 13, 96 54, 64 13, 96 54, 64 88, 14 39, 76 54, 64 13, 96 54, 64 13, 96 148, 16 88, 11 158, 09 148, 16 88, 13 158, 09 158, 09 168, 15 158, 09 168, 15 158, 09 168, 15 158, 09 168, 15 158, 09 168, 16 168, 16 17, 15 18 18 18 18 18 19 18 19 18 19 18 19 19 19 19 19 19 19 19 19 19 19 19 19	7 (6.85) 7 (6.85) 3 (6.85) 3 (6.85) 5 (6.85) 5 (6.85) 3 (6.85) 3 (6.85) 2 (6.85) 3 (6.8			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		46.851 46.851 46.853 46.853 46.853 46.853 46.851 46.851 46.851 46.851 46.851 46.851 46.851	2.68 11.75 11.70 5.46 6.81 3.97 11.35 17.55 15.81 14.81 5.83 6.70	5 6 6 7 8 8 8 0 7 1			20.675 63.075 0.0 33.641 0.0 24.201 109.243 92.338 87.806 38.095 32.568 	

		WATER SU		- INDUSTR	tat	AGRECUL	[U\$£-	IDIAL	LOSS					SHOR
		I SE AMA	RAVALP	WAH	1431/4	R10H1		- وترب د ـ ـ ـ			(f])			
	(808)	(20)	( ( ( ) )	(M(H)	(MCK)	(M(M)	(NCM)	(MCM) 50 107	(MCM)	(MCM)	(11)	(MCM)	(MCM) 54 549	0.0
1961	105.747	50.197	0.0	0.0	0.0	0.0	0.0	50,197	3.956				0.0	0.0
1963	53.350	50.197	0.0	0.0	0.0	0.0	0.0	50.197	5.335				0.0	5.9
1954	00.005	\$0,314	0.0	0.0	0.0	0.0	0.0	50.31	6.868 A 27/				0,0	0.0
1965	53 357	50.197	0.0	0.0	0.0	0.0	0.0	50.197	5.336				0.0	0.0
1967	80.813	50.197	0.0	0.0	0.0	0.0	0.0	50.197	8.081				11.780	0.0
1966	60.230	50.31	0.0	0.0	0.0	0.0	0.0	50 314	6.023				10.810	0.0
1970	317.535	50.197	0.0	0.0	0.0	0.0	0.0	50,197	11.754				39,708	15.4
1971	117.865	50.197	0.0	0.0	0.0	0.0	0.0	50.197	11.786				60.005	0.0
1972	54.643 88 367	50.314	0.0	0.0	0.0	0.0	0.0	50.197	8.814				26.822	0.0
1974	39,767	50.197	0.0	0.0	0.0	0.0	0.0	50.197	3.\$77				0.0	0.0
1975	113.582	50.197	0.0	0.0	0.0	0.0	0.0	50.197	11.358			•	42.835	5.0
1977	158 099	50.314	0.0	0.0	0.0	0.0	0.0	50 197	15.810				88.698	0.0
19/6	148.166	50.197	0.0	0.0	0.0	0.0	0.0	50.197	14.817				84.753	0.0
1979	88.312	50.197	0.0	0.0	0.0	0.0	0.0	50.197	8.831				35.222	0.0
	01.020	50.222	0.0	0.0	0.0	0.0	v.v	\$0.222	01.00		· · · · · · · · · · · · · · · · · · ·		30.025	
KATEI		100.000	0.0	0.0	0.0		0.0	100.000					59 785	
RATE?		150,000	0.0	0.6	Ð.0	0.0		150.000					66.428	
									~~~~*					
	SUMMART	DF SIMLY	RESERVOI	R OPERAT	10N	CA5	£ - 8	· · ·	· ·					
•••••	•				FR OFMAN)						-	••••••••	
E R I O D	INFLOY	-VATER SU ISLAMA	RAWALP	- INDUSTR VAH	1AL TAXILA	AGRICUL RIGHT	TURE- LEFT	TOTAL	1055	DIFFER	RÉSERVO)18 VOL.	SPILL	
		(808)							(иси)	(MCM)	(11)	(MCM)	.(MC M)	(11)
1961	108.747	53.544	0.0	0.0	0.0	0.0	0.0	53.544	10.875				51.955	0.1
1962	39.556	53.544	0.0	0.0	0.0	0.0	0.0	53.544	5.956			· .	0.0 0.0	8.4
1965	66.665	(NCH) 53.544 53.544 53.544 53.669 53.544 53.544 53.544 53.669 53.669 53.669	0.0	0.0	0.0	0.0	0.0	53.669	6.666				0.0	0.1
1965	62,737	53.544	¢.0	0.0	0.0	0.0	0.0	\$3.544	6.274				2.676	. 0.0
1966	53.357	53.544	0.0	6.0	0.0	0.0	0.0	53.544	5,336				0.0 4.799	0.0
1968	60.815	53.669	0.0	0.0	0.0	0.0	ě.š	53.669	6.023				7.745	0.4
													0.0	
1970	117.535	53.544 53.544	0.0	0.0	0.0	0.0	0.0	53.544 53.544	11.754				38.740 56.947	0.0
1972	54.643	53.669	0.0	0.0	0.0	0.0	0.0	53.669	5.464				6 6	- D. (
1973	66.142	53.544	c.o	0,0	0.0	0.0	0.0	53.544	8.814				20.025	0.0
1974	39.767	53.544	0.0	0.0	0.0	0.0	0.0	53.544	- 11.356				42.156	11.
1976	175.584	53.669	6.G	0.0	0.0	0.0	0.0	\$3.669	17.558				102.148	0.1
1977	158.099	53.544	0.0	0.0	0.0	0.0	6.0	53.544	15.810				85.057	
1979	348,300	53.524 53.609 53.544 53.544 53.544 53.669 33.544 53.544 53.544 53.544	0.0	0.0	0.0	0.0	0.0	53.544	8,831		1.11		32.350	0.1
		53.570									• • • • • • • • • • • • • • • • • • •		27.700	
					********				*			y		
		100.000			0.0					1		,	51.709	
841E2		160.000	0.0	0.0 	0.0	0.0	0.0	140.000					61.285	0.1
													4. ¹ - 2	
	SUMMARI I	DE SIMLI				(A S 1						·•		:
RIGD	INFLOW	WATER SU	PPLI	INDUSTR	ER DEMANS	AGRICUL	T U R E -		L0\$\$	DIFFER	RESERVO		SPILL	SHO
. . .													(ИСМ)	(M
1961	108.747	\$6.890	0.0	0.0	6,6	0.0	0.0	56.590	10,875				49.343	0.
1895	39.556	56.890	0.0	0.0	6.0	0.0.	0.0	56.890	3.956				0.0	
1963	53.350	56.690 57.023	0.0	0.0	0.0	0.0	0.0	57.023	6.666				0.0	3.
1965	62.737	56.890 56.890	0.0	0.0	0.0	0.0	0.0	56.890	6.274				0.0	0.0
1966	\$3.357	56.890	0.0	0.0	0.0	0.0	0.0	56,890	5.336				0.0	0. 0.
1967	80,813	56.890 57.023	0.0	0.0 6.6	0.0	0.0	0.0	57.023	6.023				1.243	0.
1969	26.850	56.890	0.0	0.0	0.0	0.0	0.0	56.890	2.685				1.243 0.0 37.773	10.
1970	117.535	56.890	0.0	0.0	0.0	0.0	0.0	56.890	11.754				. 11 200	- O 1
1972	56.663	57.023	0.0	0.0	0.0	0.0	0.0	57.023	5.464				0.0	0.4
1973	88.142	56.890 57.023 56.890	0.0	0.0	0.0	0.0	0.0	56.890	8.814	1 - A			13.228	0.
1974	39.767	56.890	0.0	0.0	0.0	0.0	0.0	56-890	3.977				0.0	17
1976	175.584	57,023	0.0	0.0	0.0	0.0	0.0	57.023	17.558				98.601	Ο.
.917	158.099	56.890	0.0	0.0	0.0	0.0	6.0	56.890	15.810				81.417	٥.
1978	148.166	56.890	0.0	0.0	0.0	0.0	0.0	56.890	14.817		1		0.6 41.478 98.601 81.417 78.756 29.393	0.
,979 	03.317	20:940	0.0				+	20.670	1 C U C U C U C U C U C U C U C U C U C					
	67.034	26.216	······				· · · · · · · •			*				
		100.000	6.0	0.0	0.0	0.0	0.0	100.000					44.858	· . <
				*-									222747	
53145		176.000	0.0	0.0	0.0	0.0	0.0	170.000			 		56.488	ο.

A.11-138

ANNUAL SUMMARY OF SIMLY RESERVOIR OPERATION STUDY

PER100		-WATER SU ISLAMA	RAWALP	1 A H	IAL TAXILA	-AGRICUL RIGHI	TURE- LEFT	LOTAL			RESERVOIR	λ£.		\$5081
			(MCM)	(MCN)	(ИСИ)	(MCM)	(MCM)	(MCM)		(MCR)	(£1)			
1961		60.237	0.0	0.0	0.0	0.0	0.0	60.237	10.875	Cherry	, .		46.727	0.0
1962	39.556	60.237	0.0	0.0	0.0	0.0	0.0	60.237	3.956				0.0	0.0
1963 1961	53.350	60.237	0.0	0.0	0.0	0.0	0.0	60.237	5.335				0.0	20,6
1965	62.737	5 60.377 60.237	0.0	0.0	0.0	0.0	0.0	60.237	0.00C				0.0	
1966	53.357	60.237	0.0	0.0	0.0	0.0	0.0	60.237	5.330				0.0	6.0
1967		60.237	0.0	0.0	0.0	0.0	0.0	60.237	8.081				0.0	0.0
1968 1969		60.377 60.237	0.0	0.0	0.0	0.0	0.0	60.377	0.023				0.0	0.0
		40.237	0.0	0.0	0.0	G.O	0.0	60.237	11.754				36.855	20.3
1971	117 845	\$0.237	0.0	0.0	0.0	0,0	0.0	60.237	11.786				50.782	0.0
1972	54,643	5 60.377	0.0	0.0	0.0	0.0	0.0	60.377	5.464				0.0	0.0
1974	39.767	60.237	0.0	0.0	0.0	0.0	0.0	60,237	3.977				6.431 0.0	0.0
1975	113.582	60.237	0.0	0.0	0.0	0.0	0.0	60.237	11.358				40.799	
1976	175.584	60.377	0.0	0.0	0.0	0.0	0.0	60.377	17.558				95.054	
1977	168.166	60.237	0.0	0.0	0.0	0.0	0.0	60.237 60.237	15.810				77.777	0.0
1979	86.312	6 40.237 60.237 60.237 60.237 60.237 60.237 60.237 60.237 60.237 60.237 60.237 60.237	0.0	0.0	0.0	0.0	e õ	60.237	6.831				25.435	0.0
		60.266											24.035	
		100.000									• • • • • • • • • • • • • • • • • • • •		39.881	
		180.008	*-						•					
				• • • • •	· · · · · · · · · · ·		- • • • · ·	· · · · · · · · · · · · · · · · · · ·						
		OF SIMLY					E = 11							
				WAT	ER DEMANS)					RESERVOIA			
·*		1 SLAMA	RAVALP	WAH	TAXILA	R16HT	LEFT				LEVEL VI	λ.		
	(MCM)	(HCH)	(MCH)	(MCM)	(RCM)	(ACH)	(HCH)	(868)	(MCM)	(RCM)	(5 1)	CRCR0	(RCB)	(80
1961	108.747	63.583	0.0	0.0	0.0	0.0	0.0	63.583	10.875				44.114	0.0
1962	59.556	5. 83.383 3. 43.583	0.0	0.0	0.0	- 0.0 - 0.0	0.0	65.585 AN 583	3.756				0.0	0.4 26.1
1964	66.665	6 43.731	0.0	0.0	0.0	6.0	0.0	63.731	6.566				0.0	9.0
1965	62.737	63.583	0.0	0.0	0.0	0.0	0.0	63.583	6.274				6.0	Q.C
1966	53.357	63.583	0.0	0.0	0.0	0.0	0.0	63.583	5.336				0.0	15.8
1048	60.815	63.383	0.0	0.0	0.0	0.0	0.0	63.383	5.081 A 023				0.0	0.0
1969	26.850	63.583	0.0	0.0	0.0	0.0	0.0	63.583	2.685				0.0	33.0
1970	117.535	63.583	0.0	0.0	0.0	0.0	0.0	63.553	11.754				35.984	22.0
3971	117.865	63.583	0.0	0.0	0.0	0.0	0.0	63.583	11.786				47.828	e.c
1972	54.645	63.731	0.0	0.0	0.0	0.0	0.0	63.751	5.404				0.8	0.0
1974	39.767	63.583	0.0	0.0	0.0	0.0	0.0	63.583	3.977				0.0	3.
1975	113.582	63.583	0.0	0.0	0.0	0.0	0.0	63.583	11.356				40.120	26.0
1976	175.584	63.731	0.0	0.0	0.0	0.0	0.0	63.731	17.558				91.507	0.0
1978	148.166	63.583	0.0	0.0	0.0	0.0	0.0	63.583	14.817				72.843	0.0
1979	8B.312	63.583	0.0	0.0	0.0	0.0	0.0	63.583	8.831		(11)		23.679	ο.ο
MEAN	87.052	63.614	0.0	0.0	0.0	0.0	0.0	63.614	5.705		••••••		22.622	7.0
• • •														
RATE1								*			· · · · · · · · · · · · · · · · · · ·			
RATES		190.000	0.0	0.0	0.0			190.000					50.048	
		OF SINLY					E = 12							
				' VAT	ER DEMANT	D							SPILL	
		-WATER SU ISLAMA	BAYALP	- ENDUSTR WAR	TAXILA	AGRICUL RIGHT	LEFF					Di .		
· .	(MCM)	(HCH)	. ENEMD.	(MCM)	(ACA)	(X(X)	(MEN)	(KEN)	(XCX)	(M(M)	(71)	(MEMJ	(MCM)	(M (
	108.747	66.930	0.0	0.0	0.0	0.0	0.0	56.930	10.875				41.500	0.0
1962	39.554	66.930 66.930	0.0	0.0	0.0	0.0	0.0	66.930 66.930	3.958 5.335				0.0 0.0	2.5 27.5
1963 1964	55.550 66 669	67.086	0.0	0.0	0.0	0.0	0.0	67.086					0.0	
1965	62.737	66.930	0.0	0.0	0.0	0.0	0.0	66.930	6,274				0.0	Q.(
1966	53.357	66.930	0.0	0.0	0.0	0.0	0.0	\$6.930					0.0	15.8
1967		66.930 67.086		0.0	0.0 0.0	0.0		66.930 67.086					0.0	3.3
1968		66.930		0.0	0.0	0.0	0.0	66.930	2.685				0.0	39.
1970	117.535	\$6.930	0.0	0.0	0.0	0.0	0.0	66.930					35.113	23.4
	117.865	68.930	0.0		0.0	9.0	0.0	66.930 67.086	11,786				44,474 0.0	0.0
1972 1973	88 1/2	67.086	0 0	0.0	0.0	0.0	0.0	66.930	8,814				0.0	σ.α
1974	39.767	66.930	. 0.0	0.0	0.0	0.0	0.0	66.930	3,977				0.0	
1975	113.582	66.930	0.0	0.0	0.0	0.0	0.0	66.930	11.358				39.442	
1976	175.584	67.086	0.0					67.086					87,961 70,496	
14//	128.099	64.930	0.0	0.0	0.0	0.0	0.0	65,930 66,930	14 817				69.850	
1978	88.312	65.930	0.0	0.0	0.0	0.0	0.0	66.930	8.831				20.891	0.0
1978 1979					~ ~								21 544	9.2
MEÁN	87 052	6 44 943	0.0	0.0	0.0	0.0	0.0	00.705	0.705					
MEÁN	87.052	66.963			s	0.0	0.0	166.000		•••••	· · · · · · · · · · · · · · · · · · ·		32.207	15.

	SUNHARY		RESERVOI			• • •	£ = 1							
,E&100		-WATER SU	JPPLY- ~ RAWALP	- LHDUSTR WAH	TAXILA	-AGRICUL RIGHT	IVAE- LEFT	INTAL		0[FFER -	RESERV	TOC.	SPILL	ระเบต
	CNCND	(NCN)	(HCH)	(NCH)	(MCM)	(MCM)	(NGN)	(NCK)	(868)	(MCM)	(FT)	(NCM)	(NCH)	(80)
1960	70.423	· 0.0	39.133	0.0	0.0	0.0	0.0	39.133 39.042	7.042				26.958	0.0
1961		0.0		0.0	0.0	0.0 0.0	0.0	39.042	5 954				17.121	0.0
1962	59.539		39.042 39.042	0.0	0.0	0.0		39-042	6,612				19.707	0.0
1964	73.697	0.0	39.133	0.0	0.0	0.0	0.0	39.133	7.370				27.602	0.0
	113.753	0.0	39.042	0.0	0.0	0.0		39.042	11:375				64.386 25.543	0.0
1960	13.984	0.0	39.042	0.0	0.0	0.0 0.0		39.042	7.398				46.530	0.0
1967	95.871 81.000		39.042	0.0	0.0	0.0	0.0	39.133	8,100				36.880	0.0
1968	46.401	0.0	19.042	0.0	0.0	0.0		39.042	4.640				3.102	0.0
1970	91,563	0.0	30.045	0.0	0.0	0.0		39.042	9.156				42.275	0.0 0.0
1421	108.388		39.042	0.0	0.0	0.0 0.0		39.042 39.133	10.839				59.541 11.021	0.0
1972	57.486		39.133 39.042	0.0	0.0			39.042	12.992				77.678	0.ŭ
1975	129.922	0.0	39.042	0.0	0.0			39.042	3.587			· · · · · ·	0.169	0.0
1975	62.976	0.0	39.042		0.0			-39.042	6.298				12.445	0.0
	177,909	0.0	39.133	0.0	0.0	0.0		39.133 39.042					118,535 85,543	0.0
	136.881		39.042 39.042	0.0	0.0	0.0		39.042					106.497	0.0
1978	100.955	0.0 0.0	39.042	0.0	0.0	0.0	0.0	39.912	3.844				45.341	0.0
1980	36.092	0.0	39.133	0.0	0.0	0.0	0.0	39.133	8.609				35.320	0.0
MEAN	92.414	0.0	39.058	0.0	0.0	0.0	0.0 :	39.068	8 241			· · ·	44.236	0.0
			100.000		0.0	0.0	0.0	100.000					113.228	0.0
RATE2			100.000		0.0	0.0	0.0	100,000					100.000	
	SUMMARY	DF RAWAL	RESERVOI	• ÷						 - -	• • • • • • • • • • • • • • • • • • •			
	:	ISLAMA	PPLY RAVALP	~ INDUSTR Vah	TAXILA	-AGRICUL RIGHT	¥URE- ⊾E71	FOTAL		DIFFER -	RESERV	810 10V	SPILL	SHOR
	(HCH)	(MCM)	(HCH)	(HCH)	(HCN)	(NCM)	(MCN)	(NCH)	(MCH)	(HCH)	(71)	(HCH)	сиси)	(MC
1960	70.423	0,0	48.917	0.0	0.0			48.917	7.042				19.586	0.0
1961	122.440	0.0	48.783	0.9	0.0	0.0		48.783					\$7.892	0.0
1982	59.539	0.0		0.0	0.0	0.0		48.783	5.954		:		8.352	0.0
1963	66.171 73.697			0.0	0.0	0.0		48.783 48.917	7.370				17.720	0.0
1964	113.753		48.783	0.0		0.0	0.0	48.783	11.375				55.056	0.0
1966	73,984		(8.783	0.0		0.0	0.0	48.783	7.398	+			15.041	0.0
1967	95.871		48,783	0.0	0.0	0.0	0.0	48.783	9.587				36.813	0.0
1958	81.000		48.917	0.0		0.0	0.0	48.917 48.783	8.100 4.640				27,523	0.0
1969	16.401 91.563		48.783 48.783	0.0 0.0	0.0	0.0	0.0	48.783					25.447	.0.0
	108.388		48.783	0.0	0.0	0.0	0.0	48.783		· · ·			\$0.036	0.0
1972	\$7.486	0.0	48.917	0.0	0.0	0.0	0.0	48.917	5.749			1. Start 1.	1.666	0.0
	129.922		48.783	0.0	0.0	0.0	0.0	48.783					67.421	0.0
1974	35.848		48.783 48.783	0.0	0.0	0,0 0,0	0-0-	48.783 48.783	3.587				0.0	0.0
	177 909		48.917	0.0	0.0	0.0	0.0	48-917	17,791	•			101.365	10.0
	136.861		48.783	0.0	0.0	0.0	0.0	48.783	13.688				73.422	0.0
	160.955		48.783	0.0	0.0	0.0	0.0	48.783					97 119	0.0
1979	88.441		48.783	0.0	0.0	0,0 0,0	0.0	48.783	8.844				36.866 24.999	0.0
	86.092		48.917	0.0	0.0	0.0		48.917	8.80Y			*		
MEAN	92.414	0.0	48.821	0.0	0.0			48.821	9.241				34.593	0.0
RAFEI		0.0	100.000	0.0		0.0							70.857	. 0.0
RATE2			124.963	0.0	0.0		0.0	124.983					78,201	0.0
5			RESERVOI									,		
ERIOD	INFLOV	VAJER SU ISLAMA	PPLY RAWALP	- ENBUSTA Wah	TAXILA	-AGRICUL RIGHT	FURE- LEFT	TOTAL	LOSS	OLFFER -	RESERV	018 VOL.	SPILL	SHOR
					614 G (1 1		1.400.41	1 11 1 14 14	1 44 2 44 3	(MCH)	(F1)		(NCH)	CH(
1960	70.423	0.0	70.440	0.0	0.0	0.0	0.0	/0.440	7.042				2.760	
	122.440	0.0	(MCR) 70.440 70.276 70.276 70.276 70.276 70.276 70.276 70.276 70.276 70.276	0.0	0.0	0.0	0.0	70.276	12.244				0.0	0.0
1962 1963	59.539	0.0	10.276	0.0	0.0	0.0	0.0	70.276	6.612		:		0.0	0.0
1964	73.697	0.0	70.440	0.0	0.0	0.0	0.0	70.440	7.370	÷			0.0	0.0
	113.753	0.0	70.276	0.0	0.0	0.0	0.0	70.276	11.375				8.918	0.0
1,01	73.984	0.0	70.276	0.0	0.0	0.0	. 0.0	10.276	7.398 3.637				0.0	0.0
1966	96.871 81.000	9.0 0 0	70.270	0.0	0.0	0.0	0.0	70,640	3 100 8 100				7.788	
1968			70.276	0.0	0.0	0.0	0.0						0.0	0.0
1966	46.401	Ð.0	70.276	0.0	0.0	0.0	0,0	70.276	9,156				0.0	11.
1966 1967 1968 1969 1970	91.563		70.276	0.0	0.0 0.0	0.0	0.0	20.276	10.839				20 710	0.0
1966 1967 1968 1969 1970 1971	91.563	0.0		0.0	0.0	0.0	0.0	70.440	3.749				0.0	
1966 1967 1968 1969 1970 1971 1972	91.563 108.388 57.486	0.0	70.440	6.0	0.0	0.0	0.0	70.274	3,587				0.0	0.0
1966 1967 1968 1969 1970 1971 1972 1973	91.563 108.388 57.484 129.922	0.0	70.440 70.276 70.276	0.0	0.0		<u> </u>	70.276	6.298				0.0	14.9
1966 1967 1968 1969 1970 1971 1972 1973 1974	20,001 91.563 108.388 57.486 129.922 35.868	0.0	70.440 70.276 70.276 70.276	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0	0.0	0.0							
1966 1967 1968 1969 1970 1971 1972 1973 1974 1974	40,001 91.563 108.388 57.486 129.922 35.868 62.976	0.0	70.440 70.276 70.276 70.276 70.440	0.0 0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0	70.440	17,791				53.021	
1966 1967 1968 1969 1970 1971 1972 1973 1974 1974	40,001 91.563 108.388 57.486 129.922 35.868 62.976	0.0	70.440 70.276 70.276 70.276 70.440 70.440	0.0 0.0 0.0 0.0	0.0 0.0 0.0	0.0	0.0	70.440	17.791				51.179	0,0
1966 1967 1968 1969 1970 1971 1972 1973 1974 1974	40,001 91.563 108.388 57.486 129.922 35.868 62.976	0.0	70.440 70.276 70.276 70.276 70.440 70.276 70.276	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0	0.0	70.440 70.276 70.276 70.276	17 791 13.688 16.095 8 977	•			51,179 76.118	0.0
1966 1967 1968 1969 1970 1971 1972 1973 1974 1974	40,001 91.563 108.388 57.486 129.922 35.868 62.976	0.0	70.440 70.276 70.276 70.276 70.440 70.276 70.276 70.276 70.275 70.440	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0	70.440 70.276 70.276 70.276 70.276 70.440	17.791 13.688 16.075 8.844 8.607		:		51.179	0,0 0,0 0,0
1966 1967 1967 1970 1970 1971 1972 1974 1975 1975 1977 1978 1979	40,000 91,563 108,388 57,484 129,922 35,868 62,976 177,909 134,681 160,955 88,441 88,092	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	70.276 70.276 70.276 70.276 70.275 70.440	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0						51,179 76.118 20,954 0,071	0,0 0,0 0,0
1966 1967 1968 1969 1970 1977 1972 1972 1973 1974 1975 1976 1977 1978 1979 1980 	20,001 91,563 108,388 57,484 129,922 35,868 62,976 177,909 136,681 160,955 88,441 88,492	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	70.276 70.440 70.276 70.276 70.276 70.440 70.323	0.0 0.0 0.0 0.0 0.0	0.0	0.0	0.0 0.0 0.0 0.0 0.0	20.323	9.241		······································		51.179 76.118 20.954 0.071 14.690	0,0 0,0 0,0
1968 1968 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 	20,001 91.563 108.388 57.486 129.922 35.868 62.976 177.909 136.881 160.955 88.441 88.092	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	70.276 70.440 70.276 70.276 70.275 70.440	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	20.323	9.241		······································		\$1.179 76.118 20.954 0.071 14.690 20.889	0,0 0,0 0,0 1,3 1,9

.

ER LOD	INFLOW -	WATER SI ISLAMA	UPPLY- RAVALP	- 1 NOUSTR WAN	1AL	AGRICUL R1GHI	TURE -	TOTAL	1055	DIFFER -	RESERVO LEVEL	18.~ VØL.	SPILL	
• • • • •	(нси)	(HCH)	(MCH)	(80.87)	(808)	(NCM)	(HCK)	(MCH)	(HCN)	(HCH)	(FT)			 ()40
1960	70.423	0.0	74.353	0.0	0.0	0.0	0.0	74.353	7.042				0.0	0.0
1962	59.539	0.0											10.154 · 0.0	
1963 1964		0.0	74.181	0.0	0.0	0.0	0.0	74.181 74.181 74.553 74.181 74.181 74.181 74.181 74.181 74.181 74.553	6.612				0.0	J.0
	73.697	0.0	74.181	0.0	0.0	0.0	0.0	74,353	11.375				0.0	2.6
1966	73.984	0.0	74.181	0.0	0.0	0.0	0.0	74 181	7.398				0.0	0.0
1987 1968	96.871 81.000	0.0	24.181	0.0	0.0	0.0	0.0	74.181	9.687				0.0	0.0
1969	46.401	0.0	74.181	0.0	0.0	0.0	0.0	74.181	4.640				2.431 0.0	0.0
1970		0.0	74.181	0.0	0.0	0.0	0.0	74.181	9.156				0.0	19.2
1971	108.388	0.0	74.353	0.0	0.0	0.0	0.0	74,381	10.839				16.245	
1973	129.922	0.0	74.181	0_0	0.0	0.0	0.0	74,181	12.992				17.190	
1974	52.868	0.0	74.181	0.0	0.0	0.0	0.0	74.181	3.587				0.0 0.0	3.0
1975	177.909	0.0	74.353	0.0	0.0	0.0	0.0	74.353	17.791				48.215	20.9
1977	136 881	0.0	74.181	0.0	0.0	0.0	0.0	74,181	13.688				47.059	
1979	88.441	0.0	74.181	0.0	0.0	0.0	0.0	74.181	8.844				72.430 19.073	
1980	108.388 57.486 129.922 35.868 62.976 177.909 136.881 160.955 88.441 86.092	0.0	74.353	0.0	0.0	0.0	0.0	74.353	8.609				0.0	0.0
MEAN	92.414	0.0	74.230	0.0	0.0	0.0	0.0	74.230	9,241				12.038	z.3
RATEL		0.0	100.000	0.0	0.0	0.0	0.0	100.000			· · · · · · · · · · · · · · · · · · ·		18.217	3.1
RATES		0.0	190.000	0.0	0.0	0.0	0.0	190.000					27.213	0.0
			_				-							
									-		RESERVO			
	-larcow	ISLANA	RAWALP	· VAH	TAXELA	RIGHT	LEFT				LEVEL	VOL.		
	(HCH)	(RCH)	(NCM)	(MCN)	(NCN)	(MCH)	(MCK)	(NEM)	(8(8)	(868)	(FT)	(MCM)	CNCND	(14)
1960	70.423	0.0	78.267	0.0	0.0 0.0	0.0	0.0	78.267 78.085	7.042				0.0 23.079	· · · ·
1962	122.440	0.0			0.0			78.085	5.956				0.0	0
1963	66.121	0.0	78.085	0.0	0.0	0.0	0.0	78.085					0.0	4.9
1964	73.697		78.267	0.0	0.0	0.0	0.0	78.085	11.375				0.0	4.
1966	73.984	0.0	78.085	0.0	0.0	0.0	0.0	78.085	7.398				0.0	0.
1967 1968	96.871 81.000		78.085	0.0	0.0	0.0	0.0	78.085 78.287					0.0	0.0
1969	46.401		78.085	0.0	0.0	0.0	0.0	28.085	4.840				0.0	:5.
1970	91.563		78.085	0.0	9.0	0.0	0.0	78.085 78.085	9.150		•		0.0	22
1971	108.388		78.267	0.0	0.0	0.0	0.0	78.247	5.749				0.0	0.
1973	129.922	0.0	78.085	0.0	0.0	0.0	0.0	28.085	12.992				9.214	Ű.
1974 1975					0.0 0.0			78.085 78.085	3_587 6,298				0.0	?. 23.
1976	177.909	0.0	78.267	0.0	0.0	0.0	0.0	78.267	17.791		-		45.233	
1977	62,976 177,909 136,881 160,955 88,441 86,692	0.0	78.085	0.0	0.0	0.0	0.0	78.085	13.488				43.031 08.049	
1979	88.441	0.0	78.085	0.0	0.0	0.0	0.0	78.085	3.844				17.192	ο.
											*-		0.0	
MEAN	92.616	0.0	78.137	0.0	0.0	0.0	0.0	78.137	9.241				10.392	۔ ،
RATEL		0.0	100.000	0.0	0.0	0.0	0.0	100.000					13.299	5.
			100 000				-	200 000					23.491	0.
RATE2			200.000							•••••				
	SUMMARY O						E = 6			• • • • × • • • •				
		WATER SL ISLAMA	RAWALP	-INDUST8 VAH	TAL TAXILA	AGRICUL	TURE- LEFT	101AL			RESERVO	VOL.	SPILL	-
	CHCHY	. CRCMA	CHCNA	(RCH)	ัดสถาดก	(858)	CREMI	(ACA)	(NCH)	(SCR)	(71)	(205)	(SCN) 0,0	લ્મા છે. ઉ
1960	70.423 122.440 59.539 66.121	0.0	82.180	0.0	0_0 0_0	0.0	0.0	82.180 81.989					16.078	0.0
1962	59.539	0.0	81.989	0.0	0.0	0.0	0.0	81.989	5.954				0.0	0.0
1963	66.121 73.697	0.0	81.989	0.0	0.0	0.0			6.612 7.370				0.0 0.0	10.9
1964	73.697	0.0	82.180	0_0 .	0.0	0.0 0.0	0.0		11.375				0.0	4
1966	73.984	0.0	81.989	0.0	0.0	0.0	0.0	81.989 81.989 81.989	7.398				0.0 0.0	0.0
1967	96.871 81.000 46 401	0.0	81.989	0.0 6 A	0.0	0.0	0.0	52.180	9.687				0.0	a.c
1969	46.401	0.0	\$1.989	0.0	0.0	0.0		\$1.989	4.640				0.0	34.5 25.3
1410		0.0	31.393	0.0	0.0	0.0	A A	81.989 \$1.989	9.158				0.0 7,471	
1971	108.388 57.486	0.0	81.989	0.0	0.0	0.0	0.0	82.180	5.769				0.0	0.0
1973	129.922	0.0 :	81.989	0.0	0.0	0.0	0.0	81,969 81,989	1 (37				1.172	12.5
1974 1975			51.989 51.989	0.0	0.0	0.0	0.0	81.989	5-278				0.0	25.4
1976	177.909	0_0	82.180	0.0	0.0	0.0	0.0	82.180	17.791				42,419 39,003	
	136 881	0.0	81.989 81 980	0.0	0.0	0.0	0.0	81.989	16.075				64.926	ə.(
1977	88.441	0.0	81.989	0.0	0.0	0.0	0.0	81.989 82.180 81.989 81.989 81.989 81.989 81.989 82.180	8.844				15.253	
1977 1978 1979		0.0	82.180											•••••
1977 1978 1979 1980	85.092						A 0	82.044	9.241				8,370	
1977 1978 1979 1980	85.092 	0.0	82.044	0.0								•		
1977 1978 1979 1980 MEAN	92.414	0.0	82.044	0.0	0.0	0.0	0.0	100 000					10,811	7.

ANNUAL SUMMARY OF RAWAL RESERVOIR OPERATION STUDY

TABLE A. II-50(3)

				WAT	ER DEMAN	0 0 *CP+C***	1006-	10181	1055		985560	RIOV	SPILL	SHOR
P€8100	INFLOW		RÁWALP		TAXILA	RIGHT	LEFT				LEVEL			
	(NCN)	(NCN)	(808)			(NCN)	(HCH)		(MCN)		(13)	(нсн)		CHC
1960	70.423	0.0	86.093	0.0	0.0	0.0	0.0	861093	7.042				0.0	0.0
1961	122.440	0.0	85.894	0.0	0.0	Q.0	Q.G .	85.894	12.244	1.1			9.065	0.0
1962	59.539	0.0	85.894	0.0	0.0	0.0		85.894	5.954				0.0	0.0
1963	36.121	0.0	85.894	0.0	0.0	0.0	0.0	85.894	6.612				0.0	18.8
1964	73.697	0.0	86.093	0.0	0.0	0.0	0.0	96.093	7.370				0.0	19.7
1985	113.753	0.0	85.894	9.0	0.0	0.0	0.0	85.894	11.375		· ·		0.0	5.1
1966	73.984	0.0	85.894	0.0	0.0	0.0	0.0	85.894	7.398				0.0	0.0
1967	96.871	0.0	85.894	0.0	0.0	0.0	0.0	85.894	9.687				0.0	3.6
1968	81,000	0.0	86.093	0.0	0.0	0.0	0.0	86.093	8.100				0.0	5.9
1969	46.401	0.0	85.894	0.0	0.0	0.0	0.0	85.894	4.540				0.0	. 44 . 1
1970	91.563	0.0	85.894	0.0	0.0	0.0	0.0	85:894	9.156				0.0	27.6
1971	108.388	0.0	85.894	0.0	0.0	0.0	0.0	85.894	10.839				4.758	.1.6
1972	57.486	0.0	86.023	0.0	0.0	0.0	0.0		5.749				0.0	1.6
	129.922	0.0	85.894	0.0	0.0	0.0	0.0	85.894	12.992			·	0.0	. 2.6
1974	35.868	0.0	85.894	0.0	0.0	0.0	0.0	85.894	3.587	2				19.5
1975	62.976	0.0	85.894	0.0	0.0	0.0	0.0	85.894	6.298				0.0	29.2
1976	177.909	0.0	86.093	0.0	0.0	0.0	0.0	85.093	17.791				39.604	4.
1977	136.881	0.0	85.894	0.0	0.0	0.0	0.0	85.894	13.688				34.975	0.0
1978	160.955	0.0	85.894	0.0	0.0	0.0	0.0	85.894	16.095				61.258	. Ò.C
1979	88.141	0.0	85.894	0.0	0.0	0.0	0.0	85.894	8.844	1			13.259	
1980	86.092	0.0	86.093	0.0	0.0	0.0	0.0	84.093	8.609				0.0	0.0
	92.414	ø.0	85.950	0.0	0.0	0.0	0.0	85,950	9.241				7.758	
RAFEI	k	0.0	100.000	0.0	0.0	0.0	0.0	100.000					620.9	10.
84162		0.0	220.000	0.0	0_0	0.0	0.0				·		17.538	0.0

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TABLE A.I-50(4) ANNUAL SUMMARY OF RAWAL RESERVOIR OPERATION STUDY

PERIOD	INFLOW	-WATER SI	IPPLY	~1NDUSTR	1AL	-AGRICH1	TBRE-	TOTAL	1.055	DIFFER	AESERVOIR	SPILL	5×08
	(MCH)	*		(NCN)	(MCM)		(MCM)			(864)	(FI) (MCH)	(MCM)	(MC
	70.423	0.0	39,133 39,042	0.0			0.0	39,133	7.042			25.958	0.0
1962	59.539	0.0	39,042	0.0	0.0	0.0	0.0	39.042	5.954			17.121	0.0
1963	66.121	0.0	39.042		0.0 0.0		0.0	39.042 39.133	6.612			19.707	0.0
	113.753	0.0	39.042		0.0	0.0	0.0		11.375			64.386	0.0
1967	96.871	0.0	39:042	0.0	0.0	0.0	0.0	39.042	9.687			46.530	0.0
1968 1969	46.401		39.042	0.0	0.0	0.0	0.0	39.133 39.042	8.100		·	36.880	0.0
	91.563 108.388		39.042	0.0	0.0	0.0	0.0	39.042 39.042	9.156			42.275 59.541	0.0 0.0
1972	57.486	0.0	39.133	0.0	~ ~	0.0	0 0	39.133	5.769			11.021	0,0
1974	129,922	0.0	39.042 39.042	0.0	0.0	0.0		39.042 39.042				77.678	0.0
1975	62.976 177.909		39.042 39.133	0.0	0.0	0.0	0.0	39.042 39.133	6.298 17.791			12.445 118.535	0.0
1977	136.881	<u>^</u>	39.042	0.0	0.0	0.0	0.0	39.042	13.688			83.543	0.0
1979	88.441	0.0	39.042	0.0	0.0	0.0	0.0	39.042	8.844			106.497 45.341	0.0
1980	86.092	0.0	39.133	0.0	0.0	0.0	0.0	39.133	8.609			35.320	
HEAN			39.068		0.0	0.0	0.0					44.236	
RATES		0.0	100.000	0.0	0.0	0.0	0.0	100.000				113.228	0.0
	*		100.000	0.0		0.0		100.000	, 1	*		100.000	
	÷	••		*-	· -				3		·····		
	SUMMARY	OF RAWAL	RESERVOI	R OPERAT	10N	CASI	ε = 2.						
PERIOD	INFLOW	-WATER S	UPPLY	-INDUSTR	ER DEMAN	D - AGRICUL	TURE-	TOTAL		ÐJFFER	RESERVOIR	5P1LL	SHOP
		ISLAMA	RAWALP	WAH	TAXILA	RIGHT	LEFT +				LEVEL VOL.	•	
	70.423	5. 0.0	48.917	. 0.0 .	0.0	0.0	0.0	(HCM) 48.917	7.042		(FT) (NCH)	(HCH) 19.586	(M) 0.0
1961	122.440		48.783	0.0	0.0	0.0	0.0	48.783 48.783	12.244			57.892	
1963 1964	66.121	0.0	48.783	0.0	0.0	0.0	0.0	48.783	0.612			10.135	. 0.0
1965	113.753		48.917 48.783	0.0	0.0	00	0.0	48.917 48.783	7.370			17.720 55.056	0.0
1966	73.984		48.783 48.783	0.0	0.0 0.0	0.0	0.0	48.783 48.783	7.398 9.687		•	15.041 36.813	0.0
	81.000	0.0	48.917	0.0	0.0	0.0	0.0	48.917	8.100			27.523	0.0
1970	46.401 91.563	0.0	48.783 48.783	0.0	0.0	0.0	0.0 0.0	48.763	4.840			0,0 25,447	0.0
1971	108.388		48.783 48.917	0.0	0.0	0.0	0.0	48.783 48.917	10.839			50.036	0.0
1973	129.922	0.0	48.783	0.0	0.0	0.0	0.0	48.783	12.992			\$7.421	0.0
1974	35.868	0.0	48.783	0.0	0.0	0.0'	0.0	48.783 48.783	3.587			0.0	0.0
1976 1977	177.909		48.917 48.783	0.0 0.0	0.0 0.0	00	0.0 0.0	48.917 48.783				101.365 73.422	0.0
1978	160.955	0.0	48.783	0.0	0.0	0.0	0.0	46.783	16.095			97.119	0.0
1980	88 441	0.0	48,783	0.0	0 0 0 0	0.0 0.0	0.0 0.0	48.783	8.609			36.358 24.999	0.0
MEAN	92.414	0.0	48.821	0.0	0.0	0.0	0.0	48.821				34.593	0.0
RAJEI												• • •	
RATES		0.0	100.000		0.0	0.0	0.0	100.000	•••••			70.857	
	--		124.963	0.0	0.0	.0.0	0.0	124.963			••••••	78.201	0.0
	SUMMARY	OF RAWAL	RESERVOI	R OPERAT	10%	(AS	٤ = 3						
1		· · · · · · · · · · · · · · · · · · ·		~ WAT	ER DEMAN	D +							
		ISLAMA	RAVALP	WAH	TAXILA	RIGHT	LEFT	101AL			RESERVOIR LEVEL VOL.	5P1ii	5H5:
1960		(HCH)	(NCR)		(MCM)	(MCN)	(MCM)	(NCH)		(BCR)	(FT) (MCN)	(MCM) 009.25	
1961	122.440	0.0	42.947	0.0	0.0	0.0	0.0	42.947 42.947	12.244			64.312	Ο.
1962 1963	59.539 66.121		42.947	0.0	0.0	0.0	0.0	42.947	5.954			13.661 15.915	0.4 0.4
1964	73.697			0.0	0 0	A 0	0.0	43.047	7.370			23.590 60.689	
1966	73.984	0.0	42.947	0.0	0.0	0.0	0.0	42.942	1.398			21.294	0.0
1967 1968	96.871			0.0	0.0	0.0	0.0	42.947 43.047	9.687			42.436	
1969 1970	46.401		42.947	0.0	0.0	0.0	0.0		4.640 9.156			0.0	
1971	108.388	0.0	42.947	0.0	0.0	0.0	0.0	42.947	10.839			55.760	Q.,
1973	57 486	0.0	43.047 42.947	0.0	0.0	0.0	0.0	43:047 42.947	5.749	:	· · ·	7.333 73.460	
	35.668	0.0	42.947	0.0	0.0	0.0	0.0	42.947 42.947 42.947 43.047	3.587			0.0 5.104	C.(
1976	177.909	0.0	43.047	0.0	0.0	0.0	0.0	43.047	17.791			114.076	0.4
1978	136.881	0.0	42.947	0.0				42.947 42.947 42.947				79.490	
1979	88.441	0.0	42.947 43.047	0.0	0.0	0.0	0.0	42.947 43.047	8.844			42.111 31.072	
**		0.0		0.0									
												· · - · · · - · • • ·	
		where we are graded as a second se	100.000		0 0	0.0	0.0	100.000				93.927	
RATE1		0.0		0.0	0.0	0.0	0.0	110.000				91.246	0.0
RATE1 RATE2				~									
RATE1 RATE2				· · · · · · · · · · · ·									
RATE1 RATE2				····	•-		-143						

		••••	RESERVOI			h								
PER100	INFLOW	1 SEAMA	UPPLY RAWALP	- INDUSTŔ VAH	1AL TAXILA	-AGRICUL RIGHT	TURE- LEFT	FOTAL				vut.	SPILL	
	(MCH)		(МСМ)		(אכא)		(MCM)	(MCM)	(HCH)		(())		(MCM)	CHC
1960	70.423		46.960	0.0	0.0	0.0		46.960	7.042				20.841	0.0
1961			46.851	0.0	0.0	0.0	0.0		5.954				59,909 10.199	0.0
1982	59.539		46.851 48.851	0.0 D.D	0.0			46.851	5.652				12.067	0.0
1963	66.171 73.697		46.960	0.0	0.0	9.0		46.960	7.370				19.675	0.0
1965	113.753		46.851	0.0	0.0	0.0	0.0	40.851					57.010	0.0
1965	23.984		46.851	0.0	0.0	0.0	0.0	46.851	7.398				16.930 38.767	0.0
1967	46.871		46.851	0.0	0.0		0.0		9.687 8.100				29.480	0.0
1968	81.000 48,401		48.980 48.851	0.0		0.0		46.851	4.640				0.0	0.0
1989	91.563		46.851	0.0				46.851					29.288	0.0
1971			46.851	0.0	0.0	0.0	0.0	46.851	10.839				51.980	0.0
1872	57.486	0.0	46.960	0.0	0.0	0.0	0.0	46.960	5.749				3.644	0.0
	129.922		46.851	0.0	0.0	0.0	0.0	46.851 46.851	3 587		•		0.0	0.0
1974	35.868		46.851 46.851		0.0	0.0	0.0	46.851	5.298				0.0	0.0
1975	177.909	0.0	46.960	0.0	0.0	0.0	0.0	46.960	17.791				102 227	0.0
	138.881		46.851	0.0	0.0	0.0	0.0	46.851 46.851	13.688				75.407	0.1
	140.955		46.851	0.0	0.0	0.0	0.0	46.851	16.095					0.0
1979	88 441		46.851	0.0	0.0	0.0	0.0	46.851	8.844				38.791 26.934	0.0
1980	86.092	0.0	46.960	0.0	0.0	0.0		40,960	8.609				20,934	
	92.416	0.0	46.882	0.0	0.0	0.0	0.0	46.882	9.241				36.499	0.4
			100.000		0.0	0.0	010	100.000					77.853	0.0
		. .	120.000		0.0		0.0	120.000					82.509	0.0
			110.000						-					
	CINHARY (nr Rauki	RESERVOI	R OPFRAT	108	- CAS	£ = 5		•					
					ir-ere-									· • • • • • •
401A3	INFLOW -	1 SEABA	PPLY SAVALP	- INDUSTR VAH	1AU	-AGRICUL Thoir	TURE- LEFT	101AL	LOSS		RESERVO	VOL.	SPILL	\$ H D
								(HCH)				(HEH)	(HCH)	
+0.co -	(HCH) 70.423	(8CM) 0.0						50.873	7.042	, circuit		SIGNO	(HCH) 17.782	0.
	122.440	0.0	50.755	0.0	0.0	0.0	.0.0		12.244				\$5.555	ο.
1942	59.539		50.755	0.0	0.0	0.0	6.0	50.755	5.954				6.749	0.
1963	66.121		50.755	0.0	0.0	0.0	0.0	50.755	6.612				6.197	۵.
1964	73.697		50.873	0.0	0.0	0.0	0.0	50.873	7.370				15,724	0.
	113.753		50.755	0.0	0.0	0.0	0.0		11.375				53.399	0.
1966	73.984		50.755	0.0	0.0	0.0	0.0	50.755	7.398 9.687				12.496	0. 0.
1967 1968	95.871 81.000		50.755 50.873	0.0 0.0	0.0 0.0	0.0	0.0	50.873	8.100				25.650	ŏ.
1969	46 401		50.755		0.0	0.0 0.0 0.0 0.0	0.0	50.255	4.640				0.0	ο.
1970	91.563	0.0	50.755		0.0	0.0 0.0 0.0 0.0 0.0	0.0	50.755 50.755 50.873	9.156	-			21.161	Ο.
1971	108.386		50.755	0 0	0.0	0.0	0.0	50.755	10.839				48.228	0.
1972	57.486		50.873	0.0	0.0	0.0	0.0	50,873	5.749				0.409	0.1
	129.922		50.755	0.0	0.0	0.0	0.0	50.755	12.992				64.720	0. 0.
1974	35.868 62.976		50.755 50.755		0.0	0.0	0.0	50.755	6.298				0.0	0.
1975	177.909		50.873		0.0	0.0	0.0		17.791				95.275	ο.
	136.881	6.0	50.755	0.0	0.0	0.0	0.0	50.755	13.668				71.396	0.
	160.955	0.0	50.755	0.0	0.0	0.0 0.0 0.0	0.0		16.095				95.201	0.
1979	88.441	0.0		0.0	0.0 0.0 0.0	0.0	0.0	50.755	8.844				35.454	0.
1980	560.98	0.0	50.873	0.0	6.0	0.0	0.0	50.873	8.609				22.796	· • • • • •
MEAN	92.634	0.0	50.789	0.0	0.0	0.0	0.0	50.789	9.241				32.633	0.
RATEL			100.000	0.0	0.0	0.0	0.0	100.000					64.252	۰.
RATES			130.000	0.0	ō.0	0.0	0,0	130.000	*******				73.769	0.
• • • • •														
	SUMMARY (RESERVOI				£ = 6							
				¥AI	ER DEMAN	 - 4681CW	 Tut8F-	TOTAL	. LOSS	DIFFER	RESERVE) R	SPILL	\$HQ
		551 AMA	RAWALP	WAH	TAXILA	X 1 6 8 1	6671				LEVEL			
	به دیده سالی ا این جور ر						(868)	(868)	(MCM)	(4(4)	(† 1)	(NCR)	(MCH)	(8
1040	70 231	(2507) 0.0	54.787	0.0	0.0	0.0	0.0	54.787	7.042				14.724	0.
1941	122 416	0.0	54.659	0.0	0.0	0.0	0.0	54.659	12.244				51.201	0.
1962	59.539	0.0	54.659	0.0	0.0	0.0	0.0	54.659	5.954				5.407	0. 0.
1963	66,121	0.0	54.659	0.0	0.0	0.0	0.0	54.659	0.012				11.690	ΰ.
1964	73 697	0.0	54.787	0.0	0.0	0.0	0.0	56 454	11, 375				49.832	ŏ.
1765	115./53	0.0	34-03¥ 57.450	0.0	6.0	0.0	0.0	54.659	7.398				8.019	0.
1966	96 871	0.0	54.659	0.0	0.0	0.0	0.0	54.459	9.687	· ·			31.491	0.
	81.000	0.0	54.787	0.0	0.0	~ ~	~ ^	54,787	8.100				22.094	0.
1969	46.401	0.0	54.659	0.0	0 0	0.0	0.0	54.659			·		0.0	0.
1970	91.563	0.0	54.659	0.0	0.0		0.0	54.659 54.659	10 810		4.		44.509	
	108.388	0.0	54.659 54.787	0.0 0 0	0.0		6.6	54.787					0.0	ō.
	57,486 179,922		54,659	Ð.D	0.0	0.0 0.0 0.0	0.0	54.659	12.992				57.184	
						0.0	0.0	54.659	3,587				0.0	0.
1975	62.976	0.0	54.059	0.0	0.0	0.0	0.0	54.659	6,298				0.0	
1074	177.909	0.0	54.787	0.0	0.0	0.0	0.0	54.787	17.791				83.463	
1910	136.881	0.0	54.659	0.0	0.0	0.0	0.0	. 54 . 659	14 005				01 314	
1977	160.955	0.0	54.659	0.0	0.0	0.0	0.0	24.039 56 890	8.814				32:117	· ŏ.
1977						0.0	0.0	54.787	8.609				10.120	~
1974 1975 1976 1977 1978 1979	AG. 972		34.707				· · · · · · · · · · · · · · · · · · ·						28.775	
1980					0 0	0.0	0.0	54.696	9.241					
1980 MESH	92.414	0.0								*	**			
1980 MEAN RATES	92.414	0.0 0.0		0.0	0.0	0.0	0.0	100.000					52.609	0

PER100		ISLAMA	IPPLY- RAVALP	WATE INDUSTRI WAH	1AL	-AGRICUL RIGHT	TURE- LEFÍ	10141			1 \$ \$ 6 5	Az Para	SP1:L	5408
•	(HCN)	(MCM)	(ACH)	(4(4)	(K(H)	(治€鳥)	(MCM)	000.83	(SCN)	(N(N)	(FT)		(8(8)	 (8(
1960	70.423	0.0	58,700	0.0	0.0	0.0	0.0	58.700	7.642				11.650	0.0
1902	59.539		58.564	0.0	0.0	0.0	0.0	56.564 58.564	5.95				48.895 0.012	0.0 0.0
1963	66.121	0 0	58.564	0.0	0.0	0.0	0.0	58.564	6.612				0.369	0.0
1964	73.697	0.0	58.700 58.564	0.0		0.0 0.0			7.370				7.739	0.0
1966	73,984		58 564		0.0			58.564					40.198 3.566	0.0 9.0
1967	96.871		56.564					58.564	9.687				27.933	ο.ί
1968 1969	81.000 46,401		58,700					58.700 58.564	8,100 4,840				181517 0.0	e.e 6.0
1970	91.563	0.0	58.564	0.0	0.0	0,0	0.0	58.564	9.156				4.393	0.0
	108.385	0.0 0.0	58.564	0.0	0.0	0.0		58.564 58.700					<0.830	0.0
	129.922	0.0	58.56	0.0	.0.0	0.0	0.0	58.56	12.992				0.0	0.0
1974	35.868	0.0	58.564	0.0	- 0.0	0.0	0.0	58.564	3.587				0.0	Ø.
1975	177.909	0.0 0.0	58.700	0.0	0.0	0.0	0.0	58.700	17.791				0.0 78.298	ь. О.9
1977	136.881	0.0	58.564	0.0	0.0	0.0	0.0	58.564	13.688				63. 31	
1978	160:955	0.0	58.564	0,0	0.0	0.0	0.0	58.564	16.095				57.411	
1980	86.092	0.0	58.700	0.0 0.0 0.0	0.0	0.0	0.0	58.700	8.509				28.780 14.695	ο.
MEAN	92.414	0.0	58.603	0.0	0.0	0.0	0.0	58.603	\$ \$.241				25.232	Û.
RATE1		0.0		0.0	0.0	0.0	0.0	100.000					43.056	ΰ,
PATE2		0.0	150.000	0.0	6.0	· Ð. Ö	0.0	150.000				• • • • • • • •	57.039	
									• • • • • • • •	• • • • •				
	SUMMARY (OF RAVAL	RESERVOI	R OPERALI	ON	CASE	E 4 8							
PERIOD	INFLOY	WATER SL	JPPLY-	WATE	ER DEMAN	-AGRICULI	TURE-	TOTAL	LOSS	DIFFER	<u>R</u> eserv	018		
		1 SC GRA	RAVALE	WA8	14.51.A	81081	1.61.1				E E VEL	VOL .		
1960	(MCM) 70:123	(MCM) 0.0	(MCM) 62.613	(M(M) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(MCH) 0.0	(868) 0.0	(8(8) 0.0	(868) 62.633	(MCM) 7.047	(KCH)	(71)	(אכא)	(MCM) 8,652	СМ 6.
1961	122.440	0.0	62.468	0.0	0.0	0.0	0.0	62.468	12 244				2.727	Ċ.
1962	59.539	0.0	62.468	0.0	0.0	0.0	0.0	62.468	5.954				0.0	с.
1964	73.697	0.0	62.613	. 0.0	0.0	0.0	0.0	62.405	7.370				0.0	с. ¢.
1965	113,753	0.0	62.468	0.0	0.0	0.0	0.0	62.466	11.375				\$9.272	ð.
1965	73.984	0.0	62.468 A2 4AB	0.0	0.0	0.0	0.0	62.468 62.468	7.395				0.0	D. Q.
1.00	01.000	0.0	06.013	0.0	0.0	0.0			0.100				14.941	÷.
1969	48.401	0.0	62.468	0.0	0.0	0.0	0.0	62.468 82.465	4.640				0.0	Ş.
1970	91.563 108.388	0.0 0.0	62.468 62.468	0.0	0.0	0.0 0.0 0.0 0.0 0.0	0.0	62,408	¥.1>6 10.539				2.538 37.150	ь. Э.
1972	57.686	0.0	62.613	0.0	0.0	0.0	0.0	62.613	5 719				0.0	Θ.
	129.922	0.0	42.468	0.0	0.0	9.9	0.0	62.488 62.468	12.992				41.100	0. 0
1975		0.0	62.468	0.0	0.0	0.0	0.0	62.468	6.298				0.0 0.0	0. 13.
	177.909	0.0	62.613	0.0	0.0	0.0	0.0	62.613	17.791				73.133	
1976	136.881	0.0	62.468	0.0	0.0	0.0	0.0	. 52.46B 62.46B	15.588				59.420 83.507	
1979	88.441	0.0	62.468	0.0 0.0 0.0	0.0	0.0	0.0	62.468	8.844				25.601	Û.
1980	\$6.092	0.0	62.613	0.0	0.0.	0.0	0.0	62.613	8.609				10.511	¢.
HEAN	92.414		62.509		0.0	0.0		62.509	9.241				22.000	ς.
RATE1		0.0	100.000		0.0	0.0		100.000		--			35.194	1.
RATE2		0.0	150.000	0.0				160.000					.9.732	ÿ,
•					•		-		•				•	
				IN OPERATI	R DEMAN	0								- • - •
PERIOD		ISLAMA	RAWALP	- INDUSTRI WAN	TAXILA	RIGHT	LEFT				LEVEL		SPEc	\$⊭0
1040				(868)						(808)	6 F T J	(SCS)		12
1960	122.440	0.0	66.372	0.0 0.0	0.0	0.0	0.0	66.372	12.254				5.70s 38.598	
	59.539				0.0	0.0	0.0	66.372	5.954				0.0	0.9
1963	66.121 73.697	0.0	66.372	0.0		0.0							0.0	0.0 0.1
1965			66.372			0.0							24.095	
	73.984		66.372	0.0	0.0	0.0	0.0	66.372	7.396				0.0	ů - ·
	96.871 81.000		66.372 66.527			0.0 0.0							15.411 31.364	
1969	46.401	0.0	66.372	0.0	0.0	0.0	0.0	66.372	4.640				0.0	0.6
1970	91.563	0.0	66.372	~ ~	A A -	0 0	A A	44 372	0 154				1.752	
	108.388		66.527	0.0	0.0	0.0	0.0	66.372	10.859				33,470	0.1
1973	129.922	0.0	66.372			0.0							33.038	÷.,
1974	35.868	0.0	66.372	0.0	0.0	0.0	0.0	66.372	3.587				0.0	3.
	62.976 177.909		66.372 66.527	0.0	0.0	0.0 0.0	0.0	66.527	17.791				530.64	
1977	136.881	0.0	66.372	0.0	0.0	0.0	0.0	66.372	13.688				55.314	0.4
	160.955 BB.441			0.0									79,791 22.835	
1980	86.092	0.0	66.527	0.0	0.0	0.0	0.0	56.527	8.609				5.725	0.0
	92.414					0.0		66.(16				• • • • •	181518	
			·	········										
MEAN					0.0	0.0	0.0	100.000					28.334	2.4
NEAN RATE1				0.0										
RATE1 RATE2		0,0	170.000	0.0	0.0	0.0	0.0	170.000			······································		42.540	0.0

	INFLOW	WATER S		- INDUSTR	IAL	-AGRICUL DIGUI	TURE -	TOTAL			LEVEL			
		(8(8)	(HCK)	(807)	(MCM)	(MCM)	(MCM)	(ACA)	(MCM)	(NCH)	(1)	(HCH)	(1)	100
1960	70.423	0.0	78.267	0.0	0.0	0.0	0.0	10.201	7.042				0.0 23.079	0.0
-	122.440	0.0	78.085	0.0	0.0	0.0	0.0	78.085 78.085	3,954				0.0	0.0
1952	59.539	0.0 0.0	78.085 78.085	0.0	0.0	0.0	0.0	78.085	6.612				ò.c	
1963	56.121 73.897		76.267	0.0	0.0	0.0	0.0	78.267	7.370	1997 - 19			0.0	9.57
	213.753		78,085	0.0	0.3	0.0	0.0	78 085					6 565	
1800	73.984		78.085	0.0	0.0	0.0	0.0	78.085	7.398				0.0	0.0
1801	96.871		78.085	0.0		0.0 0.0	0.0 0.0	78.085 78.267	9.687 8.100				0.0	0.0
ነዋልዓ ነዋልዓ	81.000 45.401		/6.267 78.085	0.0	5.0	0.0	0.0	78.085	4.640				0.0	21.9
	91.563	6.0	78.085	0.0	0.0	0.0	0.0	78.085	9.156				0.0	\$5.8
	108.398	0.0	78.085	0.0	0.0	0.0		78.085					21.872 0.0	1.6
			78.267 78.055	0.0	0.0 0.0	0.0 0.0	0.0 0.0	76.267 78.085	5.749				12.662	1.7
1975	129.922 35.848			<u> </u>		A A	A 0	78 096	1 697				0.0	
1975	02.976	0.0	78.085	0.0	0.0	0.0	0.0	78.085	6.298				0.0	23.1
1976	177.909	0.0	76.267	0.0	û,Q.	G.O	0.0	78.267	17.791				55.280	
1927	136.861	0.0	78.055	0.0	0.0	0.0	0.0	78.085	13.688				43.031 68.649	0.0
1978	160.955	0.0	75,085	0.0	0.0	0.0	0.0	75.085	8 8 4				17.192	0.0
1080	88.441 88.092	0.0	78.085 78.085 78.267 78.085 78.085 78.085 78.085 78.267	0.0	0.0	0.0	0.0	78.267	8.609				0.0	0.0
											· - - ^ - -			
** * *	93 3 11	ំព	28 137	0.0	0.0	0.0	0.0	76.137	\$ 241				11.825	
						0.0.	0.0	100.000		• • • • • • •	******		15.134	
88761 		0.0	100.000	0.0 										
RATEZ		0.0	200.000	0.0	0.0	0.0	0.0	200.000					26,732	
s	ыннаят с	F RAWAL	RESERVOI	OPERAT	ION		. = 11		·			4 11	н. 1.	
• • • • • •											RESERV		58111	 SHOR
											LEVEL			
	(866)	(RER)									1813	(MCM)	(HCN)	(MC
1960	26.423	0.0	74,353 74,183	0.0	0.0	0.0	0.0	74.353 74.181 74.181 74.181 74.353	7 04 2				0.0	
	155.440	0.0	74.181	0.0	0.0	0.0	0.0	74.181	12.244	· .			30.354	0.0 0.0
	59 539		74,181	0.0	0.0	0.0	0.0	74.181	5 Y 25				0.0	7.3
1963 1984	66.121 73.697	0.0	76.381	0.0	0.0	0.0	0.0	74.353	7.370				0.0	5.3
	113.753	0.0	76.353	0.0	0.0	0.0	0.0	74.181	11.375				559.3	2.4
	73.984	0,0	74,181	0.0 0.0	0.0	0.0	0.0	76.181	7.398				0.0	0.0
3967	96.871	0.0	74.181	6.0	0.0			74.381				÷	0.0	0.0
	\$1.000	0.0	74.353	0.0 0.0	0.0	0.0		74.353					3.550	0.0
1959	10.103	0.0	74.181 74.181	0.0	0.0	0.0		74.181					0.151	
	\$1.5c3 108.388	0.0	74,181	0.0 0.0	0.0	0.0		74.181					26.111	0.0
	57,486	0.0	74.353	0.0	0.0	0.0	0.0	74.353	5.749				0.0	0.0
1973	156.855	0.0	74.183	0.0	0.0	Ø.0		74.181					17.190	6.0
	35.845	0.0	74.181		0.0			74.181 74.181					0.0	13.1
	62.976 177.909	0.0	74.383	0.0	0.0 0.0	0.0	0.0	74.353					58.262	
	136,881	0.0	74.182	0.0	0.0	0.0	0.0	74.181					47.059	0.0
1020		0.0	21 191	0 0	0 0	0.0	0.0	74.181	16.095				72.430	0.0
1979	88.441	0.0	74,181	0.0	0.0	0.0	0.0	74.181	8.844				19.073	0.0
			74.353	0.0	0.0	0.0	0.0	74.353	8.609				0.0	
			74.230				0.0						13.473	
	92.434 					· · · · · · · · · · · · · · · · · · ·					. .			
LATES			100.000		0.0	0.0	0.0	100,000					18.151	
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				<pre></pre>	(NCH)	(HCH)	CHCH)	(8(8)	(808)	(MCM)	(11)	(#64)	(HCH)	CHC
1966	70.123	û.0	10.440	0.0	0.0	0.0	0.0	70.440	7.042				2 760	0.0
1961	122.440	0.0	70.276	0.0	0.0	0.0	0.0	76.276	12.244				54.469	0.0
1942	\$9.559	4.0	70.276	0.0	0.0	Q.Ú	0.0	70.276	5.954				0.0	. 0.5
1963	66.121	0.0	70.276	0.0	0.9 0.0	0.0	0.0	70.440	7.370				0.0	1.4
1966	132.097	0.0 0.0	70.440	0.0	0.0	0.0	0.0	70.276	11.375				11.279	0.3
1968	73,984	0.0	20.276	0.0	0, D	0.0	0.0	70.276	7.398				0.0	0.0
1967	96.871	0.0	70.276	0.0	0.0	0,0	6.0	70,276	9,687				7 788	0.0
1968	81.000	0 - 0	70,440	6.0	6.0	0.0	0.0	70.440	2,100				0.0	3.5
1969	46.405	0.0	70.276	0.0	0.0 0.0	0,0	0.0	70.276	9.154				0.967	18.1
1970	91.563	0.0	70,270	0.0	0.0	0.0	0.0	70.276	10.639	1.1			29.791	0.0
1971	57.144	0.0	70.440	0.0	ŏ.ŏ	0,0	0.0	70,440	5 7 4 9				0.0	0.0
1971	125.922	0.0	70.276	0.0	0.0	0.0	0.0	70.276	12.992				52.118	v.0 °
1976	35.868	0.0	10.276	0,0	Q.O	0.0	0.0	70.276	3.587				0.0	19.4
1975	67.976	0.0	76.276	0.0	0.0	0.0	0.0	70.276	0.298	1			63.068	0.0
1976	:77.909	0.0	76 440	0.0	0.0	0.0	0.0	70.440	13.400	5. C			51 179	0.0
	136.081	0.0	20.276	0,0	0.0	0.0	0.0	76.274	16.095				76.118	·0,0
1977	160.955 RF //1	0.0	70.274	0.0	0.0	0.0	0.0	70.276	8.844				20.954	0.0
1977 1578 1976		0.0	76.440	0,0	0.0	0,0	0.0	70.440	8.609		÷		0.071	0.0
1977 1978 1979 1980	80.042								*					
1977 1578 1979 1980	86.092		70 132	0.0	0.0	Q. D	0.0	- 70,323	9.241				15.759	2.4
MEAN							0.0	100 000					22.409	3.4
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CHAPTER I. REVIEW OF EXISTING STUDY

1.1. General

Previous study reports on the Khanpur water conveyance project have been issued by various agencies for the conveyance of water to Islamabad only, Rawalpindi only or Islamabad/Rawalpindi combined. This chapter deals with the results of review on the previous representative reports which are NESPAK and AESL Report.

There is no comprehensive study report on the Khanpur water conveyance from reservoir to twin cities of Islamabad and Rawalpindi as a combined or joint project. Besides, scopes of work in respective existing studies are quite different.

Summarized description and focus of the report are given as below:

- NESPAK Report:

In June 1980, National Engineering Services (Pakistan) Ltd. submitted to the CDA a preliminary design and feasibility report on supply of the Khanpur water to Islamabad. The NESPAK examined various alternatives to divert the Khanpur water directly from the reservoir or through the already completed Left Bank Canal with a proposed least cost solution. Focus of the report is selection of least cost conveyance canal route for mostly Islamabad area.

AESL Report:

Associated Engineering Service Ltd. (AESL) of Canada under the technical assistance of the Asian Development Bank submitted draft final report on Rawalpindi Water Supply and Sewerage Project in May 1980. The AESL

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examined the problem of water supply and sewerage for Rawalpindi and Islamabad collectively, placing their focus mainly upon groundwater development. The AESL also carried out comprehensive studies of water supply needs for Rawalpindi and Islamabad combined, in which various alternatives on water supply from Khanpur were indicated on preliminary planning basis with the best solution for a combined supply to twin cities.

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1.2. Review and Assessment of the Reports

1.2.1. NESPAK Report

The following are the summary, including scope of work and problem areas, of the report.

- Scope of Work:

The NESPAK has worked out water conveyance systems from Kanpur reservoir to Islamabad area. The study items were selection of least cost water conveyance system excluding detailed study on water demand projection and water balance study for Khanpur reservoir.

- Water Requirement:

The average demand in winter and summer would be 70 and 120 percent of yearly average. The peak summer day demand is 150% of average summer day demand, or equivalent to 1.8 times of the annual average. Design capacity of Islamabad and Rawalpindi is about 60 and 125 MGD respectively. The discharges mentioned above, however, are rather over estimate compared to optimum values.

- Service Area:

The beneficial areas of Islamabad by the Khanpur are mainly sectors 10 to 12 series, whereas for Rawalpindi they are not specified due to supplementary water supply scheme.

Survey and Investigation: Topographical and geological surveys have been made based on terms of reference on a preliminary basis. - Alternative Plans:

The NESPAK has studied five possible alternative plans on the conduction system from Khanpur reservoir including existing Left Bank Canal to service area, three of which have a tunnel plan and remainder are without tunnel construction works.

- Engineering Consideration: There are no indications of major

thrust zones near Khurram Gujar and Tarmakki in their geological profile. The rock classification along tunnel route of alternative - 2 has some discrepancy between drawings and result of field survey. "Massive Limestone" shall be alternate layer of not only limestones but also shale and marl. Stilling basin would be required at the outlet of intake tunnel. The structures of the basin should be designed with gate or valve type in order to reduce size of basin for energy dissipation.

Reinforcement of typical cross section of tunnel for free flow type can be eliminated from view point of structural design.

The economic and technical analysis shows that for supply of Khanpur water to islamabad the most feasible solution lies in obtaining the water directly from the Khanpur reservoir and fully utilizing the available head in the reservoir. Recommendable alternative plan is Alternate 2B Khanpur-Shah Allah Ditta route.

Evaluation:

- Assessment of the Report:

The report has been prepared mainly concentrating on selection of least cost water supply system for Islamabad area. The several data and information, such as topographic and geological maps as well as conveyance route, are very useful for further study and project implementation. Design concepts, however, would need some modification or changes to meet the project requirements.

1.2.2. AESL Report

The summary of the report are described as under.

- Scope of Work:

The AESL has carried out the study on water supply and sewerage plans for Rawalpindi and Islamabad. The study items of water supply scheme include projection of population and water demand, survey and evaluation of water resources for water supply, selection of least cost water conveyance systems, economic and financial analysis of the project etc.

Population Projection: Service area of twin cities falls within their administrative boundary. Proposed population of Islamabad and Rawalpindi in the year of 2000 are expected to be about 0.575 and 1.400 million respectively.

- Water Requirement:

Average water demands per day per capita are prospected to be about 46 gal. for Rawalpindi and 116 gal. for Islamabad taking into account living standard, service level of water supply and consumption trend in service area. The water demands are decided considering leakage and wastage losses reduction scheme from 60% of consumption total to 25% of it.

- Water Resources Availability: The AESL pointed out that

available water of Khanpur reservoir is about 116 MGD on an average instead of 186 MGD suggested by WAPDA. Based on the above suggetions, apportionments of Khanpur available water are revised to 40.5 MGD for both the Rawalpindi and Islamabad, and 35.0 MGD for right bank area irrigation, and others are neglected from water supply during drought period. Besides, the AESL recommended that extremely large volumes of groundwater can be developed totaling about 232 MGD against the existing capacity of 68 MGD. This recommendation seems to be difficult to realize full development.

- Alternative Plan:

The AESL has basically worked out four possible alternate plans on the water conveyance from Khanpur to twin beneficiary cities. Two alternatives from outlet of Margala tunnel and another two from Khanpur reservoir are set up. Each alternative has a plan with combined system for twin cities and separate system individually. Evaluation of the Alternative: Recommendable scheme is to

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utilize the existing Left Bank Canal and construct a tunnel to convey water to Margala treatment plant, from which it is pumped to Shah Allh Ditta reservoir for the higher zone of Islamabad and to Tirnaul and Tomar reservoirs for Rawalpindi and the lower Islamabad zone. When groundwater is considered as suitable combined water sources, the first priority of development plan is to develop groundwater to its maximum potential prior to Khanpur for the area as a whole, including Islamabad.

Assessment of the Report: The report has been compiled with

overall study on the water supply as well as sewerage schemes. The aspects on the water supply plan are very useful for the future study and project implementation. Selection of least cost water supply system, however, will need some modification due to the use of different water apportionment.

B.I-7

CHAPTER II. INVESTIGATION

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CHAPTER II. INVESTIGATION

2.1. Geological Survey

The following geological survey has been conducted with close cooperation of CDA in order to clarify geology of foundation for raw water reservoir/water treatment plant and qualitative and quantitative embankment material of raw water reservoir.

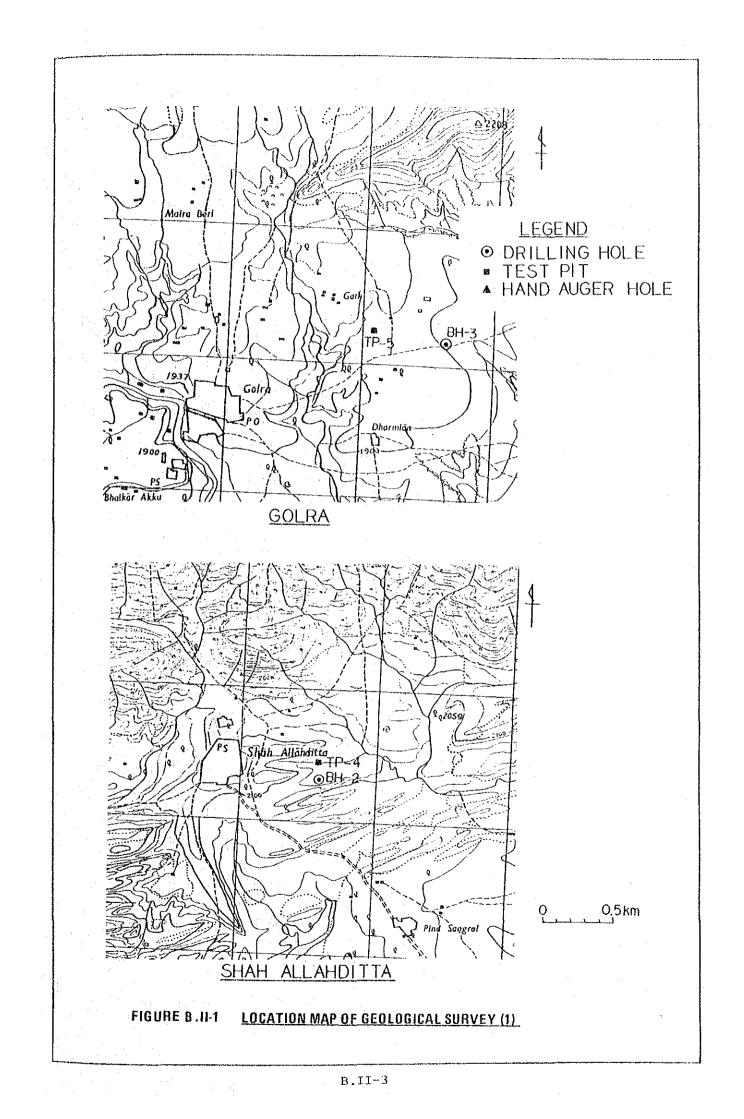
Water Treatment Plant Site

·	Location	Item	Quantity
(1)	Sang Jani	Drilling Standard penetration test	l hole, 60 ft 3 times
(2)	Shah Allah Ditta	Drilling Test pit excavation	l hole, 18 ft 1 pit
(3)	Golra Kaw Water	Drilling Standard penetration test Test pit excavation Reservoir	l hcle, 60 ft 8 times 1 pìt
(1)	Sang Jani	Test pit excavation Hand auger drilling Soil test*1	2 pits 5 holes 6 samples
(2)	Khurram Paracha	Test pit excavation Hand auger drilling Soil test	2 pits 5 holes 6 samples
Note	Total Quantity	Drilling Standard penetration test Test pit excavation Hand auger drilling Soil test	3 holes 11 times 7 pits 10 holes 12 samples

Note: *1 Test items include grain size analysis, liquid and plastic limits test, and specific gravity test.

Location map of the sites is illustrated in Figure B.II-1 and B.II-2. Each geologic log of drill hole, test pit and auger hole are also indicated in Figure B.II-3, B.II-4 and B.II-5, respectively.

Besides, results of soil test and analysis are shown in Table B.II-1 and Figure B.II-6 and B.II-7. The evaluation of survey and some consideration are discussed in Chapter III and V of this Appendix.



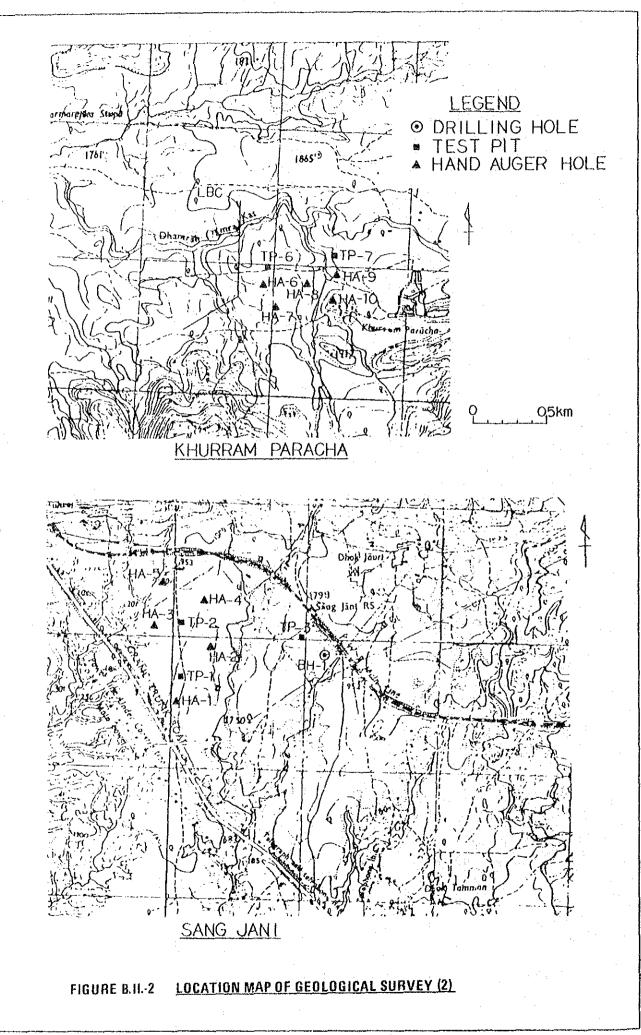


FIGURE B.II-3 GEOLOGIC LOG OF DRILL HOLE(1)

								lant
								al Depth 60' Dip Vertical
								Ground Elev. (1765)
Begu	n <u>26-</u>	9-19	84	Fin	ishe	d	30-9-	-84 Depth to W.L. More,than
	ed by		<u>M.A</u>	<u>. M .</u>	AZAM		·	Log Revised by <u>S. SUGIYAMA</u>
ELEVATION (FEET)	E	гC	S	TAND	ARD		ı	CLASSIFICATION
EET	DEPTH FEET)	GRAPHIC LOG	רב דיד	NETR	N-VA	N T.UE.)		AND PHYSICAL CONDITION
ЕГI (FJ	ជ៍	GR	0^{1}	<u>0</u> 2	0 3	0 4		
	-	' o /						0'-11.5' Silty CLAY with trac
-				17			· · ·	of concretion; light brown.
+-	-	1-1			20	· .		11.5-25' Silty CLAY with
 	1 <u>1.5</u> 10-				2.0			GRAVEL; light brown.
	-	700						
		10, 1, 1, 2, 1,						25'-28.5' Silty CLAY; light brown.
	20-	1. »/ 						28.5'-40' GRAVEL with brown
	25 -							Silty CLAY.
	28.5 -	/ ; /			24			
	30-	0000						40'-60' Silty CLAY with GRAVE
	· -	0 0						cobble & pebble dia.
	-	0 0 0 0 0						
·		80-0						
	-							
-								
	50-							
	-					· .		
~					1			
	60							
REMA	ļ			<u> </u>	[<u> </u>	

FIGURE B.H-3 GEOLOGIC LOG OF DRILL HOLE (2)

Project	
Area Designati	onTreatment Plant
	2 Total Depth Dip <u>Vertical</u>
Location	h Allahditta Ground Elev. (2095)
Begun <u>1-10-19</u>	84Finished2-10-1984Depth to W.L.M.A.M.AZAMLog Revised byS. SUGIYAMA
	STANDARD CLASSIFICATION
ELEVATI (FEET) DEPTH (FEET) GRAPHIC LOG	PENETRATION AND TEST (N-VALUE) PHYSICAL CONDITION O 10 20 30 40 50
5	O'-5' Sandy CLAY; loose; reddish brown, over_burder
- 10-	5'-15' Weathered MUDSTONE; reddish brown; sandy; with pebble; slicken Side present;
	Murree Formation.
18	
	15'-18' Mudstone; reddish brown; sandy; calsite vein intercalated; rathe hard; Murree Formation.
- 30-	
- 40-	
- 50-	
- 60-	
REMARKS :	
	B.II-6

FIGURE B. II-3 GEOLOGIC LOG OF DRILL HOLE (3)

Project	· · · · · · · · · · · · · · · · · · ·	
Area Designation <u>Treatme</u>	nt Pla	nt
Hole No. <u>BH-3</u>	Tota	1 Depth <u>60'</u> Dip Vertical
Location <u>Golra</u>		Ground Elev. (1870)
Begun <u>3-10-1984</u> Finished	4.10.	More than 1984 Depth to W.L. 18'
Logged by <u>M.A.M. AZAM</u>	······	Log Revised by S. SUCIYAMA
Image: Standard Standa		CLASSIFICATION
ZO O STANDARD H O H PENETRATION H H H PENETRATION H H H H H H H PENETRATION H H H H H H H PENETRATION H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H H		AND PHYSICAL CONDITION
		0'-5' Silty CLAY with traces
-5 - 20		of concretion; light
		brown.
		5'-16' CLAY with trace of concretion; brown
- 25		
		16'-23' Silty CLAY: compact; brown.
		23'-24' SAND with little
		gravel; medium to
		coarse grained;
- 30-2-2		limestone pebble; gray.
		24'-48' Clayey SILT; brown.
		48'~50.5' SAND with gravel;
40-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7-7		medium to coarse
		grained; limestone
48 7 7		pebble; gray.
5020 50.5		50.5'-60' Silty CLAY; brown.
REMARKS:		

FIGURE	в.п-4	LOG O	F TE	ST PIT	-OR-AUGER-HOLE (1)
 Projec					Hole No TP-1
Locat	ion com	o tani-			Ground Elev. (1765)
Area I	besigna	ation I	law W	ater Res	ervoir & borrow Area.
· ·		ension _4			
		er Leve			d
		<pre>cavatio</pre>			
ļ		r 1, 198			Logged by S. Sugiyama
Date_	000000	<u> </u>			
CLASSIFI	ICATION	DEPTH S	AMPLE	CLASSI	FICATION AND DESCRIPTION
SYME LETTER		(FEET)			OF MATERIAL
	ніс				
CL			3 lb.	0'-3'	<pre>Silty CLAY, trace of concretion; roots scattered especially at 0'-1'; brown;dry;compact; loess. Silty CLAY;a considerable amount of concretion with about l-inch</pre>
		5-0			dia. ; brown ; dry; compact; loess.
CL				8'-10'	Silt ; trace of concretion; uniform grains; brown ; dry; compact; loess.
ML					
	<u>†</u> −∕	1			
REMARI	KS:	<u> </u>	I		

FIGURE B.II-4 LOG OF TH	EST PIT OR AUGER HOLE (2)
Project	Hole No. TP-2
Location <u>SangJani</u>	Ground Elev. (1775)
Area Designation <u>Raw W</u>	later Reservoir & Borrow Area
Approx. Dimension <u>4' x</u>	$10^{1} \times 10^{1}$
Depth to Water LevelN	lot reached
Method of Excavation	Hand dug pit
Date <u>September 27, 198</u>	Logged by <u>S. SUGIYAMA</u>
	· · · · · · · · · · · · · · · · · · ·
	CLASSIFICATION AND DESCRIPTION OF
SYMBOL LETTER GRAP- (FEET)	MATERIAL
HIC	· · ·
	0'-4' Silty CLAY; trace of concretion; brown; dry; compact; loess
CL 74/1 - 3 lb.	4'-10' Silty CLAY; considerable amount of concretion with 1-½ inch max. dia.; brown; a little dry; compact; loess.
	Roots scattered 0'-10'.
	No coarse grains except for concretion.
S/ 5 7	
REMARKS:	

1	ST PIT OR AUGER HOLE (3)
	Hole No. TP-3
Location <u>Sang Jani</u>	Ground Elev. (1778)
	ment Plant
Approx. Dimension <u>4' x1</u>	0'x10'
Depth to Water Level <u>No</u>	ot reached
Method of Excavation <u>Ha</u>	und dug pit
Date <u>October 1, 1984</u>	Logged by <u>S. SUGIYAMA</u>
CLASSIFICATION DEPTH SAMPLE SYMBOL LETTER GRAP- HIC	CLASSIFICATION AND DESCRIPTION OF MATERIAL
CL	<pre>0'-10' Silty CLAY; trace of concretion; compact; massive; a little dry; low plasticity; brown; loess. 0'-3' Abundant roots; dry. 8'-10' Trace of limeston pebble</pre>
REMARKS:	
 A second s	

FIGURE B.II-4	LOG OF T	EST PIT OR AUGER HOLE (4)
Project		Hole No. TP-4
3		ttaGround Elev. (2075)
Area Designa	tion Tre	atment Pant
Approx. Dime	nsion <u>4'</u>	x 10' x 7'
Depth to Wat	er Level	Not reached
Method of Ex	cavation	Hand dug pit
Date Oc	<u>ctober 4, 19</u>	84 Logged by S.SUGIYAMA
CLASSIFICATION SYMBOL LETTER GRAP- HIC		CLASSIFICATION AND DESCRIPTION OF MATERIAL
SC SC SC Bedrock	5	 0'-1' Clavey Sand; dry; hard; abundant roots, top soil. 1'-7' Clavey Sand with rubble; massive; compact; moist; brown with yellowish sandy patch; abundant roots upto 3' and trace of roots upto 7'; Overburden. Rubble consists of hard greenish sand stone with 4" maxdia. 1'x2" cave at 5' depth. 7'- Sandy MUDSTONE to Clayey SAND STONE; reddish brown to purple; massive; soft; Murree Formation, bedrock.
	10	
REMARKS :	han gin mai di kananan manya d an pika kang kang kang kang kang kang kang ka	

		EST PIT OR AUGER HOLE (5)
Project		Hole No. <u>TP-5</u>
Location	Golra	Ground Elev. (1885)
Area Designa	tion	Treatment Plant
Approx. Dime	nsion	4'x10'x10'
Depth to Wat	er Level	Not reached
Method of Ex	cavation	Hand dug pit
		Logged by S.SUGIYAMA
		CLASSIFICATION AND DESCRIPTION
ASSIFICATION SYMBOL ETTER GRAP- HIC		OF MATERIAL
		0'-1' Silty CLAY with limestone pebble;
		abundant roots; brown; dry; top soil.
	_	1'-10' Silty CLAY; trace of concretion;
· · · · · · · · · · · · · · · · · · ·		massive; compact; trace of roots
		many small holes of 1mm dia.
CL	5—	scattered; brown with yellowish
	~-	patch; dry; loess.
	-	
·····		
	-10-	
,		

FIGURE D'II-4 IOO OL I	EST PIT OR AUGER HOLE (6)
Project	Hole No. TP-6
	chaGround Elev
e de la companya de l	Water Reservoir & Borrow Area
Approx. Dimension <u>4</u> '	x10'x10'
Depth to Water Level	
Method of Excavation	· · · · · · · · · · · · · · · · · · ·
Date <u>October 8, 1984</u>	Logged by S.SUGIYAMA
LASSIFICATION DEPTH SAMPLE	
SYMBOL LETTER GRAP- (FEET)	OF MATERIAL
HIC	
	0'-2' Silty CLAY; abundant roots; soft; brown; dry; loess.
	2'-10' Silty CLAY; compact; massive;
s/4 lb.	a little roots; a considerable
	amount of concretion; porous;
	an ant cave with 5" ϕ ; ant
5	pits scattered; brown; a little
	dry; loess.
CL	
	·

B.II-13

FIGURE B-II-4 LOG OF TEST PIT OR AUGER HOLE (7) Hole No. TP-7 Project Location Khurram Parucha Ground Elev. Area Designation Raw Water Reservoir & Borrow Area Approx. Dimension 4'x10'x10' Depth to Water Level <u>Not reached</u> Method of Excavation Hand dug pit Date October 8, 1984 Logged by S. SUGIYAMA CLASSIFICATION DEPTH SAMPLE CLASSIFICATION AND DESCRIPTION OF -SYMBOL LETTER GRAP- (FEET) MATERIAL HIC 0'-1' Sandy CLAY with gravel; abundant CL roots; gray; dry; top soil. CL 1'-3' Silty CLAY; porous; moderately compact; a considerable amount of roots; trace of concretion; 4 lb. brown with gray patch; moist; reworked loess. 5. 3'-10' Silty CLAY; massive; very compact CL hard; abundant concretion; trace of roots; brown; moist; loess. 10 REMARKS:

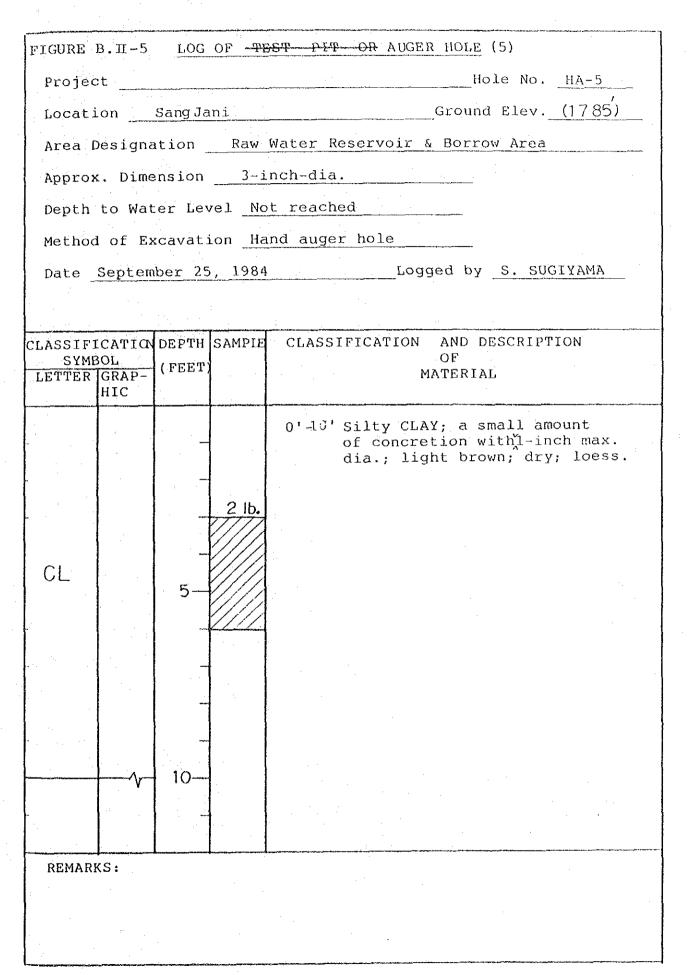
B.II-14

	and the second		• • • • • • • • • • • • • • • • • • •		· · · · · · · · · · · · · · · · · · ·
FIGURE	в.п-	5 LOG	OF P F	:54 ₽14	- OR AUGER HOLE (1)
Projec	:t				Hole No, HA-1
Locati	.on	Sang Ja	ani		Ground Elev. (1750')
Area I	Designa	ation	Raw Wa	ater Res	servoir & Borrow Area
Approx	. Dime	ension	3	inch-dia	1
Depth	to Wat	er Lev	vel Not	t reache	ed
Method	i of Ex	kcavat	ion <u>Har</u>	nd auger	t hole
Date	Septer	mber 24	4, 1984	4	Logged by S. Sugiyama
			;		
CLASSIFI SYME	OT	1		CLASS	IFICATION AND DESCRIPTION OF
LETTER		(FEET)			MATERIAL
	ніс			L	
				0'-5'	Silty CLAY; slightly organic with plant roots; no coarse grains except for trace of concretion;
CL					<pre>medium plasticity; dark brown; moist; easy to be compacted; loess.</pre>
		5	2 lb.	5"-8"	Silty CLAY-Clayey SILT; small amount of concretion with 1-inch max. dia; brown; moist to a
CL		· _			little dry; Loess.
ML					STOPPED DUE TO MUCH CONCRETION.
		-		2	
		10-			
		10			
*					
REMARI	۱ «S:	<u></u>			
			·		
:			•.	:	

FIGURE	в.п-5	LOG OI	<u>- 44</u> E	Su bi u	- OR AUGER	R HOLE	(2)	
Projec							ole No.	HA-2
·				• .		Ground	l Elev.	(1750)
					eservoir &			
1		ension 3				······································		
		er Level			ned			
		kcavation				·	: • •	
1					Logo	ged by	s. sug	IYAMA
-				· · · · · · · · · · · · · · · ·	· ·		:	
1		DEPTH SA	MPIE	CLASSI	FICATION	AND D OF	ESCRIPT	ION
SYME LETTER		(FEET)			M	ATERIA	L	
CL		5		6'~7'	Silty CLA trace of moist; re Sily SANE little an pebble; t deposit.	concre worked mediu nount corc.wn	tion; b l loess. m grain of limes	rown; is; a tone
REMARI	L KS:	↓ , , , , , , , , , , , , , , , , ,				· · · · · · · · · · · · · · · · · · ·		

				SET PIT OR AUGER HOLE (3)
			· · · ·	Hole No. HA-3
Locat	ion	Sang Ja	ni	Ground Elev. (1775)
Area l	Designa	ation _	Raw Ŵ	ater Reservoir & Borrow Area
Approx	k. Dime	ension	<u>3-in</u>	ch-dia.
Depth	to Wat	er Lev	vel <u>N</u>	ot reached
Method	l of Ex	cavat	ion <u>H</u>	and auger hole
Date	Septe	mber 2	4, 198	4 Logged by S. SUGIYAMA
·	•			
ASSIFI. SYM	ICATION BOL	1	1 1	OF
ETTER	GRAP- HIC	(FEET)		MATERIAL
				0'-1' Silty CLAY slightly organic;
` _		· · · · · · · · · · · · · · · · · · ·		medium plasticity; dark brown; moist; top soil.
		· ·		l'-10' Silty CLAY; a little amount of
			2 1	1 - IO SITCA CRAI! & LICCIE SUCCEDE OF
			2 lb.	concretion; medium plasticity;
			2 lb.	concretion; medium plasticity; brown; moist avobe 6'; a little dry from 6'; loess.
			2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5—	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL		5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>
CL	KS :	5	2 lb.	<pre>concretion; medium plasticity; brown; moist avobe 6'; a little</pre>

Proje	ct			Hole No. <u>HA-4</u>
Locat	ìon	Sarg Ja	ni	Ground Elev. (1772)
Area	Designa	ation	Raw W	Vater Reservoir & Borrow Area
÷				ch-dia.
Depth	to Wat	er Lev	el <u>No</u>	ot reached
Metho	d of Ex	kcavati	on <u>H</u> a	and auger hole
Date	Septer	aber 25	, 1984	Logged by S. SUGIYAMA
-				
LACCTO	ICATION	рерти	SAMPIE	CLASSIFICATION AND DESCRIPTION
SYMI LETTER	30L	(FEET)	onn a	OF MATERIAL
	HIC			
				0'-1' Silty CLAY ; slightly organic; medium plasticity; brown; a
				little wet; top soil.
CL				1'-8' Silty CLAY; medium plasticity; a little amount of concretion
·		-		with a hald inch max. dia; brown; a little wet; loess.
		5		
				8'-9' Silty CLAY; a considerable amount
CL				of concretion.
CL				CONDER BY MUCH CONCREPTION
	$1 \sim 10^{-1}$		1	STOPPED BY MUCH CONCRETION.
		10		
REMAR	KS:			



FICUPE	<u>к</u> т_5		EST PIT OR AUGER HOLE (6)
			Holo No HArb
Projec			
1			chaGround Elev
4			Water Reservoir & Borrow Area
Approx	ĸ. Dime	ension <u>3-i</u>	nch-dia.
Depth	to Wat	ter Level	Not reached
Method	d of E	xcavation	Hand auger hole
Date	Sept	cember 26, 1	984 Logged by S.SUGIYAMA
		··· .	
		1 1	CLASSIFICATION AND DESCRIPTION OF
SYMI LETTER		(FEET)	MATERIAL
-		-	0'-10' Silty CLAY; moderate plasticity; trace of concretion below 1;
			<pre>brown; a little dry -moist; loess.</pre>
		2 lb	
CL			
		5-////	
	-		
- -			
REMAR	KS:		
	· .		

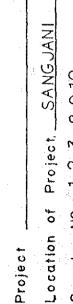
proser	nt i						Hole No		7
	1.1								
						Grou			
						voir & B	orrow Ai	cea	
Approx	<. Dim∈	ension	3	inch-di	a.				
Depth	to Wat	er Lev	e1N	ot read	hed				
				and aug		2	_		
		•				Logged b	y s si	IGTYAMA	
- Date 0	sepu	20021	<u>_0</u>	<u>09</u>				<u>, , , , , , , , , , , , , , , , , , , </u>	
ASSIFI SYME		DEPTH	SAMPLE	CLASS	SIFICAT	EON AND OF	DESCRI	PTION	
ETTER	GRAP-	(FEET)		· .	-	MATER	IAL		
	HIC								<i></i>
	:			0'-3'	Silty (CLAY wit	h trace	of bri	lck
C1	· ·				fragmen	nt and co c; dark	<pre>ncretion brown; if </pre>	n; slig moist-v	yntly vet:
	1								
CL		· -			top so:	il; rewo	rked lo	ess.	
			2 lb.		top so: Silty	il; rewo CLAY; t	rked lo race of	ess. concre	etion;
UL 			2 lb.		top so: Silty trace	il; rewo	rked lo race of s; ligh	ess. concre	etion;
			2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
CL		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
		5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
	KS :	5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;
CL	KS :	5	2 lb.		top so: Silty trace	il; rewo CLAY; t of root	rked lo race of s; ligh	ess. concre	etion;

FIGURE B. II-5 LOG OF TEST-PIT OR AUGER HOLE (8)						
Project Hole No. <u>HA-8</u>						
Location Khurrum Paruda Ground Elev.						
Area Designation <u>Raw Water Reservoir</u>						
Approx. Dimension <u>3-inch-dia</u>						
Depth to Water Level						
Method of Excavation <u>Hand auger hole</u>						
Date <u>September 27, 1984</u> Logged by <u>S.SUGIYAMA</u>						
CLASSIFICATION DEPTH SAMPLE CLASSIFICATION AND DESCRIPTION SYMBOL LETTER GRAP- HIC HIC CLASSIFICATION AND DESCRIPTION OF MATERIAL						
CL~CH a little sandy; some roots; dark brown; rather soft; moist;						
CL-CH - CL-CH						
5- 2 lb. loess.						
ML ML Ideas. 6'-8' Clavey Silt; a little amount of concretion with 0.5-inch-dia; light brown; a little dry; loess.						
ML						
grains; light gray; a little 10- dry; loess.						
REMARKS: Stopped dur to gravel encountered.						
₹						

FIGURE	в.п-5	LOG	OF TH	ST PIT OR AUGER HOLE (9)			
Projec	ct		<u></u>	Hole No. <u>HA-9</u>			
Locati	ion	Khurru	n Pariu	chaGround Elev			
Area Designation <u>Raw Water Reservoir & Borrow Area</u>							
Approx	c. Dime	ension	<u> </u>	nch-dia			
Depth	to Wat	er Lev	el	6'			
Method	l of E>	cavati	on	Hand_auger_hole			
Date		Septem	ber 27	, 1984 Logged by S. SUGIYAMA			
CLASSIFI SYME LETTER	BOL	DEPTH (FEET)	SAMPIE	CLASSIFICATION AND DESCRIPTION OF MATERIAL			
CL				0'-3' Silty CLAY; a little organic; a little concretion; brown with darker patch; moist; reworked loess.			
CL				3'-6' Silty CLAY; no coarse grains except for a little amount of concretion; light brown; moist.			
CL				6'-9' Silty CLAY;almost saturated; soft; light brown.			
		10	:				
		_					
REMARI	KS:						

FIGURE	в.ш-5	LOG	OF -44	sir pir	OR AUGER HOLE (10)
Projec	:t				Hole No. <u>HA-10</u>
Locat					Ground Elev.
					servoir & Borrow Area
				4 A	
Depth	to Wat	er Lev	vel	6'	
				· '.	er hole
Date	Sep	tember	27, 19	984	Logged by <u>S. SUGIYAMA</u>
CLASSIFI SYME LETTER	BOL	DEPTH (FEET)		CLASSI	FICATION AND DESCRIPTION OF MATERIAL
CL				0'-5'	Silty CLAY;a little amount of concretion; brown with darke: & lighter patch; moist; reworked loess.
				5-6'	Ditto.;wet.
CI		- 5		6-10'	Silty Clay; soft; almost saturated; light brown.
			2 lb.		
CL					
5- 11-11-12-11-11-11-12-11-11-11-11-11-11-1					
REMAR	KS:	, <u>)</u>	••		
	• .				

ANALYSIS (1) GRAIN-SIZE FIGURE B.IL-6



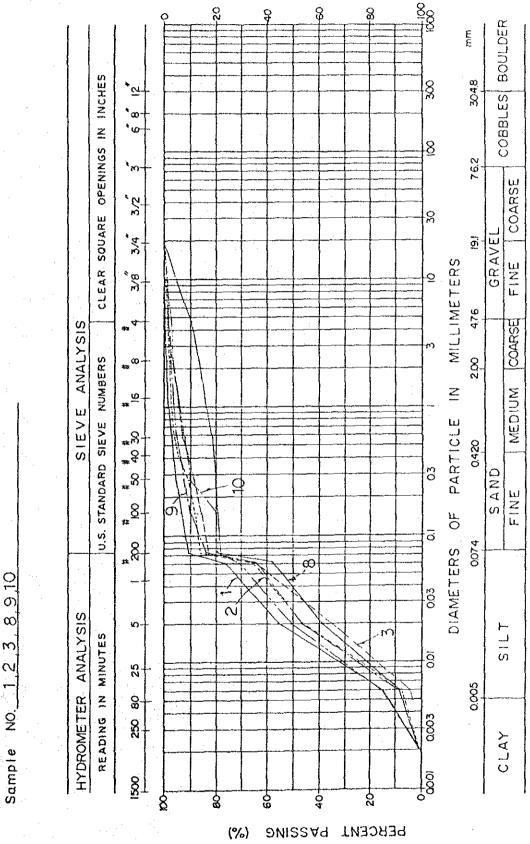




Date of Testing



PERCENT RETAINED



B.II-25

GRAIN-SIZE ANALYSIS (2) FIGURE B.II-6

Project

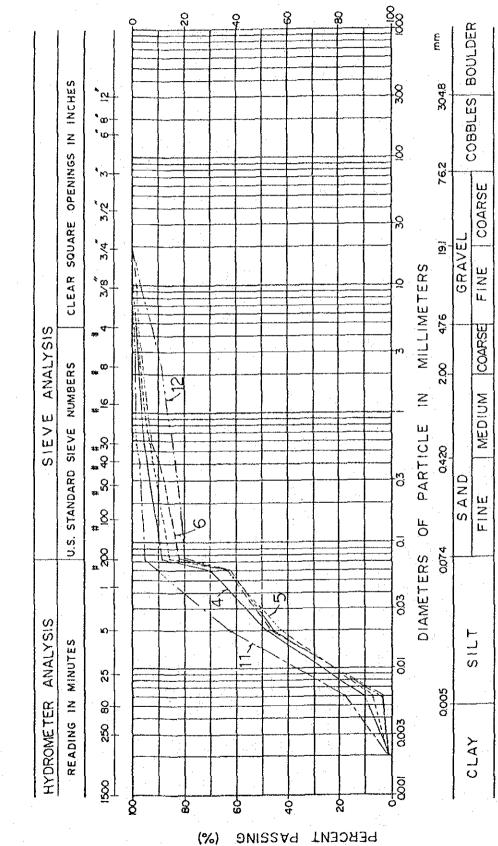
PARACHA KHURAM 7,11,12 Project. С О 4 Sample NO. Location of

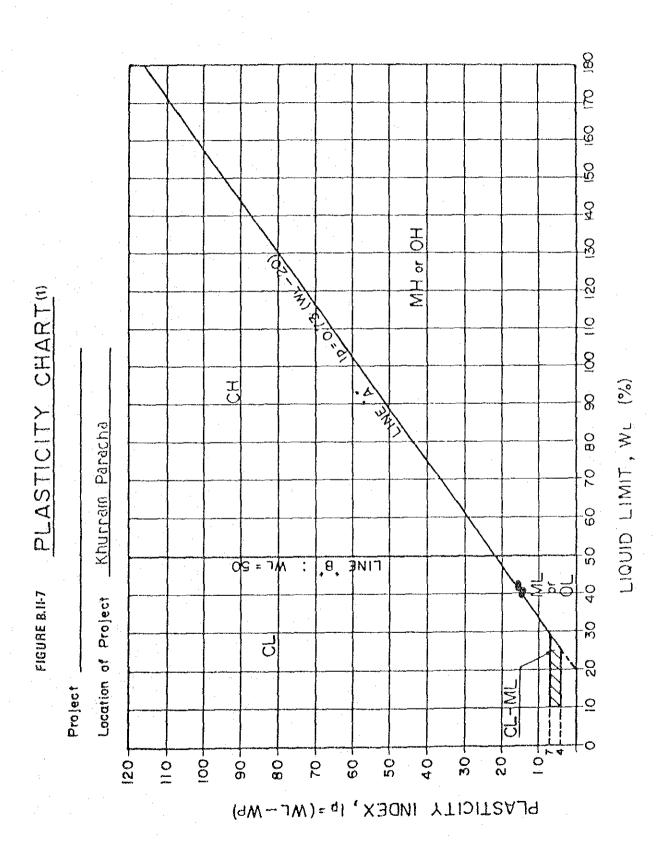
Date of Testing

Remarks ;

PERCENT RETAINED

(%)





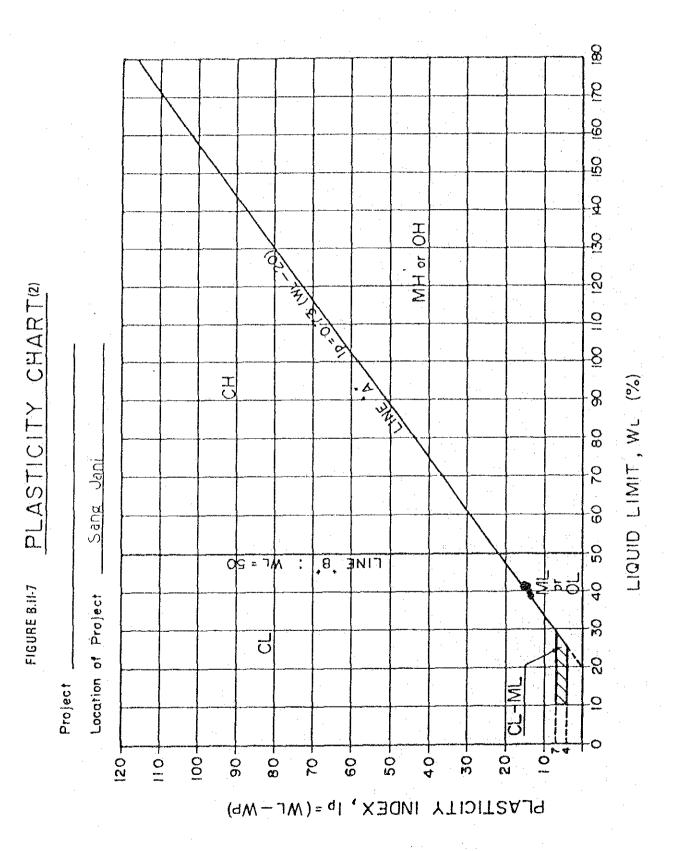


TABLE B.I-1 RESULTS OF SOIL TEST (1)

Classification Unified Soil ЯĽ CL ML ML, ЧГ M ЦГ СĽ J ЧЧ ЯΓ ML Specific Gravity 2.55 2.52 2.54 2.53 2.57 2.59 2.55 2.58 2.51 2.53 2.51 2.54 15.0 14.0 15.5 14.5 13.8 14.7 15.8 14.5 15.4 15.1 15.4 2 н. 144 1 Å Limits 26.0 25.2 26.5 24.6 25.8 25.2 25.7 26.2 25.9 26.4 27.1 26.4 Р.Ц. Atterberg's 42.5 г.г. 38.6 41.3 39.7 41.6 39.7 41.0 41.5 40.2 41.1 41.1 40.6 Khurram Paracha Khurram Paracha Location Sang Jani Sang jani -qo--do--do--90-1001 -op-- qo-- qo -Depth (ft) 6-9 8-9 3-6 3-7 5-6 3-6 3-6 3-6 3-6 3-7 3-4 3-4 Hole/Prt No. HA-10 HA-8 ТР-1 TP-2 TP-3 TP-7 HA-6 HA-7 TP-6 HA-3 HA-5 HA-1 Sample No. 10 12 ഹ Ś m ത \sim 5

B.II-29

L.L.: Liquid Limit P.L.: Plastic Limit P.I.: Plastic Index TABLE B. H-1 RESULTS OF SOIL TEST (2)

Sample	Grain	Size	Analysis	sis %	Passing	0)	. S. S. S.	, (·			Hydrometer	er Tes	h %	ssin
°o N	3/4"	3/8"	No.4	No. 8	No. 16	No. 30	No . 4 0	No.50	No. 100	No. 200	.06 .02	(Dra	n ni 006	ilim. 002
-1	ŀ	100	69.7	99.2	98.7	97.1	96.4	95.4	93.2	90.7	76.0 55	.3 15	0.0	1.0
7	100	99.3	98.7	98.1	92.2	96.1	94.4	90.7	88.6	85.9	65.2 46	.1.7	, ت	1.0
m	100	0.66	98.5	97.0	95.1	93.I	90.5	88.3	85.7	82.9	64.3 35	. 2	د. ،	I
4	100	99.6	98.7	97.3	96.1	95.4	94.1	93.3	90.9	88.2	70.0 48	.4 10	0.2	1.0
S	100	98.9	98.3	97.0	95.6	93.6	92.2	90.6	88.2	85.4	63.2 42	.4 7	1.2	1.5
œ.	100	98.1	97.5	96.5	94.7	92.9	0.06	87.4	84.9	81.8	62.5 46	.2	3.2	0.1
7	100	99.4	98.3	97.8	96.6	95.2	94.1	93.0	90.2	88.1	62.5 46	. 2	3.2	t
ω	100	95.2	89.9	86.8	84.3	81.2	80.4	80.0	79.3	78.1	57.2 38	• 5 • 8	. .3	1.2
്റ	100	99.3	98.4	97.6	96.6	95.2	93.7	92.I	0.06	83.8	64.3 46	. 2	6.0	1.2
10	100	98.8	97.2	96.3	94.8	92.6	1.16	90.6	79.8	79:0	70.4 50	.3 15	5.2	1.3
11		100	66°.	0.66	98.8	98.3	97.2	96.8	96.1	94.9	90.5 62	.2 17	7.3	1.2
12	100	96.7	92.3	88.8	87.0	84.5	83.3	82.1	81.3	80.0	62.5 46	.3 3	3.8	1.3
U.S.S.S	D	.S. Stan	Standard Se	Series.										

B.11-30

2.2. Water Quality Sampling and Analysis

During field survey in Pakistan, water quality sampling and analysis has been carried out at appropriate sites as indicated in Figure B.II-8.

Results of analysis for raw water quality and algae content are shown in Table B.II-2 and B.II-3. Assessment of analysis is discussed in Chapter III of Appendix B.

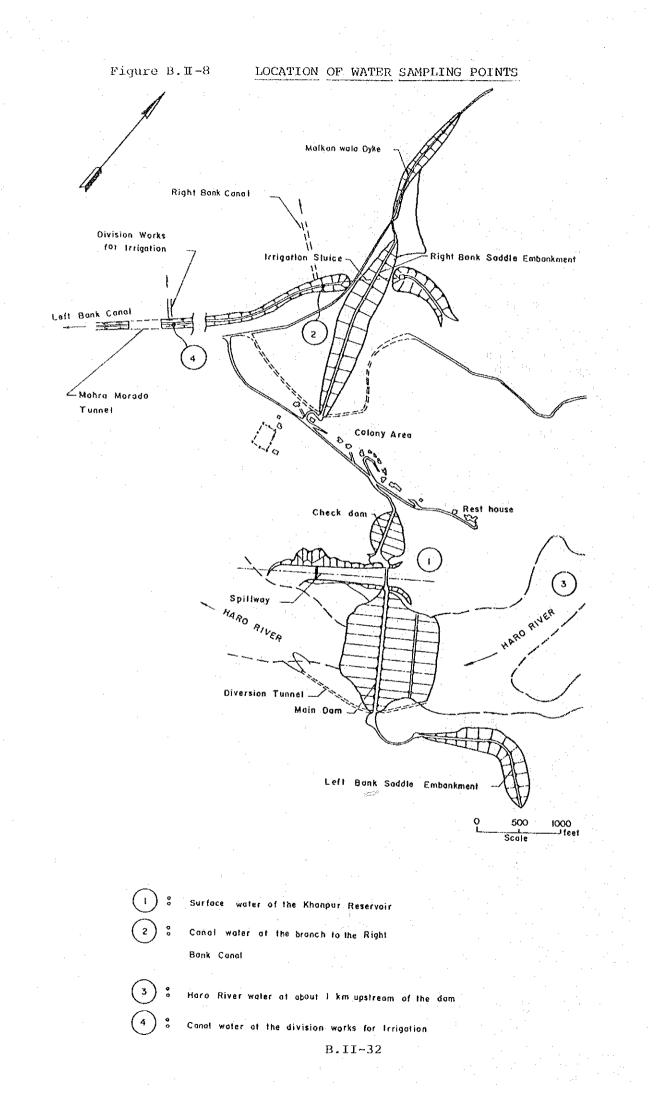


Table B.I-2

Table B.II-2 Raw Water Quality (1)

Sampling Points		1	2	3	4
Items					
		<u></u>			
Sampling date (1984)		Aug 6	Aug 6	Aug 6	Aug 6
Weather		Clear	Clear	Clear	Clear
Atom, Temperature	(°C)	35	33	35	35
Water temperature	(°C)	30	28	30	31
Discoloration	(Unit)	5	5	5	6
Odours		Unobjec-	Unobjec-	Unobjec-	Unobjec-
an a		tionable	tionable	tionable	tionable
Tastes		do	do	do	do
Turbidity	(Unit)	10	16	18	16
Total Solids	(mg/1)	250	252	252	251
pH range	•	8.1	7,9	8.0	8.0
Total hardness	(mg/1)	125	120	135	130
Calcium	(mg/1)	80	80	85	80
Chlorides	(mg/1)	16	15	17	18
Copper	(mg/1)	Nil	Nil	Nil	Nil
Iron	(mg/l)	Nil	Nil	Nil	Nil
Magnesium	(mg/1)	45	40	50	50
Manganese	(mg/1)	Nil	Nil	Nil	Nil
Sulphate	(mg/l)	49	45	50	55
Zinc	(mg/1)	0.025	0.025	0.025	0.025
Ammonia nitrogen	(mg/l)	Nil	Nil	Nil	Nil
Nitrate nitrogen	(mg/l)	0.5	0.5	0.5 _g	0.5
Nitrite nitrogen	(mg/l)	~	· •••	- <i>4</i>	-
Alkalinity	(mg/l)	90	110	105	110
Conductivity	(<i>ut</i> /cm)	354	360	357	356
Coliform group	(nos/ml)	Nil	10	6	Nil
Total colonies	(nos/ml)	15	80	30	110
Dissolved oxygen	(mg/1)	~	· -	·	

1998 - C.

Sampling Points	·	1	2	3	4
Items					
	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~				
Sampling date (1984)		Sep 13	Sep 13	Sep 13	Sep 13
Weather		Clear	Clear	Clear	Clear
Atom. Temperature	(°C)	33	34	33	32
Water temperature	(°C)	26	24	26	26
Discoloration	(Unit)	5	5	5	5
Odours		Unobjec-	Unobjec-	Unobjec-	Unobjec-
		tionable	tionable	tionable	tionable
Tastes		do	do	do	do
Furbidity	(Unit)	8	12	8	16
Total Solids	(mg/l)	259	281	257	256
oH range		8.1	8.0	8.1	8.1
Total hardness	(mg/l)	120	112	112	110
Calcium	(mg/l)	70	60	63	58
Chlorides	(mg/1)	20	18	16	19
Copper	(mg/1)	Nil	Nil	Nil	Nil
Iron	(mg/1)	Nil	Nil	Nil	Nil
Magnesium	(mg/l)	50	52	59	52
Manganese	(mg/1)	Nil	Nil	Nil	Nil
Sulphate	(mg/l)	45	35	34	30
Zinc	(mg/1)	0.02	0.025	0.01	0.02
Ammonia nitrogen	(mg/l)	Nil	Nil	Nil	Nil
Nitrate nitrogen	(mg/1)	0.55	0,5	0.45	0.5
Mitrite nitrogen	(mg/l)	0.05	0.04	0.06	0.065
Alkalinity	(mg/l)	105	108	102	100
Conductivity	(<i>//"/</i> cm)	370	388	367	365
Coliform group	(nos/ml)	3	80	6	120
fotal colonies	(nos/ml)	7	120	11	50
Dissolved oxygen	(mg/1)	7.5	8.0	7.25	8.75

Table B.I-2 Raw Water Quality (2)

Water Level of Khanpur Reservoir : 1948 ft

Tab	le B.II-2	Raw Wa	ter Quality	(3)	
			. · · ·		
Sampling Points		1	2	3	4
Items					
**************************************					••••••••••••••••••••••••••••••••••••••
Sampling date (1984)		Oct 17	Oct 17	Oct 17	Oct 17
Weather		Clear	Clear	Clear	Clear
Atom. Temperature	(°C)	26	28	26	29
Water temperature	(°C)	21	22	21	22
Discoloration	(Unit)	0	0	0	0
Odours		Unobjec-	Unobjec-	Unobjec-	Unobjec-
		tionable	tionable	tionable	tionable
Tastes		do	do	do	do
Turbidity	(Unit)	5	6	6	8
Total Solids	(mg/l)	282	308	295	290
pH range		8.3	8.3	8.2	8.2
Total hardness	(mg/1)	140	144	135	130
Calcium	(mg/1)	80	92	90	85
Chlorides	(mg/1)	20	22	21	18
Copper	(mg/1)	Nil	Nil	Nil	Nil
Iron	(mg/1)	Nil	Nil	Nil	Nil
Magnesium	(mg/1)	60	52	45	45
Manganese	(mg/l)	Nil	Nil	Nil	Nil
Zinc	(mg/1)	40	49	38	35
Ammonia nitrogen	(mg/1)	Nil	Nil	Nil	Nil
Nitrate nitrogen	(mg/1)	0.4	0.5	0.45	0.4
Nitrite nitrogen	(mg/1)		_*		
Alkalinity	(mg/1)	106	112	110	108
Conductivity	$(\mu \tau / cm)$	412	440	422	413
Coliform group	(nos/ml)	1	40	-	55
Total colonies	(nos/ml)	15	90	·	50
Dissolved oxygen	(mg/1)	6.0	7.75	7.5	9.5

Water Level of Khanpur Reservoir : 1955 ft

e B D	l point 2	1 m o m	N Q	а 1977 — 1 1977 — 1	14	22 8
Analysis of Algae	No./ml point 1	H 4 0 4	1] 1		13	25
Table B.II-3	Spectes Spectes	Melosira Nitzschia Synedra Diatoma	Achnanthes Navicula	Ankistrodesmus	Dinobryon	
	Algae	Diatom		Green Algae	Flagellum Algae	rotal

B.11-36

CHAPTER III. DESIGN CRITERIA

3.1. Hydraulic Design

Of a number of mean velocity formula prepared for open channel, tunnel and pipe line etc., the most suitable formula is to be applied in consideration of flow conditions. In the study, the Manning's Formula is applied for open channel and tunnel where the Reynolds number and roughness coefficient are considered to be relatively large, while the Hazen-Williams Formula is selected for pipeline where flows of transitional region between smooth and rough are expected.

3.1.1. Manning's Formula

 $V = \frac{1}{n} R^{2/3} S^{1/2}$

where V = flow velocity in m/s

S = slope of energy gradient in m/m

- R = hydrulic radius
 - = flow area/wetted perimeter
- n = coefficient of roughness

A. Coefficient of Roughness (n)

Lining Material	n
Concrete (Steel Form)	0.014
- do - (Wooden Form)	0.015
Concrete Block	0.017
Earth	0.025

B. Allowable Velocity (meter per second)

• •	Maximum	Minimum
Open Canal (Concrete)	1.80	0.60
Concrete Conduit & Syphon	2,50	1.00
Tunnel with Lining	2,50	1.00

3.1.2. Hazen-Williams Formula

 $V = 0.35464 \text{ CD}^{0.63} \text{ I}^{0.54}$ $Q = 0.27853 \text{ CD}^{2.63} \text{ I}^{0.54}$

where V = flow velocity in m/s

Q = discharge in cu.m/s

1 = hydraulic gradient

C = coefficient

D = inner diameter of pipe in m

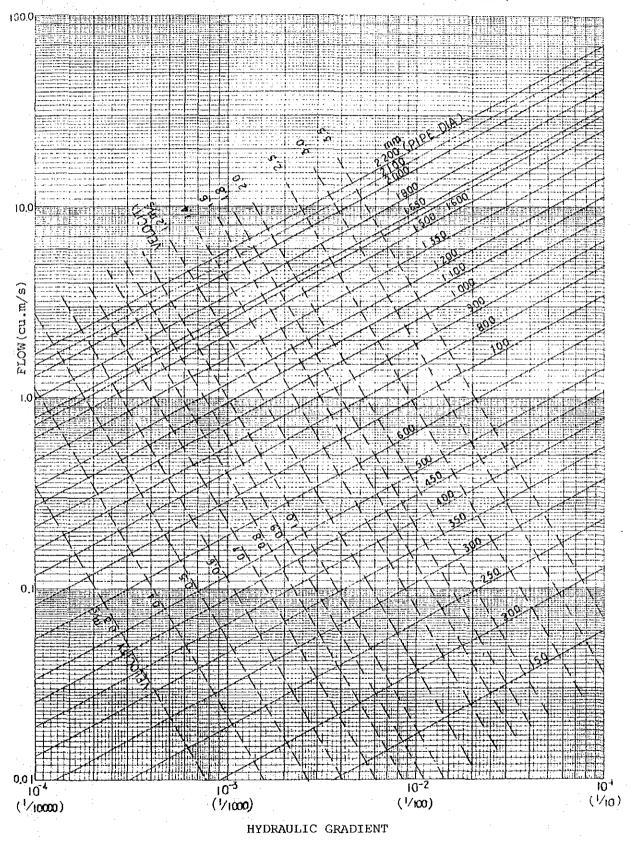
A. Coefficient of Roughness (C)

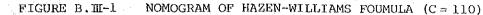
In addition to friction loss, other losses such as bend loss are also considered to determine the value of "C" at 110. Figure B.III-1 presents a hydraulic nomogram with parameters of Q, I and C.

B. Diameter and Standard Design Velocity

In consideration of safe and easy operation and maintenance of a pipeline as well as appurtenant structure and equipment, standard design velocity is determined empirically as below:

Pipe Diameter	Design Velocity	
(mm)	(m/s)	
75 ~ 150	0.7 - 1.0	
200 - 400	0.9 - 1.6	
450 - 800	1.2 - 1.8	
900 - 1,500	1.3 - 2.0	
1,600 - 3,000	1.4 - 2.5	





3.2. Conduction Main and Tunnel Geology

3.2.1. Water Head Allocation and Canal Alignment

To propose alignment of the conduction main, the followings were taken fully into consideration:

- A. Since the conduction main conveys domestic water, closed combined systems with pipelines, tunnels and syphons are proposed. If the conduction main contains open channels, sediment inflows during heavy rains would be deposited on the sill of structure causing serious difficulty in operation and maintenance works.
- B. To expect economic merits the conduction main is designed so as to minimize the total length and construction cost by means of allotting a large share to such structures that need less construction costs.

C. It is so designed as to simplify construction works.

- D. Tunnel is aligned to be straight as much as possible.
- E. To minimize construction period, vertical or inclined shafts are proposed to be constructed for a tunnel of which length exceeds 2 km.

As a basic conception of water head allocation, it is required for a water conduction system that an overall construction cost is to be minimized, by means of allocating more head (available water head) to such structures that need high construction costs (steep) and allotting less head to the structures that require low costs (gentle). The Khanpur water conduction main systems involve tunnel, pipeline and syphon as the major structures. Among these structures, difference of per unit length construction cost is

relatively small and lifting of water by pumps is inevitably he necessary for each alternative plan. Considering that the total length of conduction main by alternative plan varies with a range from 6.5 km to 12.5 km with required lifting head from 70 m to 105 m, it is clear that the merit of decreasing the construction cost in terms of allocating additional several meters of available head to the conduction main is much bigger than the demerit of increasing the construction cost of pumping stations with additional lifting head of several meters. As a consequence, design velocity for each structure is determined as under, as acceptable from stand point of operation & maintenance within the limit of the maximum allowable velocity:

DESIGN VELOCITY

Structure	Dimension	Velocity (m/s)	Energy Gradient
Pipeline	ø1,650 mm x 2	1,58	1:800
Pressure Pipe	ø1,500	1,91	1;500
	ø2,000	2.15	1:600
Tunnel $\frac{1}{2}$	Horse Shoe D=2,100	1.84	1:650
Syphon Tunnel $\frac{1}{2}$ / -do-	- do - D=2,400	1,48	1:1,500
· · · · ·			
· ,			

Notes: 1/ For length(ℓ) <3 km 2/ For ℓ >5 km

3.2.2. Tunnel

The cross-section of the tunnel is determined as standard horse shoe type due to its superior workability, although from structural point of view strength is to some extent inferior as compared with circular type. For mechanical construction, the minimum cross-section, in terms of a diameter, is 2.0 m. For the Project in consideration of velocity of flow, a diameter of 2.10 m is given for ordinary type of tunnel. For a long tunnel with a length exceeding 3 km, it is often necessary to construct lining concrete immediately after excavation, because that steel supports are deformed due to