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Option reservoir operation during floods

Furstenburg, Leon

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JUMBLES RESERVOIR. DEMONSTRATION RUN.
WINTER PMF THROUGH 24 No SIPHONS

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TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)
1.00	2.30	0.038	1.91	0.978E+04
1.25	3.10	0.041	2.04	0.104E+05
1.50	4.30	0.046	2.31	0.118E+05
1.75	6.30	0.056	2.86	0.143E+05
2.00	8.70	0.070	3.79	0.180E+05
2.25	12.20	0.091	5.12	0.234E+05
2.50	15.70	0.112	10.80	0.288E+05
2.75	19.50	0.126	16.51	0.323E+05
3.00	23.30	0.136	20.62	0.349E+05
3.25	27.10	0.146	24.47	0.373E+05
3.50	31.50	0.154	29.12	0.395E+05
3.75	36.00	0.162	34.03	0.415E+05
4.00	40.60	0.169	38.56	0.433E+05
4.25	45.90	0.177	43.53	0.453E+05
4.50	51.40	0.185	48.96	0.475E+05
4.75	57.70	0.195	54.89	0.498E+05
5.00	64.90	0.205	61.65	0.526E+05
5.25	72.90	0.217	69.26	0.556E+05
5.50	82.40	0.231	78.07	0.592E+05
5.75	93.60	0.248	88.50	0.635E+05
6.00	108.00	0.269	100.94	0.690E+05
6.25	125.70	0.297	116.96	0.761E+05
6.50	152.10	0.335	139.05	0.859E+05
6.75	188.30	0.395	167.62	0.101E+06
7.00	225.40	0.503	184.32	0.129E+06
7.25	258.40	0.697	189.04	0.179E+06
7.50	281.30	0.970	195.65	0.248E+06
7.75	298.40	1.265	205.37	0.329E+06
8.00	298.70	1.544	222.08	0.405E+06
8.25	293.00	1.760	238.18	0.464E+06
8.50	283.50	1.908	248.36	0.505E+06
8.75	270.60	1.996	251.98	0.529E+06
9.00	255.90	2.029	253.33	0.538E+0
9.25	240.50	2.014	252.72	0.534E+06
9.50	225.00	1.953	250.24	0.517E+06
9.75	209.90	1.852	246.10	0.490E+06
10.00	197.30	1.730	235.60	0.456E+06
10.25	189.40	1.606	226.44	0.422E+06
10.50	183.30	1.488	218.30	0.390E+06
10.75	178.20	1.375	211.76	0.359E+06
11.00	174.20	1.269	205.57	0.330E+06
11.25	170.70	1.168	200.59	0.302E+06
11.50	167.80	1.069	198.07	0.275E+06
11.75	165.10	0.967	195.59	0.248E+06
12.00	162.60	0.860	192.99	0.220E+06
12.25	160.10	0.754	190.40	0.193E+06
12.50	157.20	0.647	187.80	0.166E+06

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JUMBLES RESERVOIR. DEMONSTRATION RUN.
WINTER PMF THROUGH 24 No SIPHONS

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TIME (hours)	INFLOW RATE (m3/s	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)
12.75	154.10	0.538	185.17	0.138E+06
13.00	150.6	0.435	178.35	0.111E+06
13.25	146.	0.369	156.18	0.946E+05
13.50	142.20	0.347	145.58	0.888E+05
13.75	138.10	0.337	140.11	0.863E+05
14.00	134.20	0.330	136.12	0.846E+05

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PEAK INFLOW RATE= 298.70m3/s
PEAK OUTFLOW RATE= 253.33m3/s
LAG TIME= 1.00hours
PERCENTAGE ATTENUATION= 15.19%

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Mvumase reservoir Case Study
Analysis by Binnie & Partners,
Johannesburg using program by
Green modified by Furstenburg.

MUUMASE SCHEME. 200. ONE HOUR RUN.
20 000 CUMECS THROUGH 17x14.5m GATES.

FLOOD ROUTING BY STORAGE INDICATION METHOD.

RESERVOIR ELEVATION-STORAGE DATA.

ELEVATION	STORAGE
190	0
190.1	10000000
190.2	20000000
190.3	30000000
190.4	40000000
190.5	50000000
190.6	60000000
190.7	70000000
190.8	80000000
190.9	90000000
191	.1E+09
191.5	.15E+09
192	.2E+09
193	.3E+09
194	.4E+09
195	.5E+09
196	.6E+09
197	.7E+09
198	.8E+09
199	.9E+09

RESERVIOR OUTLET DATA.

GATED SPILLWAY.

CREST LEVEL OF SPILLWAY= 178.3
NORMAL RETENTION LEVEL= 197
DISCHARGE COEFFICIENT FOR FREE DISCHARGE OVER WIER= 2.00
TOTAL LENGTH OF SPILLWAY= 102
NUMBER OF GATE GROUPS= 3

GATE PERFORMANCE DATA:

GATE GROUP 1	193.115	.21E-02	0.87
GATE GROUP 2	193.415	.21E-02	0.87
GATE GROUP 3	193.715	.21E-02	0.90

TIME	INFLOW RATE	OUTFLOW GATED	OUTFLOW SPILLWAY	OUTFLOW TOTAL	WATER LEVEL	STORAGE
1	277.7	0	0	0	193	0
2	555.5	0	0	0	193	1439850
3	833.2	0	0	0	193	3999600
4	1111	0	0	0	193	7438150
5	1388.7	406.7	0	406.7	193.113	11738050
6	1666.5	1111.9	0	1111.9	193.278	17307140
7	1944.2	1882.1	0	1882.1	193.463	24058894
8	2222	2690.3	0	2690.3	193.658	31933715
9	2499.7	3575.1	0	3575.1	193.858	40861904
10	2777.5	4564.5	0	4564.5	194.053	50805877
11	3055.2	5652.6	0	5652.6	194.241	61658721
12	3333	6810.4	0	6810.4	194.419	73369457
13	3610.8	8028.2	0	8028.2	194.587	85771274
14	3888.6	9272.9	0	9272.9	194.738	98727865
15	4166.5	10477.9	0	10477.9	194.868	112014778
16	4444.3	11468.4	0	11468.4	194.968	125074594
17	4722.1	12060.1	0	12060.1	195.031	137382744
18	5000	12519.6	0	12519.6	195.076	148511801
19	5277.8	12846.1	0	12846.1	195.109	158178799
20	5555.6	13050.0	0	13050.0	195.131	166155436
21	5833.5	13155.3	0	13155.3	195.143	172388098
22	6111.3	13207.0	0	13207.0	195.149	176496376
23	6389.1	13172.4	0	13172.4	195.145	179295760
24	6667	13052.6	0	13052.6	195.132	181071719
25	6944.7	12880.8	0	12880.8	195.113	182042583
26	7222.6	12680.7	0	12680.7	195.091	182412270
27	7500.2	12453.1	0	12453.1	195.066	182321781
28	7778	12185.8	0	12185.8	195.036	181874924
29	8055.7	11884.8	0	11884.8	195.001	181137206
30	8333.5	11570.3	0	11570.3	194.964	180200902
31	8611.2	11242.5	0	11242.5	194.921	179041186
32	8889	10901	0	10901	194.874	177652142
33	9166.7	10553.9	0	10553.9	194.824	176049561
34	9444.5	10277.2	0	10277.2	194.788	174853792
35	9722.2	9971.8	0	9971.8	194.744	173425716
36	10000	9850.1	0	9850.1	194.749	173966181
37	10277.7	10127.9	0	10127.9	194.788	175805456
38	10555.5	10405.7	0	10405.7	194.826	177644687
39	10833.2	10603.4	0	10603.4	194.855	178983916
40	11111	10961.2	0	10961.2	194.901	181123144
41	11388.7	11238.9	0	11238.9	194.938	182462373
42	11666.5	11516.7	0	11516.7	194.974	183801602
43	11944.2	11794.4	0	11794.4	195.009	185140831
44	12222	12072.2	0	12072.2	195.044	186480059
45	12499.7	12349.9	0	12349.9	195.078	187819288
46	12777.5	12451.3	0	12451.3	195.091	188676049
47	13055.2	12471.3	0	12471.3	195.093	189314262
48	13333	12502.4	0	12502.4	195.097	190160345
49	13610.8	12544.1	0	12544.1	195.102	191275368
50	13888.6	12596.1	0	12596.1	195.109	192521301
51	14166.5	12657.9	0	12657.9	195.117	193963802
52	14444.3	12729.4	0	12729.4	195.126	.10336591E+09
53	14722.1	12810.2	0	12810.2	195.136	.10989403E+09
54	15000	12899.6	0	12899.6	195.147	.11711601E+09
55	15277.8	12997.2	0	12997.2	195.159	.12500163E+09

56	15555.6	13102.7	0	13102.7	194.335	.13352193E+09
57	15833.5	13215.6	0	13215.6	194.426	.14264928E+09
58	16111.3	13336.3	0	13336.3	194.523	.15235639E+09
59	16389.1	13465.2	0	13465.2	194.626	.16261447E+09
60	16667	13600.8	0	13600.8	194.733	.17339663E+09
61	16944.7	13742.6	0	13742.6	194.846	.18467951E+09
62	17222.5	13890.5	0	13890.5	194.964	.19644081E+09
63	17500.2	14046.5	0	14046.5	195.086	.208655E+09
64	17778	14209.1	0	14209.1	195.212	.22129565E+09
65	18055.7	14376.8	0	14376.8	195.342	.23434167E+09
66	18333.5	14549.5	0	14549.5	195.477	.24777473E+09
67	18611.2	14727	0	14727	195.615	.26157732E+09
68	18889	14909	0	14909	195.757	.2757327E+09
69	19166.7	15095.4	0	15095.4	195.902	.29022494E+09
70	19444.5	15287.1	0	15287.1	196.05	.3050354E+09
71	19722.2	15483.6	0	15483.6	196.201	.32017999E+09
72	20000	15684	0	15684	196.355	.3358184E+09
73	19861	15888.3	0	15888.3	196.512	.35042546E+09
74	19722.1	16069.9	0	16069.9	196.641	.36410049E+09
75	19583.2	16236.8	0	16236.8	196.757	.3761485E+09
76	19444.3	16389	0	16389	196.862	.38027192E+09
77	19305.4	16527.9	0	16527.9	196.957	.3881078E+09
78	19166.5	16656.9	0	16656.9	197.042	.39623739E+09
79	19027.5	16773.4	0	16773.4	197.118	.40366204E+09
80	18888.6	16877.8	0	16877.8	197.185	.4102883E+09
81	18749.7	16970.5	0	16970.5	197.245	.41536885E+09
82	18610.8	17052.4	0	17052.4	197.297	.41973897E+09
83	18471.9	17123.3	0	17123.3	197.343	.4236178E+09
84	18333	17184.4	0	17184.4	197.382	.42708647E+09
85	18194.1	17236	0	17236	197.415	.43008845E+09
86	18055.3	17279.4	0	17279.4	197.443	.4326114E+09
87	17916.5	17312.2	0	17312.2	197.464	.43487366E+09
88	17777.6	17337.8	0	17337.8	197.48	.4365787E+09
89	17638.8	17355.6	0	17355.6	197.491	.43767703E+09
90	17500	17368.7	0	17368.7	197.504	.43843003E+09
91	17361.1	17383.8	0	17383.8	197.513	.4393579E+09
92	17222.3	17395.1	0	17395.1	197.521	.44007704E+09
93	17083.5	17398	0	17398	197.523	.44064125E+09
94	16944.6	17398.1	0	17398.1	197.524	.44064322E+09
95	16805.8	17396.5	0	17396.5	197.522	.44054455E+09
96	16667	17388.8	0	17388.8	197.517	.44027563E+09
97	16528	17385.9	0	17385.9	197.515	.44013464E+09
98	16389.1	17377.7	0	17377.7	197.495	.44354503E+09
99	16250.2	17374.8	0	17374.8	197.467	.44638924E+09
100	16111.3	17367.3	0	17367.3	197.428	.44239605E+09
101	15972.4	17075.5	0	17075.5	197.39	.43906157E+09
102	15833.5	17019.5	0	17019.5	197.349	.43436115E+09
103	15694.5	16959.5	0	16959.5	197.305	.4305494E+09
104	15555.6	16895.7	0	16895.7	197.258	.42586025E+09
105	15416.7	16828.4	0	16828.4	197.209	.42096694E+09
106	15277.8	16757.7	0	16757.7	197.157	.41570209E+09
107	15138.9	16683.6	0	16683.6	197.102	.41025771E+09
108	15000	16606.5	0	16606.5	197.045	.40458526E+09
109	14861	16526.9	0	16526.9	196.986	.39869478E+09
110	14722.1	16446.2	0	16446.2	196.926	.39259282E+09
111	14583.2	16362.8	0	16362.8	196.862	.38628628E+09
112	14444.3	16276.7	0	16276.7	196.797	.37978468E+09
113	14305.4	16188.2	0	16188.2	196.73	.3730971E+09
114	14166.5	16097.4	0	16097.4	196.662	.3662322E+09
115	14027.5	16004.3	0	16004.3	196.591	.35913821E+09
116	13888.6	15909.1	0	15909.1	196.52	.35200301E+09
117	13749.7	15811.9	0	15811.9	196.446	.3446541E+09
118	13610.8	15712.7	0	15712.7	196.371	.33715863E+09
119	13471.9	15611.7	0	15611.7	196.295	.32952342E+09
120	13333	15508.9	0	15508.9	196.217	.32125492E+09
121	13194.1	15404.5	0	15404.5	196.138	.31385962E+09

122	13055.3	15298.4	0	15298.4	196.358	.30584343E+09
123	12916.5	15191.6	0	15191.6	195.977	.29771051E+09
124	12777.6	15085.6	0	15085.6	195.894	.28946089E+09
125	12638.8	14978	0	14978	195.81	.28109602E+09
126	12500	14869	0	14869	195.726	.27262111E+09
127	12361.1	14758.7	0	14758.7	195.64	.26404115E+09
128	12222.3	14647.1	0	14647.1	195.553	.25536087E+09
129	12083.5	14534.2	0	14534.2	195.465	.24658482E+09
130	11944.6	14420.2	0	14420.2	195.377	.23771734E+09
131	11805.8	14305.1	0	14305.1	195.287	.22876256E+09
132	11667	14188.9	0	14188.9	195.197	.21972447E+09
133	11528	14071.6	0	14071.6	195.106	.21060658E+09
134	11389.1	13953.4	0	13953.4	195.014	.20141248E+09
135	11250.2	13836.4	0	13836.4	194.921	.19214157E+09
136	11111.3	13718.9	0	13718.9	194.827	.18277266E+09
137	10972.4	13600.4	0	13600.4	194.733	.17330848E+09
138	10833.5	13481	0	13481	194.638	.16374235E+09
139	10694.6	13360.8	0	13360.8	194.542	.15407747E+09
140	10555.6	13240.7	0	13240.7	194.446	.14431705E+09
141	10416.7	13120.7	0	13120.7	194.349	.13447474E+09
142	10277.8	12999.8	0	12999.8	194.252	.12452884E+09
143	10138.9	12878.1	0	12878.1	194.155	.11447782E+09
144	10000	12755.7	0	12755.7	194.054	.10434687E+09
145	4861	12633.1	0	12633.1	193.955	95536897
146	9722.1	12510.5	0	12510.5	193.855	88528077
147	9583.2	11203.2	0	11203.2	193.775	77592978
148	9444.3	9577.6	0	9577.6	193.744	74437065
149	9305.4	9382.5	0	9382.5	193.74	74083277
150	9166.5	9241.4	0	9241.4	193.737	73734458
151	9027.5	9102.5	0	9102.5	193.735	73391407
152	8888.6	8963.8	0	8963.8	193.732	73054906
153	8749.7	8824.6	0	8824.6	193.729	72725210
154	8610.8	8685.7	0	8685.7	193.727	72402515
155	8471.9	8546.8	0	8546.8	193.724	72087050
156	8333	8407.9	0	8407.9	193.721	71778125
157	8194.1	8269	0	8269	193.718	71476507
158	8055.2	8130.2	0	8130.2	193.716	71182970
159	7916.5	7991.3	0	7991.3	193.713	70897437
160	7777.6	7852.5	0	7852.5	193.71	70619303
161	7638.8	7713.7	0	7713.7	193.708	70348370
162	7500	7574.8	0	7574.8	193.705	70084876
163	7361.1	7436	0	7436	193.702	69829303
164	7222.3	7297.2	0	7297.2	193.7	69581769
165	7083.5	7288.6	0	7288.6	193.698	69505785
166	6944.6	7281.6	0	7281.6	193.685	68530067
167	6805.8	7271.2	0	7271.2	193.67	67985844
168	6667	7257.5	0	7257.5	193.651	67185077
169	6528	7240.7	0	7240.7	193.628	66359277
170	6389.1	7220.7	0	7220.7	193.6	65509658
171	6250.2	7197.8	0	7197.8	193.568	64657164
172	6111.3	7171.9	0	7171.9	193.532	63242441
173	5972.4	6977.1	0	6977.1	193.495	49524794
174	5833.5	6130.9	0	6130.9	193.471	47180736
175	5694.5	5841.9	0	5841.9	193.463	46380116
176	5555.6	5671.1	0	5671.1	193.459	45907038
177	5416.7	5525.4	0	5525.4	193.455	45503495
178	5277.8	5385.1	0	5385.1	193.451	45114712
179	5138.9	5245.8	0	5245.8	193.447	44729062
180	5000	5106.9	0	5106.9	193.443	44344077
181	4861	4967.9	0	4967.9	193.439	43959233
182	4722.1	4829	0	4829	193.435	43574419
183	4583.2	4690.1	0	4690.1	193.431	43189611
184	4444.3	4551.2	0	4551.2	193.428	42804805
185	4305.4	4412.3	0	4412.3	193.424	42419999
186	4166.5	4273.3	0	4273.3	193.42	42035193
187	4027.5	4134.4	0	4134.4	193.416	41650397

188	3888.6	3395.5	0	3395.5	193.412	41265581
189	3749.7	3856.6	0	3856.6	193.408	40880775
190	3610.8	3717.7	0	3717.7	193.404	40495960
191	3471.9	3578.8	0	3578.8	193.401	40111163
192	3333	3537	0	3537	193.395	39551413
193	3194.1	3533.6	0	3533.6	193.385	38573083
194	3055.3	3528.4	0	3528.4	193.371	37110578
195	2916.5	3521.4	0	3521.4	193.351	35170057
196	2777.6	3512.9	0	3512.9	193.327	32757603
197	2638.8	3502.6	0	3502.6	193.298	29879215
198	2500	3490.8	0	3490.8	193.265	26540751
199	2361.1	3477.4	0	3477.4	193.227	22747934
200	2222.3	3146.8	0	3146.8	193.19	19074701
201	2083.5	2382.8	0	2382.8	193.168	16871745
202	1944.6	2099.4	0	2099.4	193.15	15054277
203	1805.8	1927.1	0	1927.1	193.135	13557399
204	1667	1780.5	0	1780.5	193.121	12134731
205	1528	1638.8	0	1638.8	193.107	10728076
206	1389.1	1500.5	0	1500.5	193.093	9327384
207	1250.2	1361.5	0	1361.5	193.079	7926435
208	1111.3	1222.6	0	1222.6	193.065	6525768
209	972.4	1083.6	0	1083.6	193.051	5125148
210	833.5	944.7	0	944.7	193.037	3724533
211	694.5	805.8	0	805.8	193.023	2323933
212	555.6	666.9	0	666.9	193.009	923327
213	416.7	528	0	528	192.995	477722
214	277.8	389.1	0	389.1	192.981	77116
215	138.9	250.1	0	250.1	192.967	67511
216	0	111.2	0	111.2	192.953	58905

PEAK INFLOW RATE= 20000cumecs
PEAK OUTFLOW RATE= 17368.8cumecs
ATTENUATION= 13.1%
LAG TIME= 1140minutes

Mvumase reservoir Case Study
Analysis using RESIMO

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MVUMASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIGH AUTOMATIC GATES.

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ELEVATION	STORAGE
193	0
193.1	1E+07
193.2	2E+07
193.3	3E+07
193.4	4E+07
193.5	5E+07
193.6	6E+07
193.7	7E+07
193.8	8E+07
193.9	9E+07
194	1E+08
194.5	1.5E+08
195	2E+08
196	3E+08
197	4E+08
198	5E+08
199	6E+08
200	7E+08
201	8E+08
202	9E+08

AUTOMATICALLY CONTROLLED OVERFLOW WIER

NO	INVERT	COEFFICIENT	WIDTH	HEIGHT	START EL	END EL
1	178.5	2.08	34	17	193.115	193.415
2	178.5	2.08	34	17	193.415	193.715
3	178.5	2.08	34	17	193.715	194.015

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MVUMASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIGH AUTOMATIC GATES.

****

TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)	GATED FLOW (m3/s)
0.00	0.00	193.000	0.00	0.000E+00	0
1.00	277.79	193.005	0.00	0.499E+06	0
2.00	555.58	193.020	0.00	0.200E+07	0
3.00	833.38	193.045	0.00	0.450E+07	0
4.00	1111.17	193.080	0.00	0.800E+07	0
5.00	1388.96	193.122	165.39	0.122E+08	165.3853
6.00	1666.75	193.157	929.72	0.157E+08	929.7204
7.00	1944.54	193.181	1387.09	0.181E+08	1387.09
8.00	2222.33	193.199	1729.86	0.200E+08	1729.86
9.00	2500.13	193.217	2022.55	0.217E+08	2022.553
10.00	2777.92	193.234	2291.67	0.234E+08	2291.669
11.00	3055.71	193.252	2546.45	0.252E+08	2546.45
12.00	3333.50	193.271	2789.04	0.271E+08	2789.042
13.00	3611.29	193.291	3079.47	0.291E+08	3079.472
14.00	3889.08	193.299	3949.67	0.299E+08	3949.665
15.00	4166.88	193.301	4026.77	0.301E+08	4026.773
16.00	4444.67	193.311	4030.84	0.310E+08	4030.84
17.00	4722.46	193.330	4038.90	0.330E+08	4038.902
18.00	5000.25	193.360	4050.91	0.360E+08	4050.914
19.00	5278.04	193.399	4066.82	0.398E+08	4066.823
20.00	5555.83	193.438	4602.52	0.437E+08	4602.523
21.00	5833.63	193.466	5209.17	0.466E+08	5209.168
22.00	6111.42	193.486	5610.58	0.486E+08	5610.579
23.00	6389.21	193.503	5930.02	0.503E+08	5930.019
24.00	6667.00	193.520	6214.55	0.520E+08	6214.55
25.00	6944.75	193.536	6479.48	0.536E+08	6479.475
26.00	7222.50	193.554	6733.97	0.553E+08	6733.968
27.00	7500.25	193.572	6979.35	0.572E+08	6979.345
28.00	7778.00	193.591	7213.95	0.591E+08	7213.948
29.00	8055.75	193.605	7848.86	0.605E+08	7848.863
30.00	8333.50	193.610	8293.44	0.610E+08	8293.436
31.00	8611.25	193.616	8312.11	0.616E+08	8312.106
32.00	8889.00	193.631	8324.92	0.631E+08	8324.918
33.00	9166.75	193.656	8345.50	0.656E+08	8345.503
34.00	9444.50	193.690	8373.65	0.690E+08	8373.651
35.00	9722.25	193.728	8708.30	0.728E+08	8708.299
36.00	10000.00	193.757	9377.64	0.757E+08	9377.639
37.00	10277.75	193.777	9796.61	0.777E+08	9796.609
38.00	10555.50	193.793	10123.15	0.793E+08	10123.15
39.00	10833.25	193.809	10411.94	0.809E+08	10411.94
40.00	11111.00	193.824	10681.53	0.824E+08	10681.53
41.00	11388.75	193.840	10942.94	0.840E+08	10942.94
42.00	11666.50	193.856	11195.42	0.856E+08	11195.42
43.00	11944.25	193.874	11441.74	0.874E+08	11441.74
44.00	12222.00	193.893	11679.83	0.893E+08	11679.83
45.00	12499.75	193.905	12354.89	0.905E+08	12354.89
46.00	12777.50	193.908	12728.61	0.909E+08	12728.61

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MVUMASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIGH AUTOMATIC GATES.

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TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)	GATED FLOW (m3/s)
47.00	13055.25	193.913	12838.28	0.913E+08	12838.28
48.00	13333.00	193.926	12853.94	0.926E+08	12853.94
49.00	13610.79	193.948	12881.14	0.948E+08	12881.14
50.00	13888.58	193.978	12919.41	0.978E+08	12919.41
51.00	14166.38	194.017	12968.29	0.102E+09	12968.29
52.00	14444.17	194.064	13027.35	0.106E+09	13027.35
53.00	14721.96	194.119	13096.16	0.112E+09	13096.16
54.00	14999.75	194.181	13174.37	0.118E+09	13174.37
55.00	15277.54	194.250	13261.59	0.125E+09	13261.59
56.00	15555.33	194.326	13357.50	0.133E+09	13357.5
57.00	15833.13	194.408	13461.77	0.141E+09	13461.77
58.00	16110.92	194.497	13574.06	0.150E+09	13574.06
59.00	16388.71	194.591	13694.09	0.159E+09	13694.09
60.00	16666.50	194.691	13821.58	0.169E+09	13821.58
61.00	16944.29	194.796	13956.25	0.180E+09	13956.25
62.00	17222.08	194.906	14097.82	0.191E+09	14097.82
63.00	17499.88	195.020	14246.06	0.202E+09	14246.06
64.00	17777.67	195.140	14400.73	0.214E+09	14400.73
65.00	18055.46	195.263	14561.58	0.226E+09	14561.58
66.00	18333.25	195.391	14728.38	0.239E+09	14728.38
67.00	18611.04	195.523	14900.93	0.252E+09	14900.93
68.00	18888.83	195.658	15079.01	0.266E+09	15079.01
69.00	19166.63	195.797	15262.44	0.280E+09	15262.44
70.00	19444.42	195.939	15450.95	0.294E+09	15450.95
71.00	19722.21	196.085	15644.43	0.308E+09	15644.43
72.00	20000.00	196.233	15842.67	0.323E+09	15842.67
73.00	19861.13	196.377	16035.63	0.338E+09	16035.63
74.00	19722.25	196.509	16213.58	0.351E+09	16213.58
75.00	19583.38	196.629	16377.09	0.363E+09	16377.09
76.00	19444.50	196.740	16526.68	0.374E+09	16526.68
77.00	19305.63	196.840	16662.90	0.384E+09	16662.9
78.00	19166.75	196.930	16786.27	0.393E+09	16786.27
79.00	19027.88	197.011	16897.33	0.401E+09	16897.33
80.00	18889.00	197.084	16996.58	0.408E+09	16996.58
81.00	18750.13	197.148	17084.51	0.415E+09	17084.51
82.00	18611.25	197.204	17161.64	0.420E+09	17161.64
83.00	18472.38	197.252	17228.40	0.425E+09	17228.4
84.00	18333.50	197.294	17285.29	0.429E+09	17285.29
85.00	18194.63	197.328	17332.74	0.433E+09	17332.74
86.00	18055.75	197.356	17371.19	0.436E+09	17371.19
87.00	17916.88	197.377	17401.05	0.438E+09	17401.05
88.00	17778.00	197.393	17422.74	0.439E+09	17422.74
89.00	17639.13	197.403	17436.63	0.440E+09	17436.63
90.00	17500.25	197.408	17443.10	0.441E+09	17443.1
91.00	17361.38	197.407	17442.50	0.441E+09	17442.5
92.00	17222.50	197.402	17435.18	0.440E+09	17435.18

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MVUMASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIG AUTOMATIC GATES.

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TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)	GATED FLOW (m3/s)
93.00	17083.63	197.392	17421.48	0.439E+09	17421.48
94.00	16944.75	197.378	17401.69	0.438E+09	17401.69
95.00	16805.88	197.359	17376.12	0.436E+09	17376.12
96.00	16667.00	197.337	17345.07	0.434E+09	17345.07
97.00	16528.08	197.311	17308.81	0.431E+09	17308.81
98.00	16389.17	197.281	17267.60	0.428E+09	17267.6
99.00	16250.25	197.247	17221.71	0.425E+09	17221.71
100.00	16111.33	197.211	17171.36	0.421E+09	17171.36
101.00	15972.42	197.171	17116.77	0.417E+09	17116.77
102.00	15833.50	197.129	17058.17	0.413E+09	17058.17
103.00	15694.58	197.083	16995.74	0.409E+09	16995.74
104.00	15555.67	197.035	16929.73	0.403E+09	16929.73
105.00	15416.75	196.984	16860.27	0.398E+09	16860.27
106.00	15277.83	196.931	16787.59	0.393E+09	16787.59
107.00	15138.92	196.876	16711.85	0.388E+09	16711.85
108.00	15000.00	196.818	16633.18	0.382E+09	16633.18
109.00	14861.08	196.758	16551.77	0.376E+09	16551.77
110.00	14722.17	196.696	16467.71	0.370E+09	16467.71
111.00	14583.25	196.632	16381.20	0.363E+09	16381.2
112.00	14444.33	196.567	16292.35	0.357E+09	16292.35
113.00	14305.42	196.499	16201.29	0.350E+09	16201.29
114.00	14166.50	196.430	16108.11	0.343E+09	16108.11
115.00	14027.58	196.360	16012.96	0.336E+09	16012.96
116.00	13888.67	196.287	15915.93	0.329E+09	15915.93
117.00	13749.75	196.214	15817.11	0.321E+09	15817.11
118.00	13610.83	196.139	15716.62	0.314E+09	15716.62
119.00	13471.92	196.062	15614.50	0.306E+09	15614.5
120.00	13333.00	195.984	15510.90	0.298E+09	15510.9
121.00	13194.13	195.905	15405.88	0.291E+09	15405.88
122.00	13055.25	195.825	15299.50	0.283E+09	15299.5
123.00	12916.38	195.744	15191.85	0.274E+09	15191.85
124.00	12777.50	195.661	15083.02	0.266E+09	15083.02
125.00	12638.62	195.578	14973.05	0.258E+09	14973.05
126.00	12499.75	195.493	14862.02	0.249E+09	14862.02
127.00	12360.88	195.408	14749.96	0.241E+09	14749.96
128.00	12222.00	195.321	14636.95	0.232E+09	14636.95
129.00	12083.13	195.234	14523.04	0.223E+09	14523.04
130.00	11944.25	195.146	14408.28	0.215E+09	14408.28
131.00	11805.38	195.057	14292.71	0.206E+09	14292.71
132.00	11666.50	194.967	14176.40	0.197E+09	14176.4
133.00	11527.63	194.876	14059.36	0.188E+09	14059.36
134.00	11388.75	194.784	13941.66	0.178E+09	13941.66
135.00	11249.88	194.692	13823.34	0.169E+09	13823.34
136.00	11111.00	194.599	13704.42	0.160E+09	13704.42
137.00	10972.13	194.505	13584.93	0.151E+09	13584.93
138.00	10833.25	194.411	13464.90	0.141E+09	13464.9

MVU 1ASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIGH AUTOMATIC GATES.

TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)	GATED FLOW (m3/s)
139.00	10694.38	194.316	13344.39	0.132E+09	13344.39
140.00	10555.50	194.220	13223.43	0.122E+09	13223.43
141.00	10416.63	194.124	13102.03	0.112E+09	13102.03
142.00	10277.75	194.027	12980.23	0.103E+09	12980.23
143.00	10138.88	193.929	12858.04	0.929E+08	12858.04
144.00	10000.00	193.858	11222.20	0.858E+08	11222.2
145.00	9861.13	193.822	10646.09	0.822E+08	10646.09
146.00	9722.25	193.799	10226.69	0.799E+08	10226.69
147.00	9583.38	193.783	9928.55	0.784E+08	9928.549
148.00	9444.50	193.773	9705.95	0.773E+08	9705.946
149.00	9305.62	193.764	9524.29	0.764E+08	9524.286
150.00	9166.75	193.757	9363.66	0.756E+08	9363.66
151.00	9027.88	193.750	9213.56	0.750E+08	9213.556
152.00	8889.00	193.743	9066.60	0.743E+08	9066.596
153.00	8750.13	193.737	8922.69	0.737E+08	8922.691
154.00	8611.25	193.731	8779.74	0.731E+08	8779.741
155.00	8472.38	193.725	8634.65	0.725E+08	8634.653
156.00	8333.50	193.719	8499.50	0.719E+08	8499.495
157.00	8194.63	193.712	8416.18	0.712E+08	8416.179
158.00	8055.75	193.702	8383.39	0.702E+08	8383.393
159.00	7916.88	193.688	8371.75	0.688E+08	8371.745
160.00	7778.00	193.669	8356.37	0.669E+08	8356.371
161.00	7639.13	193.646	8337.39	0.646E+08	8337.39
162.00	7500.25	193.619	8314.91	0.619E+08	8314.911
163.00	7361.38	193.602	7509.70	0.602E+08	7509.704
164.00	7222.50	193.598	7286.83	0.598E+08	7286.833
165.00	7083.63	193.594	7242.80	0.594E+08	7242.802
166.00	6944.75	193.587	7165.72	0.587E+08	7165.719
167.00	6805.88	193.578	7063.39	0.578E+08	7063.386
168.00	6667.00	193.569	6942.26	0.569E+08	6942.258
169.00	6528.08	193.559	6808.37	0.559E+08	6808.367
170.00	6389.17	193.549	6666.15	0.549E+08	6666.154
171.00	6250.25	193.539	6519.68	0.539E+08	6519.678
172.00	6111.33	193.529	6371.00	0.529E+08	6370.999
173.00	5972.42	193.520	6221.53	0.520E+08	6221.525
174.00	5833.50	193.512	6072.26	0.511E+08	6072.263
175.00	5694.58	193.503	5923.78	0.503E+08	5923.78
176.00	5555.67	193.495	5776.29	0.495E+08	5776.292
177.00	5416.75	193.487	5629.93	0.487E+08	5629.925
178.00	5277.83	193.480	5484.71	0.480E+08	5484.71
179.00	5138.92	193.472	5338.80	0.472E+08	5338.801
180.00	5000.00	193.465	5194.41	0.465E+08	5194.405
181.00	4861.08	193.458	5051.01	0.458E+08	5051.009
182.00	4722.17	193.451	4908.02	0.451E+08	4908.016
183.00	4583.25	193.445	4764.72	0.445E+08	4764.717
184.00	4444.33	193.438	4622.49	0.438E+08	4622.493

MVUMASE SCHEME. RESIMO DEMONSTRATION RUN.
20 000 CUMECS THROUGH SIX No. 17m WIDE x 14.5m HIGH AUTOMATIC GATES.

TIME (hours)	INFLOW RATE (m3/s)	WATER LEVEL (m)	OUTFLOW RATE (m3/s)	STORAGE VOLUME (m3)	GATED FLOW (m3/s)
185.00	4305.42	193.432	4479.60	0.432E+08	4479.602
186.00	4166.50	193.426	4335.21	0.426E+08	4335.206
187.00	4027.58	193.420	4191.76	0.420E+08	4191.764
188.00	3888.67	193.413	4108.96	0.413E+08	4108.955
189.00	3749.75	193.403	4068.77	0.403E+08	4068.766
190.00	3610.83	193.389	4063.08	0.389E+08	4063.081
191.00	3471.92	193.371	4055.45	0.371E+08	4055.451
192.00	3333.00	193.347	4045.91	0.347E+08	4045.911
193.00	3194.12	193.319	4034.49	0.319E+08	4034.489
194.00	3055.25	193.295	3557.69	0.295E+08	3557.686
195.00	2916.38	193.286	2952.81	0.286E+08	2952.813
196.00	2777.50	193.282	2917.96	0.282E+08	2917.958
197.00	2638.63	193.276	2846.38	0.276E+08	2846.377
198.00	2499.75	193.268	2748.43	0.268E+08	2748.432
199.00	2360.87	193.259	2630.56	0.259E+08	2630.558
200.00	2222.00	193.249	2498.66	0.249E+08	2498.656
201.00	2083.13	193.239	2357.99	0.239E+08	2357.99
202.00	1944.25	193.229	2212.26	0.229E+08	2212.261
203.00	1805.38	193.220	2064.14	0.220E+08	2064.135
204.00	1666.50	193.210	1914.99	0.210E+08	1914.989
205.00	1527.62	193.202	1766.03	0.202E+08	1766.027
206.00	1388.75	193.193	1617.84	0.193E+08	1617.837
207.00	1249.88	193.185	1470.64	0.185E+08	1470.64
208.00	1111.00	193.177	1324.27	0.177E+08	1324.268
209.00	972.13	193.170	1179.02	0.170E+08	1179.022
210.00	833.25	193.162	1033.12	0.162E+08	1033.116
211.00	694.37	193.155	889.24	0.155E+08	889.2401
212.00	555.50	193.148	746.43	0.148E+08	746.4345
213.00	416.63	193.142	602.86	0.142E+08	602.8641
214.00	277.75	193.135	459.15	0.135E+08	459.1509
215.00	138.88	193.129	315.99	0.129E+08	315.9878
216.00	0.00	193.122	170.70	0.122E+08	170.7007

PEAK INFLOW RATE= 20000.00m3/s
PEAK OUTFLOW RATE= 17443.10m3/s
LAG TIME= 18.00hours
PERCENTAGE ATTENUATION= 12.78%

Vaaldam Case Study Analysis by
Department of Water Affairs
using in house program

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	MEAN GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
14 / 2 / 75										
8	98.17	21.199	2150.4700							
				2.3293	647	4	260	0	907	
9	98.27	21.207	2152.8000							*****
				.5818	162	4	261	0	422	
10	98.30	21.209	2153.3800							*****
				.5830	162	4	261	0	423	
11	98.33	21.211	2153.9600							550
				1.4551	404	4	261	0	666	
12	98.39	21.216	2155.4200							502
				.2903	81	5	327	0	408	
13	98.41	21.217	2155.7100							600
				.2937	82	6	393	0	475	
14	98.42	21.218	2156.0000							667
				.5818	162	7	459	0	621	
15	98.45	21.220	2156.5900							652
				1.7432	484	8	526	0	1010	
16	98.53	21.226	2158.3300							667
				.5852	163	10	659	0	821	
17	98.55	21.228	2158.9100							671
				-.2903	-81	10	659	0	578	
18	98.54	21.227	2158.6200							582
				-.5830	-162	10	658	0	496	
19	98.51	21.225	2158.0400							315
				-.5784	-161	10	658	0	497	
20	98.49	21.223	2157.4600							221
				-2.0425	-567	10	656	0	089	
21	98.39	21.216	2155.4200							167
				-4.9492	****	12	782	0	-593	
22	98.17	21.199	2150.4700							167

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	MEAN GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
22	98.17	21.199	2150.4700							167
				-2.3259	-646	14	905	0	259	
23	98.06	21.191	2148.1400							166
				-2.3262	-646	14	901	0	255	
24	97.95	21.183	2145.8200							287
15 / 2 / 75				-1.4504	-403	14	898	0	495	
1	97.89	21.178	2144.3700							427
				-1.4517	-403	14	895	0	492	
2	97.82	21.173	2142.9200							491
				-.2925	-81	14	894	0	812	
3	97.81	21.172	2142.6200							462
				-2.3181	-644	14	891	0	247	
4	97.70	21.164	2140.3100							486
				-.8755	-243	14	888	0	645	
5	97.66	21.161	2139.4300							511
				-2.8975	-805	14	885	0	080	
6	97.53	21.151	2136.5300							468

					-.8677	-241	14	882	0	641	
7	97.49	21.148	2135.6700								560
					-.8674	-241	14	880	0	639	
8	97.45	21.145	2134.8000								538
					-1.1580	-322	14	878	0	557	
9	97.40	21.141	2133.6400								632
					-.2915	-81	14	877	0	796	
10	97.38	21.140	2133.3500								598
					-1.7373	-483	16	1000	0	518	
11	97.31	21.134	2131.6100								583
					-1.7307	-481	18	1121	0	641	
12	97.23	21.128	2129.8800								689

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
12	97.23	21.128	2129.8800							689
				-2.8940	-804	20	1240	0	436	
13	97.09	21.118	2126.9900							687
				-2.8906	-803	22	1356	0	553	
14	96.96	21.108	2124.1000							785
				-.5796	-161	22	1351	0	1190	
15	96.94	21.106	2123.5200							835
				-2.0173	-560	22	1347	0	787	
16	96.84	21.099	2121.5000							878
				-.8677	-241	22	1344	0	1102	
17	96.80	21.096	2120.6300							900
				-1.4392	-400	22	1340	0	941	
18	96.74	21.091	2119.1900							896
				-2.3135	-643	22	1335	0	692	
19	96.63	21.083	2116.8800							945
				-2.3008	-.	22	1329	0	690	
20	96.53	21.075	2114.5800							982
				-.5774	-160	22	1325	0	1164	
21	96.50	21.073	2114.0000							1046
				-.8618	-239	22	1323	0	1083	
22	96.46	21.070	2113.1400							1150
				.0000	00	22	1322	0	1322	
23	96.46	21.070	2113.1400							1162
				.0000	00	22	1322	0	1322	
24	96.46	21.070	2113.1400							1187
16 / 2 / 75				.0000	00	22	1322	0	1322	
1	96.46	21.070	2113.1400							1212
				-2.0139	-559	22	1319	0	759	
2	96.37	21.063	2111.1200							1185

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
2	96.37	21.063	2111.1200							1185
				.0000	00	22	1316	0	1316	
3	96.37	21.063	2111.1200							1183
				-.2927	-81	22	1316	0	1234	
4	96.36	21.062	2110.8300							1129
				-.5762	-160	22	1314	0	1154	
5	96.33	21.060	2110.2600							1234

6	96.33	21.060	2110.2600	.0000	00	22	1314	0	1314	1233	
7	96.28	21.056	2109.1100	-1.1475	-319	22	1312	0	993	1246	
8	96.29	21.057	2109.4000	.2915	81	22	1311	0	1392	1272	
9	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1272	
10	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1325	
11	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1311	
12	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1311	
13	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1311	
14	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1331	
15	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1371	
16	96.29	21.057	2109.4000	.0000	00	22	1311	0	1311	1431	

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
16	96.29	21.057	2109.4000							1431
				.0000	00	24	1431	0	1431	
17	96.29	21.057	2109.4000							1477
				.0000	00	26	1550	0	1550	
18	96.29	21.057	2109.4000							2059
				.0000	00	28	1669	0	1669	
19	96.29	21.057	2109.4000							2206
				-.2915	-81	28	1668	0	1588	
20	96.28	21.056	2109.1100							2320
				*******	****	28	1688	0	4808	
21	96.79	21.095	2120.3400							2376
				1.7339	482	28	1710	0	2192	
22	96.87	21.101	2122.0700							2532
				1.4414	400	28	1716	0	2116	
23	96.94	21.106	2123.5200							2570
				.5796	161	28	1720	0	1881	
24	96.96	21.108	2124.1000							2286
17 / 2 / 75				3.1787	883	28	1726	0	2609	
1	97.11	21.119	2127.2700							2388
				.2856	79	28	1732	0	1812	
2	97.12	21.120	2127.5600							2600
				4.9185	****	28	1742	0	3108	
3	97.35	21.137	2132.4800							2841
				3.7642	****	28	1757	0	2803	
4	97.52	21.150	2136.2400							2869
				5.8030	****	28	1774	0	3386	
5	97.78	21.170	2142.0500							3019
				5.5161	****	28	1794	0	3327	
6	98.03	21.189	2147.5600							2942

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	MEAN GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
6	98.03	21.189	2147.5600							2942
				3.4954	971	28	1811	0	2782	
7	98.19	21.201	2151.0600							2931
				3.2004	889	28	1823	0	2712	
8	98.34	21.212	2154.2600							2906
				2.9111	809	28	1834	0	2643	
9	98.47	21.222	2157.1700							2731
				3.2048	890	28	1845	0	2735	
10	98.62	21.233	2160.3700							2798
				4.9583	****	28	1860	0	3237	
11	98.84	21.250	2165.3300							2861
				1.4687	408	28	1872	0	2280	
12	98.91	21.255	2166.8000							2879
				4.6726	****	28	1883	0	3181	
13	99.13	21.271	2171.4700							3048
				3.8027	****	30	2034	0	3091	
14	99.30	21.284	2175.2800							3069
				2.0503	570	32	2182	0	2752	
15	99.39	21.291	2177.3300							3334
				5.5742	****	32	2199	0	3747	
16	99.65	21.310	2182.9000							3262
				4.1125	****	32	2219	0	3362	
17	99.83	21.324	2187.0100							3358
				5.8757	****	32	2241	0	3873	
18	100.10	21.344	2192.8900							3335
				1.7671	491	32	2257	1	2749	
19	100.18	21.350	2194.6600							3257
				5.0095	****	32	2272	1	3665	
20	100.41	21.367	2199.6700							3289

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	MEAN GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
20	100.41	21.367	2199.6700							3289
				1.1785	327	32	2285	3	2615	
21	100.47	21.371	2200.8400							3197
				3.5349	982	32	2296	4	3281	
22	100.63	21.383	2204.3800							3323
				4.4290	****	32	2313	5	3549	
23	100.83	21.398	2208.8100							3329
				3.5476	985	32	2330	8	3323	
24	100.99	21.410	2212.3600							3499
18 /	2 /	75		4.1409	****	32	2347	10	3507	
1	101.18	21.424	2216.5000							3577
				4.7407	****	32	2367	13	3696	
2	101.40	21.440	2221.2400							3545
				4.4473	****	32	2387	16	3639	
3	101.60	21.455	2225.6800							3609
				4.7498	****	32	2408	19	3746	
4	101.82	21.471	2230.4300							3577
				3.2676	908	32	2426	22	3356	
5	101.97	21.482	2233.7000							3698
				4.4678	****	32	2443	25	3710	
6	102.17	21.497	2238.1700							3709
				2.9783	827	32	2460	28	3316	

7	102.31	21.507	2241.1500									3606
				6.8596	****	32	2482	33	4421			
8	102.62	21.530	2248.0100									3554
				4.1785	****	32	2508	38	3706			
9	102.81	21.544	2252.1900									3469
				1.4949	415	34	2678	38	3131			
10	102.88	21.549	2253.6800									3451

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s	
10	102.88	21.549	2253.6800								3451
				.5977	166	36	2841	36	3043		
11	102.91	21.551	2254.2800								3291
				.5933	165	38	3002	33	3200		
12	102.93	21.553	2254.8700								3322
				.6011	167	38	3005	33	3206		
13	102.96	21.555	2255.4700								3340
				1.4937	415	38	3011	34	3460		
14	103.03	21.560	2256.9700								3457
				2.9978	833	38	3024	36	3892		
15	103.16	21.570	2259.9600								3565
				.5977	166	38	3033	37	3237		
16	103.19	21.572	2260.5600								3590
				2.3967	666	38	3042	39	3746		
17	103.30	21.580	2262.9600								3559
				2.6995	750	38	3056	41	3846		
18	103.42	21.589	2265.6600								3444
				.8948	249	38	3066	42	3356		
19	103.47	21.592	2266.5500								3424
				.5967	166	38	3070	43	3278		
20	103.49	21.594	2267.1500								3347
				.3040	84	38	3072	43	3200		
21	103.51	21.595	2267.4500								3254
				.0000	00	38	3073	43	3116		
22	103.51	21.595	2267.4500								3230
				.6011	167	38	3075	43	3285		
23	103.53	21.597	2268.0500								3218
				.5977	166	38	3078	44	3288		
24	103.56	21.599	2268.6500								3234

TIME hr	%FSC %	GAUGEPL. READING m	CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	GATES m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s	
24	103.56	21.599	2268.6500								3234
19 / 2 / 75				.3052	85	38	3081	44	3210		
1	103.58	21.600	2268.9600								3223
				.2949	82	38	3082	45	3209		
2	103.59	21.601	2269.2500								3225
				.6011	167	38	3085	45	3297		
3	103.62	21.603	2269.8500								3213
				-.2983	-83	38	3086	45	3048		
4	103.60	21.602	2269.5500								3187
				.6013	167	38	3087	45	3299		
5	103.63	21.604	2270.1600								3174
				.2949	82	38	3089	46	3217		

6	103.64	21.605	2270.4500								3147
				-.2949	-82	38	3089	46	3053		
7	103.63	21.604	2270.1600								3162
				.0000	00	38	3088	45	3134		
8	103.63	21.604	2270.1600								3078
				.0000	00	38	3088	45	3134		
9	103.63	21.604	2270.1600								3048
				.0000	00	38	3088	45	3134		
10	103.63	21.604	2270.1600								3032
				-1.1990	-333	38	3085	45	2797		
11	103.58	21.600	2268.9600								3002
				-.3052	-85	38	3081	44	3040		
12	103.56	21.599	2268.6500								2957
				-.5977	-166	38	3078	44	2956		
13	103.53	21.597	2268.0500								2897
				-.6011	-167	38	3075	43	2931		
14	103.51	21.595	2267.4500								2864

TIME	%FSC	GAUGE PL. READING	CAPACITY	DELTA CAPACITY	NET INFLOW	GATES		SPILL	GROSS 1-HR	MEAN INFLOW 6-HR
hr	%	m	10^6 m3	10^6 m3	m3/s	no.	m3/s	m3/s	m3/s	m3/s
14	103.51	21.595	2267.4500							2864
				-.9006	-250	38	3071	43	2863	
15	103.47	21.592	2266.5500							2816
				-1.1978	-333	38	3065	42	2774	
16	103.41	21.588	2265.3500							2823
				-1.8010	-500	38	3057	41	2597	
17	103.33	21.582	2263.5500							2775
				-1.1956	-332	38	3048	40	2756	
18	103.27	21.578	2262.3600							2712
				-.3040	-84	38	3044	39	2999	
19	103.26	21.577	2262.0500							2717
				-1.4927	-415	38	3039	38	2663	
20	103.19	21.572	2260.5600							2724
				-2.0937	-582	38	3029	37	2485	
21	103.10	21.565	2258.4700							2702
				-.9028	-251	38	3021	36	2806	
22	103.06	21.562	2257.5700							2722
				-1.4893	-414	38	3015	35	2636	
23	102.99	21.557	2256.0800							2771
				-1.4949	-415	38	3006	34	2625	
24	102.92	21.552	2254.5800							2834
20 /	2 /	75		.2905	81	38	3003	33	3117	
1	102.93	21.553	2254.8700							3012
				-.2905	-81	38	3003	33	2956	
2	102.92	21.552	2254.5800							3179
				-.5989	-166	38	3001	33	2867	
3	102.89	21.550	2253.9800							3336
				2.9841	829	38	3007	34	3870	
4	103.03	21.560	2256.9700							3413

TIME	%FSC	GAUGE PL READING	CAPACITY	DELTA CAPACITY	NET INFLOW	GATES		SPILL	GROSS 1-HR	MEAN INFLOW 6-HR
hr	%	m	10^6 m3	10^6 m3	m3/s	no.	m3/s	m3/s	m3/s	m3/s
4	103.03	21.560	2256.9700							3413
				2.0962	582	38	3021	36	3639	

5	103.12	21.567	2259.0600							3561
				1.7964	499	38	3032	37	3568	
6	103.21	21.573	2260.8600							3601
				1.7979	499	38	3042	39	3580	
7	103.29	21.579	2262.6600							3487
				2.6982	750	38	3054	40	3844	
8	103.41	21.588	2265.3500							3412
				.0000	00	38	3062	42	3103	
9	103.41	21.588	2265.3500							3335
				.3030	84	38	3062	42	3188	
10	103.42	21.589	2265.6600							3299
				.2947	82	38	3064	42	3188	
11	103.44	21.590	2265.9500							3177
				.0000	00	38	3065	42	3107	
12	103.44	21.590	2265.9500							3190
				.9053	251	38	3067	42	3361	
13	103.48	21.593	2266.8600							3061
				.0000	00	38	3070	43	3113	
14	103.48	21.593	2266.8600							2997
				-.3052	-85	40	3231	39	3185	
15	103.47	21.592	2266.5300							2929
				-3.5942	-998	42	3380	34	2415	
16	103.30	21.580	2262.9600							2885
				-2.6951	-749	44	3521	28	2800	
17	103.18	21.571	2260.2600							2867
				-2.9954	-832	44	3503	26	2697	
18	103.04	21.561	2257.2700							2750

TIME hr	%FSC %	GAUGE RDG m	EPL. CAPACITY 10^6 m3	DELTA CAPACITY 10^6 m3	NET INFLOW m3/s	GATES no.	m3/s	SPILL m3/s	GROSS 1-HR m3/s	MEAN INFLOW 6-HR m3/s
18	103.04	21.561	2257.2700							2750
				-1.4949	-415	44	3489	25	3098	
19	102.97	21.556	2255.7700							2913
				-1.7910	-498	44	3478	24	3005	
20	102.89	21.550	2253.9800							2842
				-3.5896	-997	44	3461	23	2487	
21	102.73	21.538	2250.3900							2925
				-.2961	-82	44	3449	22	3388	
22	102.71	21.537	2250.1000							2799
				-3.8789	****	44	3436	21	2379	
23	102.54	21.524	2246.2200							2756
				-.8972	-249	44	3421	19	3191	
24	102.50	21.521	2245.3200							2781
21 / 2 / 75				-3.8777	****	44	3406	18	2347	
1	102.32	21.508	2241.4400							2626
				-2.3796	-661	44	3386	17	2742	
2	102.21	21.500	2239.0600							2677
				-2.6812	-745	44	3371	15	2641	
3	102.09	21.491	2236.3800							2549
				-3.2722	-909	44	3352	14	2457	
4	101.94	21.480	2233.1100							2558
				-2.3772	-660	44	3335	13	2687	
5	101.83	21.472	2230.7300							2540
				-3.2686	-908	44	3317	11	2421	
6	101.68	21.461	2227.4600							2549
				-3.2632	-906	44	3297	10	2401	
7	101.53	21.450	2224.2000							2601

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