CHAPTER 8

RESERVOIR OPERATION STUDY FOR THE AGOS RIVER SYSTEM

8.1 Generated Discharge Series

Case No.	River	Place	Remarks
8-1	Agos	Banugao G.S.	Recorded
8-2	Agos	Agos Dam	Natural
8-3	Kanan	Kanan No.1 Dam	
8-4	Kanan	Kanan No.5 Dam	
8-5	Kaliwa	Kaliwa Dam	
8-6	Agos	Agos Afterbay Weir	
8-7	Agos	between the confluence and afterbay weir	
8-8	Kanan	between Kanan No.1 Dam and the confluence	
8-9	Kaliwa	between Kaliwa Dam and the confluence	

8.2 Alternative Development Plan A-1

Case No.	Dam	H.W.L. (m AMSL)	Pr (MW)
8-10	Agos	175	200
8-11	-do-	165	185
8-12	-do-	155	170
8-13	-do-	145	155

Note: Results of the operation study for Kaliwa dam are same with that of plan A-2 (Refer to Case No.8-14).

8.3 Alternative Development Plan A-2

Case No.	Dam	H.W.L. (m AMSL)	Pr (MW)
8-14	Kaliwa	270	- /1
8-14	Kanan No.2	295	- /1
8-15	Agos	175	152
8-16	-do-	165	140
8-17	-do-	155	128
8-18	-do-	145	116

Note: /1; Power generation at Pantay P/S is calculated separately because its data was not available in the course of the study.

8.4 Alternative Development Plan A-3

8.4.1 Kanan No.1 Dam

Case No.	H.W.L. (m AMSL)	T.W.L. (m AMSL)	Pr (MW)
8-19	300	175	138
8-20	300	165	149
8-21	300	155	158
8-22	300	145	168
8-23	290	175	127
8-24	290	165	138
8-25	290	155	147
8-26	290	145	157
8-27	280	175	115
8-28	280	165	127
8-29	280	155	135
8-30	280	145	144

8.4.2 Kaliwa Dam

Same with plan A-2 except the independent operation of Kaliwa pumped storage plant. Refer to Section 7.2 of Appendix A: Hydrology and Reservoir Operation.

8.4.3 Agos Dam

Case No.	H.W.L. (m AMSL)	Pr (MW)	H.W.L. of Kanan No.1 Dam (m AMSL)
8-31	175	152	300
8-32	175	152	290
8-33	175	152	280
8-34	165	140	300
8-35	165	140	290
8-36	165	140	280
8-37	155	128	300
8-38	155	128	290
8-39	155	128	280
8-40	145	116	300
8-41	145	116	290
8-42	145	116	280

8.4.4 Kaliwa Pumped Storage Plant

Case No.	Pr (MW)	Dia. of H.R. Tunnel (m)	H.W.L. of Agos Dam
8-43	250	8.3	175
8-44	250	8.3	165
8-45	250	8.3	155
8-46	250	8.3	145
8-47	250	7.6	175
8-48	250	7.6	165
8-49	250	7.6	155
8-50	250	7.6	145
8-51	250	6.5	165
8-52	250	6.5	155
8-53	250	6.5	145
8-54	180	8.3	175
8-55	180	8.3	165
8-56	180	8.3	155
8-57	180	8.3	145
8-58	180	7.6	175
8-59	180	7.6	165
8-60	180	7.6	155
8-61	180	7.6	145
8-62	180	6.5	175
8-63	180	6.5	165
8-64	180	6.5	155
8-65	180	6.5	145
8-66	100	8.3	175
8-67	100	8.3	165
8-68	100	8.3	155
8-69	100	8.3	145
8-70	100	7.6	175
8-71	100	7.6	165
8-72	100	7.6	155
8-73	100	7.6	145
8-74	100	6.5	175
8-75	100	6.5	165
8-76	100	6.5	155
8-77	100	6.5	145

Note: H.W.L. of Kanan No.1 dam of 290 m AMSL is assumed.

8.5 Alternative Development Plan B

8.5.1 Kanan No.5 Dam

Case No.	H.W.L. (m AMSL)	T.W.L. (m AMSL)	Pr (MW)
8-78	260	25	280
8-79	260	25	200

8.5.2 Kaliwa Dam

Same with plan A-2.

8.6 Water Supply Benefit

Case No.	Plan	Reservoir	Remarks
8-80	A-2	Kaliwa	Common for every plan
8-81	A-2	Kanan No.2	- do -
8-82	A-3	Agos	Common for every scale of Agos and Kanan No.1 dams. Water requirement can be fulfilled.
8-83	A-2	Kaliwa	Simulated spilt water series.
8-84	A-2	Kaliwa	Simulated supplied water series.
8-85	A-2	Kanan No.2	- do -

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

RECORDED MONTHLY DISCHARGE SERIES AT BANUGAO ON AGOS RIVER

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1950	237.16	118.92	135.28	55.67	31.06	30.09	59.70	73.07	55.33	211.04	217.44	274.75	124.96
1951	198.22	118.41	46.14	36.78	94.19	49.19	54.04	162.97	67.49	81.44	405.81	386.36	141.59
1952	240.30	135.38	49.80	47.46	32.66	55.31	50.26	157.82	108.25	434.73	109.90	297.24	143.26
1953	180.02	188.07	54.84	56.21	27.88	56.10	34.37	106.79	49.31	182.14	190.28	410.10	128.01
1954	160.50	106.40	183.45	45.18	32.12	26.51	32.66	45.13	51.11	62.60	123.77	414.52	107.00
1955	333.78	74.20	46.96	49.98	31.96	65.03	56.13	37.45	71.54	160.01	282.56	191.60	116.77
1956	163.45	118.30	151.42	173.07	76.06	75.85	97.91	99.65	154.16	260.76	275.66	550.70	183.08
1957	254.14	79.98	41.15	31.36	21.65	23.66	39.53	81.86	61.98	89.04	106.15	73.54	75.34
1958	145.97	78.63	73.31	86.02	78.19	74.29	91.39	66.20	90.36	203.70	190.50	68.95	103.96
1959	140.80	92.21	137.06	33.50	21.23	26.40	41.75	60.09	69.82	86.15	220.91	205.25	94.60
1960	154.06	183.22	55.40	46.78	69.95	88.11	77.20	238.56	140.40	247.50	189.78	192.26	140.27
1961	196.13	154.70	119.01	77.43	100.68	76.30	64.69	60.61	112.18	197.45	289.52	117.47	130.51
1962	167.20	133.01	77.71	76.65	34.85	34.82	99.44	79.98	203.40	112.71	206.80	185.91	117.71
1963	147.76	161.74	81.04	69.57	25.04	48.27	61.80	103.67	143.33	113.13	106.90	192.50	104.56
1964	154.03	151.59	126.17	80.05	45.43	65.87	96.23	113.68	115.67	120.05	316.35	297.78	140.24
1965	193.82	113.68	70.88	31.20	26.63	27.27	68.14	58.37	72.58	143.85	223.91	306.72	111.42
1966	100.69	75.65	30.07	20.89	24.03	31.56	33.93	37.24	83.62	195.54	284.13	261.42	102.40
1967	201.66	77.33	74.45	55.51	44.97	65.33	51.04	105.50	79.42	64.83	222.95	183.30	102.19
1968	149.48	149.49	149.11	98.38	32.86	29.37	48.79	90.55	93.67	127.85	131.68	78.94	98.35
1969	82.09	34.49	43.11	27.38	15.52	12.60	37.42	57.70	69.06	70.08	111.90	300.75	71.84
1970	146.59	56.51	24.58	41.50	16.47	24.36	37.47	26.97	118.77	209.79	391.53	228.58	110.26
1971	128.61	175.54	161.45	48.88	194.96	239.70	267.25	103.18	53.56	233.52	256.11	343.03	183.82
1972	137.71	86.55	77.72	66.97	64.93	66.17	314.99	193.14	130.04	109.34	192.60	231.45	137.63
1973	90.90	105.30	56.50	47.10	44.70	59.80	64.30	44.80	55.40	184.70	316.00	612.60	123.51
1977	208.90	191.70	118.20	54.10	45.60	33.10	101.00	85.80	123.80	98.70	262.40	128.10	120.95
1978	96.70	72.70	42.20	19.80	32.20	43.40	45.00	130.50	148.90	326.20	224.10	285.30	122.25
TOTAL	4410.67	3013.70	2225.01	1477.42	1315.82	1428.46	2026.43	2421.28	2523.15	4326.85	5849.64	6619.12	37637.55
MEAN	169.64	115.91	85.58	56.82	50.61	54.94	77.94	93.13	97.04	166.42	224.99	254.58	120.63

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED INFLOW SERIES INTO AGOS RESERVOIR FOR THE TARGET YEAR 1986

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1	211.78	107.92	120.93	47.53	26.44	24.50	51.30	67.83	51.46	187.57	198.73	250.03	112.17
2	177.01	107.46	39.46	31.41	80.18	40.05	46.43	151.29	62.76	22.38	370.90	351.60	127.58
3	214.59	122.86	44.52	40.52	27.80	45.03	43.19	146.51	100.67	386.38	100.45	270.50	128.58
4	160.76	170.67	49.02	48.00	23.73	45.67	29.53	99.13	45.86	161.88	123.91	373.21	115.12
5	143.33	96.56	163.99	38.58	27.34	21.58	28.06	41.89	47.53	55.64	113.12	377.23	96.24
6	298.07	67.34	41.98	42.68	27.21	52.94	48.23	34.22	66.53	142.22	258.25	174.36	104.55
7	145.96	107.36	135.36	147.78	64.75	61.75	84.13	92.51	143.37	231.76	251.94	501.16	163.99
8	226.95	72.58	36.79	26.78	18.43	19.26	33.97	75.99	52.64	29.14	97.02	66.92	62.62
9	130.35	71.36	65.53	73.45	66.56	60.48	78.53	61.45	84.03	181.05	174.11	62.75	92.47
10	125.73	83.68	122.52	28.60	18.07	21.49	35.87	55.78	64.93	76.57	201.90	186.79	85.16
11	137.58	166.27	49.52	39.94	59.54	71.73	66.33	221.46	130.57	219.98	173.45	174.96	125.95
12	175.14	140.39	106.39	66.11	85.70	62.12	55.59	56.26	104.33	175.49	264.61	106.90	116.59
13	149.31	120.71	69.47	65.45	29.67	28.35	85.44	74.25	189.16	100.18	189.01	169.19	105.85
14	131.95	146.78	72.44	59.40	21.32	39.30	53.10	96.24	133.30	100.55	97.70	175.18	93.94
15	137.55	137.57	112.79	68.35	38.67	53.63	82.69	105.53	107.57	106.70	289.13	270.99	125.93
16	173.08	103.16	63.36	26.64	22.67	22.20	58.55	54.19	67.50	127.85	204.65	279.13	100.25
17	89.92	68.65	26.88	17.84	63.02	25.69	29.15	34.57	77.77	173.79	259.69	232.90	92.07
18	180.08	70.18	66.55	47.40	38.28	53.19	43.86	97.94	73.86	57.62	203.77	166.81	91.63
19	133.49	135.66	133.29	84.00	27.92	23.91	41.92	84.06	87.11	113.63	120.35	71.84	88.10
20	73.31	31.30	38.54	23.38	13.21	10.26	32.15	53.56	64.22	62.29	102.27	273.70	64.85
21	130.91	51.28	21.97	35.44	14.02	19.83	32.20	25.04	110.45	186.46	357.85	208.02	99.45
22	114.85	159.30	144.32	41.24	165.96	195.15	229.64	95.28	49.81	202.55	234.08	312.17	162.53
23	122.98	60.39	69.48	57.18	55.27	53.87	270.66	179.29	120.94	97.18	176.03	210.63	122.82
24	81.17	95.56	50.51	40.22	38.05	48.69	55.25	41.59	51.52	164.16	288.81	375.48	110.92
25	186.55	173.97	105.66	46.19	38.82	26.95	86.78	79.65	115.13	87.72	239.83	116.58	108.65
26	86.35	65.98	37.72	16.91	27.41	35.33	38.67	121.14	138.48	289.92	204.82	259.64	110.20
TOTAL	3938.74	2734.94	1989.00	1261.52	1120.08	1162.98	1741.22	2247.70	2346.50	3845.66	5346.38	6023.68	33758.40
MEAN	151.49	105.19	76.50	48.52	43.08	44.73	66.97	86.45	90.25	147.91	205.63	231.68	108.20

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT ..... NIPPON KOEI

ESTIMATED INFLOW SERIES INTO KANAN NO.1 RESERVOIR

YEAR	JAN.	FEB.	MAR.	APP.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1950	125.19	67.95	78.25	30.36	16.44	13.75	6.82	6.26	8.76	79.78	86.28	106.42	52.19
1951	104.64	67.66	25.53	20.06	49.86	22.48	6.17	13.96	10.68	30.79	161.02	149.65	55.21
1952	126.85	77.35	28.81	25.88	17.29	25.28	5.74	13.52	17.13	164.34	43.61	115.13	55.08
1953	95.03	107.46	31.72	30.66	14.76	25.64	3.92	9.15	7.80	68.85	75.50	158.85	52.45
1954	84.72	60.80	106.11	24.64	17.00	12.12	3.73	3.87	8.09	23.66	49.11	160.56	46.20
1955	176.20	42.40	27.16	27.26	16.92	29.72	6.41	3.21	11.32	60.49	112.11	74.21	48.95
1956	86.28	67.59	87.59	94.39	40.26	34.67	11.18	8.54	24.40	98.57	109.38	213.31	73.01
1957	134.16	45.70	23.80	17.10	11.46	10.81	4.51	7.01	9.81	33.66	42.12	28.49	30.72
1958	77.05	44.93	42.40	46.91	41.39	33.95	10.44	5.67	14.30	77.00	75.59	26.71	41.36
1959	74.33	52.69	79.28	18.27	11.24	12.07	4.77	5.15	11.05	32.57	87.65	79.50	39.05
1960	81.33	104.69	32.04	25.51	37.03	40.27	8.82	20.44	22.22	93.56	75.30	74.42	51.33
1961	103.53	88.39	68.84	42.23	53.30	34.87	7.39	5.19	17.76	74.64	114.88	45.50	54.71
1962	88.26	76.00	44.95	41.80	18.45	15.91	11.36	6.85	32.19	42.61	82.05	72.01	44.37
1963	78.00	92.42	46.88	37.94	13.26	22.06	7.06	8.88	22.69	42.77	42.42	74.56	40.74
1964	81.31	86.62	72.98	43.66	24.05	30.11	10.99	9.74	18.31	45.38	125.52	115.34	55.33
1965	102.31	64.95	41.00	17.02	14.10	12.46	7.78	5.00	11.49	54.38	88.84	118.81	44.85
1966	53.15	43.23	17.39	11.39	39.19	14.42	3.87	3.19	13.24	73.92	112.74	101.26	40.58
1967	106.45	44.19	43.06	30.27	23.81	29.86	5.83	9.04	12.57	24.51	88.46	71.00	40.75
1968	78.91	85.42	86.25	53.65	17.39	13.42	5.57	7.76	14.83	48.33	52.25	30.58	41.20
1969	43.33	19.71	24.94	14.93	8.22	5.76	4.27	4.94	10.93	26.49	44.40	116.49	27.03
1970	77.38	32.29	14.22	22.63	8.72	11.13	4.28	2.31	18.80	79.31	155.35	88.54	42.91
1971	67.89	100.30	93.39	26.66	103.20	109.55	30.52	8.84	8.48	88.28	101.62	132.87	72.63
1972	72.69	38.03	44.96	36.52	34.37	30.24	35.97	16.55	20.58	41.33	76.42	89.65	44.78
1973	47.98	60.17	32.68	25.69	23.66	27.33	7.34	3.84	8.22	69.82	125.38	159.82	49.37
1977	110.27	109.53	68.37	29.50	24.14	15.13	11.53	7.35	19.59	37.31	104.12	49.62	48.87
1978	51.05	41.54	24.41	10.80	17.05	19.84	5.14	11.18	23.57	123.31	88.92	110.51	43.94
TOTAL	2328.30	1721.98	1287.00	805.74	696.54	652.86	231.40	207.48	399.36	1635.66	2321.02	2563.86	14851.20
MEAN	89.55	66.23	49.50	30.99	26.79	25.11	8.90	7.98	15.36	62.91	89.27	98.61	47.60

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED INFLOW SERIES INTO KANAN NO.5 RESERVOIR

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1	158.07	85.79	98.80	38.33	20.76	17.36	8.61	7.91	11.06	100.73	108.93	134.37	65.89
2	132.11	85.42	32.24	25.33	62.95	28.39	7.79	12.63	13.49	38.87	203.30	188.95	69.71
3	160.16	97.67	36.37	32.68	21.83	31.92	7.25	17.08	21.63	207.50	55.06	145.37	69.54
4	119.98	135.68	40.05	38.71	18.63	12.37	4.96	11.55	9.85	86.93	95.33	200.56	66.22
5	106.97	76.76	133.98	31.11	21.47	15.30	4.71	4.88	10.21	29.88	62.01	202.72	58.33
6	222.47	53.53	34.30	34.42	21.36	37.53	8.09	4.05	14.30	26.37	141.56	93.70	61.84
7	108.94	85.35	110.59	119.17	50.84	43.77	14.12	10.78	30.81	124.46	138.10	269.32	92.19
8	169.38	57.70	30.05	21.59	14.47	13.65	5.70	8.86	12.39	42.50	53.18	35.92	38.79
9	97.29	56.73	53.54	59.23	52.26	42.87	13.18	7.16	18.06	97.23	95.44	33.72	52.22
10	93.84	66.52	100.10	23.07	14.19	15.23	6.02	6.50	13.95	41.12	110.67	100.38	49.30
11	102.68	132.18	40.46	32.21	46.75	50.84	11.13	25.81	28.06	118.13	95.08	94.03	64.78
12	130.72	111.61	86.92	53.32	67.29	44.03	9.33	6.56	22.42	94.24	145.04	57.45	69.08
13	111.44	95.96	56.75	52.78	23.29	20.09	14.34	8.65	40.65	53.80	103.60	90.92	56.02
14	98.48	116.68	59.19	47.90	16.74	27.85	8.91	11.22	28.64	54.00	53.55	94.14	51.44
15	102.66	109.36	92.14	55.12	30.36	38.01	13.87	12.30	23.12	57.30	158.48	145.63	69.86
16	129.18	82.01	51.77	21.48	17.80	15.74	9.82	6.32	14.50	68.66	112.17	150.00	56.62
17	67.11	54.58	21.96	14.38	49.48	18.21	4.89	4.03	16.71	93.33	142.34	127.85	51.24
18	134.41	55.79	54.37	38.22	30.06	37.70	7.36	11.41	15.87	30.94	111.69	89.64	51.46
19	99.63	107.85	108.90	67.74	21.96	16.95	7.03	9.80	18.72	61.02	65.92	38.61	52.01
20	54.71	24.88	31.48	18.89	10.37	7.27	5.40	6.24	13.80	33.45	56.06	147.08	34.13
21	97.70	40.77	17.95	28.58	11.01	14.06	5.40	2.92	23.74	100.13	196.15	111.79	54.18
22	85.72	126.64	117.91	33.66	130.31	138.32	38.53	11.16	10.70	111.46	128.31	167.76	91.71
23	91.78	48.01	56.76	46.11	43.40	38.18	45.41	20.90	25.99	52.19	96.49	113.19	56.53
24	60.59	75.97	41.26	32.43	29.88	34.51	9.27	4.85	11.07	88.16	158.31	201.79	62.34
25	139.23	138.30	86.32	37.25	30.48	19.10	14.56	9.28	24.74	47.11	131.46	62.65	61.71
26	64.45	52.45	30.82	13.63	21.52	25.04	6.49	14.12	29.76	155.69	112.27	139.53	55.48
TOTAL	2939.72	2174.18	1624.97	1017.33	879.45	824.30	292.17	261.97	504.23	2065.19	2930.53	3237.14	18751.20
MEAN	113.07	83.62	62.50	39.13	33.83	31.70	11.24	10.08	19.39	79.43	112.71	124.51	60.10

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED INFLOW SERIES INTO KALIWA PICOREM RESERVOIR

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1950	20.95	6.78	5.61	2.59	1.85	3.10	27.06	38.35	25.35	47.64	48.84	63.43	24.29
1951	17.49	6.75	1.83	1.71	5.62	5.07	24.50	85.54	30.93	18.39	91.14	89.19	31.51
1952	21.21	7.77	2.07	2.20	1.95	5.70	22.78	82.84	49.60	98.14	24.68	68.62	32.29
1953	15.89	10.72	2.27	2.61	1.66	5.78	15.58	56.05	22.60	41.12	42.74	94.67	25.97
1954	14.16	6.07	7.61	2.10	1.92	2.73	14.80	23.69	23.42	14.13	27.80	95.69	19.51
1955	29.45	4.23	1.95	2.32	1.91	6.70	25.44	19.66	32.78	36.12	63.46	44.23	22.36
1956	14.42	6.75	6.28	8.04	4.54	7.81	44.38	52.30	70.64	58.87	61.91	127.13	38.59
1957	22.43	4.56	1.71	1.46	1.29	2.44	17.92	42.97	28.40	20.10	23.84	16.98	15.34
1958	12.88	4.48	3.04	4.00	4.67	7.65	41.43	34.75	41.41	45.99	42.78	15.92	21.58
1959	12.42	5.26	5.69	1.56	1.27	2.72	18.93	31.54	31.99	19.45	49.61	47.38	18.98
1960	13.60	10.45	2.30	2.17	4.17	9.08	34.99	125.22	64.34	55.88	42.62	44.38	34.10
1961	17.31	8.82	4.94	3.60	6.01	7.86	29.32	31.81	51.41	44.58	65.02	27.12	24.82
1962	14.75	7.59	3.22	3.56	2.08	3.59	45.08	41.98	93.21	25.45	46.45	42.92	27.49
1963	13.04	9.22	3.36	3.23	1.49	4.97	28.01	54.41	65.68	25.54	24.01	44.44	23.12
1964	13.59	8.64	5.23	3.72	2.71	6.79	43.62	59.67	53.01	27.10	71.05	68.74	30.32
1965	17.10	6.48	2.94	1.45	1.59	2.81	30.89	30.64	33.26	32.48	50.29	70.81	23.39
1966	8.89	4.31	1.25	0.97	4.42	3.25	15.38	19.55	38.32	44.14	63.81	60.35	22.05
1967	17.80	4.41	3.09	2.58	2.68	6.73	23.14	55.37	36.39	14.64	50.07	42.31	21.60
1968	13.19	8.52	6.19	4.57	1.96	3.03	22.12	47.53	42.92	28.86	29.57	18.22	18.89
1969	7.24	1.97	1.79	1.27	0.93	1.30	16.96	30.29	31.65	15.82	25.13	69.43	16.98
1970	12.94	3.22	1.02	1.93	0.98	2.51	16.99	14.16	54.43	47.36	87.93	52.77	24.69
1971	11.35	10.01	6.70	2.27	11.63	24.69	121.14	54.16	24.54	52.72	57.52	29.19	32.99
1972	12.15	3.80	3.22	3.11	3.87	6.82	142.78	101.38	59.59	24.68	43.26	53.43	38.17
1973	8.02	6.00	2.34	2.19	2.67	6.16	29.15	23.51	25.39	41.70	70.97	95.25	26.11
1977	18.43	10.93	4.90	2.51	2.72	3.41	45.78	45.03	56.73	22.28	58.93	29.57	25.10
1978	8.53	4.15	1.75	0.92	1.92	4.47	20.40	68.50	68.23	73.64	50.33	65.86	30.73
TOTAL	389.22	171.86	92.30	68.64	78.52	147.16	918.58	1270.88	1156.22	976.82	1313.78	1528.02	8112.00
MEAN	14.97	6.61	3.55	2.64	3.02	5.66	35.33	48.88	44.47	37.57	50.53	58.77	26.00

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED INFLOW SERIES INTO AGOS AFTERBAY WEIR (NATURAL)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
26	220.94	112.89	126.65	49.75	27.64	25.50	51.80	68.29	52.10	193.40	205.04	257.81	115.98
26	184.66	112.40	41.32	32.87	83.82	41.69	46.89	152.31	63.55	74.63	382.67	362.55	131.61
26	223.86	128.51	46.62	42.42	29.07	46.88	43.61	147.49	101.92	398.40	103.63	278.92	132.61
26	167.71	178.53	51.34	50.24	24.81	47.55	29.82	99.80	46.43	166.92	179.43	384.82	118.95
26	149.52	101.00	171.75	40.38	28.58	22.47	28.34	42.18	48.12	57.37	116.71	388.97	99.62
26	310.95	70.44	43.96	44.62	28.44	55.12	68.70	35.00	67.36	146.64	266.45	129.79	108.13
26	152.27	112.30	141.76	154.68	67.69	64.29	84.95	93.13	145.15	238.97	259.94	516.76	169.32
26	236.76	75.92	38.53	28.03	19.27	20.05	34.30	76.50	58.36	81.60	100.10	69.01	69.87
26	135.98	74.64	68.63	76.88	69.58	62.97	79.29	61.87	85.08	186.68	179.64	64.70	95.50
26	131.17	87.53	128.32	29.94	18.89	22.38	36.22	56.16	65.74	78.95	208.31	192.60	88.02
26	143.52	173.93	51.87	41.81	62.25	74.68	66.98	222.95	132.20	226.82	178.96	180.41	129.70
26	182.71	146.85	111.42	69.20	89.60	64.67	56.13	56.64	105.62	180.95	273.01	110.23	120.59
26	155.76	126.26	72.75	68.51	31.01	29.51	86.27	74.75	191.51	103.29	195.01	174.45	109.09
26	137.65	153.54	75.87	62.18	22.28	40.91	53.62	96.89	134.95	103.68	100.80	180.63	96.92
26	143.49	143.90	118.12	71.54	40.43	55.83	83.49	106.24	108.91	110.02	298.31	279.63	129.98
26	180.56	107.91	66.36	27.88	23.70	23.11	59.12	54.55	68.34	131.83	211.14	287.81	103.53
26	93.80	71.81	28.15	18.67	65.88	26.75	29.44	34.80	78.73	179.20	267.93	245.31	95.04
26	187.87	73.41	69.70	49.61	40.02	55.37	44.28	98.60	74.78	59.41	210.24	172.00	94.61
26	139.25	141.91	139.60	87.93	29.24	24.89	42.33	84.63	88.20	117.17	124.17	74.07	91.12
26	76.47	32.74	40.36	24.47	13.81	10.68	32.47	53.93	65.02	64.22	105.52	282.21	66.83
26	136.56	53.64	23.01	37.09	14.66	20.65	32.51	25.21	111.83	192.26	369.20	214.49	102.59
26	119.81	166.64	151.15	43.69	173.50	203.16	231.87	96.43	50.43	214.00	241.51	321.89	167.84
26	128.29	63.17	72.76	59.85	57.78	56.08	273.29	180.50	122.44	100.20	181.62	217.18	126.10
26	84.68	99.96	52.90	42.10	39.78	50.68	55.79	41.87	52.16	169.26	297.98	387.12	114.53
26	194.61	181.98	110.66	48.35	40.58	28.05	87.63	80.19	116.57	90.45	247.44	120.20	112.23
26	90.09	69.01	39.51	17.70	28.66	36.78	39.04	121.96	140.20	298.94	211.32	267.71	113.41
TOTAL	4108.96	2860.83	2083.09	1320.43	1171.00	1210.71	1758.14	2262.87	2375.70	3965.24	5516.07	6211.12	34844.16
MEAN	158.04	110.03	80.12	50.79	45.04	46.57	67.62	87.03	91.37	152.51	212.16	238.89	111.68

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED DISCHARGE SERIES BETW. CONFLUENCE & AFTERBAY WEIR

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
26	9.15	4.97	5.72	2.22	1.20	1.01	0.50	0.46	0.64	5.83	6.31	7.78	3.82
26	7.65	4.95	1.87	1.47	3.65	1.64	0.45	1.02	0.78	2.25	11.77	10.94	4.04
26	9.27	5.66	2.11	1.89	1.26	1.85	0.42	0.99	1.25	12.01	3.19	8.42	4.03
26	6.95	7.86	2.32	2.24	1.08	1.87	0.29	0.67	0.57	5.03	5.52	11.61	3.83
26	6.19	4.44	7.76	1.80	1.74	0.89	0.27	0.28	0.59	1.73	3.59	11.74	3.38
26	12.88	3.10	1.99	1.99	1.24	2.17	0.47	0.23	0.83	4.42	8.20	5.43	3.58
26	6.31	4.94	6.40	6.90	2.94	2.53	0.82	0.62	1.78	7.21	8.00	15.59	5.34
26	9.81	3.34	1.74	1.25	0.84	0.29	0.33	0.51	0.22	2.46	3.08	2.08	2.25
26	5.63	3.28	3.10	3.43	3.03	2.48	0.76	0.41	1.05	5.63	5.53	1.95	3.02
26	5.43	3.85	5.80	1.34	0.82	0.88	0.35	0.38	0.81	2.38	6.41	5.81	2.85
26	5.95	7.65	2.34	1.87	2.71	2.94	0.64	1.49	1.62	6.84	5.51	5.44	3.75
26	7.57	6.46	5.03	3.09	3.90	2.55	0.54	0.38	1.30	5.46	8.40	3.33	4.00
26	6.45	5.56	3.29	3.06	1.35	1.16	0.83	0.50	2.35	3.11	6.00	5.26	3.24
26	5.70	6.76	3.43	2.77	0.97	1.61	0.52	0.65	1.66	3.13	3.10	5.45	2.98
26	5.94	6.33	5.34	3.19	1.76	2.20	0.80	0.71	1.34	3.32	9.18	8.43	4.05
26	7.48	4.75	3.00	1.24	1.03	0.91	0.57	0.37	0.84	3.98	6.50	8.69	3.28
26	3.89	3.16	1.27	0.83	2.87	1.05	0.28	0.23	0.92	5.40	8.24	7.40	2.97
26	7.78	3.23	3.15	2.21	1.74	2.18	0.43	0.66	0.92	1.79	6.47	5.19	2.98
26	5.77	6.24	6.31	3.92	1.27	0.98	0.41	0.57	1.08	3.53	3.82	2.24	3.01
26	3.17	1.44	1.82	1.09	0.60	0.42	0.31	0.36	0.80	1.94	3.25	8.52	1.98
26	5.66	2.36	1.04	1.65	0.64	0.81	0.31	0.17	1.37	5.80	11.36	6.47	3.14
26	4.96	7.33	6.83	1.95	7.55	8.01	2.23	0.65	0.62	6.45	7.43	9.21	5.31
26	5.31	2.78	3.29	2.67	2.51	2.21	2.63	1.21	1.50	3.02	5.59	6.55	3.27
26	3.51	4.40	2.39	1.88	1.23	2.00	0.54	0.28	0.64	5.10	9.17	11.68	3.61
26	8.06	8.01	5.00	2.16	1.76	1.11	0.84	0.54	1.43	2.73	7.61	3.63	3.57
26	3.73	3.04	1.78	0.79	1.25	1.45	0.38	0.82	1.72	9.02	6.50	8.08	3.21
TOTAL	170.22	125.89	94.09	58.91	50.92	47.23	16.92	15.17	29.20	119.58	169.69	187.44	1085.76
MEAN	6.55	4.84	3.62	2.27	1.96	1.84	0.65	0.58	1.12	4.60	6.53	7.21	3.48

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED DISCHARGE SERIES FROM LOWER KANAN BASIN

YEAR	JAN.	FEB.	MAR.	APP.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1950	43.67	23.70	27.30	10.58	5.73	4.80	2.37	2.18	3.05	27.81	30.09	37.13	18.20
1951	36.50	23.60	8.91	6.99	17.38	7.84	2.15	4.86	3.72	10.73	56.15	52.21	19.25
1952	44.25	26.98	10.05	9.02	6.03	8.82	2.00	4.71	5.97	57.29	15.21	40.16	19.21
1953	33.15	37.48	11.07	10.68	5.15	8.94	1.37	3.19	2.72	24.00	26.33	55.41	18.29
1954	29.56	21.20	37.02	8.59	5.93	4.23	1.30	1.35	2.82	8.25	17.13	56.01	16.11
1955	61.47	14.79	9.48	9.50	5.90	10.37	2.23	1.12	3.94	21.09	39.10	25.89	17.07
1956	30.10	23.58	30.56	32.89	14.04	12.09	3.89	2.97	8.50	34.36	38.14	74.41	25.46
1957	46.80	15.94	8.30	5.96	4.00	3.77	1.52	2.44	3.42	11.73	14.69	9.94	10.71
1958	26.88	15.67	14.79	16.35	14.43	11.85	3.63	1.98	4.98	26.84	26.36	9.32	14.42
1959	25.93	18.38	27.66	6.37	3.92	4.21	1.66	1.79	3.85	11.35	30.57	22.73	13.62
1960	28.37	36.51	11.18	8.89	12.91	14.05	3.07	7.12	7.74	32.61	26.26	25.98	17.89
1961	36.12	30.83	24.02	14.72	18.58	12.17	2.57	1.81	6.18	26.02	40.06	15.87	19.08
1962	30.79	26.51	15.68	14.57	6.43	5.55	3.96	2.39	11.21	14.85	28.61	25.12	15.47
1963	27.21	32.23	16.35	13.22	4.62	7.70	2.46	3.09	7.90	14.91	14.79	26.01	14.21
1964	28.37	30.21	25.46	15.21	8.38	10.50	3.83	3.39	6.38	15.82	43.77	40.24	19.30
1965	35.69	22.66	14.30	5.93	4.91	4.35	2.71	1.74	4.00	18.96	30.98	41.45	15.64
1966	18.54	15.08	6.07	3.97	13.66	5.03	1.35	1.11	4.61	25.27	39.31	35.32	14.15
1967	37.14	15.41	15.02	10.55	8.30	10.42	2.03	3.15	4.38	8.54	30.85	24.77	14.21
1968	27.53	29.79	30.09	18.70	6.06	4.68	1.94	2.70	5.16	16.85	18.22	10.67	14.37
1969	15.12	6.87	8.70	5.20	2.86	2.01	1.49	1.72	3.81	9.23	15.68	40.64	9.43
1970	27.00	11.26	4.96	7.89	3.04	3.88	1.49	0.81	6.55	27.65	54.17	30.89	14.96
1971	23.68	34.98	32.58	9.29	35.98	38.22	10.63	3.08	2.95	30.77	35.44	46.35	25.33
1972	25.36	13.26	15.68	12.73	11.98	10.55	12.53	5.77	7.17	14.41	26.65	31.27	15.61
1973	16.74	20.99	11.40	8.95	8.25	9.53	2.56	1.34	3.05	24.34	43.72	55.75	17.22
1977	38.47	38.20	23.85	10.28	8.42	5.28	4.02	2.56	6.83	13.01	36.31	17.31	17.04
1978	17.81	14.49	8.52	3.76	5.94	6.92	1.79	3.90	8.21	42.99	31.01	38.55	15.32
TOTAL	812.24	600.60	449.02	280.80	242.84	227.76	80.60	72.28	139.10	570.18	809.38	894.40	5179.20
MEAN	31.24	23.10	17.27	10.80	9.34	8.76	3.10	2.78	5.35	21.93	31.13	34.40	16.60

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

ESTIMATED DISCHARGE SERIES FROM LOWER KALIWA BASIN

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	ANNUAL
1950	21.99	9.49	9.77	4.01	2.41	2.85	15.04	21.04	14.29	32.34	33.54	43.06	17.49
1951	18.38	9.45	3.19	2.65	7.31	4.66	13.62	46.92	17.44	12.48	62.59	60.55	21.60
1952	22.28	10.80	3.60	3.42	2.54	5.23	12.67	45.43	27.96	66.61	16.95	46.59	22.01
1953	16.69	15.01	3.96	4.05	2.17	5.31	8.66	30.74	12.74	27.91	29.35	64.27	18.40
1954	14.88	8.49	13.25	3.25	2.49	2.51	8.23	12.99	13.20	9.59	19.09	64.97	14.41
1955	30.95	5.92	3.39	3.60	2.48	6.15	14.14	10.78	18.48	24.52	43.58	30.03	16.17
1956	15.16	9.44	10.93	12.46	5.91	7.18	24.67	28.69	39.83	39.96	42.52	86.31	26.92
1957	23.57	6.38	2.97	2.26	1.68	2.24	9.96	23.52	16.01	13.64	16.37	14.53	10.85
1958	13.54	6.27	5.29	6.19	6.07	7.03	23.03	19.06	23.34	31.21	29.38	10.81	15.10
1959	13.06	7.36	9.90	2.41	1.65	2.50	10.52	17.30	18.04	13.20	34.07	32.17	13.51
1960	14.29	14.62	4.00	3.37	5.43	8.34	19.45	68.68	36.27	37.92	29.27	30.13	22.65
1961	18.19	12.35	8.59	5.57	7.82	7.22	16.30	17.45	28.98	30.26	44.65	18.41	17.98
1962	15.50	10.61	5.61	5.52	2.71	3.30	25.06	23.03	52.55	17.27	31.90	29.14	18.52
1963	13.70	12.91	5.85	5.01	1.94	4.57	15.57	29.85	37.03	17.33	16.49	30.17	15.87
1964	14.28	12.10	9.11	5.76	3.53	6.23	24.25	32.73	29.88	18.40	48.79	46.67	20.98
1965	17.97	9.07	5.12	2.25	2.07	2.58	17.17	16.80	18.75	22.04	34.53	48.07	16.37
1966	9.34	6.04	2.17	1.50	5.75	2.99	8.55	10.22	21.60	29.96	43.82	40.97	15.28
1967	18.70	6.17	5.38	4.00	3.49	6.18	12.86	30.37	20.52	9.93	34.39	28.73	15.06
1968	13.86	11.93	10.77	7.08	2.55	2.78	12.29	26.07	24.20	19.59	20.31	12.32	13.65
1969	7.61	2.75	3.11	1.97	1.21	1.19	9.43	16.61	17.84	10.74	17.26	47.14	11.40
1970	13.59	4.51	1.78	2.99	1.28	2.31	9.44	7.76	30.68	32.15	60.39	35.82	16.89
1971	11.93	14.01	11.66	3.52	15.14	22.69	67.34	29.20	13.84	35.78	39.50	53.76	26.52
1972	12.77	5.31	5.61	4.82	5.04	6.26	79.37	55.60	33.59	16.75	29.71	36.27	24.26
1973	8.43	8.40	4.08	3.39	3.47	5.66	16.20	12.90	14.31	28.30	48.24	64.62	18.21
1977	19.37	15.30	8.54	3.89	3.54	3.13	25.45	24.70	31.98	15.12	40.47	20.08	17.63
1978	8.92	5.80	3.05	1.43	2.50	4.11	11.34	37.57	38.47	49.98	34.56	44.71	20.21
TOTAL	408.98	240.50	160.68	106.34	102.18	135.20	510.64	692.06	651.82	663.00	902.20	1037.40	5416.00
MEAN	15.73	9.25	6.18	4.09	3.93	5.20	19.64	26.81	25.07	25.50	34.70	39.90	18.00

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 290 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 175,000 LOW WATER LEVEL IN METER 135,000 RATED HEAD IN METER 108,270
INSTALLED CAPACITY IN MW 200,000 DEPENDABLE CAPACITY IN MW 149,738 TARGET OPERATION HOUR A DAY 6,16
RATED DISCHARGE IN CMS 219,178 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10,0 POWER DEPENDABILITY IN % 95,0

O,HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550,0	160,25	0,0234
1950,0	111,76	0,0425
0,	63,35	0,0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	TOTAL (M US D)	P,W,F,	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	200,0	843,19	32,05	19,73	51,78	0,90909	47,07	4226,
1990	200,0	822,36	32,05	19,24	51,29	0,82645	42,39	4121,
1991	200,0	801,52	32,05	18,76	50,81	0,75131	38,17	4017,
1992	200,0	780,68	32,05	18,27	50,32	0,68301	34,37	3912,
1993	200,0	759,85	32,05	17,78	49,83	0,62092	30,94	3808,
1994	200,0	739,01	32,05	17,29	49,34	0,56447	27,85	3704,
1995	200,0	739,01	32,05	17,29	49,34	0,51316	25,32	3704,
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2037	200,0	739,01	32,05	17,29	49,34	0,00937	0,46	3704,
2038	200,0	739,01	32,05	17,29	49,34	0,00852	0,42	3704,
SUMMARY	200,0	745,26	32,05	17,44	49,49	9,91481	495,12	3735,

*** RESULTS OF THE CASE HWL= 175,000 INSTALLED CAPACITY= 200,0 STORED IN DISK FILE A1818=02 NO, 1

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
1989	100,74	1,09	10,12	89,53	188,07	605,77	171,269	41,000	126,063	0,860	199,3	4225,7	458,25	384,94	843,19
1994	84,43	1,08	4,58	78,77	188,39	600,08	171,099	41,000	125,844	0,860	199,4	3703,6	469,50	269,51	739,01

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100,0	DEPENDABLE		95,0	DEPENDABLE		90,0	DEPENDABLE		85,0	DEPENDABLE		80,0	DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	46,85	153,33	38,19	47,74	200,00	38,19	48,25	200,00	38,19	48,72	200,00	38,19	49,59	200,00	38,19
1994	48,05	152,53	39,13	48,40	200,00	39,13	49,09	200,00	39,13	49,75	200,00	39,13	50,04	200,00	39,13

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 290 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 175,000 LOW WATER LEVEL IN METER 135,000 RATED HEAD IN METER 108,270
INSTALLED CAPACITY IN MW 200,000 DEPENDABLE CAPACITY IN MW 149,738 TARGET OPERATION HOUR A DAY 6,16
RATED DISCHARGE IN CMS 219,178 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188	38,188

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1989 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	143,95	1,07	7,19	132,20	183,07	682,69	174,653	41,000	129,654	0,860	200,0	538,3	38,19	69,48	107,67
FEB,	99,15	1,39	0,	98,44	182,81	681,05	174,802	41,000	129,811	0,860	200,0	362,1	38,19	34,24	72,42
MAR,	72,95	1,61	0,	75,45	183,22	670,05	174,537	41,000	129,528	0,860	200,0	306,8	38,19	23,18	61,36
APR,	45,88	1,82	0,	55,56	184,56	640,25	173,669	41,000	128,602	0,860	200,0	217,0	38,19	5,22	43,41
MAY	40,06	1,46	0,	53,97	187,05	599,10	172,118	41,000	126,937	0,860	200,0	215,2	38,19	4,86	43,05
JUNE	39,60	1,03	0,02	56,38	190,52	552,87	170,076	41,000	124,734	0,860	200,0	214,1	38,19	4,62	42,81
JULY	46,03	0,80	3,84	61,63	194,67	498,68	167,586	41,000	122,047	0,860	199,7	238,4	38,19	9,43	47,62
AUG,	74,66	0,62	1,17	67,62	195,45	512,74	166,416	41,000	120,861	0,860	198,2	261,8	38,19	13,78	51,97
SEP,	82,15	0,82	0,	75,44	193,95	528,03	166,924	41,000	121,424	0,860	197,4	285,2	38,19	18,26	56,45
OCT,	140,51	0,82	14,56	99,31	190,45	597,19	169,115	41,000	123,908	0,860	198,0	396,0	38,19	40,52	78,70
NOV,	198,28	0,80	34,44	147,10	186,15	638,52	171,841	41,000	126,785	0,860	198,3	576,1	38,19	76,63	114,82
DEC,	224,28	0,88	59,07	151,32	184,56	673,35	173,747	41,000	128,740	0,860	200,0	614,6	38,19	84,73	122,92
MEAN	100,74	1,09	10,12	89,53	188,07	605,77	171,269	41,000	126,063	0,860	199,3	4225,7	456,25	384,94	843,19

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 153,3 MW

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	132,01	1,06	4,61	124,54	184,11	667,58	174,036	41,000	128,985	0,860	200,0	506,0	39,13	62,07	101,19
FEB,	97,27	1,38	0,	97,51	184,05	663,66	174,059	41,000	129,011	0,860	200,0	357,4	39,13	32,35	71,48
MAR,	71,95	1,59	0,	75,77	184,74	649,17	173,644	41,000	128,565	0,860	200,0	306,5	39,13	22,18	61,30
APR,	47,59	1,79	0,	56,33	186,21	621,85	172,726	41,000	127,580	0,860	200,0	218,3	39,13	4,53	43,65
MAY	44,20	1,44	0,	54,52	188,31	590,34	171,443	41,000	126,201	0,860	200,0	216,0	39,13	4,08	43,20
JUNE	44,36	1,03	0,	56,65	190,44	555,83	169,883	41,000	124,545	0,860	199,6	214,9	39,13	3,77	42,89
JULY	48,53	0,81	0,	56,51	192,34	532,28	168,475	41,000	123,049	0,860	199,1	219,7	39,13	4,60	43,73
AUG,	58,46	0,64	0,	58,34	193,01	530,89	167,777	41,000	122,319	0,860	198,5	226,3	39,13	5,79	44,91
SEP,	59,01	0,83	0,	57,14	192,66	533,59	167,700	41,000	122,264	0,860	198,0	214,3	39,13	3,23	42,36
OCT,	86,86	0,81	3,67	70,78	191,17	564,70	168,607	41,000	123,263	0,860	198,1	278,9	39,13	16,18	55,30
NOV,	140,09	0,78	7,23	105,86	188,23	632,63	171,251	41,000	126,149	0,860	199,5	411,1	39,13	43,00	82,13
DEC,	182,56	0,88	38,64	131,79	185,06	662,77	173,391	41,000	128,411	0,860	200,0	534,3	39,13	67,73	106,86
MEAN	84,43	1,08	4,58	78,77	188,39	600,08	171,066	41,000	125,844	0,860	199,4	3703,6	469,50	269,51	739,01

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 6 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 21-TH YEAR 6-TH MONTH TO 21-TH YEAR 11-TH MONTH LOWEST POWER 152,5 MW

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 290 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 165,000 LOW WATER LEVEL IN METER 128,000 RATED HEAD IN METER 99,200
INSTALLED CAPACITY IN MW 185,000 DEPENDABLE CAPACITY IN MW 139,526 TARGET OPERATION HOUR A DAY 5,45
RATED DISCHARGE IN CMS 221,277 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10,0 POWER DEPENDABILITY IN % 95,0

0,HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550,0	160,25	0,0234
1950,0	111,76	0,0425
0,	63,35	0,0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P,W,F,	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	185,0	780,24	29,65	18,26	47,90	0,90909	43,55	4226,
1990	185,0	760,76	29,65	17,80	47,45	0,82645	39,21	4120,
1991	185,0	741,29	29,65	17,35	46,99	0,75131	35,31	4015,
1992	185,0	721,81	29,65	16,89	46,54	0,68301	31,79	3910,
1993	185,0	702,34	29,65	16,43	46,08	0,62092	28,61	3804,
1994	185,0	682,86	29,65	15,98	45,63	0,56447	25,75	3699,
1995	185,0	682,86	29,65	15,98	45,63	0,51316	23,41	3699,
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2037	185,0	682,86	29,65	15,98	45,63	0,00937	0,43	3699,
2038	185,0	682,86	29,65	15,98	45,63	0,00852	0,39	3699,
SUMMARY	185,0	688,71	29,65	16,12	45,76	9,91481	457,88	3731,

*** RESULTS OF THE CASE HWL= 165,000 INSTALLED CAPACITY= 185,0 STORED IN DISK FILE A1818=02 NO, 2

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
1989	100,74	0,92	10,46	89,36	187,63	485,82	162,015	41,000	116,877	0,860	184,4	4225,9	375,00	405,24	780,24
1994	84,43	0,91	4,61	78,92	189,31	469,17	161,140	41,000	115,904	0,860	184,5	3698,9	420,75	262,11	682,86

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100,0	DEPENDABLE		95,0	DEPENDABLE		90,0	DEPENDABLE		85,0	DEPENDABLE		80,0	DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	41,53	141,68	31,25	42,10	185,00	31,25	43,07	185,00	31,25	43,59	185,00	31,25	44,19	185,00	31,25
1994	46,60	142,03	35,06	46,98	185,00	35,06	47,84	185,00	35,06	48,33	185,00	35,06	48,85	185,00	35,06

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 290 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 165,000 LOW WATER LEVEL IN METER 128,000 RATED HEAD IN METER ,,,,,, 99,200
INSTALLED CAPACITY IN MW 185,000 DEPENDABLE CAPACITY IN MW 139,526 TARGET OPERATION HOUR A DAY 5,45
RATED DISCHARGE IN CMS 221,277 TYPE OF RULE CURVE ,, VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250	31,250

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1989 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	143,95	0,91	7,16	134,30	182,92	540,42	164,944	41,000	120,000	0,860	185,0	546,3	31,25	69,82	101,07
FEB,	99,15	1,17	0,	98,68	182,91	538,72	164,958	41,000	119,991	0,860	185,0	362,6	31,25	35,83	67,08
MAR,	72,95	1,35	0,	74,33	183,31	531,41	164,731	41,000	119,748	0,860	185,0	302,0	31,25	24,62	55,87
APR,	45,88	1,53	0,	52,29	184,52	510,82	164,019	41,000	118,983	0,860	185,0	204,3	31,25	6,55	37,80
MAY	40,06	1,23	0,	50,32	186,79	480,04	162,714	41,000	117,581	0,860	185,0	201,1	31,25	5,95	37,20
JUNE	39,60	0,87	0,01	51,99	190,21	445,62	160,877	41,000	115,581	0,860	185,0	197,9	31,25	5,37	36,62
JULY	46,03	0,68	3,85	57,41	194,28	403,01	158,617	41,000	113,128	0,860	184,6	223,0	31,25	9,93	41,18
AUG,	74,66	0,53	1,18	67,13	194,51	418,62	157,755	41,000	112,309	0,860	183,2	261,9	31,25	16,86	48,11
SEP,	82,15	0,70	0,	76,26	193,10	432,06	158,289	41,000	112,872	0,860	182,7	290,4	31,25	22,00	53,25
OCT,	140,51	0,70	14,63	104,86	189,15	486,49	160,549	41,000	115,434	0,860	183,3	420,3	31,25	46,12	77,37
NOV,	198,28	0,68	36,62	151,85	185,76	510,16	162,608	41,000	117,594	0,860	183,7	594,9	31,25	78,53	109,78
DEC,	224,28	0,74	60,87	152,95	183,72	536,16	164,333	41,000	119,522	0,860	185,0	621,2	31,25	83,67	114,92
MEAN	100,74	0,92	10,46	89,36	187,63	485,82	162,015	41,000	116,877	0,860	184,4	4225,9	375,00	405,24	780,24

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 3 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 141,7 MW

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	132,03	0,89	4,59	124,60	184,44	527,27	164,144	41,000	119,109	0,860	185,0	505,3	35,06	58,42	93,48
FEB,	97,28	1,16	0,	97,49	184,31	523,96	164,202	41,000	119,173	0,860	185,0	356,8	35,06	30,94	66,00
MAR,	71,98	1,33	0,	75,24	185,05	511,47	163,788	41,000	118,724	0,860	185,0	303,8	35,06	21,15	56,21
APR,	47,67	1,50	0,	55,35	186,68	487,85	162,851	41,000	117,715	0,860	185,0	214,0	35,06	4,52	39,59
MAY	44,29	1,21	0,	53,48	189,04	460,00	161,515	41,000	116,273	0,860	185,0	211,2	35,06	4,00	39,07
JUNE	44,42	0,86	0,	55,66	191,91	428,65	159,853	41,000	114,479	0,860	184,8	209,7	35,06	3,70	38,76
JULY	48,61	0,67	0,	55,60	194,23	408,14	158,334	41,000	112,852	0,860	184,3	214,3	35,06	4,44	39,50
AUG,	58,50	0,53	0,	57,71	194,91	408,83	157,644	41,000	112,129	0,860	183,7	222,1	35,06	5,72	40,78
SEP,	58,99	0,69	0,	56,95	194,33	412,32	157,662	41,000	112,180	0,860	183,1	212,0	35,06	3,72	38,78
OCT,	86,71	0,68	3,83	70,81	192,46	442,86	158,733	41,000	113,352	0,860	183,2	277,8	35,06	15,91	50,97
NOV,	139,89	0,66	7,42	109,67	188,62	500,25	161,564	41,000	116,475	0,860	184,6	425,4	35,06	43,55	78,62
DEC,	182,53	0,74	38,64	135,02	185,37	522,03	163,597	41,000	118,610	0,860	185,0	546,5	35,06	66,05	101,11
MEAN	84,43	0,91	4,61	78,92	189,31	469,17	161,140	41,000	115,904	0,860	184,5	3698,9	420,75	262,11	682,86

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 21-TH YEAR 6-TH MONTH TO 21-TH YEAR 10-TH MONTH LOWEST POWER 142,0 MW

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KAHAN HWL 300 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 155,000 LOW WATER LEVEL IN METER 121,000 RATED HEAD IN METER ,,,,, 91,130
INSTALLED CAPACITY IN MW 170,000 DEPENDABLE CAPACITY IN MW 127,534 TARGET OPERATION HOUR A DAY 4,87
RATED DISCHARGE IN CMS 221,342 TYPE OF RULE CURVE ,, VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10,0 POWER DEPENDABILITY IN % 95,0

O,HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550,0	160,25	0,0234
1950,0	111,76	0,0425
0,	63,35	0,0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	TOTAL (M US D)	P,W,F,	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	170,0	717,35	27,24	16,79	44,03	0,90909	40,03	4228,
1990	170,0	699,25	27,24	16,36	43,60	0,82645	36,04	4122,
1991	170,0	681,14	27,24	15,94	43,18	0,75131	32,44	4015,
1992	170,0	663,04	27,24	15,52	42,76	0,68301	29,20	3909,
1993	170,0	644,93	27,24	15,09	42,33	0,62092	26,29	3802,
1994	170,0	626,83	27,24	14,67	41,91	0,56447	23,66	3695,
1995	170,0	626,83	27,24	14,67	41,91	0,51316	21,51	3695,
,	,	,	,	,	,	,	,	,
,	,	,	,	,	,	,	,	,
,	,	,	,	,	,	,	,	,
2037	170,0	626,83	27,24	14,67	41,91	0,00937	0,39	3695,
2038	170,0	626,83	27,24	14,67	41,91	0,00852	0,36	3695,
SUMMARY	170,0	632,26	27,24	14,79	42,04	9,91481	420,66	3727,

*** RESULTS OF THE CASE HWL= 155,000 INSTALLED CAPACITY= 170,0 STORED IN DISK FILE A1818W02 NO, 3

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
1989	100,74	0,77	10,59	89,37	187,45	384,10	152,544	41,000	107,437	0,860	169,3	4228,4	307,88	409,48	717,35
1994	84,24	0,76	4,38	79,10	190,16	365,19	151,307	41,000	106,054	0,860	169,5	3695,3	381,00	245,83	626,83

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100,0	DEPENDABLE		95,0	DEPENDABLE		90,0	DEPENDABLE		85,0	DEPENDABLE		80,0	DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	37,20	127,73	25,66	37,71	170,00	25,66	38,54	170,00	25,66	39,09	170,00	25,66	39,90	170,00	25,66
1994	46,03	129,33	31,75	46,65	170,00	31,75	47,64	170,00	31,75	47,94	170,00	31,75	48,55	170,00	31,75

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 300 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 155,000 LOW WATER LEVEL IN METER 121,000 RATED HEAD IN METER 91,130
INSTALLED CAPACITY IN MW 170,000 DEPENDABLE CAPACITY IN MW 127,534 TARGET OPERATION HOUR A DAY 4,87
RATED DISCHARGE IN CMS 221,342 TYPE OF RULE CURVE ,, VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1989 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	143,95	0,75	7,11	136,08	183,30	421,78	155,000	41,000	110,045	0,860	170,0	552,4	25,66	68,24	93,90
FEB,	99,15	0,97	0,	98,68	183,36	420,55	154,963	41,000	110,005	0,860	170,0	361,7	25,66	35,84	61,50
MAR,	72,95	1,13	0,	73,35	183,66	416,47	154,803	41,000	109,832	0,860	170,0	297,4	25,66	24,91	50,56
APR,	45,88	1,28	0,	49,89	184,68	402,75	154,257	41,000	109,241	0,860	170,0	194,8	25,66	7,47	33,12
MAY	40,06	1,03	0,	47,78	186,85	379,32	153,123	41,000	108,011	0,860	170,0	191,0	25,66	6,31	32,47
JUNE	39,60	0,73	0,00	48,69	190,24	353,84	151,483	41,000	106,213	0,860	170,0	185,5	25,66	5,89	31,54
JULY	46,03	0,57	3,83	54,21	194,16	320,16	149,389	41,000	103,939	0,860	169,5	211,0	25,66	10,12	35,78
AUG,	74,66	0,45	1,17	67,56	193,81	334,87	148,686	41,000	103,290	0,860	167,9	265,1	25,66	19,03	44,68
SEP,	82,15	0,59	0,	76,06	192,03	349,13	149,392	41,000	104,037	0,860	167,5	291,2	25,66	23,37	49,02
OCT,	140,51	0,59	14,58	111,86	188,03	385,23	151,555	41,000	106,602	0,860	168,4	449,4	25,66	50,42	76,08
NOV,	198,28	0,57	36,79	152,86	185,49	406,13	153,265	41,000	108,255	0,860	168,9	598,4	25,66	75,88	101,54
DEC,	224,28	0,62	62,42	155,39	183,45	421,78	154,784	41,000	109,960	0,860	170,0	630,4	25,66	81,51	107,16
MEAN	100,74	0,77	10,59	89,37	187,45	384,10	152,544	41,000	107,437	0,860	169,3	4228,4	307,88	409,48	717,35

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 127,7 MW

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	131,23	0,75	4,52	124,63	184,67	413,16	154,323	41,000	109,306	0,860	170,0	504,5	31,75	54,01	85,76
FEB,	97,18	0,96	0,	97,32	184,57	410,48	154,359	41,000	109,346	0,860	170,0	355,5	31,75	28,69	60,44
MAR,	72,33	1,11	0,	74,90	185,34	400,63	153,965	41,000	108,917	0,860	170,0	301,9	31,75	19,58	51,33
APR,	47,88	1,25	0,	54,92	187,23	379,13	152,983	41,000	107,850	0,860	170,0	211,7	31,75	4,24	35,99
MAY	45,02	1,00	0,	53,14	190,08	354,70	151,544	41,000	106,281	0,860	170,0	208,8	31,75	3,74	35,49
JUNE	45,68	0,71	0,	55,47	193,52	327,47	149,801	41,000	104,380	0,860	169,9	207,4	31,75	3,49	35,24
JULY	50,36	0,56	0,	55,60	196,16	311,95	148,283	41,000	102,738	0,860	169,4	212,4	31,75	4,23	35,98
AUG,	60,29	0,44	0,	58,40	196,45	315,83	147,776	41,000	102,223	0,860	168,6	223,4	31,75	5,92	37,67
SEP,	60,72	0,57	0,	58,09	195,42	321,16	147,974	41,000	102,466	0,860	168,0	215,5	31,75	4,42	36,17
OCT,	86,00	0,57	3,61	71,28	193,39	349,37	149,179	41,000	103,767	0,860	168,4	278,7	31,75	15,27	47,02
NOV,	133,51	0,58	5,98	110,58	189,08	391,86	151,902	41,000	106,775	0,860	169,6	428,1	31,75	40,95	72,70
DEC,	180,35	0,61	37,66	135,46	185,62	409,57	153,813	41,000	108,827	0,860	170,0	547,3	31,75	61,29	93,04
MEAN	84,24	0,76	4,38	79,10	190,16	365,19	151,307	41,000	106,054	0,860	169,5	3695,3	381,00	245,83	626,83

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 3 TIMES
LONGEST DURATION FROM 21-TH YEAR 6-TH MONTH TO 21-TH YEAR 10-TH MONTH LOWEST POWER 129,3 MW

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 300 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 145,000 LOW WATER LEVEL IN METER 114,000 RATED HEAD IN METER 82,600
INSTALLED CAPACITY IN MW 155,000 DEPENDABLE CAPACITY IN MW 116,326 TARGET OPERATION HOUR A DAY 4,31
RATED DISCHARGE IN CMS 222,652 TYPE OF RULE CURVE ,; VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10,0 POWER DEPENDABILITY IN % 95,0

0,HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550,0	160,25	0,0234
1950,0	111,76	0,0425
0,	63,35	0,0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P,W,F,	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	155,0	654,52	24,84	15,32	40,15	0,90909	36,50	4229,
1990	155,0	638,07	24,84	14,93	39,77	0,82645	32,87	4124,
1991	155,0	621,62	24,84	14,55	39,38	0,75131	29,59	4018,
1992	155,0	605,17	24,84	14,16	39,00	0,68301	26,64	3912,
1993	155,0	588,73	24,84	13,78	38,61	0,62092	23,98	3807,
1994	155,0	572,28	24,84	13,39	38,23	0,56447	21,58	3701,
1995	155,0	572,28	24,84	13,39	38,23	0,51316	19,62	3701,
,	,	,	,	,	,	,	,	,
,	,	,	,	,	,	,	,	,
,	,	,	,	,	,	,	,	,
,	,	,	,	,	,	,	,	,
2037	155,0	572,28	24,84	13,39	38,23	0,00937	0,36	3701,
2038	155,0	572,28	24,84	13,39	38,23	0,00852	0,33	3701,
SUMMARY	155,0	577,21	24,84	13,51	38,35	9,91481	383,70	3733,

*** RESULTS OF THE CASE HWL= 145,000 INSTALLED CAPACITY= 155,0 STORED IN DISK FILE A1818=02 NO, 4

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
1989	100,74	0,64	10,67	89,42	187,36	303,12	143,117	41,000	98,030	0,860	154,5	4229,1	248,63	405,90	654,52
1994	84,24	0,63	4,36	79,25	190,18	287,16	141,845	41,000	96,620	0,860	154,4	3701,2	330,38	241,90	572,28

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100,0	DEPENDABLE		95,0	DEPENDABLE		90,0	DEPENDABLE		85,0	DEPENDABLE		80,0	DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	33,22	119,23	20,72	33,71	155,00	20,72	34,53	155,00	20,72	35,24	155,00	20,72	36,61	155,00	20,72
1994	44,07	118,94	27,53	44,64	155,00	27,53	45,49	155,00	27,53	45,77	155,00	27,53	46,49	155,00	27,53

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-1 KANAN HWL 300 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 145,000 LOW WATER LEVEL IN METER 114,000 RATED HEAD IN METER 82,600
INSTALLED CAPACITY IN MW 155,000 DEPENDABLE CAPACITY IN MW 116,326 TARGET OPERATION HOUR A DAY 4,31
RATED DISCHARGE IN CMS 222,652 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN,	FEB,	MAR,	APR,	MAY	JUNE	JULY	AUG,	SEP,	OCT,	NOV,	DEC,
RULE CURVE IN MWH	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719	20,719

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1989 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	143,95	0,62	7,05	136,27	183,82	327,41	145,000	41,000	100,050	0,860	155,0	551,6	20,72	64,77	85,49
FEB,	99,15	0,81	0,	98,66	183,88	326,64	144,972	41,000	100,019	0,860	155,0	360,7	20,72	35,18	55,90
MAR,	72,95	0,93	0,	72,78	184,08	324,61	144,870	41,000	99,908	0,860	155,0	294,4	20,72	24,91	45,63
APR,	45,88	1,06	0,	48,32	184,93	315,54	144,461	41,000	99,461	0,860	155,0	188,4	20,72	8,49	29,21
MAY	40,06	0,86	0,	45,19	186,90	299,49	143,534	41,000	98,447	0,860	155,0	180,7	20,72	7,29	28,00
JUNE	39,60	0,61	0,	46,06	190,07	281,16	142,156	41,000	96,924	0,860	155,0	175,8	20,72	6,54	27,26
JULY	46,03	0,48	3,80	51,56	193,88	254,91	140,315	41,000	94,912	0,860	154,5	201,3	20,72	10,40	31,12
AUG,	74,66	0,38	1,15	68,11	192,92	268,35	139,818	41,000	94,533	0,860	153,0	268,6	20,72	20,57	41,29
SEP,	82,15	0,50	0,	75,28	190,95	284,86	140,695	41,000	95,418	0,860	152,9	289,4	20,72	23,78	44,50
OCT,	140,51	0,50	14,50	117,10	187,30	307,40	142,704	41,000	97,705	0,860	153,9	470,9	20,72	52,08	72,80
NOV,	198,28	0,47	36,65	155,68	185,48	321,59	144,083	41,000	99,106	0,860	154,7	608,4	20,72	73,54	94,26
DEC,	224,28	0,52	63,66	157,92	183,85	327,41	144,946	41,000	100,037	0,860	155,0	639,1	20,72	78,34	99,06
MEAN	100,74	0,64	10,67	89,42	187,36	303,12	143,117	41,000	98,030	0,860	154,5	4229,1	248,63	405,90	654,52

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 119,2 MW

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO, (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R,W,L, (M)	T,W,L, (M)	E,HEAD (M)	EFFICI,	POWER (MW)	O,HOUR (H)	P,E, (GWH)	S,E, (GWH)	T,E, (GWH)
JAN,	131,23	0,62	4,46	124,63	185,08	322,23	144,437	41,000	99,430	0,860	155,0	503,2	27,53	50,47	78,00
FEB,	97,19	0,80	0,	97,11	184,83	320,48	144,537	41,000	99,541	0,860	155,0	354,1	27,53	27,35	54,88
MAR,	72,36	0,92	0,	74,05	185,51	313,49	144,212	41,000	99,185	0,860	155,0	298,1	27,53	18,67	46,20
APR,	47,94	1,04	0,	53,23	187,37	297,08	143,335	41,000	98,224	0,860	155,0	205,1	27,53	4,25	31,78
MAY	45,08	0,84	0,	51,29	190,28	278,20	142,008	41,000	96,765	0,860	155,0	201,4	27,53	3,68	31,21
JUNE	45,74	0,59	0,	53,76	194,19	255,88	140,332	41,000	94,908	0,860	155,0	200,5	27,53	3,55	31,08
JULY	50,41	0,46	0,	53,79	196,72	245,57	138,927	41,000	93,386	0,860	154,3	205,1	27,53	4,14	31,67
AUG,	60,31	0,37	0,	57,44	196,23	252,25	138,675	41,000	93,157	0,860	153,5	220,2	27,53	6,28	33,81
SEP,	60,69	0,48	0,	58,17	194,77	257,52	139,080	41,000	93,627	0,860	153,0	216,9	27,53	5,64	33,17
OCT,	85,91	0,48	3,73	72,58	192,21	281,94	140,387	41,000	95,089	0,860	153,3	285,2	27,53	16,32	43,85
NOV,	133,39	0,46	5,84	118,06	186,30	305,35	142,502	41,000	97,460	0,860	154,2	457,5	27,53	43,22	70,75
DEC,	180,31	0,51	37,51	137,51	186,34	318,14	143,896	41,000	98,879	0,860	155,0	554,0	27,53	58,34	85,87
MEAN	84,24	0,63	4,36	79,25	190,18	287,16	141,845	41,000	96,620	0,860	154,4	3701,2	330,38	241,90	572,28

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 21-TH YEAR 6-TH MONTH TO 21-TH YEAR 10-TH MONTH LOWEST POWER 118,9 MW

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 1967 (UNIT C.M.S.)

MONTH	KALIWA RIVER: PICOREM DAM-SITE INFLOW	PICOREM DAM-SITE SUPPLY	PICOREM DAM-SITE SPILL	LOWER KALIWA	SUB TOTAL	KANAN RIVER: KANAN NO.2 DAM INFLOW	KANAN NO.2 DAM SUPPLY	KANAN NO.2 DAM SPILL	LOWER KANAN	SUB TOTAL	AGOS NO.1 DAM NATURAL	AGOS NO.1 DAM AVAILA.	AGOS NO.1 DAM K(J)
JAN.	14.97	1.77	12.31	15.23	28.04	89.55	0.	89.55	31.24	120.79	151.49	148.85	0.87730
FEB.	6.61	1.77	3.72	9.25	12.97	66.23	0.	66.23	23.10	89.33	105.19	102.30	0.88258
MAR.	3.55	1.77	0.99	6.18	7.17	49.50	0.	49.50	17.27	66.77	76.50	73.94	0.86396
APR.	2.64	1.77	0.29	4.09	4.38	30.99	0.	30.99	10.80	41.79	48.52	46.17	0.81251
MAY	3.02	1.77	0.55	3.93	4.48	26.79	0.	26.79	9.34	36.13	43.08	40.61	0.80246
JUNE	5.66	1.77	2.24	5.20	7.44	25.11	0.	25.11	8.76	33.87	44.73	41.31	0.75191
JULY	55.33	1.77	31.44	19.64	51.08	8.90	0.	8.90	3.10	12.00	66.97	63.08	0.80932
AUG.	48.88	1.77	46.51	26.81	73.32	7.98	0.	7.98	2.78	10.76	86.45	84.08	0.90291
SEP.	44.47	1.77	41.93	25.07	67.00	15.36	0.	15.36	5.35	20.71	90.25	87.21	0.90382
OCT.	37.57	1.77	35.06	25.50	60.56	62.91	0.	62.91	21.93	84.84	147.91	145.40	0.87368
NOV.	50.53	1.77	48.07	34.70	82.77	89.27	0.	89.27	31.13	120.40	205.63	203.17	0.90302
DEC.	58.77	1.77	56.26	39.90	96.16	98.61	0.	98.61	34.40	133.01	231.68	229.17	0.90016
TOTAL	312.00	21.22	279.36	216.00	495.36	571.20	0.	571.20	199.20	770.40	1298.40	1265.76	10.28364
MEAN	26.00	1.77	23.28	18.00	41.28	47.60	0.	47.60	16.60	64.20	108.20	105.48	0.85697

*** VOLUME USED FROM INITIAL STORAGE IN C.M.S.MONTH

PICOREM DAM 0.

KANAN NO.2 DAM 0.

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 1989 (UNIT C.M.S.)

	KALIWA RIVER					KANAN RIVER					AGOS NO.1 DAM		
	PICOREM DAM-SITE			LOWER	SUB	KANAN NO.2 DAM			LOWER	SUB			
MONTH	INFLOW	SUPPLY	SPILL	KALIWA	TOTAL	INFLOW	SUPPLY	SPILL	KANAN	TOTAL	NATURAL	AVAILA.	K(J)
JAN.	14.97	6.66	7.43	15.73	23.16	89.55	0.	89.55	31.24	120.79	151.49	143.95	0.84855
FEB.	6.61	6.66	0.57	9.25	9.82	66.23	0.	66.23	23.10	89.33	105.19	99.15	0.85539
MAR.	3.55	6.66	0.	6.18	6.18	49.50	0.	49.50	17.27	66.77	76.50	72.95	0.85245
APR.	2.64	6.66	0.	4.09	4.09	30.99	0.	30.99	10.80	41.79	48.52	45.88	0.80741
MAY.	3.02	6.66	0.	3.93	3.93	26.79	0.	26.79	9.34	36.13	43.08	40.06	0.79157
JUNE	5.66	6.66	0.53	5.20	5.73	25.11	0.	25.11	8.76	33.87	44.73	39.60	0.72070
JULY	35.33	6.66	14.39	19.64	34.03	8.90	0.	8.90	3.10	12.00	66.97	46.03	0.59060
AUG.	48.88	6.66	37.09	26.81	63.90	7.98	0.	7.98	2.78	10.76	86.45	74.66	0.80176
SEP.	44.47	6.66	36.37	25.07	61.44	15.36	0.	15.36	5.35	20.71	90.25	82.15	0.86653
OCT.	37.57	6.66	30.17	25.50	55.67	62.91	0.	62.91	21.93	84.84	147.91	140.51	0.84431
NOV.	50.53	6.66	43.18	34.70	77.88	89.27	0.	89.27	31.13	120.40	205.63	198.28	0.88130
DEC.	58.77	6.66	51.37	39.90	91.27	98.61	0.	98.61	34.40	133.01	231.68	224.28	0.88096
TOTAL	312.00	79.87	221.10	216.00	437.10	571.20	0.	571.20	199.20	770.40	1298.40	1207.50	9.72153
MEAN	26.00	6.66	18.42	18.00	36.42	47.60	0.	47.60	16.60	64.20	108.20	100.62	0.81013

*** VOLUME USED FROM INITIAL STORAGE' IN C.M.S.MONTH

PICOREM DAM 0.

KANAN NO.2 DAM 0.

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 1996 (UNIT C.M.S.)

MONTH	KALIWA RIVER: PICOREM DAM-SITE INFLOW	PICOREM DAM-SITE SUPPLY	PICOREM DAM-SITE SPILL	LOWER KALIWA	SUB TOTAL	KANAN RIVER: KANAN NO.2 DAM INFLOW	KANAN NO.2 DAM SUPPLY	KANAN NO.2 DAM SPILL	LOWER KANAN	SUB TOTAL	AGOS NO.1 DAM NATURAL	AGOS NO.1 DAM AVAILA.	AGOS NO.1 DAM K(J)
JAN.	14.97	22.98	0.	15.73	15.73	89.55	1.46	87.24	31.24	118.48	151.49	134.21	0.79116
FEB.	6.61	22.98	0.	9.25	9.25	66.23	1.46	63.67	23.10	86.77	105.19	96.02	0.82843
MAR.	3.55	22.98	0.	6.18	6.18	49.50	1.46	46.77	17.27	64.04	76.50	70.22	0.82051
APR.	2.64	21.77	0.	4.09	4.09	30.99	1.46	28.07	10.80	38.87	48.52	42.96	0.75598
MAY	3.02	19.92	0.	3.93	3.93	26.79	1.46	24.13	9.34	33.47	43.08	37.40	0.73897
JUNE	5.66	19.46	0.	5.20	5.20	25.11	1.46	22.77	8.76	31.53	44.73	36.73	0.66862
JULY	35.33	22.37	0.39	19.64	20.03	8.90	1.46	6.73	3.10	9.83	66.97	29.87	0.38321
AUG.	48.88	22.64	3.36	26.81	30.17	7.98	1.46	5.96	2.78	8.74	86.45	38.90	0.41776
SEP.	44.47	22.98	1.41	25.02	26.48	15.36	1.46	13.17	5.35	18.52	90.25	45.00	0.46370
OCT.	37.57	22.98	3.93	25.50	29.43	62.91	1.46	60.74	21.93	82.67	147.91	112.11	0.67366
NOV.	50.53	22.98	7.44	34.70	42.14	89.27	1.46	87.15	31.13	118.28	205.63	160.42	0.71303
DEC.	58.77	22.98	19.06	39.90	58.96	98.61	1.46	96.44	34.40	130.84	231.68	189.81	0.74557
TOTAL	312.00	267.11	35.59	216.00	251.59	571.20	17.47	542.86	199.20	742.06	1298.40	993.65	8.00059
MEAN	26.00	22.26	2.97	18.00	20.97	47.60	1.46	45.24	16.60	61.84	108.20	82.80	0.66672

*** VOLUME USED FROM INITIAL STORAGE' IN C.M.S.MONTH

PICOREM DAM	0.
KANAN NO.2 DAM	0.

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT — NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 2000 (UNIT C.M.S.)

MONTH	KALIWA RIVER: PICOREM DAM-SITE INFLOW	PICOREM DAM-SITE SUPPLY	PICOREM DAM-SITE SPILL	LOWER KALIWA	SUB TOTAL	KANAN RIVER: KANAN NO.2 DAM INFLOW	KANAN NO.2 DAM SUPPLY	KANAN NO.2 DAM SPILL	LOWER KANAN	SUB TOTAL	AGOS NO.1 DAM NATURAL	AGOS NO.1 DAM AVAILA	AGOS NO.1 DAM K(J)
JAN.	14.97	22.98	0.	15.73	15.73	89.55	23.50	63.00	31.24	94.24	151.49	109.97	0.64826
FEB.	6.61	22.98	0.	9.25	9.25	66.23	23.50	41.73	23.10	64.83	105.19	74.08	0.63914
MAR.	3.55	22.98	0.	6.18	6.18	49.50	23.50	25.46	17.27	42.73	76.50	48.91	0.52148
APR.	2.64	21.77	0.	4.09	4.09	30.99	23.50	8.63	10.80	19.43	48.52	23.52	0.41393
MAY	3.02	19.97	0.	3.93	3.93	26.79	23.50	6.99	9.34	16.33	43.08	20.26	0.40029
JUNE	5.66	19.46	0.	5.20	5.20	25.11	23.50	5.72	8.76	14.48	44.73	19.68	0.35819
JULY	35.33	22.37	0.39	19.64	20.03	8.90	23.50	0.69	3.10	3.79	66.97	23.83	0.30571
AUG.	48.88	22.64	3.36	26.81	30.17	7.98	23.50	0.	2.78	2.78	86.45	32.95	0.35380
SEP.	44.47	22.98	1.41	25.07	26.48	15.36	23.31	0.	5.35	5.35	90.25	31.83	0.32798
OCT.	37.57	22.98	3.93	25.50	29.43	62.91	23.50	11.21	21.93	33.14	147.91	62.57	0.37600
NOV.	50.53	22.98	7.44	34.70	42.14	89.27	23.50	46.81	31.13	77.94	205.63	120.07	0.53369
DEC.	58.77	22.98	19.06	39.90	58.96	98.61	23.50	68.20	34.40	102.60	231.68	161.56	0.63462
TOTAL	312.00	267.11	55.59	216.00	251.59	571.20	281.85	278.44	199.20	477.64	1298.40	729.23	5.56309
MEAN	26.00	22.26	2.97	18.00	20.97	47.60	23.49	23.20	16.60	39.80	108.20	60.77	0.46359

*** VOLUME USED FROM INITIAL STORAGE IN C.M.S.MONTH

PICOREM DAM	0.
KANAN NO.2 DAM	0.

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 2005 (UNIT C.M.S.)

MONTH	KALIWA RIVER: PICOREM DAM-SITE INFLOW	PICOREM DAM-SITE SUPPLY	PICOREM DAM-SITE SPILL	LOWER KALIWA	SUB TOTAL	KANAN RIVER: KANAN NO.2 DAM INFLOW	KANAN NO.2 DAM SUPPLY	KANAN NO.2 DAM SPILL	LOWER KANAN	SUB TOTAL	AGOS NO.1 DAM NATURAL	AGOS NO.1 DAM AVAILA.	AGOS NO.1 DAM KC(J)
JAN.	14.97	22.98	0.	15.73	15.73	89.55	33.07	51.35	31.24	82.59	151.49	98.32	0.57959
FEB.	6.61	22.98	0.	9.25	9.25	66.23	33.07	32.27	23.10	55.37	105.19	64.62	0.55752
MAR.	3.55	22.98	0.	6.18	6.18	49.50	33.07	18.50	17.27	35.77	76.50	41.95	0.49020
APR.	2.64	21.77	0.	4.09	4.09	30.99	32.97	4.17	10.80	14.97	48.52	19.06	0.33543
MAY	3.02	19.97	0.	3.93	3.93	26.79	32.12	3.32	9.34	12.66	43.08	16.59	0.32787
JUNE	5.66	19.46	0.	5.20	5.20	25.11	32.02	2.97	8.76	11.73	44.73	16.93	0.30816
JULY	35.33	22.37	0.39	19.64	20.03	8.90	31.14	0.	3.10	3.10	66.97	23.13	0.29680
AUG.	48.88	22.64	3.36	26.81	30.17	7.98	26.38	0.	2.78	2.78	86.45	32.95	0.35380
SEP.	44.47	22.98	1.41	25.07	26.48	15.36	23.25	0.	5.35	5.35	90.25	31.83	0.32798
OCT.	37.57	22.98	3.93	25.50	29.43	62.91	32.26	2.06	21.93	23.99	147.91	53.42	0.32101
NOV.	50.53	22.98	7.44	34.70	42.14	89.27	33.07	19.44	31.13	50.57	205.63	92.70	0.41204
DEC.	58.77	22.98	19.06	39.90	58.96	98.61	33.07	51.22	34.40	85.62	231.68	144.58	0.56793
TOTAL	312.00	267.11	35.59	216.00	251.59	571.20	375.49	185.31	199.20	584.51	1298.40	636.10	4.87834
MEAN	26.00	22.26	2.97	18.00	20.97	47.60	31.29	15.44	16.60	32.04	108.20	53.01	0.40653

*** VOLUME USED FROM INITIAL STORAGE' IN C.M.S.MONTH

PICOREM DAM	0.
KANAN NO.2 DAM	0.

ESTIMATION OF DISCHARGE SERIES OF AGOS RIVER SYSTEM FOR AGOS H.E. PROJECT — NIPPON KOEI

TABLE OF AVERAGE MONTHLY DISCHARGE OF THE TARGET YEAR 2009 (UNIT C.M.S.)

	KALIWA RIVER					KANAN RIVER					AGOS NO.1 DAM		
	PICOREM DAM-SITE			LOWER	SUB	KANAN NO.2 DAM			LOWER	SUB			
MONTH	INFLOW	SUPPLY	SPILL	KALIWA	TOTAL	INFLOW	SUPPLY	SPILL	KANAN	TOTAL	NATURAL	AVAILA.	K(J)
JAN.	14.97	22.98	0.	15.73	15.73	89.55	38.17	43.55	31.24	74.79	151.49	90.52	0.53361
FEB.	6.61	22.98	0.	9.25	9.25	66.23	38.17	27.31	23.10	50.41	105.19	59.66	0.51466
MAR.	3.55	22.98	0.	6.18	6.18	49.50	32.69	15.71	17.27	32.98	76.50	39.16	0.45763
APR.	2.64	21.77	0.	4.09	4.09	30.99	37.27	2.98	10.80	13.78	48.52	17.87	0.31453
MAY	3.02	19.97	0.	3.93	3.93	26.79	37.02	2.54	9.34	11.88	43.08	15.81	0.34243
JUNE	5.66	19.46	0.	5.20	5.20	25.11	36.52	2.71	8.76	11.47	44.73	16.67	0.30345
JULY	35.33	22.37	0.39	19.64	20.03	8.90	31.79	0.	3.10	3.10	66.97	23.13	0.29480
AUG.	48.88	22.64	3.36	26.81	30.17	7.98	21.37	0.	2.78	2.78	86.45	32.95	0.35380
SEP.	44.47	22.98	1.41	25.07	26.48	15.36	19.66	0.	5.35	5.35	90.25	31.83	0.32798
OCT.	37.57	22.98	3.93	25.50	29.43	62.91	35.93	1.16	21.93	23.09	147.91	52.53	0.31564
NOV.	50.53	22.98	7.44	34.70	42.14	89.27	38.17	10.79	31.13	41.92	205.63	84.06	0.37363
DEC.	58.77	22.98	19.06	39.90	58.96	98.61	57.91	45.05	34.40	79.45	231.68	138.41	0.54369
TOTAL	312.00	267.11	35.59	216.00	251.59	571.20	409.65	151.81	199.20	351.01	1298.40	602.61	4.64786
MEAN	26.00	22.26	2.97	18.00	20.97	47.60	34.14	12.65	16.60	29.25	108.20	50.22	0.38732

*** VOLUME USED FROM INITIAL STORAGE IN C.M.S.MONTH

PICOREM DAM 0.

KANAN NO.2 DAM 0.

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 175.000 LOW WATER LEVEL IN METER 135.000 RATED HEAD IN METER 108.000
INSTALLED CAPACITY IN MW 152.000 DEPENDABLE CAPACITY IN MW 117.209 TARGET OPERATION HOUR A DAY 8.22
RATED DISCHARGE IN CMS 166.992 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	38,750	38,750	38,750	38,750	38,750	38,750	38,750	38,750	38,750	38,750	38,750	38,750

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	152.0	772.92	24.36	18.09	42.44	0.90909	38.59	5095.
1990	152.0	753.70	24.36	17.64	41.99	0.82645	34.71	4969.
1991	152.0	734.48	24.36	17.19	41.54	0.75131	31.21	4843.
1992	152.0	715.26	24.36	16.74	41.10	0.68301	28.07	4717.
1993	152.0	696.04	24.36	16.29	40.65	0.62092	25.24	4590.
1994	152.0	676.82	24.36	15.84	40.20	0.56447	22.69	4464.
1995	152.0	648.20	24.36	15.18	39.54	0.51316	20.29	4279.
1996	152.0	620.57	24.36	14.52	38.88	0.46651	18.14	4093.
1997	152.0	592.44	24.36	13.86	38.22	0.42410	16.21	3907.
1998	152.0	564.31	24.36	13.20	37.56	0.38554	14.48	3722.
1999	152.0	536.18	24.36	12.55	36.90	0.35049	12.93	3536.
2000	152.0	508.05	24.36	11.89	36.25	0.31863	11.55	3350.
2001	152.0	496.74	24.36	11.61	35.97	0.28966	10.42	3272.
2002	152.0	484.42	24.36	11.34	35.69	0.26333	9.40	3194.
2003	152.0	472.60	24.36	11.06	35.42	0.23939	8.48	3116.
2004	152.0	460.79	24.36	10.78	35.14	0.21763	7.65	3038.
2005	152.0	448.97	24.36	10.51	34.86	0.19784	6.90	2960.
2006	152.0	443.67	24.36	10.38	34.74	0.17986	6.25	2925.
2007	152.0	438.37	24.36	10.26	34.62	0.16351	5.66	2890.
2008	152.0	433.06	24.36	10.13	34.49	0.14864	5.13	2855.
2009	152.0	427.76	24.36	10.01	34.37	0.13513	4.64	2820.
2010	152.0	427.76	24.36	10.01	34.37	0.12285	4.22	2820.
.	.	.	.	.	.	.	.	.
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2037	152.0	427.76	24.36	10.01	34.37	0.00937	0.32	2820.
2038	152.0	427.76	24.36	10.01	34.37	0.00852	0.29	2820.
SUMMARY	152.0	486.61	24.36	11.39	35.74	9.91481	382.14	3208.

*** RESULTS OF THE CASE HWL= 175.000 INSTALLED CAPACITY= 152.0 STORED IN DISK FILE A1818-02 NO. 1

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 175.000 LOW WATER LEVEL IN METER 135.000 RATED HEAD IN METER 108.000
INSTALLED CAPACITY IN MW 152.000 DEPENDABLE CAPACITY IN MW 117.209 TARGET-OPERATION-HOUR-A-DAY 8.22
RATED DISCHARGE IN CMS 166.992 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	38.750	38.750	38.750	38.750	38.750	38.750	38.750	38.750	38.750	38.750	38.750	38.750

LENGTH OF INFLOW SERIES IN YEAR 26

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
1989	100.74	1.09	18.52	81.13	141.07	605.85	171.273	39.299	127.826	0.860	151.6	5095.2	465.00	307.92	772.92
1994	82.82	1.08	10.29	71.45	142.12	585.31	170.319	39.272	126.849	0.860	151.5	4464.3	420.75	256.07	676.82
2000	60.79	1.07	6.32	53.40	142.09	583.07	170.233	39.255	126.785	0.860	151.4	3350.2	262.88	245.18	508.05
2005	53.05	1.06	4.63	47.36	142.70	574.81	169.829	39.250	126.337	0.860	151.5	2960.2	248.63	200.35	448.92
2009	50.28	1.06	4.02	45.70	142.96	571.09	169.662	39.249	126.153	0.860	151.5	2820.1	245.25	182.51	427.76

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	46.87	120.11	38.75	47.36	152.00	38.75	48.25	152.00	38.75	48.74	152.00	38.75	49.58	152.00	38.75
1994	42.40	119.89	35.06	42.81	152.00	35.06	43.52	152.00	35.06	44.01	152.00	35.06	44.43	152.00	35.06
2000	26.51	117.93	21.91	26.75	152.00	21.91	27.29	152.00	21.91	27.51	152.00	21.91	27.71	152.00	21.91
2005	25.06	117.98	20.72	25.28	152.00	20.72	25.85	152.00	20.72	26.04	152.00	20.72	26.19	152.00	20.72
2009	24.77	117.46	20.44	24.99	152.00	20.44	25.41	152.00	20.44	25.67	152.00	20.44	25.82	152.00	20.44

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 165.000 LOW WATER LEVEL IN METER 128.000 RATED HEAD IN METER 99.000
INSTALLED CAPACITY IN MW 140.000 DEPENDABLE CAPACITY IN MW 108.944 TARGET OPERATION HOUR A DAY 7.32
RATED DISCHARGE IN CMS 167.791 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	140.0	711.48	22.43	16.65	39.08	0.90909	35.53	5091.
1990	140.0	694.05	22.43	16.24	38.68	0.82645	31.96	4966.
1991	140.0	676.61	22.43	15.83	38.27	0.75131	28.75	4841.
1992	140.0	659.18	22.43	15.42	37.86	0.68301	25.86	4716.
1993	140.0	641.74	22.43	15.02	37.45	0.62092	23.25	4591.
1994	140.0	624.31	22.43	14.61	37.04	0.56447	20.91	4466.
1995	140.0	598.53	22.43	14.01	36.44	0.51316	18.70	4282.
1996	140.0	572.74	22.43	13.40	35.84	0.46651	16.72	4098.
1997	140.0	546.96	22.43	12.80	35.23	0.42410	14.94	3914.
1998	140.0	521.18	22.43	12.20	34.63	0.38554	13.35	3730.
1999	140.0	495.39	22.43	11.59	34.03	0.35049	11.93	3546.
2000	140.0	469.61	22.43	10.99	33.42	0.31863	10.65	3362.
2001	140.0	458.85	22.43	10.74	33.17	0.28966	9.61	3285.
2002	140.0	448.10	22.43	10.49	32.92	0.26333	8.67	3208.
2003	140.0	437.34	22.43	10.23	32.67	0.23939	7.82	3131.
2004	140.0	426.59	22.43	9.98	32.42	0.21763	7.05	3054.
2005	140.0	415.83	22.43	9.73	32.17	0.19784	6.36	2976.
2006	140.0	411.09	22.43	9.62	32.05	0.17986	5.77	2942.
2007	140.0	406.35	22.43	9.51	31.94	0.16351	5.22	2908.
2008	140.0	401.60	22.43	9.40	31.83	0.14864	4.73	2874.
2009	140.0	396.86	22.43	9.29	31.72	0.13513	4.29	2840.
2010	140.0	396.86	22.43	9.29	31.72	0.12285	3.90	2840.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2037	140.0	396.86	22.43	9.29	31.72	0.00937	0.30	2840.
2038	140.0	396.86	22.43	9.29	31.72	0.00852	0.27	2840.
SUMMARY	140.0	450.47	22.43	10.54	32.98	9.91481	352.24	3224.

*** RESULTS OF THE CASE HWL= 165.000 INSTALLED CAPACITY= 140.0 STORED IN DISK FILE A1818=02 NO. 4

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 165.000 LOW WATER LEVEL IN METER 128.000 RATED HEAD IN METER 99.000
INSTALLED CAPACITY IN MW 140.000 DEPENDABLE CAPACITY IN MW 108.944 TARGET OPERATION HOUR A DAY 7.32
RATED DISCHARGE IN CMS 167.791 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781	31,781

LENGTH OF INFLOW SERIES IN YEAR 26

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QQ (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
1989	100.74	0.92	19.39	80.43	139.94	485.73	162.010	39.297	118.663	0.860	139.6	5091.2	381.38	330.11	711.48
1994	82.82	0.92	11.18	70.73	140.58	477.84	161.588	39.268	118.221	0.860	139.7	4466.1	341.63	282.68	624.31
2000	60.79	0.90	6.49	53.41	141.97	455.37	160.324	39.255	116.903	0.860	139.4	3362.1	228.00	241.61	469.61
2005	53.05	0.89	4.76	47.41	142.37	451.53	160.108	39.249	116.652	0.860	139.5	2976.4	215.25	200.58	415.83
2009	50.28	0.89	4.12	45.27	142.42	451.54	160.129	39.247	116.670	0.860	139.6	2839.8	212.25	184.61	396.86

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	41.58	110.55	31.78	42.14	140.00	31.78	43.12	140.00	31.78	43.63	140.00	31.78	44.23	140.00	31.78
1994	37.25	111.37	28.47	37.59	140.00	28.47	38.27	140.00	28.47	38.63	140.00	28.47	39.10	140.00	28.47
2000	24.89	110.09	19.00	25.15	140.00	19.00	25.63	140.00	19.00	25.91	140.00	19.00	26.15	140.00	19.00
2005	23.54	110.56	17.94	23.82	140.00	17.94	24.30	140.00	17.94	24.44	140.00	17.94	24.67	140.00	17.94
2009	23.15	110.36	17.69	23.42	140.00	17.69	23.89	140.00	17.69	24.07	140.00	17.69	24.26	140.00	17.69

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 155.000 LOW WATER LEVEL IN METER 121.000 RATED HEAD IN METER 91.000
INSTALLED CAPACITY IN MW 128.000 DEPENDABLE CAPACITY IN MW 99.317 TARGET OPERATION HOUR A DAY 6.58
RATED DISCHARGE IN CMS 166.895 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	26.125	26.125	26.125	26.125	26.125	26.125	26.125	26.125	26.125	26.125	26.125	26.125

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 90.0

D.HOUR / YEAR	KW VALUE IN US D.	KWH VALUE IN US D.
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	128.0	651.80	20.51	15.25	35.76	0.90909	32.51	5102.
1990	128.0	635.99	20.51	14.88	35.39	0.82645	29.25	4978.
1991	128.0	620.17	20.51	14.51	35.02	0.75131	26.31	4853.
1992	128.0	604.36	20.51	14.14	34.65	0.68301	23.67	4729.
1993	128.0	588.55	20.51	13.77	34.28	0.62092	21.29	4605.
1994	128.0	572.73	20.51	13.40	33.91	0.56447	19.14	4481.
1995	128.0	549.03	20.51	12.85	33.36	0.51316	17.12	4296.
1996	128.0	525.32	20.51	12.29	32.80	0.46651	15.30	4110.
1997	128.0	501.61	20.51	11.74	32.25	0.42410	13.68	3925.
1998	128.0	477.91	20.51	11.18	31.70	0.38554	12.22	3740.
1999	128.0	454.20	20.51	10.63	31.14	0.35049	10.91	3554.
2000	128.0	430.49	20.51	10.07	30.59	0.31863	9.75	3369.
2001	128.0	420.67	20.51	9.84	30.36	0.28966	8.79	3293.
2002	128.0	410.85	20.51	9.61	30.13	0.26333	7.93	3217.
2003	128.0	401.03	20.51	9.38	29.90	0.23939	7.16	3140.
2004	128.0	391.21	20.51	9.15	29.67	0.21763	6.46	3064.
2005	128.0	381.39	20.51	8.92	29.44	0.19784	5.82	2988.
2006	128.0	377.20	20.51	8.83	29.34	0.17986	5.28	2955.
2007	128.0	373.00	20.51	8.73	29.24	0.16351	4.78	2921.
2008	128.0	368.80	20.51	8.63	29.14	0.14864	4.33	2888.
2009	128.0	364.60	20.51	8.53	29.04	0.13513	3.92	2854.
2010	128.0	364.60	20.51	8.53	29.04	0.12285	3.57	2854.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2037	128.0	364.60	20.51	8.53	29.04	0.00937	0.27	2854.
2038	128.0	364.60	20.51	8.53	29.04	0.00852	0.25	2854.
SUMMARY	128.0	413.49	20.51	9.68	30.19	9.91481	322.41	3237.

*** RESULTS OF THE CASE HWL= 155.000 INSTALLED CAPACITY= 128.0 STORED IN DISK FILE A1818-02 NO. 7

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 155.000 LOW WATER LEVEL IN METER 121.000 RATED HEAD IN METER 91.000
INSTALLED CAPACITY IN MW 178.000 DEPENDABLE CAPACITY IN MW 99.317 TARGET OPERATION HOUR A DAY 6.58
RATED DISCHARGE IN CMS 166.895 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	26,125	26,125	26,125	26,125	26,125	26,125	26,125	26,125	26,125	26,125	26,125	26,125

LENGTH OF INFLOW SERIES IN YEAR 26

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG* (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
1989	100.74	0.77	19.97	80.00	138.86	384.15	152.548	39.295	109.278	0.860	127.6	5101.7	313.50	338.30	651.80
1994	82.82	0.77	11.67	70.38	139.35	329.60	152.258	39.264	109.000	0.860	127.7	4481.1	278.25	294.48	572.73
2000	60.79	0.75	6.76	53.28	141.72	354.61	150.595	39.255	107.202	0.860	127.6	3369.1	195.75	234.74	430.49
2005	53.05	0.74	4.90	47.42	142.25	347.53	150.068	39.250	106.645	0.860	127.4	2988.0	186.25	194.64	381.39
2009	50.28	0.74	4.23	45.31	142.17	349.81	150.253	39.246	106.838	0.860	127.5	2854.2	184.13	180.47	364.60

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	37.23	99.62	26.12	37.73	128.00	26.13	38.55	128.00	26.13	39.10	128.00	26.13	39.89	128.00	26.13
1994	33.04	100.57	23.19	33.34	128.00	23.19	34.07	128.00	23.19	34.42	128.00	23.19	34.92	128.00	23.19
2000	23.25	100.71	16.31	23.51	128.00	16.31	23.99	128.00	16.31	24.27	128.00	16.31	24.54	128.00	16.31
2005	22.30	101.60	15.56	22.43	126.25	15.56	23.01	128.00	15.56	23.16	128.00	15.56	23.44	128.00	15.56
2009	21.89	102.22	15.34	22.09	128.00	15.34	22.61	128.00	15.34	22.77	128.00	15.34	22.97	128.00	15.34

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 145.000 LOW WATER LEVEL IN METER 114.000 RATED HEAD IN METER 82.500
INSTALLED CAPACITY IN MW 116.000 DEPENDABLE CAPACITY IN MW 90.368 TARGET OPERATION HOUR A DAY 5.88
RATED DISCHARGE IN CMS 166.832 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 90.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.26	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1989	116.0	592.25	18.59	13.87	32.46	0.90909	29.51	5117.
1990	116.0	578.46	18.59	13.54	32.12	0.82645	26.55	4993.
1991	116.0	564.16	18.59	13.20	31.79	0.75131	23.88	4870.
1992	116.0	549.87	18.59	12.87	31.46	0.68301	21.48	4747.
1993	116.0	535.58	18.59	12.53	31.12	0.62092	19.32	4623.
1994	116.0	521.29	18.59	12.20	30.79	0.56447	17.38	4500.
1995	116.0	499.90	18.59	11.20	30.29	0.51316	15.54	4315.
1996	116.0	478.52	18.59	11.20	29.79	0.46651	13.90	4131.
1997	116.0	457.13	18.59	10.20	29.29	0.42410	12.42	3946.
1998	116.0	435.74	18.59	10.20	28.79	0.38554	11.10	3761.
1999	116.0	414.35	18.59	9.70	28.28	0.35049	9.91	3577.
2000	116.0	392.96	18.59	9.20	27.78	0.31863	8.85	3392.
2001	116.0	383.92	18.59	8.98	27.57	0.28966	7.99	3314.
2002	116.0	374.89	18.59	8.77	27.36	0.26333	7.21	3237.
2003	116.0	365.85	18.59	8.56	27.15	0.23939	6.50	3159.
2004	116.0	356.81	18.59	8.35	26.94	0.21763	5.86	3082.
2005	116.0	347.77	18.59	8.14	26.73	0.19784	5.29	3004.
2006	116.0	343.93	18.59	8.05	26.64	0.17986	4.79	2971.
2007	116.0	340.09	18.59	7.96	26.55	0.16351	4.34	2938.
2008	116.0	336.25	18.59	7.87	26.46	0.14864	3.93	2905.
2009	116.0	332.41	18.59	7.78	26.37	0.13513	3.56	2872.
2010	116.0	332.41	18.59	7.78	26.37	0.12285	3.24	2872.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2037	116.0	332.41	18.59	7.78	26.37	0.00937	0.25	2872.
2038	116.0	332.41	18.59	7.78	26.37	0.00852	0.22	2872.
SUMMARY	116.0	376.85	18.59	8.82	27.41	9.91481	292.71	3255.

*** RESULTS OF THE CASE HWL= 145.000 INSTALLED CAPACITY= 116.0 STORED IN DISK FILE A1818-02 NO. 10

** RESERVOIR OPERATION STUDY OF AGOS DAM ** PLAN A-2 KANAN HWL 295 NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 145.000 LOW WATER LEVEL IN METER 114.000 RATED HEAD IN METER 82.500
INSTALLED CAPACITY IN MW 116.000 DEPENDABLE CAPACITY IN MW 90.368 TARGET OPERATION HOUR A DAY 5.88
RATED DISCHARGE IN CMS 166.832 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156	21,156

LENGTH OF INFLOW SERIES IN YEAR 26

*** SUMMARY OF RESERVOIR OPERATION STUDY FOR EACH TARGET YEAR ***

YEAR	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
1989	100.74	0.64	20.50	79.59	137.67	303.11	143.117	39.291	99.924	0.860	115.7	5116.6	253.88	338.87	592.75
1994	82.82	0.64	12.06	70.13	138.25	298.22	142.735	39.261	99.551	0.860	115.7	4500.1	227.25	294.04	521.29
2000	60.79	0.63	7.06	53.10	140.25	283.29	141.536	39.250	98.231	0.860	115.7	3391.9	156.38	236.59	392.96
2005	53.05	0.62	5.08	47.36	141.71	271.35	140.549	39.248	97.165	0.860	115.5	3004.2	156.38	191.39	347.77
2009	50.28	0.62	4.35	45.31	141.66	271.25	140.532	39.245	97.155	0.860	115.5	2872.4	155.25	177.16	332.41

*** DEPENDABLE DISCHARGE & POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1989	33.26	92.59	21.16	33.74	116.00	21.16	34.55	116.00	21.16	35.25	116.00	21.16	36.56	116.00	21.16
1994	29.63	91.11	18.94	29.96	116.00	18.94	30.66	116.00	18.94	31.15	116.00	18.94	31.82	116.00	18.94
2000	20.41	91.28	13.03	20.68	116.00	13.03	21.10	116.00	13.03	21.34	116.00	13.03	21.64	116.00	13.03
2005	20.47	91.28	13.03	20.69	115.46	13.03	21.18	116.00	13.03	21.35	116.00	13.03	21.65	116.00	13.03
2009	20.22	92.89	12.94	20.50	116.00	12.94	20.97	116.00	12.94	21.17	116.00	12.94	21.40	116.00	12.94

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 106.200
INSTALLED CAPACITY IN MW 138.000 DEPENDABLE CAPACITY IN MW 114.503 TARGET OPERATION HOUR A DAY 4.66
RATED DISCHARGE IN CMS 154.181 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH OF OPERATION (M US D)	OPERATION HOUR (H)
1994	138.0	411.62	22.11	9.63	31.75	0.90909	28.86	2986.
1995	138.0	411.62	22.11	9.63	31.75	0.82645	26.24	2986.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	138.0	411.62	22.11	9.63	31.75	0.00937	0.30	2986.
2043	138.0	411.62	22.11	9.63	31.75	0.00852	0.27	2986.
SUMMARY	138.0	411.62	22.11	9.63	31.75	9.91481	314.76	2986.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 106.200
INSTALLED CAPACITY IN MW 138.000 DEPENDABLE CAPACITY IN MW 114.503 TARGET OPERATION HOUR A DAY 4.66
RATED DISCHARGE IN CMS 154.181 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938	19,938

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.93	1.70	82.55	133.02	443.57	299.185	175.000	123.152	0.860	138.0	464.0	19.94	44.09	64.03
FEB.	66.23	1.21	0.	64.82	132.61	444.07	299.522	175.000	123.495	0.860	138.0	329.2	19.94	25.49	45.43
MAR.	49.50	1.40	0.	48.84	132.64	442.09	299.490	175.000	123.462	0.860	138.0	274.5	19.94	17.95	37.88
APR.	30.99	1.60	0.	32.89	132.94	433.02	299.220	175.000	123.188	0.860	138.0	178.4	19.94	4.68	24.61
MAY	26.79	1.30	0.	31.69	133.63	416.41	298.608	175.000	122.569	0.860	138.0	176.8	19.94	4.47	24.40
JUNE	25.11	0.93	0.	31.60	134.75	397.18	297.647	175.000	121.586	0.860	138.0	169.4	19.94	3.43	23.37
JULY	8.90	0.72	0.	27.11	136.93	346.47	295.805	175.000	119.708	0.860	138.0	147.4	19.94	0.41	20.34
AUG.	7.98	0.54	0.	27.27	140.10	293.36	292.948	175.000	116.800	0.860	137.7	144.8	19.94	0.	19.94
SEP.	15.36	0.66	0.	28.87	142.68	256.65	290.295	175.000	114.103	0.860	137.0	145.6	19.94	0.	19.94
OCT.	62.91	0.65	0.67	34.06	141.07	330.37	291.500	175.000	115.512	0.860	137.0	181.7	19.94	4.97	24.91
NOV.	89.27	0.66	0.80	59.73	135.97	403.14	295.726	175.000	119.972	0.860	137.2	320.8	19.94	24.20	44.14
DEC.	98.61	0.76	6.15	80.98	134.06	431.86	298.200	175.000	122.276	0.860	137.9	453.9	19.94	42.69	62.62
MEAN	47.53	0.94	0.79	45.80	135.88	386.20	296.496	175.000	120.469	0.860	137.7	2986.5	239.25	172.37	411.62

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 5 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 2 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 12-TH MONTH LOWEST POWER 116.4 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	25.67	116.39	19.94	25.84	138.00	19.94	26.19	138.00	19.94	26.50	138.00	19.94	26.64	138.00	19.94

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 165.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 116.200
INSTALLED CAPACITY IN MW 149.000 DEPENDABLE CAPACITY IN MW 122.016 TARGET OPERATION HOUR A DAY 4.61
RATED DISCHARGE IN CMS 152.144 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	149.0	439.20	23.88	10.28	34.15	0.90909	31.05	2953.
1995	149.0	439.20	23.88	10.28	34.15	0.82645	28.23	2953.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	149.0	439.20	23.88	10.28	34.15	0.00937	0.32	2953.
2043	149.0	439.20	23.88	10.28	34.15	0.00852	0.29	2953.
SUMMARY	149.0	439.20	23.88	10.28	34.15	9.91481	338.64	2953.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 165.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 116.200
INSTALLED CAPACITY IN MW 149.000 DEPENDABLE CAPACITY IN MW 122.016 TARGET OPERATION HOUR A DAY 4.61
RATED DISCHARGE IN CMS 152.144 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313	21,313

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	QZ4 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	F.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.93	1.59	82.66	134.77	443.55	299.185	165.000	131.233	0.860	149.0	458.5	21.31	47.01	68.32
FEB.	66.23	1.21	0.	64.82	134.37	444.03	299.520	165.000	131.587	0.860	149.0	324.9	21.31	27.10	48.41
MAR.	49.50	1.40	0.	48.86	134.40	442.00	299.487	165.000	131.552	0.860	149.0	271.0	21.31	19.07	40.38
APR.	30.99	1.60	0.	32.94	134.70	432.81	299.213	165.000	131.264	0.860	149.0	176.3	21.31	4.95	26.26
MAY	26.79	1.30	0.	31.72	135.38	416.13	298.595	165.000	130.620	0.860	149.0	174.7	21.31	4.71	26.03
JUNE	25.11	0.93	0.	31.66	136.49	396.75	297.629	165.000	129.599	0.860	149.0	167.5	21.31	3.64	24.96
JULY	8.90	0.72	0.	27.17	138.62	345.89	295.778	165.000	127.651	0.860	149.0	145.9	21.31	0.43	21.74
AUG.	7.98	0.54	0.	27.31	141.38	292.68	292.913	165.000	124.661	0.860	148.4	143.7	21.31	0.	21.31
SEP.	15.36	0.66	0.	28.88	143.91	255.93	290.254	165.000	121.885	0.860	147.7	144.5	21.31	0.	21.31
OCT.	62.91	0.65	0.63	34.05	142.10	329.80	291.463	165.000	123.347	0.860	147.5	180.1	21.31	5.27	26.58
NOV.	89.27	0.66	0.75	59.64	137.48	402.94	295.709	165.000	127.951	0.860	148.0	316.4	21.31	25.66	46.97
DEC.	98.61	0.76	5.85	81.21	135.62	431.86	298.195	165.000	130.329	0.860	148.8	449.3	21.31	45.61	66.92
MEAN	47.53	0.94	0.75	45.84	137.45	385.88	296.479	165.000	128.457	0.860	148.6	2952.8	255.75	183.45	439.20

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 6 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 12-TH MONTH LOWEST POWER 123.7 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	25.75	123.73	21.31	25.92	149.00	21.31	26.27	149.00	21.31	26.56	149.00	21.31	26.71	149.00	21.31

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 155.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 124.000
INSTALLED CAPACITY IN MW 158.000 DEPENDABLE CAPACITY IN MW 131.518 TARGET OPERATION HOUR A DAY 4.64
RATED DISCHARGE IN CMS 151.186 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	158.0	466.85	25.32	10.92	36.24	0.90909	32.95	2959.
1995	158.0	466.85	25.32	10.92	36.24	0.82645	29.95	2959.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	158.0	466.85	25.32	10.92	36.24	0.00937	0.34	2959.
2043	158.0	466.85	25.32	10.92	36.24	0.00852	0.31	2959.
SUMMARY	158.0	466.85	25.32	10.92	36.24	9.91481	359.35	2959.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 155.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 124.000
INSTALLED CAPACITY IN MW 158.000 DEPENDABLE CAPACITY IN MW 131.518 TARGET OPERATION HOUR A DAY 4.64
RATED DISCHARGE IN CMS 151.186 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719	22,719

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.93	1.60	82.66	134.48	443.52	299.184	155.000	139.464	0.860	158.0	459.4	22.72	49.87	72.59
FEB.	66.23	1.21	0.	64.83	134.09	443.99	299.518	155.000	139.827	0.860	158.0	325.6	22.72	28.73	51.45
MAR.	49.50	1.40	0.	48.88	134.12	441.89	299.483	155.000	139.788	0.860	158.0	271.7	22.72	20.21	42.93
APR.	30.99	1.60	0.	32.99	134.42	432.58	299.204	155.000	139.486	0.860	158.0	176.9	22.72	5.23	27.95
MAY	26.79	1.30	0.	31.75	135.08	415.83	298.582	155.000	138.819	0.860	158.0	175.2	22.72	4.96	27.68
JUNE	25.11	0.93	0.	31.72	136.15	396.31	297.609	155.000	137.766	0.860	158.0	168.2	22.72	3.85	26.57
JULY	8.90	0.72	0.	27.22	138.20	345.30	295.750	155.000	135.758	0.860	158.0	146.7	22.72	0.45	23.17
AUG.	7.98	0.54	0.	27.34	140.88	291.99	292.876	155.000	132.690	0.860	157.4	144.4	22.72	0.	22.72
SEP.	15.36	0.66	0.	28.89	143.33	255.22	290.213	155.000	129.845	0.860	156.7	145.1	22.72	0.	22.72
OCT.	62.91	0.65	0.63	34.00	141.60	329.21	291.425	155.000	131.348	0.860	156.5	180.4	22.72	5.54	28.26
NOV.	89.27	0.66	0.76	59.48	137.12	402.74	295.690	155.000	136.083	0.860	157.0	316.3	22.72	27.08	49.80
DEC.	98.61	0.76	5.89	81.10	135.31	431.84	298.190	155.000	138.531	0.860	157.8	449.7	22.72	48.30	71.02
MEAN	47.53	0.94	0.75	45.83	137.08	385.55	296.461	155.000	136.600	0.860	157.6	2959.4	272.63	194.22	466.85

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 6 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 12-TH MONTH LOWEST POWER 133.1 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	25.82	133.09	22.72	25.99	158.00	22.72	26.35	158.00	22.72	26.62	158.00	22.72	26.78	158.00	22.72

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 145.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 134.000
INSTALLED CAPACITY IN MW 168.000 DEPENDABLE CAPACITY IN MW 142.112 TARGET OPERATION HOUR A DAY 4.70
RATED DISCHARGE IN CMS 148.758 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	168.0	500.75	26.92	11.72	38.64	0.90909	35.13	2985.
1995	168.0	500.75	26.92	11.72	38.64	0.82645	31.93	2985.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	168.0	500.75	26.92	11.72	38.64	0.00937	0.36	2985.
2043	168.0	500.75	26.92	11.72	38.64	0.00852	0.33	2985.
SUMMARY	168.0	500.75	26.92	11.72	38.64	9.91481	383.10	2985.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 145.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 300.000 LOW WATER LEVEL IN METER 270.000 RATED HEAD IN METER 134.000
INSTALLED CAPACITY IN MW 168.000 DEPENDABLE CAPACITY IN MW 142.112 TARGET OPERATION HOUR A DAY 4.70
RATED DISCHARGE IN CMS 148.758 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469	24.469

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.93	1.67	82.59	133.32	443.66	299.191	145.000	149.568	0.860	168.0	462.8	24.47	53.29	77.76
FEB.	66.23	1.21	0.	64.84	132.97	444.10	299.525	145.000	149.926	0.860	168.0	328.3	24.47	30.69	55.16
MAR.	49.50	1.40	0.	48.91	133.00	441.93	299.487	145.000	149.885	0.860	168.0	274.1	24.47	21.58	46.05
APR.	30.99	1.60	0.	33.05	133.28	432.45	299.202	145.000	149.580	0.860	168.0	178.7	24.47	5.56	30.03
MAY	26.79	1.30	0.	31.81	133.89	415.54	298.573	145.000	148.910	0.860	168.0	177.1	24.47	5.28	29.75
JUNE	25.11	0.93	0.	31.78	134.88	395.85	297.591	145.000	147.854	0.860	168.0	170.1	24.47	4.10	28.57
JULY	8.90	0.72	0.	27.28	136.77	344.71	295.724	145.000	145.851	0.860	168.0	148.5	24.47	0.47	24.94
AUG.	7.98	0.54	0.	27.36	139.25	291.36	292.844	145.000	142.794	0.860	167.4	146.2	24.47	0.	24.47
SEP.	15.36	0.66	0.	28.86	141.50	254.67	290.183	145.000	139.969	0.860	166.8	146.8	24.47	0.	24.47
OCT.	62.91	0.65	0.65	33.89	139.94	328.91	291.406	145.000	141.470	0.860	166.6	181.8	24.47	5.85	30.32
NOV.	89.27	0.66	0.81	59.31	135.78	402.75	295.692	145.000	146.202	0.860	167.1	318.2	24.47	28.83	53.30
DEC.	98.61	0.76	6.07	80.87	134.10	431.97	298.198	145.000	148.638	0.860	167.8	452.2	24.47	51.47	75.94
MEAN	47.53	0.94	0.78	45.81	135.74	385.33	296.452	145.000	146.703	0.860	167.6	2984.8	293.63	207.12	500.75

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 6 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 7-TH MONTH TO 20-TH YEAR 12-TH MONTH LOWEST POWER 143.8 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0	% DEPENDABLE		95.0	% DEPENDABLE		90.0	% DEPENDABLE		85.0	% DEPENDABLE		80.0	% DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	25.94	143.83	24.47	26.10	168.00	24.47	26.45	168.00	24.47	26.69	168.00	24.47	26.86	168.00	24.47

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 96.600
INSTALLED CAPACITY IN MW 127.000 DEPENDABLE CAPACITY IN MW 103.241 TARGET OPERATION HOUR A DAY 4.33
RATED DISCHARGE IN CMS 155.992 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	65.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	127.0	380.66	20.35	8.91	29.26	0.90909	26.60	3001.
1995	127.0	380.66	20.35	8.91	29.26	0.82645	24.18	3001.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	127.0	380.66	20.35	8.91	29.26	0.00937	0.27	3001.
2043	127.0	380.66	20.35	8.91	29.26	0.00852	0.25	3001.
SUMMARY	127.0	380.66	20.35	8.91	29.26	9.914R1	290.10	3001.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 96.600
INSTALLED CAPACITY IN MW 127.000 DEPENDABLE CAPACITY IN MW 103.241 TARGET OPERATION HOUR A DAY 4.33
RATED DISCHARGE IN CMS 155.992 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063	17,063

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.75	1.74	83.31	132.47	346.00	289.484	175.000	113.798	0.860	127.0	469.4	17.06	42.56	59.62
FEB.	66.23	0.97	0.	64.92	132.07	346.83	289.810	175.000	114.104	0.860	127.0	330.7	17.06	24.93	41.99
MAR.	49.50	1.13	0.	48.50	132.04	346.49	289.831	175.000	114.125	0.860	127.0	273.5	17.06	17.67	34.73
APR.	30.99	1.29	0.	32.70	132.33	338.73	289.588	175.000	113.878	0.860	127.0	178.1	17.06	5.55	22.61
MAY	26.79	1.04	0.	30.93	133.12	324.85	288.931	175.000	113.215	0.860	127.0	173.2	17.06	4.94	22.00
JUNE	25.11	0.74	0.	30.40	134.31	309.20	287.974	175.000	112.242	0.860	127.0	163.5	17.06	3.71	20.77
JULY	8.90	0.57	0.	25.40	136.89	263.49	285.946	175.000	110.186	0.860	127.0	138.2	17.06	0.49	17.55
AUG.	7.98	0.42	0.	25.51	141.19	215.41	282.666	175.000	106.856	0.860	126.9	134.4	17.06	0.	17.06
SEP.	15.36	0.50	0.	27.18	144.67	183.46	279.588	175.000	103.738	0.860	126.2	135.2	17.06	0.	17.06
OCT.	62.91	0.51	0.80	34.70	141.70	255.52	281.299	175.000	105.730	0.860	125.9	185.3	17.06	6.30	23.36
NOV.	89.27	0.53	1.23	65.59	135.89	312.34	286.023	175.000	110.547	0.860	126.2	353.6	17.06	27.72	44.79
DEC.	98.61	0.61	6.35	82.84	133.69	335.93	288.475	175.000	112.885	0.860	127.0	465.5	17.06	42.05	59.11
MEAN	47.53	0.75	0.86	45.92	135.88	297.92	286.618	175.000	110.925	0.860	126.8	3000.6	204.75	175.91	380.66

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 4 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 105.9 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	23.82	105.88	17.06	24.00	127.00	17.06	24.32	127.00	17.06	24.63	127.00	17.06	24.83	127.00	17.06

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 165.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 106.200
INSTALLED CAPACITY IN MW 138.000 DEPENDABLE CAPACITY IN MW 114.503 TARGET OPERATION HOUR A DAY 4.35
RATED DISCHARGE IN CMS 154.181 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	18.625	18.625	16.625	18.625	18.625	18.625	18.625	18.625	18.625	18.625	18.625	18.625

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	138.0	413.49	22.11	9.68	31.79	0.90909	28.90	2999.
1995	138.0	413.49	22.11	9.68	31.79	0.82645	26.27	2999.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	138.0	413.49	22.11	9.68	31.79	0.00937	0.30	2999.
2043	138.0	413.49	22.11	9.68	31.79	0.00852	0.27	2999.
SUMMARY	138.0	413.49	22.11	9.68	31.79	9.91481	315.19	2999.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 165.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 106.200
INSTALLED CAPACITY IN MW 138.000 DEPENDABLE CAPACITY IN MW 114.503 TARGET OPERATION HOUR A DAY 4.35
RATED DISCHARGE IN CMS 154.181 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	18,625	18,625	18,625	18,625	18,625	18,625	18,625	18,625	18,625	18,625	18,625	18,625

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.75	1.72	83.35	132.64	345.99	289.486	165.000	123.481	0.860	138.0	468.9	18.63	46.08	64.71
FEB.	66.23	0.97	0.	64.93	132.28	346.79	289.809	165.000	123.787	0.860	138.0	330.2	18.63	26.94	45.56
MAR.	49.50	1.13	0.	48.53	132.26	346.36	289.826	165.000	123.804	0.860	138.0	273.2	18.63	19.08	37.70
APR.	30.99	1.29	0.	32.78	132.54	338.40	289.573	165.000	123.546	0.860	138.0	178.2	18.63	5.97	24.59
MAY	26.79	1.04	0.	31.02	133.28	324.29	288.904	165.000	122.867	0.860	138.0	173.5	18.63	5.32	23.94
JUNE	25.11	0.74	0.	30.46	134.40	308.50	287.931	165.000	121.875	0.860	138.0	163.7	18.63	3.96	22.59
JULY	8.90	0.57	0.	25.48	136.80	262.56	285.889	165.000	119.794	0.860	138.0	138.7	18.63	0.52	19.14
AUG.	7.98	0.42	0.	25.55	140.75	214.38	282.592	165.000	116.432	0.860	137.9	135.0	18.63	0.	18.63
SEP.	15.36	0.50	0.	27.16	143.94	182.49	279.508	165.000	113.295	0.860	137.2	135.8	18.63	0.	18.63
OCT.	62.91	0.51	0.78	34.56	141.20	254.96	281.238	165.000	115.315	0.860	136.9	184.9	18.63	6.72	25.35
NOV.	89.27	0.53	1.22	65.40	135.82	312.30	286.007	165.000	120.202	0.860	137.2	352.3	18.63	29.87	48.50
DEC.	98.61	0.61	6.30	82.86	133.76	335.97	288.477	165.000	122.566	0.860	138.0	464.9	18.63	45.53	64.16
MEAN	47.53	0.75	0.85	45.93	135.83	297.48	286.586	165.000	120.563	0.860	137.8	2999.3	223.50	189.99	413.49

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 4 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 116.8 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	23.97	116.80	18.62	24.14	138.00	18.63	24.44	138.00	18.63	24.76	138.00	18.63	24.95	138.00	18.63

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 155.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 114.200
INSTALLED CAPACITY IN MW 147.000 DEPENDABLE CAPACITY IN MW 120.340 TARGET OPERATION HOUR A DAY 4.31
RATED DISCHARGE IN CMS 152.731 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	19.625	19.625	19.625	19.625	19.625	19.625	19.625	19.625	19.625	19.625	19.625	19.625

LENGTH OF INFLOW SERIES IN YEAR 76

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	146.7	435.81	23.51	10.20	33.71	0.90909	30.64	2970.
1995	146.7	435.81	23.51	10.20	33.71	0.82645	27.86	2970.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
2042	146.7	435.81	23.51	10.20	33.71	0.00937	0.32	2970.
2043	146.7	435.81	23.51	10.20	33.71	0.00852	0.29	2970.
SUMMARY	146.7	435.81	23.51	10.20	33.71	9.91481	334.22	2970.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 155.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 114.200
INSTALLED CAPACITY IN MW 147.000 DEPENDABLE CAPACITY IN MW 120.340 TARGET OPERATION HOUR A DAY 4.31
RATED DISCHARGE IN CMS 152.731 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	19,625	19,625	19,625	19,625	19,625	19,625	19,625	19,625	19,625	19,625	19,625	19,625

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.75	1.61	83.47	134.17	345.94	289.484	155.000	130.037	0.860	147.0	464.3	19.63	48.62	68.25
FEB.	66.23	0.97	0.	64.93	133.80	346.74	289.806	155.000	130.365	0.860	147.0	326.4	19.63	28.36	47.98
MAR.	49.50	1.13	0.	48.54	133.77	346.30	289.823	155.000	130.384	0.860	147.0	270.1	19.63	20.09	39.71
APR.	30.99	1.29	0.	32.77	134.06	338.35	289.570	155.000	130.112	0.860	147.0	176.2	19.63	6.27	25.90
MAY	26.79	1.04	0.	31.03	134.82	324.21	288.900	155.000	129.391	0.860	147.0	171.6	19.63	5.60	25.22
JUNE	25.11	0.74	0.	30.47	135.96	308.39	287.925	155.000	128.336	0.860	147.0	161.9	19.63	4.17	23.79
JULY	8.90	0.57	0.	25.50	138.41	262.39	285.879	155.000	126.119	0.860	147.0	137.2	19.63	0.54	20.17
AUG.	7.98	0.42	0.	25.58	142.21	214.14	282.575	155.000	122.549	0.860	146.7	133.8	19.63	0.	19.63
SEP.	15.36	0.50	0.	27.18	144.96	182.19	279.484	155.000	119.262	0.860	145.5	135.0	19.63	0.	19.63
OCT.	62.91	0.51	0.75	34.59	142.22	254.70	281.214	155.000	121.405	0.860	145.2	183.5	19.63	7.08	26.70
NOV.	89.27	0.53	1.14	65.41	137.04	312.20	285.995	155.000	126.573	0.860	145.9	348.6	19.63	31.45	51.08
DEC.	98.61	0.61	6.04	83.10	135.23	335.95	288.475	155.000	129.062	0.860	146.9	461.0	19.63	48.13	67.76
MEAN	47.53	0.75	0.81	45.97	137.24	297.36	286.577	155.000	126.948	0.860	146.6	2969.5	235.50	200.31	435.81

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 4 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 6 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 122.4 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0	% DEPENDABLE		95.0	% DEPENDABLE		90.0	% DEPENDABLE		85.0	% DEPENDABLE		80.0	% DEPENDABLE	
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	23.98	122.42	19.62	24.15	146.72	19.63	24.45	147.00	19.63	24.78	147.00	19.63	24.97	147.00	19.63

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 145.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 122.000
INSTALLED CAPACITY IN MW 157.000 DEPENDABLE CAPACITY IN MW 130.653 TARGET OPERATION HOUR A DAY 4.30
RATED DISCHARGE IN CMS 152.692 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	156.7	463.78	25.11	10.85	35.97	0.90909	32.70	2958.
1995	156.7	463.78	25.11	10.85	35.97	0.82645	29.72	2958.
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2042	156.7	463.78	25.11	10.85	35.97	0.00937	0.34	2958.
2043	156.7	463.78	25.11	10.85	35.97	0.00852	0.31	2958.
SUMMARY	156.7	463.78	25.11	10.85	35.97	9.91481	356.59	2958.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 145.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 290.000 LOW WATER LEVEL IN METER 260.000 RATED HEAD IN METER 122.000
INSTALLED CAPACITY IN MW 157.000 DEPENDABLE CAPACITY IN MW 130.653 TARGET OPERATION HOUR A DAY 4.30
RATED DISCHARGE IN CMS 152.692 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938	20.938

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	Q.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.75	1.59	83.49	134.75	345.90	289.482	145.000	138.280	0.860	157.0	462.4	20.94	51.65	72.59
FEB.	66.23	0.97	0.	64.94	134.39	346.69	289.803	145.000	138.618	0.860	157.0	325.0	20.94	30.09	51.03
MAR.	49.50	1.13	0.	48.55	134.37	346.20	289.818	145.000	138.635	0.860	157.0	269.0	20.94	21.30	42.24
APR.	30.99	1.29	0.	32.81	134.65	338.16	289.561	145.000	138.352	0.860	157.0	175.6	20.94	6.63	27.57
MAY	26.79	1.04	0.	31.08	135.39	323.89	288.884	145.000	137.605	0.860	157.0	171.1	20.94	5.92	26.86
JUNE	25.11	0.74	0.	30.51	136.51	307.96	287.900	145.000	136.516	0.860	157.0	161.4	20.94	4.41	25.34
JULY	8.90	0.57	0.	25.55	138.89	261.83	285.844	145.000	134.232	0.860	157.0	137.0	20.94	0.57	21.51
AUG.	7.98	0.42	0.	25.61	142.56	213.48	282.529	145.000	130.561	0.860	156.7	133.6	20.94	0.	20.94
SEP.	15.36	0.50	0.	27.18	145.23	181.53	279.430	145.000	127.199	0.860	155.5	134.7	20.94	0.	20.94
OCT.	62.91	0.50	0.75	34.53	142.60	254.74	281.169	145.000	129.404	0.860	155.2	182.6	20.94	7.46	28.40
NOV.	89.27	0.53	1.11	65.31	137.57	312.10	285.978	145.000	134.722	0.860	155.9	346.6	20.94	33.31	54.24
DEC.	98.61	0.61	5.93	83.18	135.78	335.93	288.471	145.000	137.278	0.860	156.9	459.4	20.94	51.18	72.12
MEAN	47.53	0.75	0.79	45.98	137.74	297.06	286.555	145.000	135.098	0.860	156.6	2958.5	251.25	212.53	463.78

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 4 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 6 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 132.5 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	24.06	137.45	20.94	24.23	156.71	20.94	24.52	157.00	20.94	24.86	157.00	20.94	25.05	157.00	20.94

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 280.000 LOW WATER LEVEL IN METER 250.000 RATED HEAD IN METER 86.600
INSTALLED CAPACITY IN MW 115.000 DEPENDABLE CAPACITY IN MW 91.192 TARGET OPERATION HOUR A DAY 3.79
RATED DISCHARGE IN CMS 157.563 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500

LENGTH OF INFLOW SERIES IN YEAR 26

*** BENEFIT CALCULATION ***
DISCOUNT RATE 10.0 POWER DEPENDABILITY IN % 95.0

O.HOUR / YEAR	KW VALUE IN US D	KWH VALUE IN US D
2550.0	160.25	0.0234
1950.0	111.76	0.0425
0.	63.35	0.0682

YEAR	DEPENDABLE POWER (MW)	ANNUAL ENERGY (GWH)	BENEFIT POWER (M US D)	BENEFIT ENERGY (M US D)	BENEFIT TOTAL (M US D)	P.W.F.	PRESENT WORTH (M US D)	OPERATION HOUR (H)
1994	115.0	349.03	18.43	8.17	26.60	0.90909	24.18	3038.
1995	115.0	349.03	18.43	8.17	26.60	0.82645	21.98	3038.
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2042	115.0	349.03	18.43	8.17	26.60	0.00937	0.25	3038.
2043	115.0	349.03	18.43	8.17	26.60	0.00852	0.23	3038.
SUMMARY	115.0	349.03	18.43	8.17	26.60	9.91481	263.69	3038.

** RESERVOIR OPERATION STUDY OF KANAN NO.1 DAM PLAN A-3 TWL = 175.000 ** NIPPON KOEI TOKYO/JAPAN

HIGH WATER LEVEL IN METER 280.000 LOW WATER LEVEL IN METER 250.000 RATED HEAD IN METER 86.600
INSTALLED CAPACITY IN MW 115.000 DEPENDABLE CAPACITY IN MW 91.192 TARGET OPERATION HOUR A DAY 3.79
RATED DISCHARGE IN CMS 157.563 TYPE OF RULE CURVE .. VARIABLE MASS CURVE

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
RULE CURVE IN MWH	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500

LENGTH OF INFLOW SERIES IN YEAR 26

*** MONTHLY SUMMARY OF RESERVOIR OPERATION STUDY FOR THE TARGET YEAR 1994 ***

MONTH	INFLOW (CMS)	EVAPO. (CMS)	SPILL (CMS)	Q24 (CMS)	QG (CMS)	S2 (MCM)	R.W.L. (M)	T.W.L. (M)	E.HEAD (M)	EFFICI.	POWER (MW)	O.HOUR (H)	P.E. (GWH)	S.E. (GWH)	T.E. (GWH)
JAN.	89.55	0.59	1.83	85.21	130.97	260.31	279.809	175.000	104.193	0.860	115.0	484.6	13.50	42.23	55.73
FEB.	66.23	0.76	0.	65.62	130.78	259.94	279.986	175.000	104.336	0.860	115.0	337.2	13.50	25.28	38.78
MAR.	49.50	0.88	0.	48.94	130.84	259.09	279.939	175.000	104.288	0.860	115.0	278.4	13.50	18.51	32.01
APR.	30.99	1.01	0.	31.82	131.12	254.32	279.721	175.000	104.067	0.860	115.0	174.9	13.50	6.61	20.11
MAY	26.79	0.82	0.	29.22	131.78	245.63	279.207	175.000	103.552	0.860	115.0	165.3	13.50	5.51	19.01
JUNE	25.11	0.58	0.	28.47	132.85	235.41	278.418	175.000	102.748	0.860	115.0	154.9	13.50	4.31	17.81
JULY	8.90	0.45	0.	22.33	135.61	198.25	276.412	175.000	100.711	0.860	115.0	122.7	13.50	0.61	14.11
AUG.	7.98	0.32	0.	22.19	140.65	159.31	272.956	175.000	97.202	0.860	115.0	117.4	13.50	0.	13.50
SEP.	15.36	0.38	0.	23.76	144.41	136.54	269.785	175.000	93.990	0.860	114.1	118.4	13.50	0.	13.50
OCT.	62.91	0.40	1.00	35.70	139.90	205.70	272.372	175.000	96.870	0.860	113.8	194.4	13.50	8.68	22.18
NOV.	89.27	0.42	1.66	73.71	134.06	240.66	277.053	175.000	101.534	0.860	114.4	402.6	13.50	32.71	46.21
DEC.	98.61	0.48	6.83	85.88	131.77	255.17	279.175	175.000	103.634	0.860	115.0	487.5	13.50	42.57	56.07
MEAN	47.53	0.59	0.96	45.98	134.58	225.68	277.050	175.000	101.412	0.860	114.8	3038.3	162.00	187.03	349.03

*** THERE ARE POWER DEFICIT OF THE LONGEST DURATION 4 CONTINUOUS MONTH ***
THESE DEFICITS OCCURED 5 TIMES
LONGEST DURATION FROM 20-TH YEAR 8-TH MONTH TO 20-TH YEAR 11-TH MONTH LOWEST POWER 92.6 MW

*** DEPENDABLE DISCHARGE , POWER OUTPUT AND ENERGY OUTPUT ***

	100.0 % DEPENDABLE			95.0 % DEPENDABLE			90.0 % DEPENDABLE			85.0 % DEPENDABLE			80.0 % DEPENDABLE		
YEAR	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)	Q(CMS)	P(MW)	E(GWH)
1994	20.70	92.62	13.50	20.90	115.00	13.50	21.26	115.00	13.50	21.49	115.00	13.50	21.72	115.00	13.50