

Appendix III.1.7

Intake Pump List



Table (1) Intake Pump List [1-1]
(Central Water Source)

Pump No.	Pump and Motor										Status as of Oct. 1988			Remarks				
	Well No.	No. on Map	Type of Pump	Capacity (m ³ /h)	Head (m)	Lifting Pipe/Well Diameter (mm)	Casing Diameter (mm)	Well Depth (m)	Installation Date	Type of Motor	Output (Kw)	Installation Date	Control Board		Portable	Minor Damage (*)	Heavy Damage (#1)	Replaced
1			PCW-8-25-100	25	100	80	400-350	22.5	1961	PEW-22-219	22	1982	JAN-51-21	V			V	Old (#3)
2			PCW-8-25-100	25	100	80	400-350	22.6	1961	PEW-11-180	11	1982	JL-51-02	V			V	
3			PCW-8-25-100	25	100	80	350-250	25.2	1959	PEW-11-180	11	1992	JL-51-02	V			V	
4			PCW-8-25-100	25	100	80	350-250	27.3	1959	PEW-11-180	11	1992	SFT-58-02	V			V	Old (#3)
5			PCW-8-25-100	25	100	80	350-250	28.2	1959	PEW-11-180	11	1989	JL-51-02	V			V	
6			PCW-8-25-100	25	100	80	350-250	28.2	1959	PEW-8-40	8	1992	JAN-51-21	V			V	
7			PCW-8-25-100	25	100	80	350-250	25.7	1959	PEW-11-180	11	1992	JL-51-02	V			V	
8			PCW-8-25-100	25	100	80	400-350	25.0	1961	PEW-22-219	22	1992	SFT-58-02	V			V	
9			PCW-8-25-100	25	100	80	600-400	28.4	1961	PEW-22-219	22	1991	SFT-58-02	V			V	Old (#3)
10			PCW-10-63-65	63	65	100	600-400	30.7	1969	PEW-45-219	45	1989	SFT-58-02	V			V	Abandoned
11			Abandoned															
12			PCW-10-63-150	63	150	100	600-400	27.0	1972	PEW-45-219	45	1989	JL-51-02	V			V	
13			PCW-10-63-110	63	110	100	600-400	30.6	1972	PEW-32-219	32	1993	SFT-58-02	V			V	
14			PCW-10-63-65	63	65	100	600-400	31.0	1972	PEW-22-219	22	1989	SFT-58-02	V			V	
15			PCW-10-120-60	120	60	100	600-400	32.0	1972	PEW-32-219	32	1990	SFT-58-02	V			V	
16			PCW-10-63-65	63	65	100	600-400	30.0	1972	PEW-22-219	22	1989	SFT-58-02	V			V	
17			PCW-10-63-65	63	65	100	600-400	30.0	1972	PEW-22-219	22	1990	SFT-58-02	V			V	
18			PCW-10-63-65	63	65	100	600-400	30.0	1973	PEW-22-219	22	1989	SFT-58-02	V			V	
19			PCW-10-63-65	63	65	100	600-400	30.0	1973	PEW-22-219	22	1986	JL-51-02	V			V	
20			PCW-10-120-60	120	60	100	600-400	33.6	1973	PEW-32-219	32	1992	JL-51-02	V			V	
21			PCW-10-120-60	120	60	100	600-400	32.6	1973	PEW-32-219	32	1990	SFT-58-02	V			V	
22			PCW-10-63-65	63	65	100	600-400	33.3	1973	PEW-32-219	32	1990	SFT-58-02	V			V	
23			PCW-10-63-65	63	65	100	600-400	31.0	1975	PEW-22-219	22	1989	SFT-58-02	V			V	
24			PCW-10-63-65	63	65	100	600-400	30.0	1975	PEW-22-219	22	1990	SFT-58-02	V			V	
25			PCW-10-63-65	63	65	100	600-400	30.0	1975	PEW-22-219	22	1992	SFT-58-02	V			V	
26			PCW-10-120-60	120	60	100	600-400	30.0	1975	PEW-32-219	32	1992	SFT-58-02	V			V	
27			PCW-10-120-60	120	60	100	600-400	27.0	1975	PEW-32-219	32	1992	SFT-58-02	V			V	
28			PCW-10-63-65	63	65	100	700-300	32.0	1980	PEW-22-219	22	1990	SFT-58-02	V			V	
29			PCW-10-63-110	63	110	100	600-300	42.0	1980	PEW-22-219	22	1990	SFT-58-02	V			V	
30			PCW-10-63-150	63	150	100	600-300	45.0	1980	PEW-22-219	22	1990	SFT-58-02	V			V	
31			PCW-10-63-65	63	65	100	600-300	44.0	1980	PEW-22-219	22	1990	SFT-58-02	V			V	
32			PCW-10-63-65	63	65	100	600-300	42.0	1980	PEW-22-219	22	1990	JL-51-02	V			V	
33			PCW-10-63-110	63	110	100	600-300	37.0	1980	PEW-22-219	22	1990	JL-51-02	V			V	
34			PCW-10-63-65	63	65	100	600-300	37.0	1980	PEW-22-219	22	1990	JL-51-02	V			V	
35			PCW-10-63-150	63	150	100	600-300	31.0	1983	PEW-45-219	45	1989	SFT-58-02	V			V	
36			PCW-10-63-150	63	150	100	600-300	29.5	1983	PEW-22-219	22	1990	SFT-58-02	V			V	
37			PCW-10-63-65	63	65	100	600-300	31.0	1983	PEW-22-219	22	1990	JAN-51-21	V			V	
38			PCW-10-63-110	63	110	100	600-300	30.0	1983	PEW-22-219	22	1988	SFT-58-02	V			V	
39			PCW-10-63-150	63	150	100	600-300	40.0	1983	PEW-45-219	45	1990	SFT-58-02	V			V	
40			PCW-10-63-150	63	150	100	600-300	40.0	1983	PEW-22-219	22	1990	JL-51-02	V			V	
41			PCW-10-63-110	63	110	100	600-300	30.6	1983	PEW-22-219	22	1990	JL-51-02	V			V	
42			PCW-8-25-100	25	100	80	600-300	34.0	1983	PEW-11-180	11	1990	JL-51-02	V			V	
43			PCW-8-25-100	25	100	80	600-300	32.0	1983	PEW-22-219	22	1989	JL-51-02	V			V	
44			PCW-8-25-100	25	100	80	600-300	35.0	1983	PEW-11-180	11	1990	SFT-58-02	V			V	
45			PCW-8-25-100	25	100	80	600-300	27.0	1983	PEW-11-180	11	1986	SFT-58-02	V			V	

(*) : Minor damage able to be repaired by ISSAC
 (#2) : Heavy damage or broken; to be replaced
 (#3) : Old and deteriorated

Legend:

**Intake Pump List [1-2]
(Central Water Source)**

Well No.	Pump No.	No. on Map	Type of Pump	Capacity (m ³ /h)	Head (m)	Lifting Pipe Diameter (mm)	Casing Diameter (mm)	Well Depth (m)	Pump and Motor		Type of Motor	Output (T/h)	Installation Date	Control Board	Status as of Oct. 1993			Remarks
									Well Diameter (mm)	Motor					Workable	Minor Damage (%)	Heavy Damage (%)	
46	46/59	PCW-10-63-65	63	65	100	600-300	30.0	1983	PCW-22-219	22	1980	SET-58-02	V					
47	47/58	PCW-10-63-65	63	65	100	600-300	33.0	1983	PCW-22-219	22	1981	SET-58-02	V					
48	48/57	PCW-10-63-65	63	65	100	600-300	33.0	1983	PCW-22-219	22	1985	SET-58-02	V					
49	49/56	PCW-10-63-65	63	65	100	600-300	28.0	1983	PCW-22-219	22	1988	SET-58-02	V					
50		Transferred														Transferred		
51	51/64	PCW-10-63-65	63	65	100	600-300	30.0	1984	PCW-22-219	22	1982	SET-58-02	V					
52	52/65	PCW-10-63-65	63	65	100	600-300	32.0	1984	PCW-22-219	22	1988	JAN-51-21	V					
53	53/66	PCW-10-63-65	63	65	100	600-300	31.0	1984	PCW-22-219	22	1989	SET-58-02	V					
54	54/67	PCW-10-63-65	63	65	100	600-300	41.0	1984	PCW-22-219	32	1982	SET-58-02	V					
55	55/68	PCW-10-63-65	63	65	100	600-300	30.0	1984	PCW-22-219	32	1985	SET-58-02	V					
56	56/69	PCW-8-25-100	25	100	80	600-300	26.0	1984	PCW-11-180	11	1992	SET-58-02	V					
57	57/70	PCW-8-25-100	25	100	80	600-300	26.0	1984	PCW-11-180	11	1991	SET-58-02	V					
58	58/71	PCW-8-25-100	25	100	80	600-300	25.0	1984	PCW-11-180	11	1984	SET-58-02	V					
59	59/73	PCW-10-63-65	63	65	100	600-300	23.0	1984	PCW-22-219	22	1982	SET-58-02	V					
60	60/74	PCW-10-63-65	63	65	100	600-300	24.0	1984	PCW-22-219	22	1987	SET-58-02	V					
61	61/75	PCW-8-25-100	25	100	80	600-300	26.0	1984	PCW-11-180	11	1983	SET-58-02	V					
62	62/76	PCW-8-25-100	25	100	80	600-300	18.0	1984	PCW-11-180	11	1984	SET-58-02	V					
63	63/77	PCW-8-25-100	25	100	80	600-300	21.0	1984	PCW-11-180	11	1984	JAN-51-11	V					
64	64/78	PCW-8-25-100	25	100	80	600-300	22.0	1984	PCW-11-180	11	1990	SET-58-01	V					
65	65/79	PCW-8-25-100	25	100	80	600-300	22.0	1984	PCW-11-180	11	1992	SET-58-01	V					
66	66/80	PCW-8-25-100	25	100	80	600-300	22.0	1984	PCW-11-180	11	1990	SET-58-01	V					
67	67/81	PCW-6-10-80	10	80	60	600-300	22.0	1984	PCW2-8-140	2.8	1983	SET-58-01	V					
68	68/82	PCW-6-10-80	10	80	60	600-300	22.0	1984	PCW2-8-140	2.8	1984	SET-58-01	V					
69	69/8a	PCW-10-63-65	63	65	100	600-300	28.0	1984	PCW-22-219	22	1990	SET-58-01	V					
70	70/8a	PCW-10-63-65	63	65	100	600-300	28.0	1984	PCW-22-219	22	1984	SET-58-01	V					
71	71/8a	PCW-8-40-60	40	60	80	600-300	24.0	1984	PCW-11-180	11	1984	SET-58-01	V					
72	72/8a	PCW-8-25-100	25	100	80	600-300	21.0	1984	PCW-11-180	11	1988	JAN-51-11	V					

(#1): Minor damage able to be repaired by USAC
 (#2): Heavy damage or broken; to be replaced
 (#3): Old and deteriorated

[Legend]

Number of Pumps to be Replaced with New Pump	23
Technical Specification of New Pump	
Capacity (m ³ /h)	60
Head (m)	22
Output (T/h)	23

Table (2) Intake Pump List [2]
(Industrial Water Source)

Pump No. Well No. No. on Map	Pump And Motor										Status as of Oct. 1993			Remarks
	Type of Pump	Capacity (m ³ /h)	Head (m)	Lifting Pipe Well Diameter (mm)	Casing Diameter (mm)	Well Depth (m)	Installation Date	Type of Motor	Output (kw)	Control Board	Portable	Minor Damage (#1)	Heavy Damage (#2)	
1	3 P2W-10-63-110	63	110	100	400-200	21.60	1983 P2W-32-219	32	1976 JN-51-02	V	V	V	V	Old (#3)
2	4 P2W-14-1-3	200	75	200	400-200	27.00	1983 P2W-55	55	1983 SET-50-02	V	V	V	V	
3	5 P2W-14-1-3	200	75	200	400-200	26.10	1983 P2W-55	55	1983 P2W-50-03	V	V	V	V	
4	6 P2W-10-63-65	63	65	100	400-200	25.40	1983 P2W-22-219	22	1982 P2W-50-03	V	V	V	V	
5	7 P2W-10-63-65	63	65	100	400-200	25.00	1983 P2W-22-219	22	1980 P2W-50-03	V	V	V	V	
6	8 P2W-10-63-65	63	65	100	400	25.20	1983 P2W-22-219	22	1983 JN-51-21	V	V	V	V	
7	9 P2W-12-160-65	160	65	150	400	26.00	1983 P2W-45-270	45	1980 JN-51-02	V	V	V	V	Old (#3)
8	10 P2W-14-1-3	200	75	200	400	53.50	1975 A8S-55	55	1984 P2W-50-03	V	V	V	V	
9	11 P2W-14-1-3	200	75	200	400-300	48.00	1975 A8S-55	55	1984 P2W-50-03	V	V	V	V	
10	12 P2W-14-1-3	200	75	200	400-300	50.00	1975 A8S-55	55	1984 P2W-50-03	V	V	V	V	Old (#3)
11	13 P2W-10-63-150	63	150	100	400-300	43.20	1975 P2W-45-270	45	1993 JN-51-02	V	V	V	V	
12	14 P2W-10-63-65	63	65	100	400-300	30.00	1977 P2W-22-219	22	1977 SET-58-02	V	V	V	V	Old (#3)
13	15 P2W-12-160-65	160	65	150	400-300	30.00	1977 P2W-45-270	45	1992 SET-58-02	V	V	V	V	
14	16 P2W-12-160-65	160	65	150	400	32.00	1977 P2W-45-270	45	1993 SET-58-02	V	V	V	V	
15	17 P2W-10-63-65	63	65	100	400	30.00	1977 P2W-22-219	22	1886 SET-58-02	V	V	V	V	
16	18 P2W-12-160-65	160	65	150	400	30.00	1975 P2W-45-270	45	1889 SET-58-02	V	V	V	V	

(#1): Minor damage able to be repaired by ISAC
(#2): Heavy damage or broken; to be replaced
(#3): Old and deteriorated

[Legend]

Number of Pumps to be Replaced with New Pump	7
Technical Specification of New Pump	
Capacity (m ³ /h)	
Head (m)	60
Output (kw)	37

Table (3) Intake Pump List [3]
(Meat Complex Water Source)

Pump No. Well No. No. on Map	Pump And Motor										Status as of Oct. 1993			Remarks
	Type of Pump	Capacity (m ³ /h)	Head (m)	Lifting Pipe Well Diameter (mm)	Casing Diameter (mm)	Well Depth (m)	Installation Date	Type of Motor	Output (kw)	Control Board	Portable	Minor Damage (#1)	Heavy Damage (#2)	
1	P2W-10-120-60	120	60	100	600-400	28.00	1965 P2W-45-270	45	1990 SET-58-02	V	V	V	V	
2	P2W-12-160-65	160	65	150	600-400	28.20	1965 P2W-45-270	45	1990 SET-58-02	V	V	V	V	Old (#3)
3	P2W-12-160-65	160	65	150	600-400	28.00	1965 P2W-45-270	45	1992 SET-58-02	V	V	V	V	Old (#3)
4	P2W-14-1-3	200	75	200	600-400	28.00	1965 A8S-55	55	1965 P2W-50-03	V	V	V	V	Old (#3)
5	P2W-10-120-60	120	60	100	600-400	28.10	1965 P2W-45-270	45	1987 SET-58-02	V	V	V	V	
6	P2W-10-63-65	63	65	100	600-250	40.00	1978 P2W-22-219	22	1986 SET-58-02	V	V	V	V	
7	P2W-10-63-65	63	65	100	600-250	40.00	1978 P2W-22-219	22	1984 SET-58-02	V	V	V	V	
8	P2W-10-63-65	63	65	100	600-250	40.00	1978 P2W-22-219	22	1986 SET-58-02	V	V	V	V	

(#1): Minor damage able to be repaired by ISAC
(#2): Heavy damage or broken; to be replaced
(#3): Old and deteriorated

[Legend]

Number of Pumps to be Replaced with New Pump	5
Technical Specification of New Pump	
Capacity (m ³ /h)	
Head (m)	60
Output (kw)	37

Table (4) Intake Pump List [4] (Upper Water Source)

Well No.	Pump No.	Pump And Motor		Capacity (m ³ /h)	Read (m)	Lifting Pipe (m)	Casing Diameter (cm)	Well Depth (m)	Installation Date	Type of Motor	Output (kw)	Installation Date	Control Board	Status as of Oct. 1993			Remarks
		Type of Pump	Well Diameter (cm)											Motor Capacity (kw)	Minor Damage (\$)	Heavy Damage (\$)	
1	1	ECM-10-120-60	65	100	630-325	30	1990	PEM-22-219	22	1990	JAN-51-21	✓					
2	2	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
3	3	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
4	4	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
5	5	ECM-10-120-60	120	100	630-325	32	1990	PEM-22-219	32	1990	JAN-51-21	✓					
6	6	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
7	7	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
8	8	ECM-10-120-60	120	100	630-325	35	1990	PEM-22-219	32	1990	JAN-51-21	✓					
9	9	ECM-10-120-60	120	100	630-325	32	1990	PEM-22-219	32	1990	JAN-51-21	✓					
10	10	ECM-10-63-65	63	100	630-325	33	1990	PEM-22-219	22	1990	JAN-51-21	✓					
11	11	ECM-10-63-65	63	100	630-325	28	1990	PEM-22-219	22	1990	JAN-51-21	✓					
12	12	ECM-10-63-65	63	100	630-325	26	1990	PEM-22-219	22	1990	JAN-51-21	✓					
13	13	ECM-10-120-60	120	100	630-325	27	1990	PEM-22-219	32	1990	JAN-51-21	✓					
14	14	ECM-12-160-65	160	150	630-325	36	1990	PEM-45-270	45	1990	JAN-51-21	✓					
15	15	ECM-12-160-65	160	150	630-325	28	1990	PEM-45-270	45	1990	JAN-51-21	✓					
16	16	ECM-12-160-65	160	150	630-325	31	1990	PEM-45-270	45	1990	JAN-51-21	✓					
17	17	ECM-12-160-65	160	150	630-325	30	1990	PEM-45-270	45	1990	JAN-51-21	✓					
18	18	ECM-10-63-65	63	100	630-325	30	1990	PEM-22-219	22	1990	JAN-51-21	✓					
19	19	ECM-10-120-60	120	100	630-325	31	1990	PEM-22-219	32	1990	JAN-51-21	✓					
20	20	ECM-10-120-60	120	100	630-325	32	1990	PEM-22-219	32	1990	JAN-51-21	✓					
21	21	ECM-12-160-65	160	150	630-325	31	1990	PEM-45-270	45	1990	JAN-51-21	✓					
22	22	ECM-12-160-65	160	150	630-325	33	1990	PEM-45-270	45	1990	JAN-51-21	✓					
23	23	ECM-12-160-65	160	150	630-325	31	1990	PEM-45-270	45	1990	JAN-51-21	✓					
24	24	ECM-12-160-65	160	150	630-325	32	1990	PEM-45-270	45	1990	JAN-51-21	✓					
25	25	ECM-12-160-65	160	150	630-325	23	1990	PEM-45-270	45	1990	JAN-51-21	✓					
26	26	ECM-12-160-65	160	150	630-325	34	1990	PEM-45-270	45	1990	JAN-51-21	✓					
27	27	ECM-10-120-60	120	100	630-325	30	1990	PEM-22-219	32	1990	JAN-51-21	✓					
28	28	ECM-10-120-60	120	100	630-325	37	1990	PEM-22-219	32	1990	JAN-51-21	✓					
29	29	ECM-10-120-60	120	100	630-325	40	1990	PEM-22-219	32	1990	JAN-51-21	✓					
30	30	ECM-12-160-65	160	150	630-325	37	1990	PEM-45-270	45	1990	JAN-51-21	✓					
31	31	ECM-10-120-60	120	100	630-325	31	1990	PEM-22-219	32	1990	JAN-51-21	✓					
32	32	ECM-12-160-65	160	150	630-325	34	1990	PEM-45-270	45	1990	JAN-51-21	✓					
33	33	ECM-10-120-60	120	100	630-325	36	1990	PEM-22-219	32	1990	JAN-51-21	✓					
34	34	ECM-10-120-60	120	100	630-325	35	1990	PEM-22-219	32	1990	JAN-51-21	✓					
35	35	ECM-12-160-65	160	150	630-325	35	1990	PEM-45-270	45	1990	JAN-51-21	✓					
36	36	ECM-10-120-60	120	100	630-325	35	1990	PEM-22-219	32	1990	JAN-51-21	✓					
37	37	ECM-10-120-60	120	100	630-325	27	1990	PEM-22-219	32	1990	JAN-51-21	✓					
38	38	ECM-10-120-60	120	100	630-325	33	1990	PEM-22-219	32	1990	JAN-51-21	✓					
39	39	ECM-12-160-65	160	150	630-325	30	1990	PEM-45-270	45	1990	JAN-51-21	✓					

(*)1: Minor damage able to be repaired by USAG
 (*)2: Heavy damage or broken; to be replaced
 (*)3: Old and deteriorated

Number of Pumps to be Replaced with new Pump: 0

Appendix III.1.8

Drawings of Intake Pump Houses



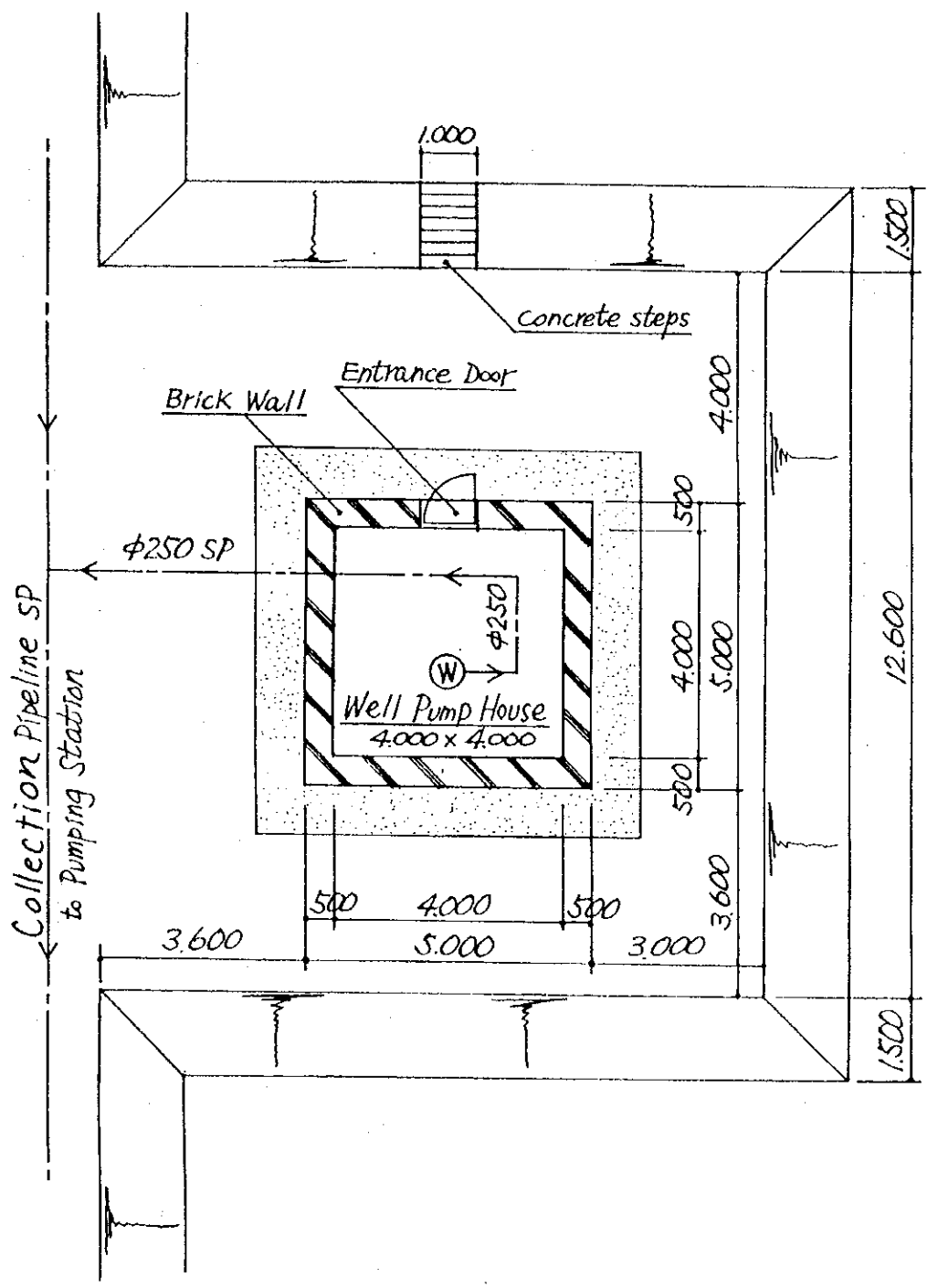


Fig (1) Typical Intake Pump House General Layout
 JICA The Study on Water Supply System in Ulaanbaatar and Surroundings

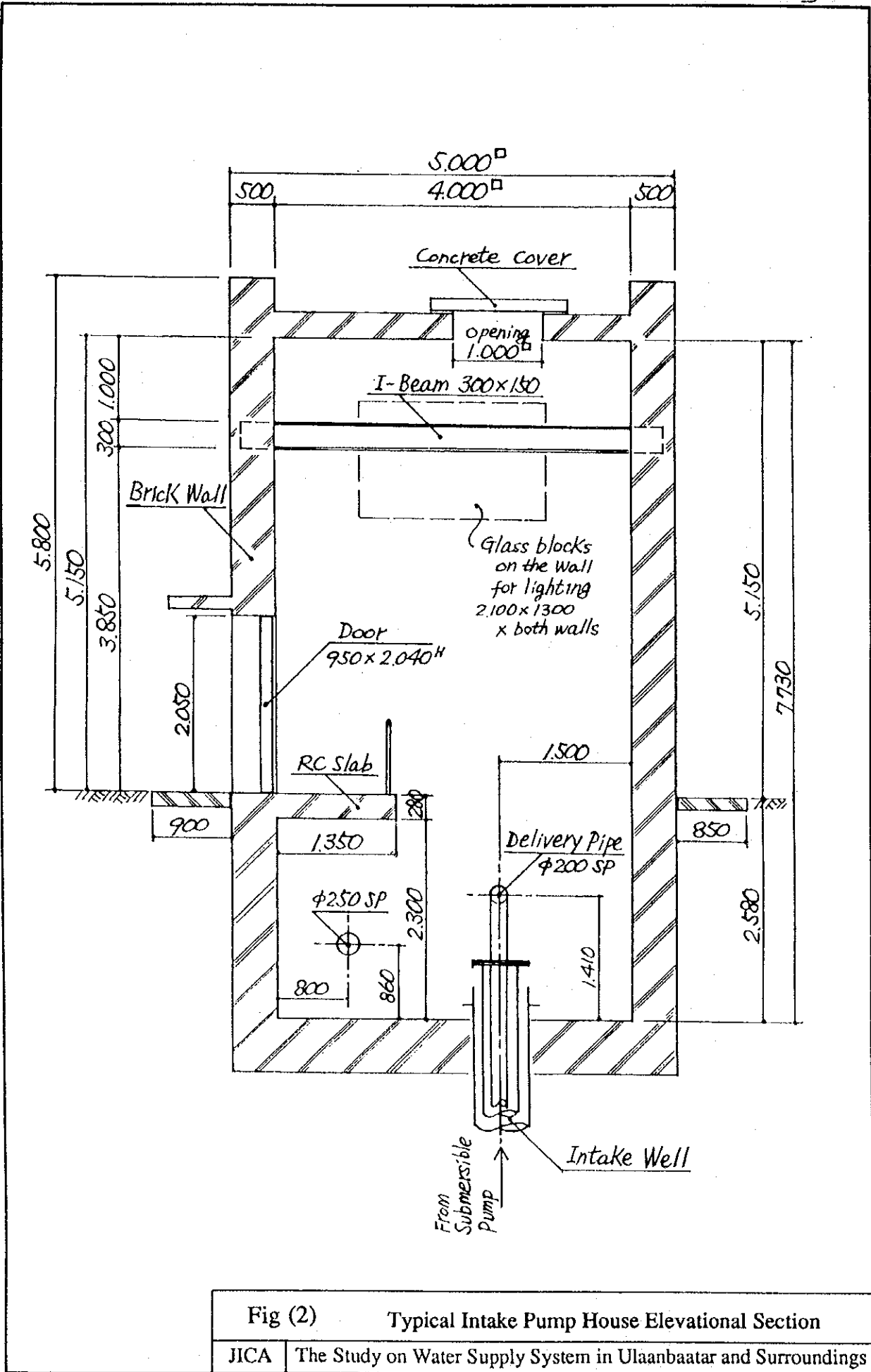


Fig (2) Typical Intake Pump House Elevational Section

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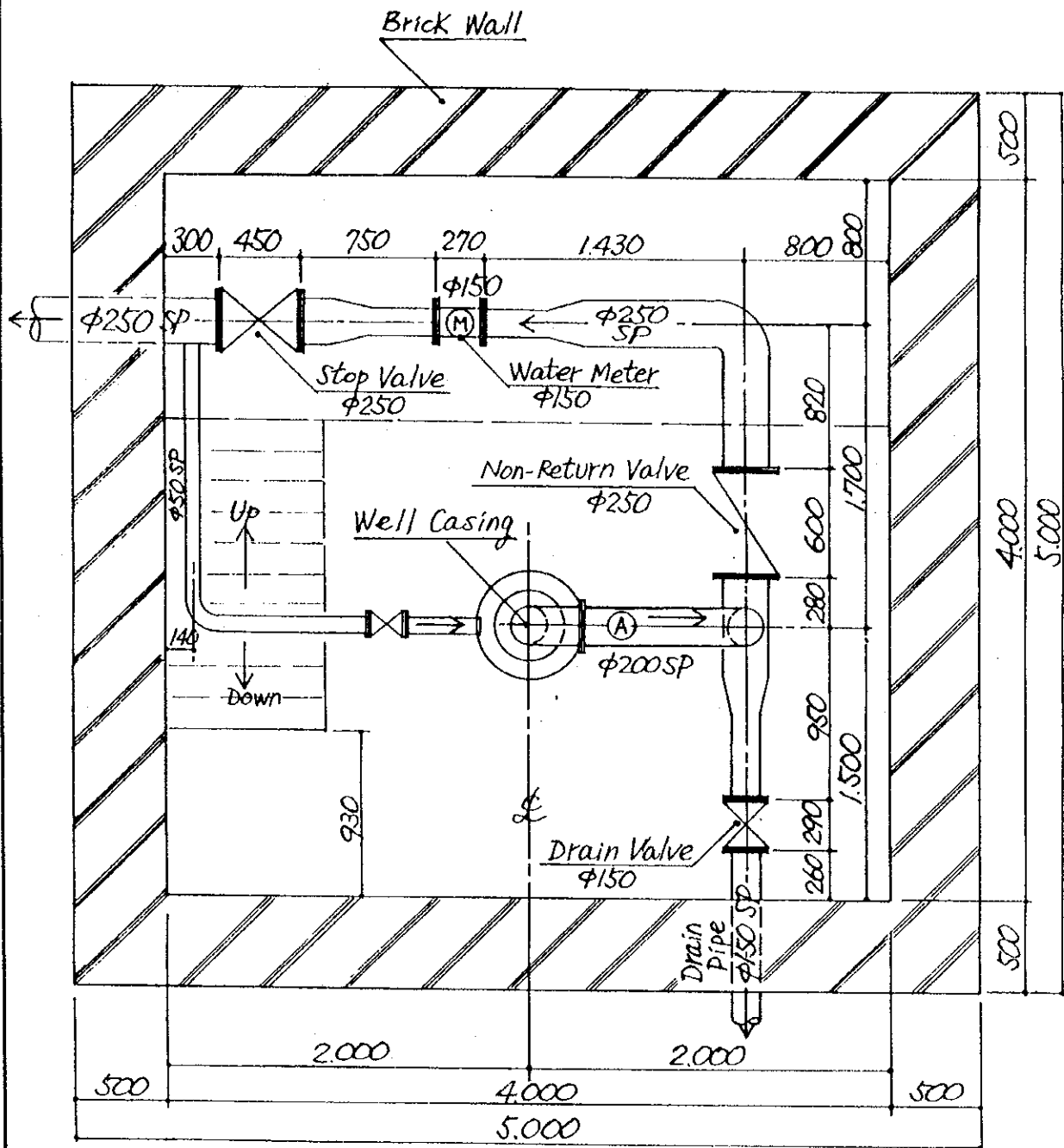


Fig (3) Typical Intake Pump House Basement Plan

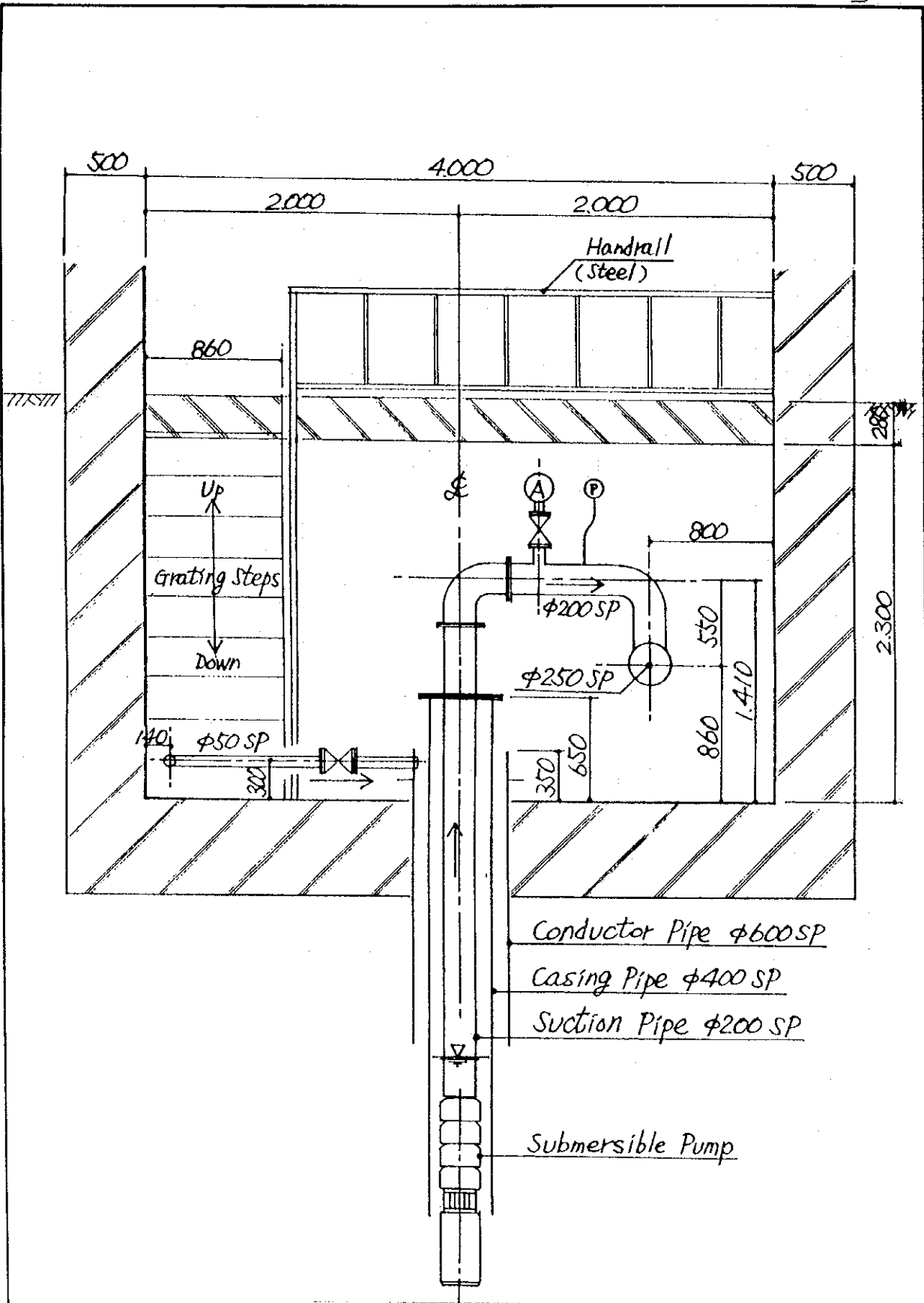


Fig (4) Typical Intake Pump House Basement Section
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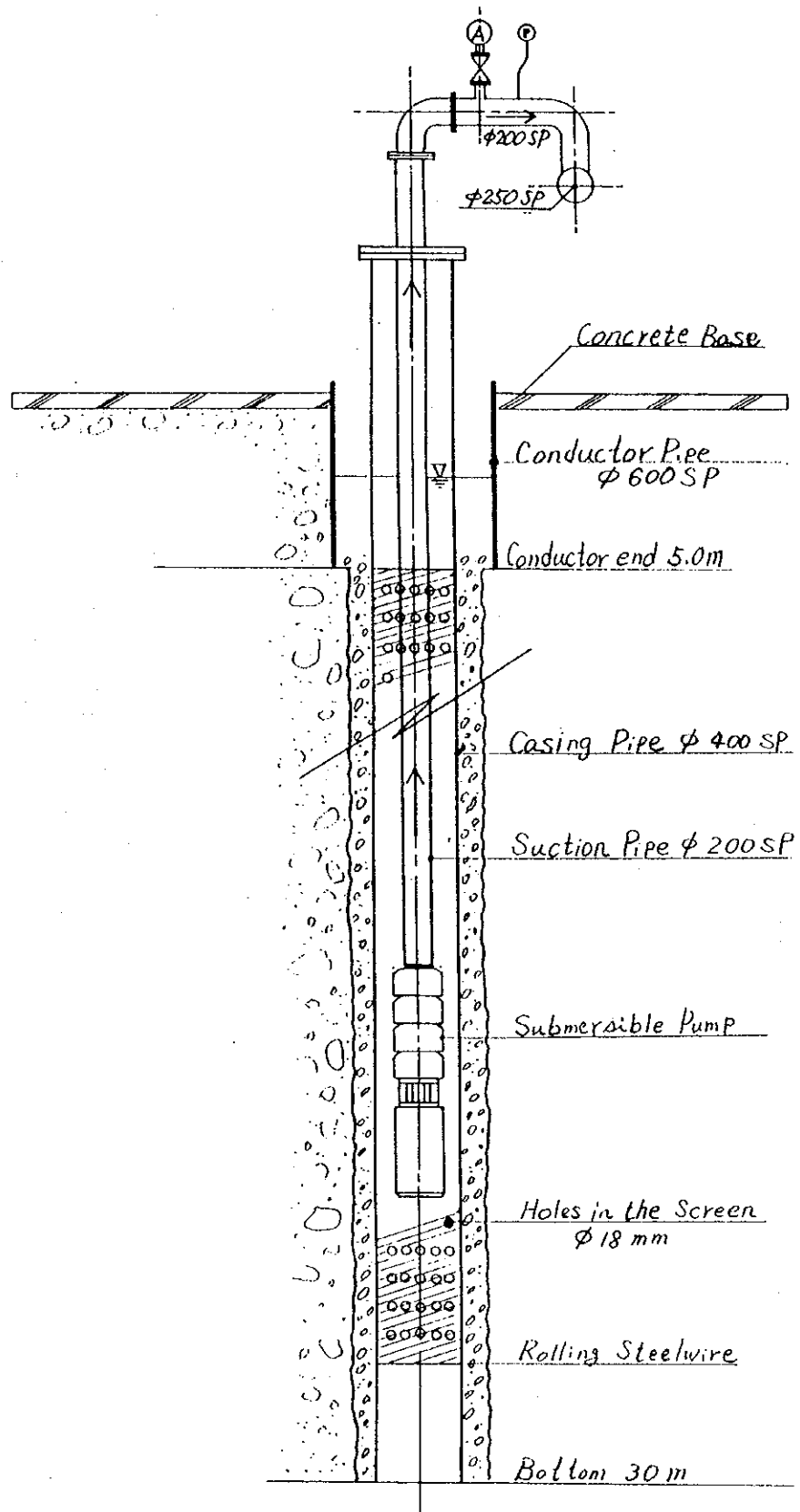


Fig (5) Typical Intake Well

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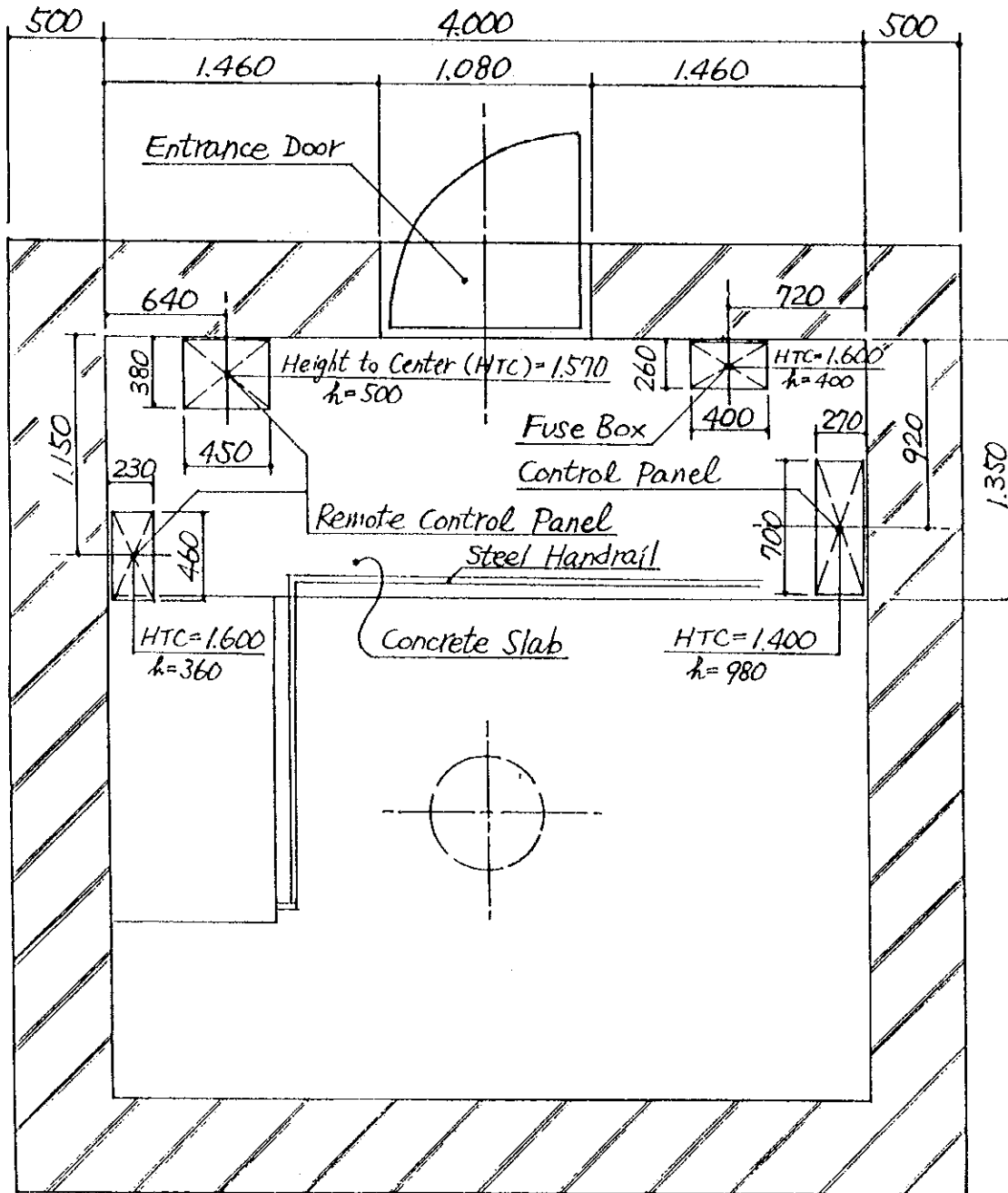


Fig (6) Typical Intake Pump House Groundfloor Plan
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Appendix III.1.9
Layout of the Pumping Stations



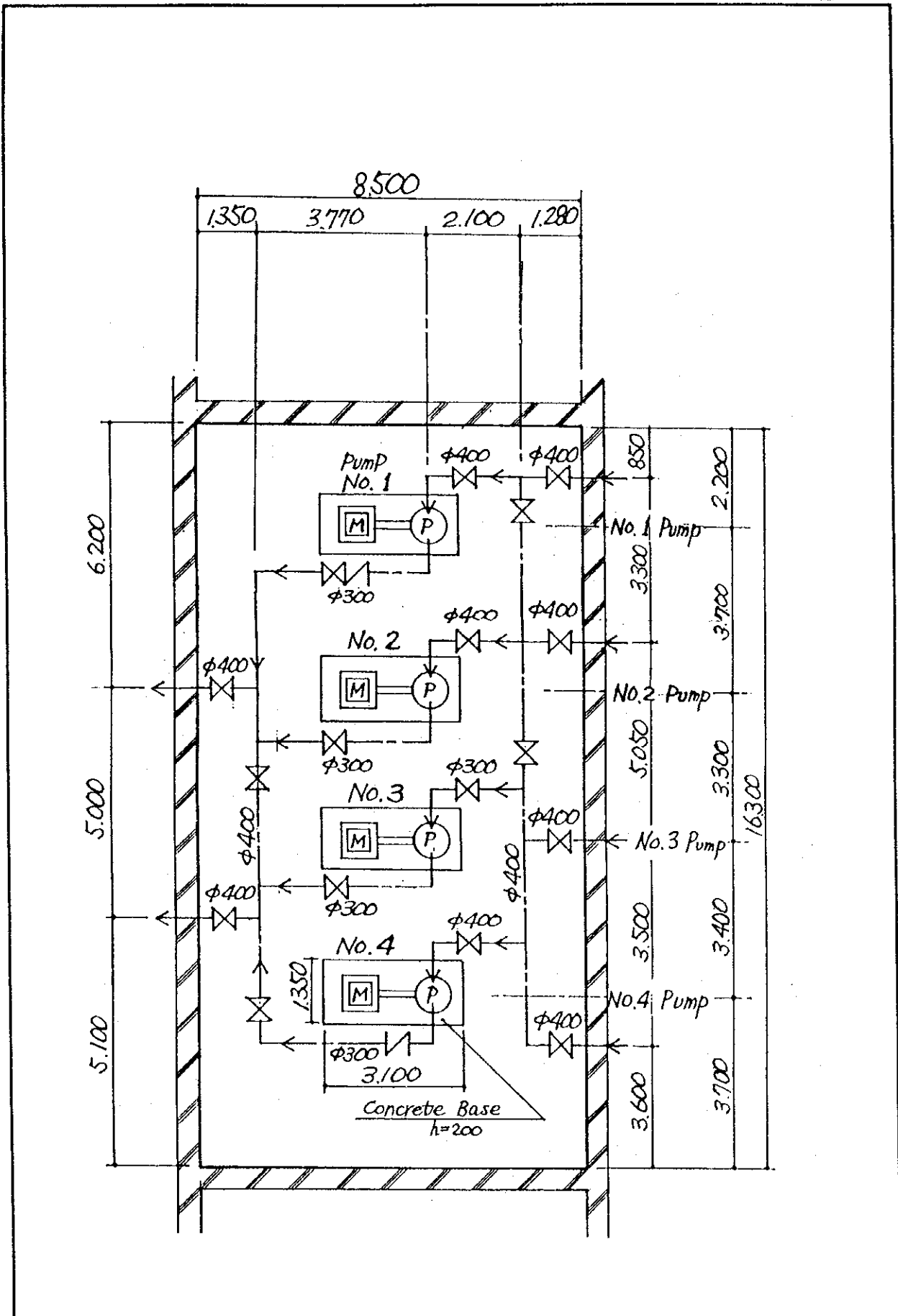


Fig (1) Central Water Source Pumping Station (Old)

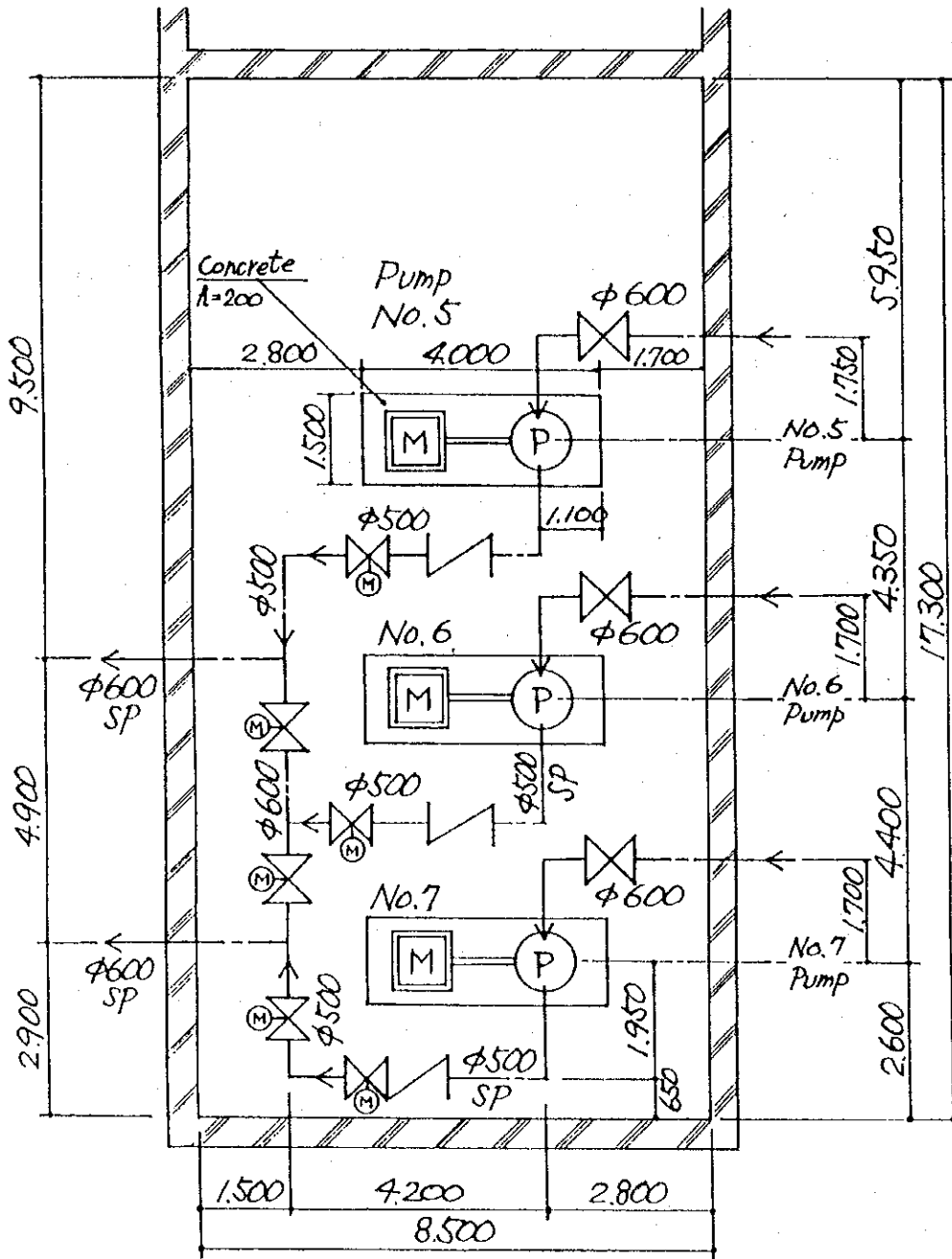


Fig (2) Central Water Source Pumping Station (New)

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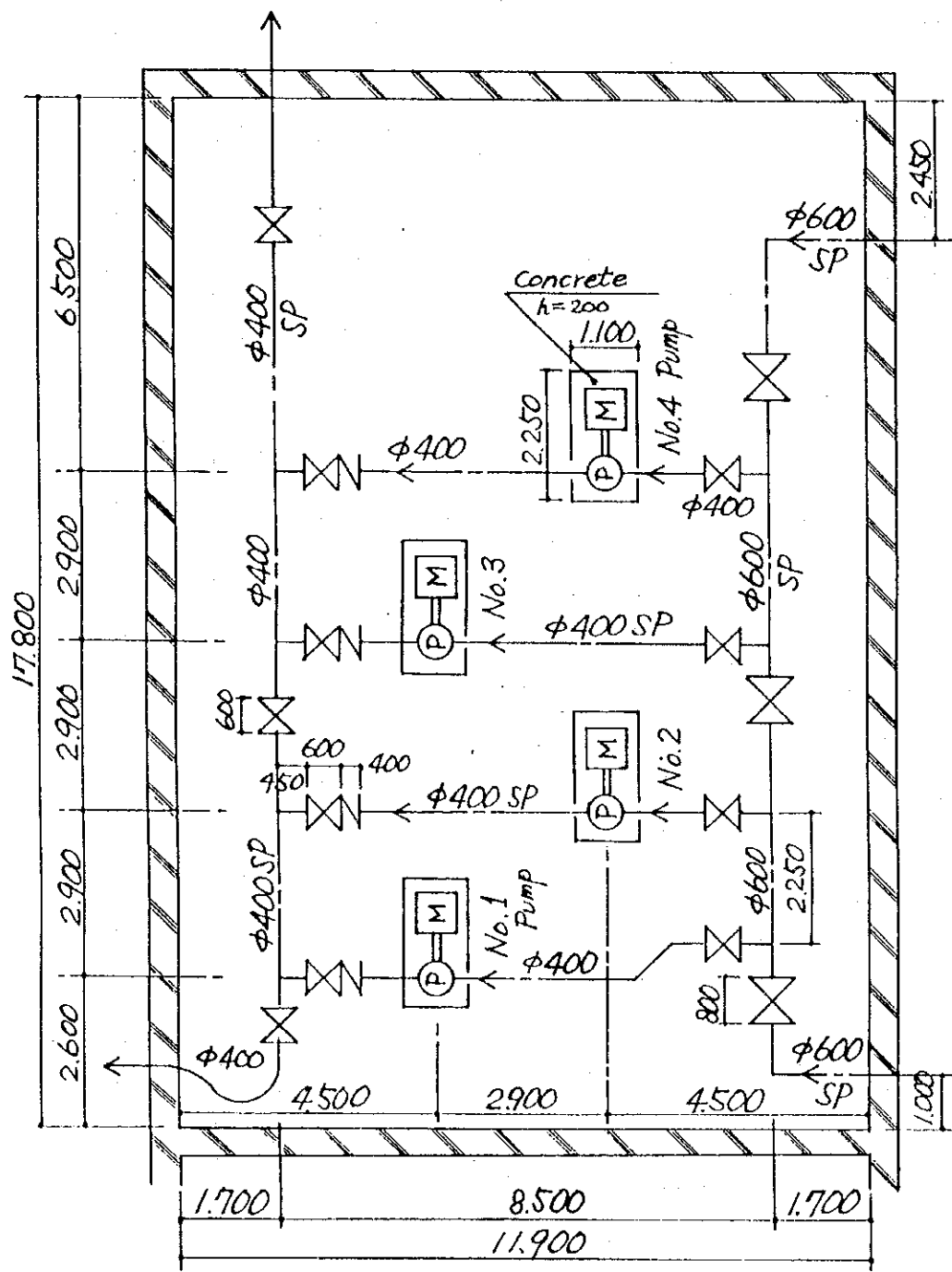


Fig (3) Tasgan Pumping Station
 JICA The Study on Water Supply System in Ulaanbaatar and Surroundings

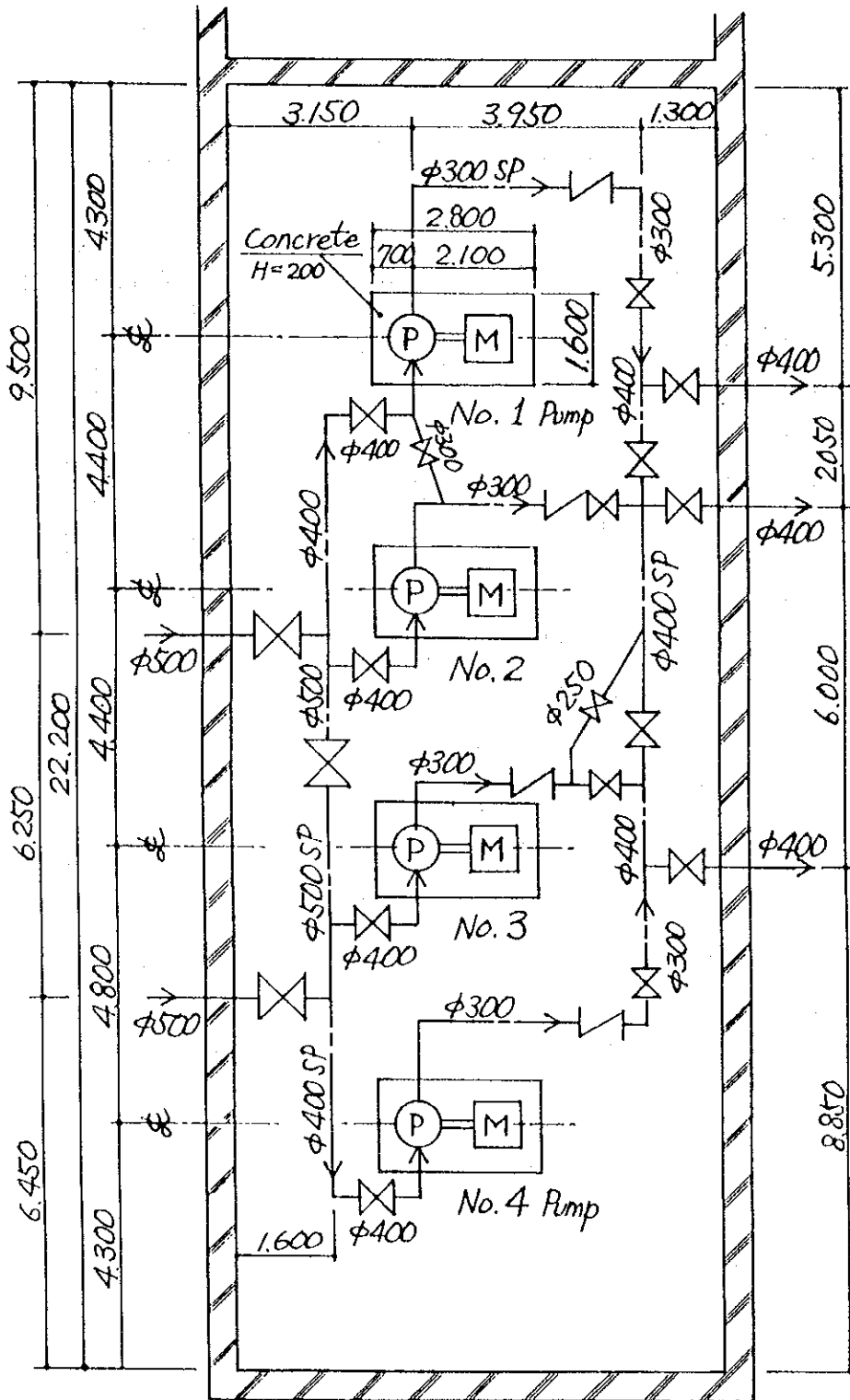


Fig (4) Industrial Water Source Pumping Station

JICA The Study on Water Supply System in Ulaanbaatar and Surroundings

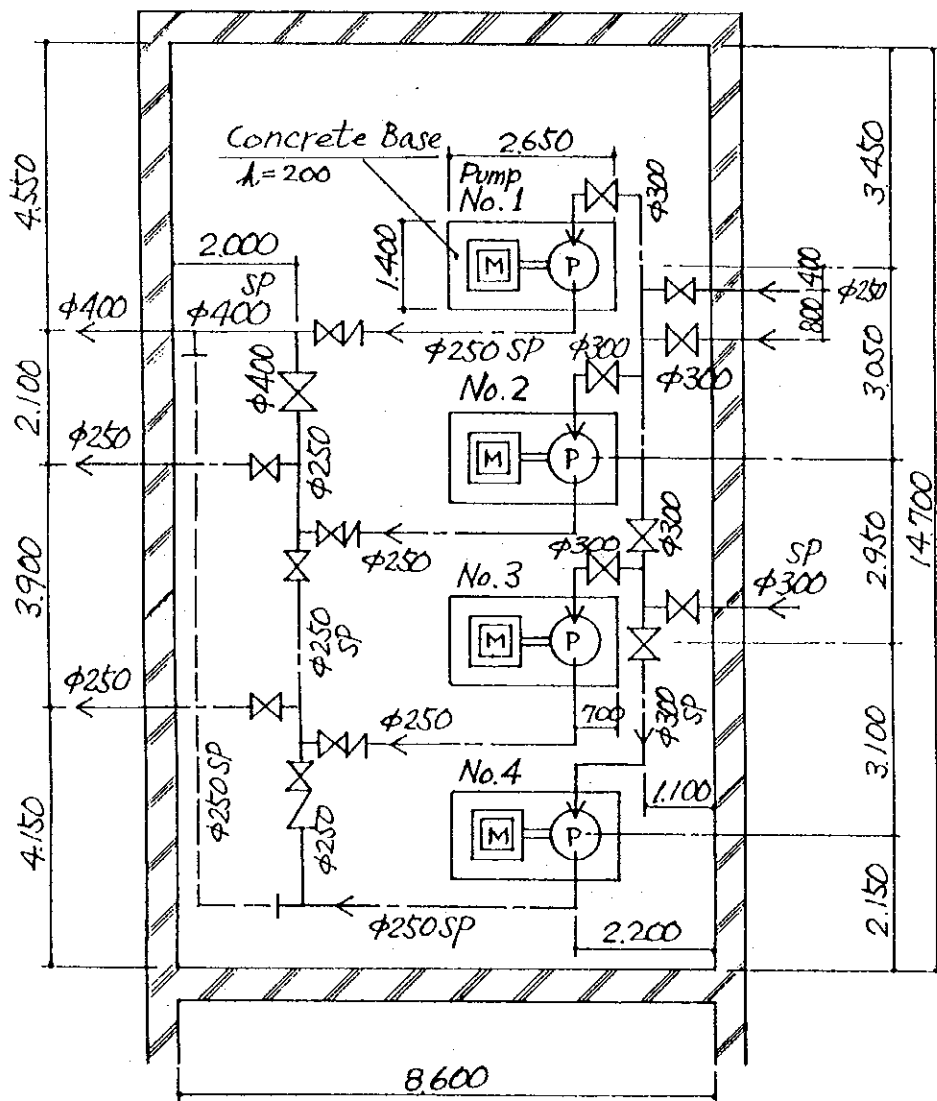


Fig (5) Meat Complex Water Source Pumping Station

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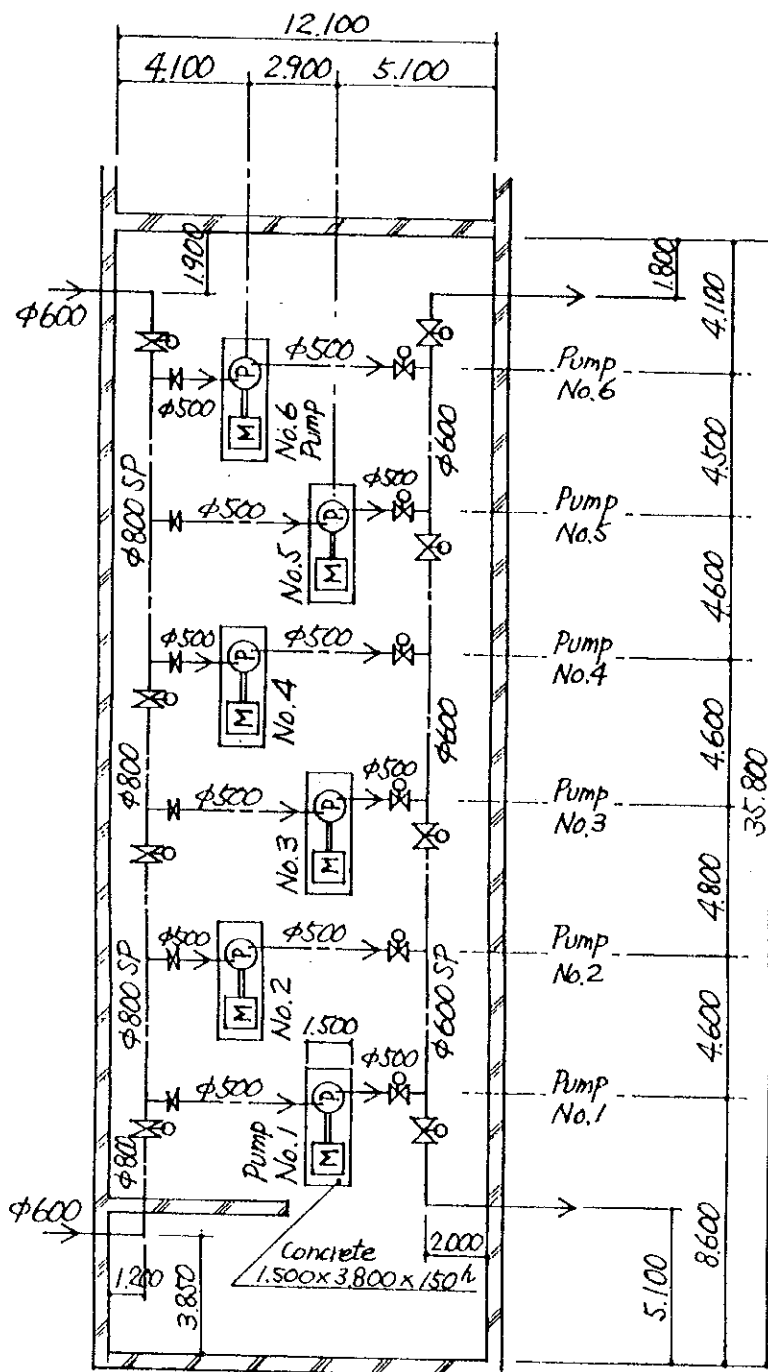


Fig (6) Upper Water Source Pumping Station

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Appendix III 1.10

**Survey on Water Taps
Conditions in Apartment Buildings**



Appendix III.1.10

A Survey on Water Taps Conditions in Apartment Buildings

During the course of the present study, a survey was carried out on the actual conditions of water service taps/faucets installed in household rooms in apartment buildings, in order to find present situation of wastage of water and leakage from water taps in apartment buildings.

The survey was carried out by individual interview method on four (4) apartment buildings, two old buildings and other two middle-aged; thus 40 households' water taps in total were surveyed. Its survey result is given in Tables (1) to (4).

The findings from the survey result are as follows:

- Water taps are installed in kitchens, bathrooms, toilets and washbasins in general, and total number of water taps is four (4) in average in each household.
- In old buildings, most of water taps (87%) are not functioning well, causing leakage and wastage.
- Combining old and middle-aged buildings, about 62% of water taps are not in good condition, which requires repair work.

Recommendations

- 1) All the water taps in the existing buildings should be checked to be repaired. The check work should start in particular from older buildings.
- 2) All water taps are recommended to be equipped with water meters for the purpose of water charge which should be paid based on the water volume actually consumed. Although installation of water meters to existing buildings is considered comparatively difficult, at least newly-planned buildings should have water meters in each household.

Table (1) Water Taps Survey Sheet (No.1)

Survey Date : 12 October 1993

Name of Apartment Building : Bldg. No.13 / 120,000 District

Building Status : Old

Room No.	Water Taps (Number and Condition)						Remarks
	Kitchen		Bathroom		Toilet	Washbasin	
	Mixed	Single	Mixed	Single			
1) 1		2		2	1 (*)	1 (*)	
2) 2		2	1		1 (*)	1 (*)	
3) 3		2	1		1 (*)	1 (*)	
4) 4	2			2	1 (*)	1 (*)	
5) 5		2		2	1 (*)	1 (*)	
6) 6		2		2	1 (*)	1 (*)	
7) 7		2		2	1 (*)	1 (*)	
8) 8		2		2	1 (*)	1 (*)	
9) 9		2		2	1 (*)	1 (*)	
10) 10		2		2	1 (*)	1 (*)	
11) 11		2		2	1 (*)	1 (*)	
12) 12	2		2		1 (*)	1 (*)	

(Note): (1) * Working in good condition.

(2) All water taps except (*) are no good.

Table (2) Water Taps Survey Sheet (No.2)

Survey Date : 14 October 1993
 Name of Apartment Building : Bldg. No.3 / 3rd 4th Microdistrict
 Building Status : Middle-Aged

Room No.	Water Taps (Number and Condition)				Remarks		
	Kitchen		Bathroom			Toilet	Washbasin
	Mixed	Single	Mixed	Single			
1) 33	1 (*)		1 (*)		1 (*)		
2) 34	1 (*)		1		1		
3) 20	1 (*)		1 (*)		1 (*)		
4) 11	1 (*)		1 (*)		1 (*)		
5) 63	1 (*)		1		1 (*)		
6) 57	1 (*)		1 (*)		1		
7) 44	1 (*)		1		1		
8) 105	1 (*)		1 (*)		1 (*)		
9) 108	1		1 (*)		1 (*)		
10) 102	1 (*)		1 (*)		1		
11) 99	1		1 (*)		1		
12) 93	1 (*)		1		1		

(Note): (1) * Working in good condition.
 (2) All water taps except (*) are no good.

Table (3) Water Taps Survey Sheet (No.3)

Survey Date : October 1993
 Name of Apartment Building : 40,000 District
 Building Status : Old

Room No.	Water Taps (Number and Condition)				Remarks		
	Kitchen		Bathroom			Toilet	Washbasin
	Mixed	Single	Mixed	Single			
1) 18-35	1 (*)		1			2 (*)	
2) 62-23	1			1			
3) 6-40	1		1			2	Repaired by himself
4) 9-49	1		1 (*)			2	Repaired by himself
5) 26-33	1		1			2	
6) 21-16	1 (*)		1 (*)			2 (*)	
7) 24-87	1		1			1 (*)	

(Note): (1) * Working in good condition.
 (2) All water taps except (*) are no good.

Table (4) Water Taps Survey Sheet (No.4)

Survey Date : October 1993

Name of Apartment Building : Building No. 30, 1 and 3a

Building Status : Middle-Aged

Room No.	Water Taps (Number and Condition)					Remarks	
	Kitchen		Bathroom		Toilet		Washbasin
	Mixed	Single	Mixed	Single			
1) 30-5	1 (*)		1 (*)		1	1 (*)	Repaired in 1990
2) 1-37	1		1		1 (*)	1 (*)	Repaired in 1986
3) 3a-1	1 (*)		1 (*)		1 (*)	1 (*)	
4) 30-15	1 (*)		1 (*)		1 (*)	1 (*)	Started in 1991
5) 3-18	1 (*)		1 (*)		1 (*)	1 (*)	
6) 1-5	1 (*)		1		1 (*)	1 (*)	
7) 1-23	1 (*)		1		1	1 (*)	
8) 3a-8	1 (*)		1 (*)		1 (*)	1 (*)	
9) 3a-45	1 (*)		1 (*)		1 (*)	1 (*)	

(Note): (1) * Working in good condition.

(2) All water taps except (*) are no good.

Appendix III.1.11

Result of the Monthly Water Quality Analysis of Raw Wastewater and Treated

Appendix III.1.11 Results of the Monthly Water Quality Analysis of Raw Wastewater and Treated Wastewater (Average)

Year	Items	Month												Average
		1	2	3	4	5	6	7	8	9	10	11	12	
1988	SS	194.80	163.40	165.30	183.80	174.60	140.60	145.20		219.70	294.30	236.00	242.40	196.37
	Treated W (mg/l)	10.40	30.90	9.80	11.10	7.50	7.50	8.00		11.50	32.70	18.40	14.30	14.74
	Removal Eff	94.66	81.09	94.07	93.96	95.70	94.67	94.49		94.77	88.89	92.20	94.10	92.60
1989	BOD5	166.80	165.00	157.00	162.60	170.60	150.60	130.60		219.70	294.30	236.00	242.40	190.51
	Treated W (mg/l)	14.30	20.40	12.00	12.60	10.90	12.00	15.20		11.50	32.70	18.40	14.30	15.85
	Removal Eff	91.43	87.64	92.36	92.25	93.61	92.03	88.36		94.77	88.89	92.20	94.10	91.60
1989	SS	192.20	156.60	230.80	226.30	191.10	159.30	182.80	301.80	320.00	286.80	342.60	504.60	257.91
	Treated W (mg/l)	13.30	8.60	8.40	10.40	8.80	9.30	7.40	7.40	9.30	8.20	16.30	23.70	10.93
	Removal Eff	93.08	94.51	96.36	95.40	95.40	94.16	95.95	97.55	97.09	97.14	95.24	95.30	95.60
1989	BOD5	171.20	224.80	189.00	250.60	239.00	270.00	197.00	234.00	329.70	269.00	317.00	496.00	265.61
	Treated W (mg/l)	18.50	15.00	9.80	17.00	14.90	12.80	13.00	10.00	15.80	21.80	37.00	47.00	19.38
	Removal Eff	89.19	93.33	94.81	93.22	93.77	95.26	93.40	95.73	95.21	91.90	88.33	90.52	92.89
1990	SS	877.00	265.00	227.80	214.70	343.00	261.00	173.00	208.30		347.50	261.00	266.80	313.19
	Treated W (mg/l)	20.80	6.00	10.00	13.20	12.20	20.00	8.90	10.80		23.80	28.80	14.60	15.37
	Removal Eff	97.63	97.74	95.61	93.85	96.44	92.34	94.86	94.82		93.15	88.97	94.53	94.54
1990	BOD5	419.00	260.80	345.50	269.00	252.00	305.00	213.30	322.00		320.00	405.00	339.00	313.69
	Treated W (mg/l)	26.00	12.00	20.00	21.60	24.80	22.80	11.30	15.60		27.00	41.00	15.00	21.55
	Removal Eff	93.79	95.40	94.21	91.97	90.16	92.52	94.70	95.16		91.56	89.88	95.58	93.18
1991	SS	219.60	216.40	179.80	197.00	400.20	252.40	137.60	271.00	239.90	317.70	303.30	315.80	254.23
	Treated W (mg/l)	21.40	17.90	9.50	22.10	52.60	18.00	8.10	11.50	8.50	20.20	43.80	13.40	20.58
	Removal Eff	90.26	91.73	94.72	88.78	86.86	92.87	94.11	95.76	96.46	93.64	85.56	95.76	92.21
1991	BOD5	314.60	292.00	188.00	325.00	212.00	221.00	277.00	259.00	324.20	272.00	429.00	336.00	287.48
	Treated W (mg/l)	13.80	14.80	20.80	34.60	22.40	14.10	29.20	33.80	22.20	44.20	37.80	28.30	26.33
	Removal Eff	95.61	94.93	88.94	89.35	89.43	93.62	89.46	86.95	93.15	83.75	91.19	91.58	90.66
1992	SS	172.30	158.00	206.70	169.80	148.90	132.70	156.60	152.30	152.30	171.60		218.00	167.20
	Treated W (mg/l)	11.00	9.60	21.60	11.80	14.80	19.70	11.40	21.20	21.30	11.00		14.80	15.29
	Removal Eff	93.62	93.92	89.55	93.05	90.06	85.15	92.72	86.08	86.01	93.59		93.21	90.63
1992	BOD5	161.20	253.50	256.20	190.10	270.40	106.30	246.00	154.00	261.30	244.30		214.33	214.33
	Treated W (mg/l)	23.80	35.10	33.40	36.50	40.50	12.80	14.00	45.00	33.00	19.40		29.35	29.35
	Removal Eff	85.24	86.15	86.96	80.80	85.02	87.96	94.31	70.78	87.37	92.06		85.67	85.67

Legend SS : Suspended Solid, BOD5 : Biochemical Oxygen Demand,

Raw W : Raw Wastewater, Treated W : Treated Wastewater, Removal Eff : Removal Efficiency,

Appendix IV.1.1

Original Data of Analyses for Well of USAG

Appendix IV.1.1 Original Data of Analyses for Wells of USAG

Upper Water Source

Item	Well number	29		30		31		32		33		34		9	10	
		13.Sep. 1993	26.Apr. 1994	28.Jun. 1994	13.Sep. 1993	28.Jun. 1994	26.Apr. 1994	28.Jun. 1994	13.Sep. 1993	28.Jun. 1994	13.Sep. 1993	28.Jun. 1994	13.Sep. 1993			28.Jun. 1994
Water temperature	UNIT	9	4	7	8	5	4	5	8	3	7	4	7	5	9	11
pH		6.7	7.5	8.1	6.8	7.8	6.9	7.5	6.6	6.9	6.6	7.5	6.7	7.6	7.7	7.2
Conductivity	micro s/cm	70	90	100	70	60	70	50	70	50	70	50	70	60	90	90
Turbidity	NTU			0	0	0	0	0	0	0	0	0	0	0	0	0
DO	mg/l	13.8	19.9	15.1	14.1	15.2	13.9	19.2	13.8	19.4	14.5	14.9	14.5	15.7	13.6	12.7
Alkali	mg/lCaCO3	38	33	39	24	36	38	35	30	32	35	29	38	26	32	33
SO4--	mg/l	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1
Cl-	mg/l	6	5	5	5	8	4.5	6	18	5.5	8	5.5	8	4.4	10	13.5
Ca++	mg/l	0.45	0.6	0.85	1.2	0.9	1.25	0.95	1.3	0.37	0.87	0.87	1	0.89	0.95	0.67
Mg++	mg/l	1.82	0.6	3.62	2.43	3.48	6.68	4.21	1.82	7.05	2.64	7.29	3.01	3.98	1.45	6.44
TDS	mg/l	79	71.5	39	77.5	42.5	87	84.5	45	115.5	24	70	87	86.5	47.5	48.5
Mn	mg/l		0.1	0	0	0	0.1	0.1	0	0.1	0	0	0	0	0.1	0
Fe	mg/l		0.05	0.09		0.07	0.11	0.03		0.03	0.04		0.12	0.01	0.18	0.05
Bacteria	Number/l		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coliform	Number/l		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Central Water Source (1/6)

Item	Well number	57		58		17		16		14		8	14	6	
		14.Sep. 1993	14.Sep. 1993	14.Sep. 1993	14.Sep. 1993	27.Apr. 1994	13.Dec. 1993	14.Sep. 1993	6.Sep. 1994	8.Jun. 1994	13.Dec. 1993				14.Sep. 1993
Water temperature	UNIT	9	9	12	6	6	6	11	4	5	11	3	7	6	12
pH		6.7	6.8	6.8	7	6.6	7.9	7.5	7.1	7	7.5	6.7	6.8	7.6	7.3
Conductivity	micro s/cm	100	90	80	100	100	100	80	120	100	90	110	100	90	100
Turbidity	NTU							0			0			0	0
DO	mg/l	13.4	13.5	11.6	16.9	15.4	15.3	12.5	16.3	16	12.7	12.1	15.9	12.8	12.8
Alkali	mg/lCaCO3	37	39	29	28	33	33	33	31	38	33	38	32	39	42
SO4--	mg/l	0	0	0	25	2	0	1	22	3	2	0	20	1	0
Cl-	mg/l	7	4	5	5.5	6	9	9	5	7	6	6	5.5	8	6.5
Ca++	mg/l	1.55	1	1.35	0.7	0.65	0.95	0.65	0.8	0.92	1.07	1	0.75	1.1	0.65
Mg++	mg/l	5.47	4.25	1.82	7.53	7.86	0.24	2.67	7.29	4.01	0.6	6.68	9.94	15.2	2.67
TDS	mg/l	81	77	69	46.5	65	55	60	71.8	60.5	66.5	49.5	66.5	69	66.5
Mn	mg/l				0	0	0	0.1	0	0	0.1	0	0	0	0.1
Fe	mg/l				0.01	0.4	0.01	0.05	0.03	0.13	0.03	0.08	0.01	0.18	0.03
Bacteria	Number/l				0	0	0	0	0	0	0	0	0	1	0
Coliform	Number/l				0	0	0	2	0	0	0	0	0	1	0

█ : Exceed the standard limit for drinking water

Central Water Source (2/6)

Item	Well number																	
	13			39			38			70								
UNIT	14.Sep. 1993	13.Dec. 1993	27.Apr. 1994	8.Jun. 1994	6.Sep. 1994	14.Sep. 1993	13.Dec. 1993	27.Jun. 1994	6.Sep. 1994	14.Sep. 1993	13.Dec. 1993	27.Jun. 1994	6.Sep. 1994	15.Sep. 1993	27.Apr. 1994	16.Jun. 1994	6.Sep. 1994	
Water temperature	9	4	7	6	10	7	5	6	7	5	4	6	6	10	5	5	7	9
pH	6.7	6.8	7.2	7.4	7.8	6.7	6.9	7.8	7.6	6.7	7.2	7.5	7.6	6.8	7	7.8	7.5	7.5
Conductivity	90	140	90	90	90	110	110	180	120	160	100	140	130	80	120	110	100	100
Turbidity				0	0			0	0	0		0	0				0	0
DO	13.1	14.5	15.8	15.4	13.6	14.9	14.5	15.2	14.6	16.1	15.3	15.1	15.2	13	17.2	15.1	13	13
Alkali	44	28	37	37	39	44	77	52	44	52	40	45	42	39		30	36	36
SO4--	0	18	1	0	1	3	0	25	12	17	28	20	19	0		3	0	0
Cl-	4	5	7.5	8	8	7	3.5	11	27	10	4	7	32	8	8	6.5	10	10
Ca++	0.85	0.95	1.22	0.72	0.82	0.85	0.6	1.45	0.77	0.8	0.72	1.25	0.97	0.55	0.67	0.77	0.8	0.8
Mg++	10.3	1.21	2.06	1.13	0.64	9.72	13.37	3.64	9.48	35.2	7.9	3.04	5.47	11.55	4.01	3.04	1.21	1.21
TDS	85	49.5	65	130.5	62.1	76	51.5	154	86.5	111.5	43	117.5	78	68.5	71.5	53.5	83.5	83.5
Mn		0.1	0.2	0	0.1		0	0.1	0	0	0	0.1	0.1	0.2	0.2	0	0.1	0.1
Fe		0	0	0.02	0.08		0.01	0.04	0.06		0.03	0.02	0.06		0.01	0.01	0.01	0.01
Bacteria		0	0	0	0		0	0	3		0	0	0		0	0	0	0
Coliform		0	0	0	0		1	0	3		1	0	1		0	0	0	0

Central Water Source (3/6)

Item	Well number																	
	55			54			53			52			62					
UNIT	15.Sep. 1993	28.Apr. 1994	16.Jun. 1994	20.Sep. 1994	15.Sep. 1993	16.Jun. 1994	20.Sep. 1994	15.Sep. 1993	26.Apr. 1994	16.Jun. 1994	15.Sep. 1993	16.Jun. 1994	20.Sep. 1994	15.Sep. 1993	27.Apr. 1994	16.Jun. 1994	20.Sep. 1994	
Water temperature	9	4	6	9	10	5	11	9	4	6	6	6	8	12	4	4	7	10
pH	6.7	7.2	7.4	7.5	6.6	7.4	7.5	6.7	6.4	7.3	6.8	7.4	7.7	6.7	7.1	7.4	7.4	7.7
Conductivity	90	90	90	100	90	80	90	90	90	80	110	90	110	70	110	100	100	80
Turbidity			0	0	0	0	0	0	0	0	0	0	0				0	0
DO	13.7	18.1	15.4	13	13	14.6	12	14.1	18.1	14.3	14.2	14.4	12.6	12	18.5	14.6	12.5	12.5
Alkali	37	45	45	42	35	39	43	40	34	34	38	41	49	29		40	34	34
SO4--	0	0	0	0	0	0	5	1	1	0	0	1	4	1		0	2	2
Cl-	6	6	5	10	6	6	8	5	5	6.5	6.5	5	8.5	6.5	7.5	8	12	12
Ca++	1	0.57	0.77	0.67	1.15	0.65	0.62	1.85	0.55	0.7	1.05	0.7	1.65	0.9	0.7	0.67	0.6	0.6
Mg++	4.86	2.79	1.82	26.7	1.21	1.21	8.51	4.86	3.04	1.82	3.64	0.85	4.49	1.82	7.29	4.01	4.41	4.41
TDS	73.5	59	76.5	65	88.5	86	52	63.5	60.5	87	71.5	62.5	67	65.5	87	81.5	54.5	54.5
Mn		0	0	0.1			0.1	0	0.1		0	0	0		0.2	0	0.1	0.1
Fe		0.09	0.04	0.03		0.05	0.09		0.1	0.04		0.03	0		0.37	0.04	0.01	0.01
Bacteria		0	0	0		0	0	0	0	0		0	0		0	0	0	0
Coliform		0	0	0		0	0	0	0	0		0	0		0	0	0	1

█: Exceed the standard limit for drinking water

Central Water Source (4/6)

Item	Well number 61				51				35				28				29	
	15.Sep. 1993	28.Apr. 1994	16.Jun. 1994	20.Sep. 1994	15.Sep. 1993	27.Apr. 1994	16.Jun. 1994	20.Sep. 1994	18.Sep. 1993	28.Apr. 1994	27.Jun. 1994	6.Sep. 1994	18.Sep. 1993	28.Apr. 1994	8.Jun. 1994	6.Sep. 1994	18.Sep. 1993	
Water temperature	12	3	7	7	10	13	3	4	10	8	9	10	7	7	7	9	9	
pH	6.8	7.3	7.7	7.5	7	7	6.8	7.2	7.6	7.1	7.4	7.3	7.2	7.2	7.5	7.5	6.9	
Conductivity	70	110	90	70	70	140	170	180	130	110	110	110	180	170	170	170	170	
Turbidity																		
DO	12.2	19.6	15.6	11.8	12.3	19.5	15.9	12	13.8	16.2	12.8	10.8	12.3	16.3	15.2	10.3	12.8	
Alkali	30		32	40	51		44	39	40		39	43	59		69	62	57	
SO4--	0	0	0	0	2	1	19	6	4		1	11	20		17	18	19	
Cl-	6	5	5.5	10.5	9	10	6	8	7	5	8	7	8	5	11.5	9	7	
Ca++	0.95	0.87	0.65	0.62	0.65	0.72	1.37	1.07	0.8	0.72	0.7	0.85	1.2	0.77	1.35	1.27	1	
Mg++	3.64	0.36	2.43	1.13	1.64	3.64	4.86	2.18	4.21	2.43	6.08	6.32	3.64	3.4	0.85	4.25	3.64	
TDS	74.5	65.5	77	42	48.5	58.5	79.4	65	59.5	77.5	90.5	83.5	100	77.5	103	124	130	
Mn		0	0	0	0.2	0.1	0	0	0	0	0.1	0.1	0	0.1	0	0.1		
Fe		0.06	0.04	0.02		0.03	0.03	0.01		0.01	0.03	0.12		0.01	0.02	0.05		
Bacteria		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coliform		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	

Central Water Source (5/6)

Item	Well number 29				30				32				34				2	
	28.Apr. 1994	8.Jun. 1994	6.Sep. 1994	18.Sep. 1993	28.Apr. 1994	8.Jun. 1994	6.Sep. 1994	18.Sep. 1993	28.Apr. 1994	8.Jun. 1994	6.Sep. 1994	18.Sep. 1993	28.Apr. 1994	8.Jun. 1994	18.Sep. 1993	17.Des. 1993	27.Apr. 1994	
Water temperature	7	7	9	7	7	7	7	8	6	7	8	6	6	6	6	6	7	
pH	6.7	7.3	7.4	7	6.9	7.4	7.6	6.7	6.6	7.3	7.4	6.8	6.4	7.3	6.7	6.7	7.5	
Conductivity	150	150	160	130	150	130	120	180	210	200	180	170	220	210	110	110	90	
Turbidity																		
DO	15.7	14.5	10.7	13.6	15.3	14.5	12.6	13.1	15.1	13.5	12.5	14.1	15.4	14.1	12.9	13.5	16.8	
Alkali		49	61	43		51	47	59		55	56	56	62	41	29			
SO4--		11	19	13		11	12	22		24	21	20		22	1	6	1	
Cl-	4.5	11	8	8	3.5	0.9	8	6	5.5	1.6	2.5	9	2	6	5	7.5		
Ca++	0.75	1.05	1.05	1.05	0.77	1.2	0.87	1.55	1.5	1.45	1.35	1.15	1.5	0.92	0.75	0.82		
Mg++	3.04	3.04	0.36	1.45	3.65	10.57	2.43	1.21	9.12	6.08	12.16	2.79	1.82	1.82	15.2	13.13		
TDS	76.5	90.5	109	105.5	59	145	90.5	142.5	59	172	121.5	133.5	62.5	81	109.5	59.5		
Mn	0	0	0.1	0	0.2	0	0	0	0.06	0.17	0.03	0	0	0	0	0	0.1	
Fe	0.02	0.16	0.03		0.09	0.03	0.04						0.08	0.01		0.01	0.02	
Bacteria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coliform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

█ : Exceed the standard limit for drinking water

Central Water Source (6/6)

Item	Well number	2				5				6			
		27 Jun. 1994	6 Sep. 1994	17 Dec. 1993	24 Dec. 1993	16 Sep. 1993	17 Dec. 1993	20 Sep. 1994	27 Jun. 1994	6 Sep. 1994	17 Dec. 1993	24 Dec. 1993	
Water temperature	°C	8	10	9	8	11							
pH		8	8.1	6.7	6.9	7.8							
Conductivity	micro s/cm	90	110	130	140	90							
Turbidity	NTU	0	0	0	0	0							
DO	mg/l	13.9	14.3	13.6	14.3	12							
Alkali	mg/lCaCO3	50	52	31	34	41							
SO4--	mg/l	0	12	0	14	3							
Cl-	mg/l	6.5	7.5	5	5	19							
Ca++	mg/l	0.7	1	1	1	0.7							
Mg++	mg/l	3.64	0.65	16.4	12.16	15.44							
TDS	mg/l	87	67.5	61.5	64.5	53.5							
Mn	mg/l	0	0.1	0	0	0.1							
Fe	mg/l	0.03	0.04	0.01	0.04	0.04							
Bacteria	Number/l	0	2	1	0	2							
Coliform	Number/l	0	0	0	0	1							

Meat Complex Water Source (1/2)

Item	Well number	4				5				3				7				6	
		16 Sep. 1993	17 Dec. 1993	27 Jun. 1994	16 Sep. 1993	17 Dec. 1993	27 Jun. 1994	12 Sep. 1994	16 Sep. 1993	17 Dec. 1993	27 Jun. 1994	12 Sep. 1994	16 Sep. 1993	17 Dec. 1993	28 Jun. 1994	12 Sep. 1994	16 Sep. 1993	17 Dec. 1993	
Water temperature	°C	8	5	7	9	7	9	9	7	5	8	8	9	7	7	9	8	8	6
pH		7.1	6.9	7.3	7	7	7.4	7.6	6.8	7.1	7.2	7.6	6.8	7.2	7.1	7.5	6.7	6.9	6.9
Conductivity	micro s/cm	390	390	370	360	390	330	390	400	380	400	410	440	440	460	490	440	440	410
Turbidity	NTU			0			0	0			0	0			0	0			
DO	mg/l	15	13.5	13.4	13.6	14.2	12.3	13.1	15	12.5	13.2	13.4	12.6	14.5	10.5	13.1	12.8	13.1	
Alkali	mg/lCaCO3	119	64	56	42	63	52	61	92	62	59	144	118	62	56	120	133	58	
SO4--	mg/l	75	75	75	75	75	75	75	58	44	54	53	31	75	55	60	19	75	
Cl-	mg/l	25	23	23	26	22.5	21	28	27	29.5	31	32	34	24	32	32	37	23.5	
Ca++	mg/l	2	2.02	2.1	2.3	2.06	2.15	2.12	2.15	2.5	2.1	2.8	2.25	2.15	2.55	2.77	3.25	2.03	
Mg++	mg/l	7.29	5.83	10.33	7.29	5.59	11.9	7.9	6.68	1.45	19.4	18.48	10.57	1.45	7.9	7.65	4.25	3.52	
TDS	mg/l	293.5	251	324.5	276.5	240	306.5	240.5	261	254	326.5	299.5	200.5	247.5	363.5	286.5	273	241	
Mn	mg/l		0.1	0.1		0.1	0	0.1		0	0.1	0.1		0	0	0.4		0.1	
Fe	mg/l		0.01	0.07		0.02	0.07	0.02		0.02	0.03	0.05		0.07	0.06	0.03		0	
Bacteria	Number/l		0	0		1	0	0		1	0	1		0	0	1		0	
Coliform	Number/l		0	0		1	0	0		2	0	5		0	0	1		0	

Exceed the standard limit for drinking water

Meat Complex Water Source (2/2)

Item	Well number		6	
	Sampling date	28.Jun. 1994	12.Sep. 1994	UNIT
Water temperature	°C	6	9	
pH		7.4	7.4	
Conductivity	micro s/cm	430	480	
Turbidity	NTU	0	0	
DO	mg/l	11.8	13.4	
Alkali	mg/lCaCO3	54	135	
SO4--	mg/l	58	55	
Cl-	mg/l	27	23	
Ca++	mg/l	2.95	3.25	
Mg++	mg/l	9.72	7.29	
TDS	mg/l	368.5	276	
Mn	mg/l	0	0.03	
Fe	mg/l	0.01	0.04	
Bacteria	Number/l	0	0	
Coliform	Number/l	0	0	

Industrial Water Source

Item	Well number		12	
	Sampling date	18.Sep. 1993	26.Apr. 1994	27.Jun. 1994
Water temperature	°C	12	6	11
pH		7.7	7.5	7.6
Conductivity	micro s/cm	90	240	210
Turbidity	NTU			1
DO	mg/l	12.6	17.7	12
Alkali	mg/lCaCO3	59	39	40
SO4--	mg/l	0	47	50
Cl-	mg/l	7	16.5	7.5
Ca++	mg/l	0.65	1.62	1.55
Mg++	mg/l	12.16	7.01	2.43
TDS	mg/l	251	262.5	162
Mn	mg/l		0.5	0.1
Fe	mg/l		0.2	0.04
Bacteria	Number/l	0	0	0
Coliform	Number/l	0	0	3

Exceed the standard limit for drinking water

Appendix IV.2.1

Original Data of River Water Quality
by Central Environment Research Laboratory,
the Ministry of Environment

Appendix IV.2.1 Original Data of River Water Quality by Central Environment Reserch Laboratory, the Ministry of Environment

Terelj (1/2)

Year	Item	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform		
	Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number		
Year	Date																l		
1986	Jan.																		
	Feb.																		
	Mar.																		
	Apr.																		
	May																		
	25,Jun.	7.6	4.6	1.7	15.7	1.1	56.4	1.31	0.011	0.21	0.006	0.11	0.004	0.01	0.08				
	29,Jul.	7.7	4.6	0.6	8.6	0.7	55.5	0.79	0.014	0.34	0.003	0.08	0.001	0.15	0.18				
	26,Aug.	7.7	3.8	1.1	8.5	1.8	51.8	2	0.013	0.28	0.015	0.18	0.002	0.2	0.04				
	30,Sept.	7.9	5	1.2	6.6	1.4	79.6	0.7	0.02	0.19	0.001	0.03	0.012	0.04	0.16				
	29,Oct.	7.5	8.8	2.9					0.62	0.2	0.09	0.007	0.2						
	Nov.																		
30,Dec.	7.6	4.2	1.3					0.07	0.002		0.005	0.06							
Average		7.7	5.2	1.5	9.9	1.3	60.8	0.9	0.043	0.22	0.006	0.11	0.005	0.1	0.12				
1987	Jan.																		
	Feb.																		
	Mar.																		
	27,Apr.	7.5	11.6	1.9		1.8		0.46	0.006	0.34	0.006	0.1	0.002	0.06	0.27				
	30,May	7.9	16.4	5	24	9.6	149.3	0.46	0.001	0.31	0.008	0.02	0.003	0	0.05				
	25,Jun.	7.4	8.6	0.5	15.4	3.5	90.2	0.25	0.023	0.21	0.008	0.07	0.008	0.06	0.06				
	27,Jul.	7.4	8.6	1	19.5	2.1	67.1	0.26	0.007	0.17	0.003	0.13	0.01	0	0.04				
	20,Aug.	7.6	10.2	3.8				0.41	0.004	0.15	0.001	0.05			0.14				
	16,Sept.	6.8	6.7	4.1	9.2	2.5	43.8	0.34	0.002	0.94	0.008	0.04	0	0	0.06				
	26,Oct.	7.6	11.8	2.8	4.1			0.99	0.005	0.34	0.024								
	18,Nov.	7.1	9	9	14.6	1.8	110.4	0.06	0.001	0.24	0.004	0.05	0.002	0.23					
29,Dec.	7.8	9.2	15.9					0.15	0.001		0.019	0.01			0.03				
Average		7.5	10.2	4.9	14.5	3.6	92.2	0.4	0.006	0.34	0.009	0.06	0.004	0.06	0.09				
1988	14,Jan.	7.8	9.2	6.1	43.7			0.15	0.019		0			0.06					
	17,Feb.	6.8	7.6	4	24.4	3.9	112.2	0.33	0.006	0.26	0.007	0.36		0.17					
	22,Mar.	6.7	16.2	7.9				0.19	0.005		0.009								
	18,Apr.	7.4	9.8	7.2	2.8	13.1	96.6	0.48	0.01	0.24	0.012	0.15	0.005	0	0.05				
	18,May	8.6	5	2.7	3.6	6.4	63.8	0.19	0.006	0.39	0.004	0.17	0.016	0.32	0.04				
	23,Jun.	6.8	5.6	2.9	3.3	7.4	43.4	0.78	0.004	0.02	0.004	0.1	0.005	0	0.06				
	22,Jul.	7.4	7.6	2.9	2	3.9	54.6		0.006	0.09	0.003	0.06		0.36	0.06				
	25,Aug.	7.2	7.4	1.4	2	3.9	36.4		0.003	0.31	0.02	0.06			0.09				
	26,Sept.	6.8	9	1.4	2.9	5.7	48.1		0.002	0.15	0.003	0.03		0	0.04				
	24,Oct.	7.2	9	6.9	1.5	10.6			0.002		0.016	0.07		0.03	0.1				
	16,Nov.	7.2	11.4	5	1.6	9.6	81.7		0.017	0.21	0.029	0.08		0.06	0.02				
19,Dec.	7.2	10.6	1.9	1.9	8.5		0.49	0.003	0.13	0.013				0.02					
Average		7.3	9	4.2	8.2	7.3	67.1	0.4	0.007	0.2	0.01	0.12	0.009	0.11	0.05				
1989	13,Jan.	7.1	16.4	2.4	30.7	5.7	137.4	0.06	0.001	0.13	0.002	0.06		0.09					
	16,Feb.	7.4	27	5.5	37.6	13.8	218.7	0.69	0.039	0.06	0.011	0.01		0.05			0.001		
	20,Mar.	7.9	26.4	6.1	18.2	30.8	258.1		0.017	0.26	0.035	0.03					0.013		
	20,Apr.	7.9	10.4	3.2	9.9	9.9	81.1	0.72	0.001	0.03	0.011	0.03	0.002	0.02				37	
	22,May	8.3	16.8	3	2.5	5.3	71	0.52	0.003	0.15	0.009	0.05	0.01	0.02				29	
	19,Jun.	7.6	9	2.7	15	11.3	84.4	0.29	0.002	0.06	0.056	0.03	0.005	0.1				19	
	26,Jul.	7.4	8.8	3.2	2.2	10.6	50.2	0.42	0.006	0.05	0.054	0.05	0.007	0.07			0.007		
	15,Aug.	7.4	9.6	1	3.4	7.8	47.8	0.39	0.004	0.08	0.015	0.11	0.007	0.03					
	21,Sept.	8	9.2	1.4	1	12.4	87.6	0.78	0.003	0.23	0.002	0.11	0.01	0.3					11
	19,Oct.	7.4	8.8	2.2	0.2	7	73.2	0.22	0.014	0.31	0.022	0.01	0.002	0.03					22
	13,Nov.	7.4	9.2	4.7	1	3.2	83.1	0.29	0.001	0.4	0.022	0.03	0.002	0.08					35
09,Dec.	7			1.8				0.3	0.002		0.027	0.04	0.001	0.08	0.1			31	
Average		7.6	13.8	3.2	10.3	10.7	108.4	0.4	0.008	0.16	0.022	0.05	0.005	0.08	0.1	0.007		26	

Terej (2/2)

Year	Item	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform	
	Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number	
	Date																λ	
1990	15,Jan.	7.6						0.12	0.003		0.047			0.14	0.27		21	
	14,Feb.	6.5	9	2.3	3.6	1.4	78.6	1.04	0.001		0.003	0.04		0.04	0.65		20	
	28,Mar.	7.4			13.4			3.05	0.044		0.19			0.18	0.24	0.164		
	29,Apr.	7.6	14.2	2.8	11.3	3.5	133.8	0.64	0.005	0.4	0.053	0.09	0.001	0	0.14	0.214	18	
	23,May	8.4	7.4	2.7	3.1	6	45.4	0.03	0.002	0.48	0.021	0.04	0	0.02	0.16	0.076	25	
	14,Jun.	7.8	7.4	2.3	1.2	6	42.7	0.26	0.002	0.13	0.017	0.01	0.005	0	0.25		12	
	15,Jul.	7.4	5.4	1.7	2.2	3.2	37.3	0.52	0.002	0.3	0.006	0.04	0.017		0.27		14	
	27,Aug.	7.6	9.8	0.5	12	2.3	39.5	0.94	0.002	0.27	0.008	0.04	0.003		0.23			
	Sep.																	
	08,Oct.	7.9	8.2	4.5	0.4	3.2			0.002	0.28	0.006	0.04	0	0.04	0.76	0.036	22	
	05,Nov.	8.5	8.2	2.4	1.1	3.5	58		0.001	0.23	0.024	0.04	0		0.06		20	
	06,Dec.	7.2	12.3	3.5	1.8	5.7	74.8	0.18	0.003	0.23	0.004	0.02	0.01	0.03	0.11	0.098	25	
Average		7.6	9.1	2.5	5	3.9	63.8	0.8	0.006	0.29	0.034	0.04	0.005	0.06	0.29	0.118	20	
1991	22,Jan.	7.3						0.21	0.005	0.24	0.004		0.002		0.19	0.121	12	
	Feb.																	
	25,Mar.	7.3	25	7.4	13.7	4.2	180.6	0.18	0.012	2.24	0.013	0.02	0.008	0.11	1.4	0.08	31	
	18,Apr.	8	12.6	1.8	0.1	2.8	54.5	0.3	0.005	0.23	0.004	0.08	0.041	0.02	0.23	0.029		
	22,May	7.5	4.8	1.8	1.6	4.6	27.6	0.47	0.004	0.14	0.013	0.1	0.002	0.01	0.03	0.08		
	17,Jun.	7.8	8.1	1	1.8	8.2	65.3	0.3	0.002	0.14	0.01	0.05	0.003	0.05	0.29	0.084		
	05,Jul.	7.5	9.8	1.5	10.1	3.5	57	0.31	0.003	0.28	0.011	0.05	0.002	0.03	0.01	0.05		
	Aug.																	
	04,Sept.	7.7	7.8	1	2.1	1.4	38.7	0.85	0.002	0.12	0.012	0.08	0.009	0.19	0.19	0.1		
	21,Oct.	7.4	8	1.9	0.8	2.1	46	0.57	0.001	0.14	0.007	0.04	0.002	0.02	0.14	0.03		
	Nov.																	
20,Dec.	7.2	16.2	6.1	4.2	2.1	49.8	0.68	0.008	0.11	0.084	0.07	0.001	0.03	0.15	0.08			
Average		7.5	11.5	2.8	4.3	3.6	64.9	0.4	0.005	0.4	0.018	0.06	0.008	0.06	0.29	0.073	22	
1992	09,Jan.	6.8	19.4	4.4	9	3.9	85.3	0.43	0.004	0.5	0.028	0.04	0.006		0.52	0.063		
	Feb.																	
	Mar.																	
	Apr.																	
	May																	
	03,Jun.	7.1	5.4	2.3	2	6.7	43.1	0.27	0.002	0.28	0.005	0.17	0.004		0.71	0.28		
	09,Jul.	7.8	7.2	1.9	2.3	10	55.3	1.39	0.001	0.36	0.005	0.07	0.002	0.1				
	Aug.																	
	04,Sept.	6.9	6.4	1.2	2.9	2.8	37.3	0.45	0.009	0.47	0	0.26	0.001	0.25	0.66	0.23		
	Oct.																	
	Nov.																	
	Dec.																	
Average		7.2	9.6	2.5	4.1	5.9	55.3	0.6	0.004	0.4	0.01	0.14	0.003	0.18	0.63	0.191		

Ulaanbaatar (1/2)

Year	Item	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform
	Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number
Year	Date																l
1986	Jan.																
	Feb.																
	Mar.																
	28, Apr.	7	7.6	1.6	22.1	1	150.4	0.26	0.002	0.12	0.017	0.08	0.002	0.11	0.09		
	30, May	7.5	5	0.6	3.1	1	45.9	0.34	0.005	0.08	0.007	0.22	0.003	0.05	0.08		
	25, Jun.	7.6	13.8	0.8	16.9	0.7	64.5	0.86	0.001	0.44	0.001	0.77	0.002	0.06	0.05		
	29, Jul.	7.8	4.8	0.6	8.1	2.1	64	0.33	0.002	0.36	0.007	0.08	0.002	0.27	0.09		
	30, Aug.	8	6.6	1.7	5.9	8.2	78.7	0.26	0.009	0.15	0.004	0.04	0.002	0.05	0.04		
	29, Sep.	7.9			3.5				0.2	0.024	0.14	0.003	0.19				
	Oct.																
	Nov.																
	Dec.																
Average		7.6	7.6	1.1	9.9	2.6	80.7	0.4	0.007	0.22	0.007	0.23	0.002	0.11	0.07		
1987	Jan.																
	01, Apr.	7.1			66.8			4.43	0	0.16	0.28	0.14		0.11	0.08		
	18, Apr.	7.6	15	2.3	39.2	2.1	160.3	0.48	0.003	0.13	0.02	0.05	0.008		0.05		
	27, Apr.	7.8	11	1.9	19.1	1.1	92	0.26	0.006	0.23	0.005	0.04	0.001	0.18	0.05		
	30, May	7.8	17.8	4.3	18.5	2.1	89	0.44	0.003	0.13	0.011	0.01	0.01	0.15	0.16		
	25, Jun.	7.6	12.2	3.3	13.2	3.9	87.3	0.26	0.013	0.27	0.007	0.1	0.01	0.06	0.04		
	27, Jul.	7.4	7.8	2.4	20.1	2.5	69.1	0.26	0.011	0.08	0.011	0.1	0.022		0.11		
	21, Aug.	7.4			10.8				0.23	0.004	0.32	0.019	0.07		0.02	0.03	
	16, Sep.	6.8	8.9	2.2	6.9	2.5	38.2	0.3	0.003	0.29	0.013	0.09	0.001	0	0.09		
	27, Oct.	8			5.7	9.9			0.26	0.002	0.17	0.01	0.02		0		
	18, Nov.	7.4	16.4	14.3	4.3	6	116.2	0.06	0.001	0.09	0.003	0.06	0.014	0.03			
	Dec.																
Average		7.5	12.7	4.4	20.5	3.8	93.2	0.7	0.005	0.19	0.038	0.07	0.009	0.07	0.08		
1988	Jan.																
	Feb.																
	Mar.																
	18, Apr.	7.6	11.4	5.2	5	14.5	99.6	0.27	0.008	0.19	0.005	0.13	0	0	0.08		
	18, May	7.2	5.8	3.9	3.5	6.4		0.36	0.004	0.27	0.001	0.28	0.002	0.22	0.23		
	23, Jun.	6.6	7.2	0.9	2.1	10.6	59.9	0.8	0.003	0.15	0.008	0.06	0.01	0.01	0.09		
	22, Jul.	6.9	9.6	1.1	3.7	7.1	65		0.034	0.04	0.022	0.14		0.23	0.07		
	25, Aug.	7.4	9	1.4	3	3.9	45.1		0.003	0.26	0.018	0.05			0.12		
	26, Sep.	6.6	10	2.3	3.1	5.7			0.002	0.13	0.005	0.01		0.02	0.04		
	24, Oct.	7.2	11.4	4.5	2	8.1			0.002		0.005	0.18		0.02	0.06		
	16, Nov.	7	13.8	4.2	1.2	10.6	72.1		0.002	0.16	0.002	0.11		0	0.02		
	19, Dec.	7.5	18	3.9	5.6	10.3		0.14	0.002	0.1	0.006				0.23		
Average		7.1	10.7	3	3.2	8.6	68.3	0.4	0.007	0.16	0.008	0.12	0.004	0.07	0.1		
1989	Jan.																
	Feb.																
	Mar.																
	20, Apr.	7.9	12.4	2.8	8.6	16.8		0.74	0.002	0.07	0.008	0		0.05			20
	22, May	7.2	13.4	1.9	2.6	3.9	64.4	0.26	0.004		0.008	0.04		0.05			9
	19, Jun.	7.8	9.8	2.8	5.2	11.3	76	0.33	0.021	0.06	0.06	0.06	0.003	0.03			6
	26, Jul.	7.4	8.8	1	2	15.6	67.7	0.41	0.008	0.06	0.063	0.13	0.005	0.01		0.006	
	16, Aug.	7.5	10.8	0.7	1.5	8.9	56.9	0.26	0.003	0.05	0.014	0.05	0.002	0.01			10
	21, Sep.	8.1	10.8	2.1	1.3	11.3	87.9	0.16	0.002	0.11	0.029	0.08	0.001	0.11			14
	19, Oct.	7.8	8.4	3.8	1.3	6	83.7	0.1	0.004	0.32	0.002	0.02	0.002	0.08			10
	13, Nov.	7.4	12.4	2.8	1.4	1.4	82.7	0.32	0.001	0.95	0.02	0.03	0.002	0.16			14
	09, Dec.	7.1			1.9				0.05	0.001		0.018	0.02	0.003	0.07	0.17	
Average		7.6	10.9	2.2	2.9	9.4	74.2	0.3	0.005	0.23	0.025	0.05	0.003	0.06	0.17		12

Ulaanbaatar (2/2)

Year	Item	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform	
	Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number	
Year	Date																l	
1990	Jan.																	
	Feb.																	
	28,Mar.	6.9			13.6			0.45	0.007	0.17	0.011	0.05		0.04	0.31	0.053		
	29,Apr.	7.8	12.8	2.2	6.8	2.8	91.4	0.17	0.002	0.64	0.01	0.01	0.008	0.03	0.12	0.003	20	
	23,May	8	7.4	2.3	2.2	3.5	44.5	0.09	0.004	0.42	0.01	0.07	0		0.05	0.076	11	
	14,Jun.	7.8	8.8	2.3	1.3	6	44.6	0.34	0.003	0.1	0.009	0.02		0	0.21		9	
	15,Jul.	7.5	6.4	2.2	1.7	3.5	36.6	0.37	0.002	0.25	0.005	0.03	0.032		0.26		12	
	27,Aug.	7.4	9	1.9	10.4	1.5	52.1	0.98	0.004	0.27	0.008	0.06	0.004		0.14			
	Sep.																	
	08,Oct.	8.3	9.8	1.9	0.3	2.1			0.002	0.39	0.004	0.03	0.001	0.04	0.04	0.043	10	
	05,Nov.	8.1	11.4	1.7	1	3.5	61.3		0.004	0.25	0.048	0.05	0		1.44			
	06,Dec.	7.3	11.4	3	3.5	6.4	68.9	0.07	0.001	0.26	0.003	0.02	0.003	0.05	0.2	0.027	9	
Average		7.7	9.6	2.2	4.5	3.7	57.1	0.4	0.003	0.31	0.012	0.04	0.007	0.03	0.31	0.04	12	
1991	Jan.																	
	Feb.																	
	Mar.																	
	18,Apr.	8	22.8	3.3	4.6	6	126.9	1.72	0.105	0.42	0.07	0.06	0.081	0.44	0.27	0.226		
	22,May	7.5	7.8	0.5	3.5	2.8	31.6	0.68	0.004	0.1	0.017	0.08	0.001	0.02	0.21	0.102		
	17,Jun	7.8	8.1	1	2	7.4	53.1	0.35	0.002	0.05	0.01	0.05	0.003	0.03	0.27	0.095		
	05,Jul.	7.9	7.4	1.5	6.7	5.3	79.5	0.33	0.005	0.62	0.01	0.03	0.002	0.06	0.03	0.06		
	Aug.																	
	04,Sept.	8.1	6.6	2.4	3.5	4.6	51.8	0.41	0.003	0.33	0.014	0.09	0.003	0.02	0.34	0.09		
	21,Oct.	7.5	9	1	1.8	2.1	50.5	0.84	0.001	0.12	0.004	0.05	0	0.04	0.54	0.03		
	20,Nov.	7.4	25	6.4	20.6	5	179.8	0.14	0.001	0.08	0.004	0.01			0.32	0.04		
	Dec.																	
Average		7.7	12.4	2.3	6.1	4.7	81.9	0.6	0.017	0.25	0.018	0.05	0.015	0.1	0.28	0.092		
1992	Jan.																	
	Feb.																	
	Mar.																	
	Apr.																	
	May																	
	03,Jun	7.4	6	3.3	1	7.4	55.6	0.2	0.003	0.65	0.007	0.16	0.004		0.05	0.11		
	09,Jul.	7.5	11.2	1.7	1.6	19.5	84.3	1.66	0.031	0.47	0.227	0.22	0.003	0.28	0.39			
	Aug.																	
	04,Sept.	6.9	7.2	1.2	2.4	3.5	47.8	0.35	0.009	0.42	0	0.22	0.001	0.12	0.4	0.23		
	29,Oct.	7.3	10.4	1.9	1.8	6.4	69.2	0.13	0.002	0.84	0.002	0.08	0	0.06	0.65	0.08		
	Nov.																	
	Dec.																	
Average		7.3	8.7	2	1.7	9.2	64.2	0.6	0.011	0.6	0.059	0.17	0.002	0.15	0.37	0.14		

Altanbulag (1/2)

Year	Item Unit	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform	
	Date	-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number /l	
1986	24,Jan.	7.8	47.1	10.9	1.9	179.3	393.9	2.68	0.13	0.06	0.311	0.51	0.006					
	Feb.																	
	Mar.																	
	28,Apr.	6.4	19.2	2.4	59.5	41.8	313.5	7.4	0.027	0.52	0.216	0.72	0.023	0.11	0.23			
	29,May	7.8	8	1.8	24.5	12.4	115.5	3.12	0.022	0.14	0.036	0.27	0.006	0.04	0.11			
	24,Jun	7.7	14	1.5	23.2	1.1	88.9	2.41	0.022	0.29	0.012	1.03	0.008	0.1	0.09			
	30,Jul.	7.8	6.6	0.2	7.8	2.8	63.7	0.67	0.009	0.25	0.008	0.13	0.012	0.32	0.1			
	Aug.																	
	23,Sep.	8.6	6.6	4.2	23.1	8.2	127.1	1.21	0.031	0.16	0.022	0.36	0	0.1	0.21			
	29,Oct.	7.8			46.3				3.1	0.124	0.11	0.007	0.21					
	27,Nov.	8	15.4	3	61.9	42.2	276.9	1.28	0.133	0.2	0.078	0.11	0.01					
	Dec.																	
Average		7.7	16.7	3.4	31	41.1	197.1	2.7	0.062	0.22	0.086	0.42	0.009	0.13	0.15			
1987	Jan.																	
	Feb.																	
	01,Apr.	7.8			109.5			5.35	0.556	0.37	0.247	0.49		0.58	0.21			
	28,Apr.	7.6	17.4	3.9		5.7		2.17	0.039	0.67	0.077	0.08	0.005	1.43	0.11			
	29,May	7.9	24.9	8.1	50.9	30.8	200.7	4.33	0.166	0.01	0.101	0.07	0.012	0.04	0.08			
	26,Jun	7.5			49.8			0.96	0.018	0.03	0.15	0.12	0.028	0.44	0.1			
	28,Jul.	7.6	11	2.3	29.3	5	97.7	0.68	0.012	0.15	0.044	0.23	0.018		0.06			
	21,Aug.	7.5			20.4			0.64	0.012	0.45	0.014	0.13		0.04	0.14			
	17,Sep.	7.6	11.2	2.2	9.2	4.6	67.3	0.47	0.005	0.12	0.036	0.06	0	0.72	0.04			
	27,Oct.	7.7			15.8	14.9			0.65	0.009	0.51	0.142	0.04		0			
	19,Nov.	7.3	42.5	5.4	11.5	84	406.3	3.37	0.044	3.04	1.292	0.15	0.003	0.2				
	30,Nov.	7.4	40.9	9.8					6.21	0.128		0.532	0.07		0.16	0.27		
Average		7.6	24.7	5.3	37.1	24.2	193	2.5	0.099	0.59	0.264	0.14	0.011	0.4	0.13			
1988	15,Jan.	7.4	51.5	4.1	119.6			5.21			0.48			0.26				
	18,Feb.	7	49.3	12.2	193.6	132.6	640.9	6.01	0.023	0.32	0.046	0.21		0.08				
	23,Mar.	7	46.3	24.3	125.8			3.19	0.271	0.27	1.182	0.16	0.006	0	0.2			
	19,Apr.	7.6	29.6	12.4		61		6.2	0.195	0.52	0.155	0.18	0.02	0.16	0.33			
	19,May	7	8.6	3.9	3.4	12.4	63.9	0.42	0.023	0.49	0.033	0.18	0.002	0.02	0.14			
	24,Jun	6.6	7.6	1.7	5.4	6.4	51.5	0.96	0.013	0.19	0.008	0.04	0.016	0.04	0.09			
	23,Jul.	7.2	10.4	2.3	1.7	9.6	73.4		0.031	0.33	0.03	0.04			0.14			
	26,Aug.	7.3	11.4	1	1.4	9.2	56.2		0.017	0	0.073	0.08		0.03	0.07			
	27,Sep.	7.4	13	2.1	3.2	8.2	67.7		0.003	0.06	0.07	0.24		0.2	0.61			
	27,Oct.	7.4	18	7.9	19.7	25.9			0.008		0.215	0.44		0.06	0.3			
	17,Nov.	7.8	17.2	4.9	10.4	12	107		0.003	0.26	0.01	0.01			0.27			
	20,Dec.	7.4	53.1	10		96.4			2.73	0.034	0.43	0.138						
Average		7.3	26.3	7.2	48.4	37.4	151.5	3.5	0.056	0.29	0.203	0.16	0.011	0.09	0.24			
1989	14,Jan.	8.1	61.3	12.4	141.5	154.2	676	0.55	0.517	0.1	0.57	0.1		0.38				
	17,Feb.	7.6	55.7	6.4	190.7	113.8	660.3	16.62	1.021	0.09	0.84	0.18		0.21		0.004		
	21,Mar.	7.6	52.1	12.3	160.9	103.5	615.4		0.4	0.02	0.94	0.14				0.012		
	21,Apr.	7.3	24	8.8	34.6	38.3	163.8	5.16	0.089	0.05	0.267	0.05		0.04			42	
	23,May	7.3	22.8	9.1		25.2			2.69	0.072		0.278	0.13		0.2			32
	19,Jun	7.4	18	1.1	29.8	23.4	165.5	0.68	0.156	0.61	0.121	0.05	0.006	0.24				
	27,Jul.	7.5	11.2	1.4	1.6	13.5	64	0.21	0.003	0.09	0.032	0.07	0	0.07		0.09		
	16,Aug.	7.5	11.2	1.9	3.3	9.9	50.6	0.36	0.006	0.07	0.018	0.16	0.001	0.03				
	22,Sep.	8.1	16.2	3.8	32.2	23.4	184.9	1.66	0.024	0.27	0.118	0.07	0.002	0.1				33
	20,Oct.	7.9	16.2	1.3	32.2	21.6	212.9	4.74	0.011	0.52	0.25	0.06	0.002	0.08				38
	13,Nov.	7.5	37.7	9	142.6	78.7	659	6.54	0.162	5.8	1.665	0.12	0.003	0.22				31
	09,Dec.	7.5			115.8				13.6	0.49		1.77	0.14	0.001	0.28	0.21		
Average		7.6	29.7	6.1	80.5	55	345.2	4.8	0.246	0.76	0.572	0.11	0.002	0.17	0.21			

Altanbulag (2/2)

Year	Item Unit Date	pH	Ca	Mg	SO4	Cl	TDS	NH4	NO2	NO3	P	Fe2+3	Cu	Mn	F	Mo	Coliform	
		-	mg/l	mg/l	mg/l	mg/l	mg/l	mgN/l	mgN/l	mgN/l	mgP/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	Number /l
1990	16,Jan.	8			76.8			11.4	0.339		0.249	0.06	0.003	0.2	0.15		34	
	15,Feb.	7.5	47.3	9.5	33.1	95.4	312.7	9.88	2.326	1.61	0.897	0.13		0.11	0.89		30	
	29,Mar.	7.5			123.7			7.57	0.65	5.7	0.94	0.14	0.002	0.61	0.27	0.095		
	20,Apr.	7.6	59.1	4.5	164.3	98.9	745.9	16.3	0.243	1.75	1.058	0.09	0.004	0.01	0.14	0.151	31	
	24,May	7.8	21.4	2.3	50.9	23	186.2	2.05	0.077	1.16	0.059	0.03	0.001	0.02	0.29	0.099	40	
	15,Jun	8.4	16.2	3.2	22.2	15.6	125.8	1.97	0.05	0.27	0.18	0.03	0	0	0.44		31	
	16,Jul.	7.4	7.2	1.1	2.4	4.2	39.7	0.64	0.006	1.26	0.013	0.05	0.015		0.22		33	
	28,Aug.	7.6	9	1	7.4	1.5	48.5	0.8	0.003	0.59	0.001	0.03	0.008	0.01	0.11	0.049	35	
	Sep.																	
	09,Oct.	7.8	12.2	2.6	1.8	9.9	78.5		0.017	0.53	0.113	0.06	0	0.04	0.2		30	
	04,Nov.	8.2	22	3	21.4	21.8	164.5		0.068	1.26	0.112	0.05	0.002		0.26	0.148		
07,Dec.	7.4	24.5	22.4	13.4	100	391.5	12.53	0.17	1.99	0.575	0.16	0.007	0.08	0.09		34		
Average		7.7	24.3	5.5	47	41.1	232.6	7	0.359	1.61	0.382	0.08	0.004	0.12	0.28	0.108	33	
1991	23,Jan.	7.4			113.8	115.9		27.5	0.21	0.33	1.205	0.08	0.005		0.24	0.184	30	
	Feb.																	
	26,Mar.	7.6	45.3	8.9	58.7	115.9	429.6	17.87	0.672	5.03	0.33	0.11	0.036	0.21	0.36	0.178	27	
	19,Apr.	7.4	29.8	5.7	19.3	23	184.9	5.08	0.043	0.14	0.105	0.02	0.141	0.05	0.46	0.189		
	23,May	7.5	8.6	1	2.9	4.6	43.6	0.78	0.007	0.14	0.066	0.04	0.001	0.13	0.5	0.113		
	18,Jun	7.7	9.8	2.4	1.9	11.3	66.5	0.61	0.006	0.04	0.031	0.04	0.003	0.04	0.24	0.073		
	06,Jul.	7.8	7.4	2.9	4.8	8.6	66.9	0.44	0.009	0.19	0.012	0.11	0.001	0.07	0.18	0.03		
	Aug.																	
	05,Sept.	8	9.8	1.2	2.6	3.5	50	0.78	0.005	0.44	0.039	0.08	0.003	0.02	0.27	0.06		
	22,Oct.	7.4	15.6	3.3	8.1	10.3	90.5	1	0.026	0.14	0.086	0.06	0.006	0.02	0.51	0.11		
	Nov.																	
Dec.																		
Average		7.6	18	3.6	26.5	36.6	133.1	6.8	0.122	0.81	0.234	0.07	0.025	0.08	0.35	0.117	29	
1992	10,Jan.	7.3	43.7	11.8	102.9	74.4	523.3	18.8	0.138	3.66	1.425	0.24	0.005		0.46	0.18		
	Feb.																	
	Mar.																	
	Apr.																	
	May																	
	04,Jun	7.1	10.6	2.3	5.2	12	79.2	2.35	0.014	3.16	0.139	0.28	0.002		0.17	0.11		
	Jul.																	
	Aug.																	
	05,Sept.	7	7.6	1.2	2.9	3.5	49.4	0.27	0.01	0.57	0	0.34	0.005	0.13	0.34	0.32		
	30,Oct.	7.5	20	2.7	24.5	26.6	177.2	3.6	0.028	0.03	0.081	0.18	0.002	0.39	0.38	0.08		
	Nov.																	
Dec.																		
Average		7.2	20.5	4.5	33.9	29.1	207.3	6.3	0.048	1.86	0.411	0.26	0.004	0.26	0.34	0.173		

Appendix IV.2.2

Original Data of River Water Quality Investigated
by JICA Study Team

Appendix IV.2.2 Original Data of River Water Quality Investigated by JICA Study Team

Location	R-1					R-2					R-3					Standard
	21.Sep. 1993	26.Mar. 1994	27.May 1994	18.Aug. 1994	13.Sep. 1994	23.Sep. 1993	28.Mar. 1994	30.May 1994	19.Aug. 1994	12.Sep. 1994	24.Sep. 1993	26.Mar. 1994	30.May 1994	26.Aug. 1994	15.Sep. 1994	
Item	Unit															
Water temperature	°C	11	7	11	15	11	10	3	17	22	11	13	7	15	22	13
pH		8.3	7.1	7.8	7.6	8	7.5	7.3	8.5	8.7	8.3	7.8	7.8	9	8.4	8.4
Conductivity	micro s/cm	80		80	50	60	80		100	80	90	120	140	220	170	120
Turbidity	NTU		0	1	0	7		0	1	5	9			0.9	48	7
DO	mg/l	15.1	16.1	12.7	13.5	13.8	14.4	17.3	14.4	10.6	13.2	12.6	14.8	11.7	10.6	12.4
Alkali	mg/lCaCO3	70	27	31	27	51	6		43	40	36	14		60	73	34
SO4--	mg/l	0	0	1	2	3	3		1	3	7	75	59	23	63	7
Cl-	mg/l	6	5	8.5	31.5	12.5	5	9	9.5	11.5	29	12	40	10.5	10	15.2
Ca++	mg/l	0.57	0.47	0.6	0.5	0.95	0.62	0.95	0.7	0.5	0.82	1.27	2.12	1.24	1.45	0.9
Mg++	mg/l	5.83	3.64	1.89	2.67	8.75	1.64	3.64	6.68	7.9	0.97	3.89	16.4	3.64	3.89	15.2
TDS	mg/l	72	75	55	47	54.5	86	87.5	62.5	52	62.5	96.3		128.5	144.5	100
NO2-	mg/l	0.004	0.005	0.001	0.002	0.004	0.001	0.005	0.03	0.005	0.008	0.027	0.215	0.12	0.069	0.023
NO3-	mg/l	0.5	1	0.6	0.6	1.1	1.6	0.9	0.9	0.7	1.4	1.1	4.1	7.6	6.3	2.5
NH4+	mg/l	0.01	0.17	0.1	0.11	0.12	0.11	0.12	0.05	0.18	0.2	0.7	2.75	0.46	0.89	0.27
PO4	mg/l	2.75	0.01	0.01	0.01	0.79	2.46	0.45	0	1.82	0.01	0.49	2.64	2.25	0.37	0.15
Cr	mg/l	0.01	0.01	0.01	0.02	0.02	0.03	0	0.01	0.04	0.05	0.04	0.04	0.04	0.06	0.05
Mn	mg/l	0.2	0.2	0	0.1	0.2	0	0.4	0	0	0.3	0.1	0.1	0.1	0.2	0.5
Fe	mg/l	0.05	0.07	0.02	0.04	0.12	0.06	0.09	0.03	0.1	0.25	0.14	0.07	0.05	0.55	0.16
F	mg/l	0.3		1.18	0.77	0.05	0.39		1.19	1.05	0.03	0.3		1.21	0.55	0.21
Cu	mg/l	0.03	0	0.03	0.01	0.04	0.03	0	0.01	0.01	0.07	0.07	0	0.01	0.02	0.15
Zn	mg/l	0.07	0.03	0.02	0.02	0.04	0.12	0.03	0.01	0.01	0.03	0.23	0.01	0	0.26	0.01
COD	mg/l	0		0	21	12	70		0	22	18	115		0	24	23
Bacteria	Number/l	2	0	0	3	4	9	1	0	0	3	26	1	3	14	5
Coliform	Number/l	4	0	0	2	1	22	1	0	0	4	26	1	4	4	9

Standard: Standard for drinking water in Mongolia

R-1: Terej bridge

R-2: Zaisan bridge

R-3: Chicken factory bridge

Exceed the standard limit for drinking water

Appendix IV.3.1

Original Data for Water Quality
of Reservoir Water Analyzed by USAG

Appendix IV.3.1 Original Data for Water Quality of Reservoir Water Analyzed by USAG

Upper Water Source

Item	Unit	1991				1992				1993		Average	Standard
		Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun		
Color					25	14	27	19	12	11	14	17	20
Smell					0	0	0	0	0	0	0	0	0
Taste					0	0	0	0	0	0	0	0	2
pH					6.9	6.8	6.9	6.9	6.9	7	6.8	6.9	6.5-8.5
NH4	mg/l				0.088	0.025	0.046	0.05	0	0.03	0.011	0.036	
NO2	mg/l				0.007	0.002	0	0.002	0	0.002	0	0.002	
NO3	mg/l				0.62	1.6	1.7	1.36	1.56	1.35	1.48	1.38	10
Fe2+	mg/l				0.15	0.071	0.083	0.136	0.024	0.146	0.075	0.098	0.3
Hardness	mg/l				0.75	0.72	0.58	0.78	0.75	0.8	0.74	0.73	
Ca	mg/l				0.45	0.57	0.46	0.58	0.54	0.5	0.51	0.52	100
Mg	mg/l				3.65	1.82	1.46	2.43	2.55	4.25	2.79	2.71	30
Cl	mg/l				6	6	6.2	7.1	5.2	6.3	5.2	6	350
TDS	mg/l				74.5	52	63.5	63.4	51	75	66.3	63.7	1000
SO4	mg/l				8.4	7.2	8.5	7	38.7	2.4	7.1	11.3	500
DO	mg/l												
Residual Cl2	mg/l												
Mn	mg/l												0.1
F	mg/l				0	0.16	0.23	0.12	0.15	0.04	0.06	0.11	0.7-1.5
Coliform	Number/l				<3	<3	<3	<3	<3	<3	<3	<3	3

Central Water Source

Item	Unit	1991				1992				1993		Average	Standard
		Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun		
Color		3	7	6	6	6	10	8	3	6	4	6	20
Smell		1	0.5	0.5	0.5	0.5	0	0.5	0	0	0	0	0
Taste		0	0	0	0	0	0	0	0	0	0	0	2
pH		7.2	6.7	6.8	6.6	6.8	6.8	6.9	6.9	7	6.9	6.9	6.5-8.5
NH4	mg/l	0	0.021	0	0.006	0.035	0	0.007	0	0.026	0	0.01	
NO2	mg/l	0	0	0	0	0.001	0.004	0	0	0	0	0.001	
NO3	mg/l	2.04	3.56	1.8	1.75	1.6	2.78	2.8	8.37	2.34	3.7	3.07	10
Fe2+	mg/l	0.008	0.019	0.012	0.021	0.074	0.008	0.038	0.022	0.021	0	0.022	0.3
Hardness	mg/l	0.85	0.95	0.72	0.9	0.93	0.95	0.95	1.02	1.21	1.15	0.96	
Ca	mg/l	0.67	0.78	0.65	0.8	0.75	0.76	0.7	0.88	0.95	0.9	0.78	100
Mg	mg/l	2.18	2.06	0.85	1.21	2.18	2.31	3.04	1.7	3.16	2.4	2.11	30
Cl	mg/l	6.3	5	4.6	6.6	7	8.2	8.8	7.2	9	6.5	6.9	350
TDS	mg/l	73	63.8	72.5	71	63.7	78.8	89.5	78.8	75.7	87.3	75.4	1000
SO4	mg/l	5.2	10.4	8.2	10	7.9	9.9	7.1	10.7	9.9	7.2	8.7	500
DO	mg/l										2.16	2.16	
Residual Cl2	mg/l	0.46	0.38	0.36	0.33		0.26	0.45	0.32		0.4	0.37	
Mn	mg/l				0.011							0.011	0.1
F	mg/l	0.21	0.2	0.19	0.11	0.11	0.2	0.09	0.09	0.23	0.07	0.15	0.7-1.5
Coliform	Number/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3

Industrial Water Source

Item	Unit	1991				1992				1993		Average	Standard
		Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun		
Color		3	6	5	5	6	8	8	3	4	3	5	20
Smell		1	1	1	0.5	0.5	0	0.5	0.5	0	0	1	0
Taste		0	0	0	0	0	0	0	0	0	0	0	2
pH		7.1	7	6.9	6.6	6.7	6.9	7	6.9	7.1	7	6.9	6.5-8.5
NH4	mg/l	0	0.024	0	0.003	0.013	0	0.006	0	0.01	0	0.006	
NO2	mg/l	0	0	0	0	0.001	0	0	0	0	0	0	
NO3	mg/l	2.3	2.64	2.01	1.33	1.6	5.4	2.6	5.44	2.23	2.5	2.81	10
Fe2+	mg/l	0.016	0.033	0.035	0.075	0.072	0.016	0.023	0.004	0.006	0	0.028	0.3
Hardness	mg/l	2.64	2.65	2.6	2.9	2.75	3.45	1.51	2.53	2.89	2.54	2.65	
Ca	mg/l	2.41	2.13	2.19	2.6	2.36	8.91	1.22	2.17	2.35	2.3	2.86	100
Mg	mg/l	2.79	6.32	4.98	3.64	4.74	6.56	3.52	4.37	6.56	8.4	5.19	30
Cl	mg/l	21	24	24	45	29.3	27.6	17.6	24.8	25.6	26	26.5	350
TDS	mg/l	245.1	230	262.8	285.6	248.7	244	205.5	221	234.5	264.3	244.2	1000
SO4	mg/l	41.1	70.9	63.1	89.6	63.7	59.2	49.9	67.5	59.9	59.8	62.5	500
DO	mg/l										0.8	0.8	
Residual Cl2	mg/l	0.68	0.67	0.77	0.71		0.51	0.54	0.58	0.53	0.51	0.61	
Mn	mg/l				0.01							0.01	0.1
F	mg/l	0.65	0.78	0.84	1.01	0.7	0.77	0.84	0.88	0.74	0.76	0.8	0.7-1.5
Coliform	Number/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3

Meat Complex Water Source

Item	Unit	1991				1992				1993		Average	Standard
		Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun	Jul.-Sep.	Oct.-Des	Jan.-Mar.	Apr.-Jun		
Color		3	5	5	9	11	18	11	5	5	2	7	20
Smell		1	0.5	0.5	0.5	0	0	0.5	0.5	0	0	0	0
Taste		0	0	0	0	0	0	0	0	0	0	0	2
pH		7.1	7	6.8	6.7	6.9	6.8	6.7	6.9	6.9	6.9	6.9	6.5-8.5
NH4	mg/l	0	0.033	0.04	0.016	0.02	0.01	0.034	0	0.018	0	0.017	
NO2	mg/l	0	0	0	0.004	0.004	0	0.003	0	0.002	0	0.001	
NO3	mg/l	11.3	14.1	10.2	13.4	11.1	6.13	11.1	7.44	8.4	12.7	10.59	10
Fe2+	mg/l	0.024	0.028	0.021	0.191	0.031	0.025	0.084	0.017	0.035	0	0.046	0.3
Hardness	mg/l	3.19	3.28	3.29	3.28	3.26	3.36	2.76	3.32	2.79	3.1	3.16	
Ca	mg/l	2.36	2.43	2.68	2.5	2.58	2.68	2.22	2.74	2.44	2.3	2.49	100
Mg	mg/l	10.1	10.3	7.68	9.48	8.26	8.26	6.56	7.05	4.25	9.7	8.16	30
Cl	mg/l	27.8	31	26.5	34	32.6	32.3	32.8	25.6	26.3	29.1	29.8	350
TDS	mg/l	230.6	267	307	299.8	253.7	281.5	289	249.5	243	291.5	271.3	1000
SO4	mg/l	49.2	77.1	56.8	53.7	52.3	52.9	50.2	40.3	76.8	62.4	57.2	500
DO	mg/l										0.8	0.8	
Residual Cl2	mg/l	0.76	0.93	0.85	0.59			0.46	0.56	0.49	0.43	0.63	
Mn	mg/l				0.005							0.005	0.1
F	mg/l	0.24	0.35	0.17	0.15	0.18	0.15	0.18	0.26	0.23	0.12	0.2	0.7-1.5
Coliform	Number/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3

Standard:Standard for drinking water in Mongolia

Appendix IV.3.2

Original Data for Water Quality
of Reservoir Water Analyzed by JICA Study Team

Appendix IV.3.2. Original Data for Water Quality of Reservoir Water Analyzed by JICA Study Team

Location Sampling date	Upper Water Source				Central Water Source				North-East				Tasgan			
	21.Sep. 1993	9.Dec. 1993	12.Sep. 1994	18.Aug. 1994	25.Sep. 1993	9.Dec. 1993	27.Apr. 1994	25.May 1994	19.Aug. 1994	21.Sep. 1994	23.Sep. 1993	9.Dec. 1993	25.Sep. 1994	19.Aug. 1994	25.May 1994	19.Aug. 1994
Water temperature	10	6	7	9	10	11	4	6	10	10	12	8	13	8	5	11
pH	7.4	6.5	7.1	7.7	7.1	7.8	7.7	6.3	7	7.5	7.1	7.7	7.3	7.3	7.1	7.2
Conductivity	60		70	70	98	110	130	120	100	110	110	100	100	110	100	100
Turbidity	NTU		0	0	0	0	0	0	0	0	0	0	0	0	0	0
DO	mg/l	15	17.5	13.4	12.4	13.9	15.1	16.6	16.8	13.5	12.6	13.6	11.2	14.2	16.3	11.9
Alkali	mg/lCaCO3	34	0.28	54	47	42	15	68	45	61	34	45	44	32	44	34
SO4--	mg/l	0	45	1	1	10	16	10	15	3	8	10	9	1	27	6
Cl-	mg/l	6	7	5	5	11	7	7.5	6.5	8	13	10	8	8	9.5	9
Ca++	mg/l	0.6	0.5	1.57	0.62	0.77	0.75	0.87	0.92	0.95	0.92	0.72	0.92	0.8	0.87	0.8
Mg++	mg/l	2.67	3.04	1.45	6.44	10.7	1.21	2.67	10.09	4.86	3.89	1.82	4.1	5.47	2.18	5.9
TDS	mg/l	56.3	52	67	49.5	47.5	62.1	73.5	81	50.5	50	52.4	65.5	72.2	51	58.5
NO2-	mg/l	0.0035	0.001	0.002	0	0.003	0.004	0.004	0.002	0.003	0.001	0.009	0	0.001	0.003	0.002
NO3-	mg/l	0.5	1.8	0.4	0.7	0.8	1.1	1.9	0.3	0.8	1.2	0.5	1.3	0.4	0.7	1
NH4+	mg/l	0	0.09	0.15	0.07	0.09	0	0.09	0.07	0.12	0.18	0.12	0	0.11	0.16	0.1
PO4	mg/l	1.56	2.68	0.06	0.02	2.75	2.75	2.69	0.01	0.05	0.68	0.05	0.09	1.8	0.02	0.13
Cr	mg/l	0.01	0.01	0.02	0.01	0	0.01	0.01	0	0.03	0.01	0.06	0	0.01	0.02	0.03
Mn	mg/l	0.02	0	0	0	0	0.1	0.02	0.1	0	0.06	0	0	0	0.1	0.02
Fe	mg/l	0.02	0.08	0.05	0.03	0	0.03	0.08	0.03	0.11	0.03	0.12	0.02	0.1	0.22	0.04
F	mg/l	0.27	0.97	1.28	0.37	0	0.46	0.384	0.45	1.14	0.1	0.23	1.23	0.65	0.98	0.14
Cu	mg/l	0.01	0.02	0.02	0	0.03	0.02	0	0.01	0	0.01	0.04	0.03	0	0.01	0.01
Zn	mg/l	0.07	0.04	0	0.01	0.03	0.25	0.11	0	0.01	0.01	0.03	0.04	0	0.02	0.01
COD	mg/l	1		0	19	12	6		0	17	2	2	0	17	21	2
Residual Cl2	mg/l	0.8	0.01	0	0	0.03	0.02	0.01	0.01	0.05	0.03	2.2	0	0.01	0.08	0.35
Coliform	Number/l	0	0	0	0	1	0	0	0	0	0	0	0	0	31	0
Bacteria	Number/l	1	0	0	0	1	0	0	0	0	0	0	0	0	1	11

Location Sampling date	North-West				Industrial Water Source				Meat Complex Water Source				
	23.Sep. 1993	9.Dec. 1993	24.Sep. 1994	20.Sep. 1994	19.Aug. 1994	25.May 1994	9.Dec. 1993	24.Sep. 1994	20.Sep. 1994	26.Apr. 1993	25.May 1994	19.Aug. 1994	12.Sep. 1994
Water temperature	13	9	6	9	11	10	10	11	10	8	9	8	9
pH	6.7	7.2	7.2	7.4	7.7	7.1	7.1	7.3	7.8	7	7.2	6.8	7.5
Conductivity	110		140	120	130	230		290	250	260	380	410	440
Turbidity	NTU		0	0	0	0	0	0	0	0	0	0	0
DO	mg/l	12.3	14.2	16.7	11.2	12.8	14	11.7	12.4	14.3	13.3	17.1	11.8
Alkali	mg/lCaCO3	37	44	30	43	46	14	67	65	44	23	89	70
SO4--	mg/l	0	16	15	17	15	20	61	58	41	35	64	67
Cl-	mg/l	7	14.5	6.5	10	15.5	18	32	25	12	38	34	34
Ca++	mg/l	0.9	0.72	0.6	0.77	1.35	1.32	1.5	1.6	1.37	1.6	2.15	2.5
Mg++	mg/l	0.24	1.58	3.04	5.83	9.97	9.12	2.06	3.28	13	1.21	14.54	8.51
TDS	mg/l	68.4	58.5	58.5	72	89.5	86.7	273.5	292	160.5	156	80.4	306.5
NO2-	mg/l	0.005	0.001	0.001	0.002	0.001	0.005	0.002	0.001	0.001	0	0.005	0.001
NO3-	mg/l	0.5	3.1	0.2	0.8	1.2	1	1.8	0.3	0.7	1.2	1.5	2.1
NH4+	mg/l	0	0.11	0.11	0.2	0.13	0.03	0.09	0.11	0.17	0.09	0.05	0.08
PO4	mg/l	0.08	1.92	0.03	0.7	1.16	0.2	0.89	0.01	0.7	2.4	0.24	0.53
Cr	mg/l	0.01	0	0.04	0.01	0.04	0.01	0.02	0.03	0.04	0	0.01	0.02
Mn	mg/l	0.04	0.1	0.1	0.02	0	0	0	0	0.02	0.03	0.04	0.03
Fe	mg/l	0.03	0.09	0.05	0.25	0.17	0.2	0.02	0.04	0.01	0.01	0.09	0.04
F	mg/l	0.51	1.14	0.75	1.09	0.68	0.46	1.83	0.8	0.63	0.75	0	0.98
Cu	mg/l	0.08	0.02	0.04	0	0.02	0	0.01	0	0.03	0	0.01	0
Zn	mg/l	0.01	0.02	0.01	0	0.01	0.2	0.07	0.08	0	0.05	0.29	0.02
COD	mg/l	2		0	16	16	11		0	19	20	99	0
Residual Cl2	mg/l	1.77	0	0.02	0.08	0.19	0.02	0.01	0.06	0.2	0.02	0.02	0.03
Coliform	Number/l	0	0	0	0	0	0	0	0	0	0	0	0
Bacteria	Number/l	1	0	0	0	0	0	0	0	0	0	0	0

Exceed the standard limit for drinking water

Appendix IV.3.3

Original Data for Water Quality
of Taps, Water Service and Water Vending Center



Appendix IV.3.3 Original Data for Water Quality of Tap water, Water service and Water Vending Center

Location	Tap water Anur Hotel						Tap water T.P.D.						Tap water USAG						Water service station						Water supply station				
	24.Sep. 1993	24.Dec. 1993	27.May 1994	26.Jun. 1994	21.Sep. 1994	24.Sep. 1994	24.Sep. 1993	24.Sep. 1994	21.Sep. 1994	26.Jun. 1994	21.Sep. 1994	24.Sep. 1993	24.Sep. 1994	21.Sep. 1994	26.Jun. 1994	27.May 1994	24.Dec. 1993	24.Sep. 1993	21.Sep. 1994	26.Jun. 1994	24.Sep. 1993	24.Sep. 1993	21.Sep. 1994	26.Jun. 1994	24.Sep. 1993	24.Sep. 1993	21.Sep. 1994	26.Jun. 1994	
Water temperature	12	10	8	11	11	11	12	15	12	8	11	11	11	11	10	10	10	10	10	8	10	10	10	10	10	10	10	10	10
pH	7.2	7.3	7.3	7.3	7.4	7.7	6.5	6.9	7.3	7.3	7.3	6.6	6.8	6.5	6.5	6.6	6.9	6.9	7.2	6.5	6.5	6.6	6.9	7.2	6.9	6.9	7.2	7.5	
Conductivity	100	110	110	100	120	110	110	110	140	100	100	100	100	100	260	110	110	100	100	260	110	110	100	100	100	100	100	100	100
Turbidity																													
DO	13.5	13.9	18.7	10.9	12.3	13.2	17.1	14.7	10.4	11.8	12.5	13.8	16.4	10.3	13.1	13.3	17.8	14.7	11.9	14.7	11.9	12.4	13.3	12.5	12.5	11.1	11.1	12.7	
Alkali	5	18	37	25	32	19	15	92	39	62	7	20	44	43	26	10	31	43	48	43	28	16	12	12	12	44	44	37	
SO4--	0	27	2	10	4	0	19	3	2	3	8	28	5	5	1	2	18	8	1	8	1	45	2	15	8	8	21	21	
Cl-	7.5	7.5	7	0	10.5	6	6.5	7.5	0	11	6	5.5	9	0	0.9	6	6.5	8.5	1	12	7	5.5	7	5.5	1	11.5	11.5	11.5	
Ca++	0.55	0.64	0.9	0.85	0.9	0.5	0.57	0.75	0.9	0.82	0.8	0.55	0.8	0.5	0.9	0.75	0.55	0.85	0.75	0.85	0.8	0.42	0.65	0.42	0.65	1	0.87	0.87	
Mg++	6.01	1.24	1.26	3.29	7.9	1.21	1.31	4.25	0.6	3.64	1.28	1.15	3.04	0.6	3.04	1.68	1.05	2.89	2.43	3.04	3.04	0.97	1.72	0.97	1.72	2.67	3.4	3.4	
TDS	65.8	58.5	72	94	74	62.3	48.5	75	95.5	70.5	54.3	55.5	61	67.5	63	72	81.5	243.5	98	72.5	72.5	61.5	72.5	61.5	72.5	96	69.5	69.5	
NO2-	0	0.003	0.001	0.001	0.001	0.003	0.002	0.002	0.002	0.002	0.002	0.008	0.001	0.001	0.001	0.001	0.001	0	0.003	0.001	0.001	0	0.001	0	0.001	0.002	0.002	0.002	
NO3-	1.2	1.4	0.8	0.2	1.3	0.9	0.9	0.9	0.4	0.8	1.9	0.8	0.8	0.5	0.9	1.6	1.2	0.6	0.4	0.8	1.1	1.3	0.8	1.1	1.3	0.5	0.7	0.7	
NH4+	0.01	0.02	0.07	0.13	0.1	0.02	0.01	0.09	0.11	0.11	0	0.01	0.06	0.12	0.09	0	0	0.09	0.1	0.12	0	0.01	0	0.01	0.01	0.1	0.09	0.09	
PO4	0.19	0.1	0.05	0.01	0	0.03	0.04	0.02	0.09	0	0.09	0.08	0.55	0.07	0.01	0.28	1.58	0.01	0.12	0	2.56	0.38	0.12	0	0.12	0	0	0	
Cr	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0	0.01	0.03	0.01	0.01	0.01	0.01	0.05	0.01	0.02	0.04	0.02	0.05	0.03	0.01	0.01	0.01	0.01	0.02	0.05	0.05	
Mn	0.05	0.01	0	0	0	0	0	0.1	0	0	0.1	0.01	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	
Fe	0.07	0.05	0.04	0	0.05	0.07	0.06	0.06	0.02	0.08	0.22	0.07	0.78	0.06	0.12	0.05	0.06	0.13	0.01	0.08	0.13	0.04	0.04	0.04	0.04	0.01	0.04	0.04	
CN	0	0	0	0	0	0	0	0.001	0	0	0	0	0	0.001	0.001	0	0	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
F	0.42		1.33	0.11	0.1	0.44		1.5	0.1	0.37	0.28		1.22	0.01	0.32	0.24	0.24	0.74	0.17	0.33	0.21	0.25	0.25	0.25	0.06	0.06	0.32	0.32	
Cu	0.01	0.01	0.09	0.04	0.01	0.01	0.02	0.01	0	0.01	0.01	0	0.01	0.01	0.04	0.03	0	0.02	0.04	0.03	0	0.02	0	0.02	0.02	0.04	0.04	0.04	
Zn	0.14	0.04	0.05	0.01	0.06	0.12	0.03	0.01	0.27	0.03	0.14	0.04	0	0.05	0	0.15	0.07	0	0	0	0.09	0.08	0.01	0.01	0.01	0.01	0	0	
Cd	0.005		0.001	0.003	0.002	0.005		0.001	0.005	0.001	0.01		0.002	0.006	0.002	0.009		0.001	0.004	0.001	0.005					0.004	0.004	0.004	
Phenol			0	0.0001	0.0001			0.002	0.0004	0.0002			0	0.0001	0.0001			0	0.0001	0						0.0001	0.0001	0.0001	
Hg			0	0	0			0	0	0.0017			0.0017	0	0			0.0017	0.0017	0.0017						0.0017	0	0	
Residual Cl2	0.02	0.01	0.05	0	0.02	0.04	0.02	0.06	0	0.03	0.05	0.02	0.02	0.02	0.02	0.01	0.04	0.02	0.01	0.02	0.04	0.01	0.01	0.01	0.01	0.01	0.02	0.02	
Coliform	1	0	0	0	0	0	1	0	0	0	2	1	0	3	0	3	0	0	0	1	0	2	0	0	0	0	0	0	
Bacteria	3	1	0	1	0	0	29	1	0	0	2	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	

Exceed the standard limit for drinking water

Location Sampling date Item	Water service station						Water supply station					
	24, Sep. 1993	24, Dec. 1993	27, May 1994	26, Jun. 1994	21, Sep. 1994	24, Dec. 1993	26, Jun. 1994	21, Sep. 1994	24, Dec. 1993	26, Jun. 1994	21, Sep. 1994	
Water temperature	10	10	8	10	10	10	10	10	10	10	10	
pH	6.6	6.8	6.5	7.3	7.4	6.6	6.9	7.2	7.5	7.2	7.5	
Conductivity	100		260	110	110	100		100	100	100	100	
Turbidity			0	0	0			0	0	0	0	
DO	13.3	17.8	14.7	11.9	12.4	13.3	12.5	11.1	12.7	11.1	12.7	
Alkali	10	11	43	48	28	16	12	44	37	44	37	
SO4--	2	18	8	1	45	2	15	8	21	8	21	
Cl-	6	6.5	8.5	1	12	7	5.5	1	11.5	1	11.5	
Ca++	0.75	0.55	0.85	0.75	0.8	0.42	0.65	1	0.87	1	0.87	
Mg++	1.68	1.05	2.89	2.43	3.04	0.97	1.72	2.67	3.4	2.67	3.4	
TDS	72	81.5	243.5	98	72.5	61.5	72.5	96	69.5	96	69.5	
NO2-	0.001	0	0.003	0.001	0.001	0	0.001	0.002	0.002	0.002	0.002	
NO3-	1.6	1.2	0.6	0.4	0.8	1.1	1.3	0.5	0.7	0.5	0.7	
NH4+	0	0	0.09	0.1	0.12	0	0.01	0.1	0.09	0.1	0.09	
PO4	0.28	1.58	0.01	0.12	0	2.56	0.38	0.12	0	0.12	0	
Cr	0.01	0.02	0.04	0.02	0.05	0.03	0.01	0.02	0.05	0.02	0.05	
Mn	0	0	0	0	0.1	0	0	0	0.1	0	0.1	
Fe	0.05	0.06	0.13	0.01	0.08	0.13	0.04	0.01	0.04	0.01	0.04	
CN	0	0	0	0	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
F	0.24	0.24	0.74	0.17	0.33	0.21	0.25	0.06	0.32	0.06	0.32	
Cu	0.03	0	0.02	0.04	0.03	0	0.02	0.04	0.01	0.04	0.01	
Zn	0.15	0.07	0	0	0	0.09	0.08	0.01	0	0.01	0	
Cd	0.009		0.001	0.004	0.001	0.005		0.004	0.003	0.004	0.003	
Phenol			0	0.0001	0			0.0001	0.0001	0.0001	0.0001	
Hg			0.0017	0.0017	0.0017			0.0017	0	0.0017	0	
Residual Cl2	0.01	0.04	0.02	0.01	0.02	0.04	0.01	0.01	0.02	0.01	0.02	
Coliform	3	0	0	1	0	2	0	0	0	0	0	
Bacteria	0	0	0	0	1	0	0	1	0	1	0	

█ : Exceed the standard limit for drinking water

Appendix IV.4.1

Original Data for Water Quality
of Effluent from Industries

Appendix IV.4.1 Original Data for Water Quality of Effluent from Industries

Sampling Date Item	Location										E-1					E-2					E-3					Standard
	24.Sep. 1993	4.Dec. 1993	30.May 1994	20.Jul 1994	21.Sep. 1994	24.Sep. 1993	4.Dec. 1993	30.May 1994	20.Jul 1994	21.Sep. 1994	24.Sep. 1993	4.Dec. 1993	30.May 1994	20.Jul 1994	21.Sep. 1994	24.Sep. 1993	4.Dec. 1993	30.May 1994	20.Jul 1994	21.Sep. 1994	24.Sep. 1993	4.Dec. 1993	30.May 1994	20.Jul 1994	21.Sep. 1994	
Water temperature	21		17	22	16	15		15	20	13	15		15	20	13	15		16	18	13	15		16	18	13	
pH	10.4		11.7	8.8	9.6	7.3		8.2	7.8	7.6	7		8.2	7.8	7.6	7		7.1	7.5	7.8	7		7.1	7.5	7.8	
Conductivity	4700		210	500	2600	690		640	400	680	590		640	400	680	590		380	400	580	590		380	400	580	
Turbidity	220		24	0.1	67	17		20	0.1	49	10		20	0.1	49	10		0.1	0.1	18	10		0.1	0.1	18	
DO	9.7		9.8	6	9.9	11.4		11.4	7.4	11.8	11.6		11.4	7.4	11.8	11.6		10.7	7.8	11.8	11.6		10.7	7.8	11.8	
Alkali	46	152	66	133	168	36	135	154	117	198	30	62	39	1020	2720	30	62	39	1020	2720	30	62	39	1020	2720	
SO4--	75	75	75	5	75	75	14	75	36	75	41	2	49	31	37	41	2	49	31	37	41	2	49	31	37	
Cl-	56		45	59	860	72		36.5	31	220	46		37	31.5	160	46		37	31.5	160	46		37	31.5	160	
Ca++	4.25		2.32	1.65	4.22	1.15		1.25	1.75	3.2	2.25		1.57	1.35	2.57	2.25		1.57	1.35	2.57	2.25		1.57	1.35	2.57	
Mg++	12.16		7.66	24.3	4.62	1.21		18.24	7.9	6.68	10.57		7.66	11.18	12.52	10.57		7.66	11.18	12.52	10.57		7.66	11.18	12.52	
TDS	528.3		322	314	1564	543.2		263	232	1484	125.8		242	221	1148.5	125.8		242	221	1148.5	125.8		242	221	1148.5	
NO2-	0.069	0.07	0.159	0.085	0.259	0.33	0.33	0.33	0.114	0.198	0.284	0.144	0.264	0.33	0.184	0.284	0.144	0.264	0.33	0.184	0.284	0.144	0.264	0.33	0.184	
NO3-	31.1	35.5	2.2	0.8	9	16	4.8	8.9	2.4	8.4	3.1	4	8.5	2.3	4.4	3.1	4	8.5	2.3	4.4	3.1	4	8.5	2.3	4.4	
NH4+	2.75	2.75	2.76	2.65	2.21	2.75	2.75	2.75	2.75	2.17	2.75	3.28	1.38	2.75	1.13	2.75	3.28	1.38	2.75	1.13	2.75	3.28	1.38	2.75	1.13	
PO4	0.63	0.56	0.85	1.15	2.74	0.63	2.75	2.25	2.75	2.72	0.38	2.75	2.25	2.75	2.25	0.38	2.75	2.25	2.75	2.25	0.38	2.75	2.25	2.75	2.25	
Cr	0		0.52	0.49	1.58	0.16		0.42	0.38	0.08	0.16		0.42	0.38	0.08	0.16		0.38	0.3	0.03	0.16		0.38	0.3	0.03	
Mn	2.3	0	3.6	0	1.4	2	0	2.3	0	1.5	0.1	0	2.3	0	0.3	0.1	0	0.6	0	0.3	0.1	0	0.6	0	0.3	
Fe	0.89	0.15	0.96	0.29	0.37	0.7	0.63	0.69	0.3	0.5	0.25	0.06	0.04	0.04	0.25	0.06	0.04	0.04	0.04	0.25	0.06	0.04	0.04	0.04	0.25	
CN	0.043	0.001	0	0.005	0.017	0.028	0	0	0.009	0.019	0.001	0.001	0	0.001	0.001	0.001	0.001	0	0.001	0.001	0.001	0.001	0	0.001	0.001	
F	0	0.71	2.2	0.53	0.79	0.02	0.26	1.82	0.54	0.71	0	0.26	1.82	0.54	0.71	0	0.26	1.57	0.54	0.35	0	0.26	1.57	0.54	0.35	
Cu	1.24	0.15	2.15	0.07	0.57	0.56	0.03	0.57	0.18	0.52	0	0.03	0.57	0.18	0.52	0	0.03	0.01	0.01	0.08	0	0.01	0.01	0.01	0.08	
Zn	0.62	0.14	0.38	0	0.21	0.42	0	0.18	0.15	0.13	0.39	0.01	0.01	0.05	0.01	0.39	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.05	0.01	
COD	334		10	18	14	99		24	26	45	18		29	27	35	18		29	27	35	18		29	27	35	
Pb	0.176		0.176	0.026	0.28	0.177		0.176	0.076	0.19	0.009		0.176	0.076	0.19	0.009		0.126	0.034	0.2	0.009		0.126	0.034	0.2	
Cd	0.1		0.004	0.015	0.005	0.1		0.008	0.004	0.005	0		0.008	0.004	0.005	0		0.003	0.005	0.001	0		0.003	0.005	0.001	
Phenol	0.006		0.003	0.0033	0.0033	0.006		0	0.0007	0.0004	0.007		0	0.0007	0.0004	0.007		0	0.0001	0	0.007		0	0.0001	0	
Hg	0		0.0017	0.0042		0		0.0017	0.0017	0.0017	0		0.0017	0.0017	0.0017	0		0	0	0	0		0	0	0	
As	0.07		0.1	0.08	0.07	0.06		0.06	0.1	0.13	0.01		0.06	0.1	0.13	0.01		0.08	0.07	0.09	0.01		0.08	0.07	0.09	

Exceed for effluent standard to sewage system in Mongolia

