

**THE STUDY ON RESTRUCTURING OF WATER
SUPPLY SYSTEM OF TASHKENT CITY IN
THE REPUBLIC OF UZBEKISTAN**

**FINAL REPORT
VOLUME 4
DATA REPORT**

MARCH 2006

**Japan International Cooperation Agency
Global Environment Department**

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JAPAN INTERNATIONAL COOPERATION AGENCY

TASHKENT CITY MUNICIPALITY

TASHKENT CITY REGIONAL COMMUNAL SERVICE COMPLEX (TKEO)

TASHKENT VODOKANAL (SUVSOZ)

THE REPUBLIC OF UZBEKISTAN

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ERNST & YOUNG SHINNIHON

NJS CONSULTANTS CO., LTD.

VOLUMES of
FINAL REPORT
“THE STUDY ON RESTRUCTURING OF WATER SUPPLY SYSTEM
OF TASHKENT CITY IN THE REPUBLIC OF UZBEKISTAN”

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Volume 2 DRAFT FINAL REPORT

Volume 3 SUPPORTING REPORT

Volume 4 DATA REPORT

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On Restructuring of Water Supply System
Of Tashkent City
in the Republic of Uzbekistan**

Final Report

**Data Report
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Chapter 2 Conditions of the Water Supply System

D 2.3.6 Water Quality

(1) Uzbekistan Drinking Water Standard

1) Field of Application

Current standard is applied for the drinking water supplied by the centralized systems of household and drinking water supply, as well as by the centralized water supply systems that supply water both for drinking and technical purposes. The standard defines drinking water quality characteristics and procedure of the drinking water quality control.

Current standard is also used to certify the drinking water. It is used by certifying agencies of drinking water supply and testing and controlling service agencies that serve for certifying agencies, producers and consumers of drinking water.

2) Hygienic Requirements and Quality Control Methods of Drinking Water

i) Drinking water must be safe in epidemic and radiation means and harmless by chemical content.

It should also have favorable organoleptic characteristics.

These requirements are satisfied when the quality of drinking water is consistent with the norms shown in Table D2.3.6.1, and is checked with accepted control procedures.

Table D2.3.6.1 Analysis Indices and Method

Indices or components	Unit	Standard	Analysis method
1. Microbiological indices			
1.1 Total bacteria number	microbe quantity in 1ml. of water	not more than 100	GOST 18963-73, ISO 8360/1-2-88
1.2 Number of coliform group	quantity in 1000 ml. of water	not more than 3	GOST 18963-73, ISO 9308/1-2-90
1.3 Number of fresh fecal coliform	quantity in 300 ml. of water	Not detected	GOST 18963-73, SO 9308/1-2-90
1.4 Kolifags	BOE quantity in 200 ml. of water	Not detected	Methodical instructions, approved by Ministry of Health of Republic of Uzbek.
2. Parasitological indices			
2.1 Pathogenic bacteria	Cyst quantity in 25 l. of water	Not detected	Methodical instructions, approved by Ministry of Health of Republic of Uzbek.
2.2 Heminth ovums	Ovum and larvae quantity in 25 l. of water	Not detected	-Ditto-
3. Toxicological indices			
a) Inorganic components			
3.1 Aluminum (Al)	mg/l	0.2 (0.5) ^{*4}	GOST 18165-89
3.2 Beryllium (Be)	ditto	0.0002	GOST 18294-81
3.3 Boron (B)	ditto	0.5	ISO 9390-90
3.4 Cadmium (Cd)	ditto	0.001	ISO 5961-85
3.5 Molybdenum (Mo)	ditto	0.25	GOST 18308-72
3.6 Arsenic (As)	ditto	0.05	GOST 4152-81
3.7 Nickel (Ni)	ditto	0.1	ISO 8288-86
3.8 Nitrates (NO ₃) ^{*1}	ditto	45	GOST 18826-73
3.9 Nitrites (NO ₂)	ditto	3	GOST 4192-82
3.10 Mercury (Hg)	ditto	0.0005	ISO 5666/3-84
3.11 Lead (Pb)	ditto	0.03	GOST 18293-72
3.12 Selenium (Se)	ditto	0.01	GOST 19413-89
3.13 Strontium (Sr)	ditto	7	GOST 23950-88
3.14 Fluoride (F)	ditto	0.7	GOST 4386-89
3.15 Chromium (Cr ⁺⁶)	ditto	0.05	ISO 9174-90
b) Organic components			
3.16 Benzol	mg/l	10	Meth. instr. appr. by Min. of Health of Rep.of Uzb.
3.17 Benzapilene	ditto	0.01	-ditto-
3.18 Polyacrylamide	ditto	2	GOST 19355-85
3.19 Pesticides 6)	ditto		Meth. instr. appr. by Min. of Health of Rep.of Uzb.
4. Organic indices			
4.1 Taste	degree	2	GOST 3351-74
4.2 Odor	ditto	2	-Ditto-
4.3 Turbidity ^{*2}	degree	1.5/2.0/ ^{*5}	-Ditto-
4.4 Color	degree	20/25/ ^{*6}	-Ditto-
4.5 pH value	pH	6-9	measured by pH-meter
4.6 Total dissolved solid	mg/l	1000/1500/ ^{*7}	GOST 18164-72
4.7 Iron (Fe)	mg/l	0.3/1.0/ ^{*7}	GOST 4011-72
4.8 General hardness ^{*3}	Ca+Mg-eqv/l	7/10/ ^{*7}	GOST 4151-72
4.9 Manganese (Mn)	mg/l	0.1	GOST 4974-72
4.10 Copper (Cu)	ditto	1	GOST 4388-72
4.11 Phosphate (PO ₄)	ditto	3.5	GOST 18309-72
4.12 Sulfate (SO ₄)	ditto	400/500/ ^{*7}	GOST 4389-72
4.13 Chloride (Cl)	ditto	250/350/ ^{*7}	GOST 4245-72
4.14 Zinc (Zn)	ditto	3	GOST 18293-72
4.15 SPAV (PAV)	ditto	0.5	ISO 7875/1-2-84
4.16 Phenol	ditto	0.001/0.1 ^{*8}	ISO 6439-90
4.17 Mineral oil	ditto	0.1	Meth. instr. appr. by Min. of Health of Rep.of Uzb.
5. Radioactive pollution indices			
5.1 Total alpha-radioactivity ^{*9}	Bq/l	0.1	ISO 9696-92
5.2 Total beta-radioactivity ^{*9}	Bq/l	1	ISO 9697-92

*1: Analyzed as NO₃⁻, 45mg/L of the standard value is almost equivalent to the Japanese standard value of 10 mg/L for N-NO₃

*2: This value is analyzed in comparison with the water standard of GOST, and is approximately 50% lower than the value analyzed by Japanese method

*3: The Uzbekistan standard of Ca + Mg equivalent with a value 7 as above, is equivalent to 294-350mg/L in CaCO₃ conversion (Japanese standard is 300mg/L)

*4: When high colored water is treated by coagulant

*5: When water is effectively disinfected

*6: When high color is treated and disinfected under the control of trihalomethane

*7: With only disinfection

*8: When water is not chlorinated

*9: Recommended by WHO guideline (2nd Edition), average concentration of α and β radiation

- ii) In case there is information about presence of some harmful substances in water source of water supply system, additional quality control is to be conducted with decisions of territorial divisions of State Sanitary Control in order to define the concentration of those substances, assessment of their harmlessness in accordance with Maximum Concentration Limit (MCL) of those substances.
- Temporary deviation of organoleptic characteristics records from accepted levels could be allowed by sanitary epidemiologic services of corresponding regions, provided that the necessity of this deviation was caused by either conditions of nature or emergency situations, and they cannot harm the health of the population. The information about these temporary deviations should be delivered to the population.
 - Application of international standards is allowed in case of correspondence of the ranges of definable concentrations to the MCL levels (response limit is 0.3 MCL) and adherence of the analysis' error levels.
 - In order to control the technological process of water preparation, water supply enterprises can use additional figures (alkalinity, electro conductivity and others) that allow to correct technological operations in time, control the use of reagents in case of compulsory ensuring of purification level, disinfection of water and correspondence of drinking water to the accepted hygienic requirements.
 - In case there is a suspicion of chemical contamination of drinking water sources, since there are no available and sensitive methods of their determination, bio-testing the drinking water for toxicity index for infusorium or daphnia is used as an additional method. The index should not exceed 50% after dichlorination of water which is determined by the following formula:

$$T = \frac{Y_k - Y_o}{Y_o} \times 100\%$$

where: Y_k – magnitude of test-reaction for control sample

Y_o – magnitude of test-reaction for testing sample

- In case of detection of several chemical substances in water, that according to the toxicity level belong to the 1st and 2nd class of danger (except radioactive components), calculated composite figures of water quality assessment for those groups of substances, such as pesticides; trihalomethanes; nitrates and nitrites are used by the following formula:

$$\frac{C_1 \text{fact.}}{\text{MLC}_1} + \frac{C_2 \text{fact.}}{\text{MLC}_2} + \frac{C_3 \text{fact.}}{\text{MLC}_3} \leq 1$$

where: C_1, C_2, C_3 are the concentrations of dangerous chemical substances; and

MLC_1 MLC_2 MLC_3 are maximum level of concentration of each substance in water.

- iii) Quality control of water in centralized systems of household and drinking water supply:
- Quality control of water in centralized systems of household and drinking water supply is conducted in the centralized laboratories of water supply enterprises that are accredited in accordance with established procedure. Quality control of drinking water is done by the laboratories of the State Sanitary Epidemiologic Control of RU. In case there is a need of special analysis, conduction of which requires use of complex equipment, special preparation and protective action of the personnel, laboratories of testing centers and scientific organizations which are accredited for their competency (in case of arbitral and certificated analysis - also for their independence) can be used on agreement basis.
 - Technological quality control of water on different stages of water preparation process is conducted in accordance with technological regulations in the time schedule, authorized by the agencies of the State Sanitary Epidemiologic Control of RU. Quality control of water and its assessment is done at the water reservoirs, sources of water supply before it reaches the distribution pipelines, and at the distribution pipelines themselves.
 - Number of sampling points of water and their whereabouts at reservoirs, pressured water pipelines, before the entrance into the distribution pipelines and at the distribution pipelines is determined by consent of the agencies of the State Sanitary Epidemiologic Control of RU. Water sampling from distribution pipelines is done at the street water-dispensing facilities of main lines, deadlock and eminent points of nets.
 - Selection, preservation, storage and transportation of the samples for the analysis are done in accordance with active standards.
 - Depending on the analysis done during the control process, there are the following types of control:
 - Brief control that includes identification of basic bacteriologic info (total microbe number, coli-index), organoleptic info (smell, taste, color, turbidity), easily identifiable physical and chemical info (pH and others);
 - General physical and chemical control that includes identification of widely spread water components both of natural origin and those ones which are added during the process of water preparation (aluminum, arsenic, nitrates, nitrites, poly-acrylamide, lead, fluorine, iron, general stiffness, manganese, copper, polyphosphates, sulfates, solid residue, chlorides, zinc);

- Special virusologic and parasitologic control that identifies colibacillus, cysts of pathogenic intestinal protozoa and heminth eggs including those having carcinogenic action, which is harmful even in low concentrations and needs to be analyzed using complex equipment and highly-qualified personnel in order to identify them (pesticides, polynuclear aromatic hydrocarbons, volatile halogen containing compounds, mercury, cyanide and others);
- Special radiation control that is to determine total radiation activity of alpha and beta ray and in case of necessity, radio nuclide composition of contamination.

Analysis details and frequency of their conduction for each type of control is determined in the Water Quality Control Programs developed by water supply enterprises and approved by the agencies of State Sanitary Control.

If there is reliable information with reference to the analysis process at the water supply source about the absence of particular contaminants, it is allowed to exclude those contaminants from the list of constantly controlled substances temporarily (for the period of 1-3 years) with the authorization of State Sanitary Head Doctor of the region.

- Quality control of water of water supply sources at water intakes is done in accordance with all requirements of O'z DSt (Uzbekistan State Standard) and sanitary regulation of RU "Hygienic, sanitary and technical requirements for the sources of centralized drinking water supply facilities". List of controlled substances and figures in each type of analysis is determined based on the type and class of the water supply source, local natural and sanitary conditions (Recommendations are given in attachment no.1).
- Quality control of water before its entry into the distribution pipelines is done in accordance with the recommendations on types, details and frequency of analysis given in attachment 2. During the control of disinfection of water with chlorine and ozone at the water supply systems, regardless of the type of water supply source, the concentration of residual chlorine and ozone should be checked at least once an hour, in accordance with standards given in Table D 2.3.6.2.

Table D 2.3.6.2 Standards of Disinfectant Composition and Control Principles

Disinfectant composition	Controlling point	MCL, mg/l	Necessary contact period of reagent with water, at least	Control principle
Residual chlorine	After reservoirs of clean water	0.2-0.5	30**	GOST 18190-72
Residual ozone	After mixing camera	0.1-0.3	12**	GOST 18301-72

- Quality control of drinking water at the distribution pipelines is done based on the figures of “brief control”. Additional control for general physical and chemical control figures and other special types of control figures is done based on instructions of agencies of State Sanitary and Epidemiological Control or water supply enterprises’ initiatives in case there are grounds for those types control (complaints, bad health condition of population, bad condition of water pipelines etc.) Number of samples taken for the analysis from water pipelines should be in proportion to the number of people consuming water from the net and in accordance with Table D 2.3.6.3.

Table D 2.3.6.3 Frequency of Water Quality Analysis at Distribution Pipelines

Number of people consuming water (thousand people)	Least number of samples taken from the net during a month
Less than 10	2
10-20	10
20-50	30
50-100	100
More than 100	200

In case there is a microbe contamination exceeding standards of Table D 2.3.6.1, repetition of the sampling for those necessary figures should be done. In case the coli-index is greater than 20 in 2 consecutively taken samples, water should be thoroughly examined based on the decisions of the agencies of State Sanitary and Epidemiological Control. In case of the existence of colibacillus, in 2 consecutively taken samples, water should be examined to find out whether it contains enteroviruses or not. In these cases based on epidemiological data, water examination to check whether it contains antigen of hepatitis A virus could be recommended. Also, there can be recommendation to check the existence of mineral nitrogen containing substances and chlorides in drinking water from distribution pipe.

- Frequency and types of analyses of water samples is determined by special plans and schedules of drinking water quality control approved by Ministry of Health of RU.

D 2.3.6.4 Analyses Types, Contents and Sampling Frequency of Drinking Water Quality Control at Water Intakes

Analyses types and contents	Sampling and water quality analyses conduction frequency (number of analyses in a year)									
	Groundwater					Surface water				
	Number of people consuming water from the given water intake facility (thousand people)									
	< 10	10-20	20-50	50-100	> 100	< 10	10-20	20-50	50-100	> 100
1	2	3	4	5	6	7	8	9	10	11
<u>Brief control</u> Total microbe number, number of bacterium of colibacillus group (coli-index), smell, taste, turbidity, hydrogen indicator (pH), permanganate oxidation, phyto- and zooplankton	12	12	24	52	90	52	90	180	380	380
<u>General physical and chemical control</u> arsenic, nitrates, nitrites, lead, fluoride, iron, general hardness, manganese, copper, polyphosphates, sulfates, solid residue, chlorides etc.	2	4	6	6	12	6	6	12	12	24
<u>Special virusologic and parasitologic control</u> colibacillus, cysts of pathogenic intestinal protozoa, heminth eggs	With instructions of the State Sanitary Epidemiological Control agencies					based on epidemiological data, water examination to check whether it contains enteroviruses, virus of hepatitis A, comma bacillus				
						3	3	6	6	12
<u>Special toxicologic control</u> Barium, boron, cadmium, molybdenum, nickel, mercury, selenium, strontium, chromium, cyanides, volatile halogen containing carbohydrates, benzol, benzapilene, pesticides, phenol, chlorophenol, as well as other polluting chemical compounds	1	2	3	3	6	3	3	6	6	12
<u>Special radiation control</u> Total radiation activity of alpha and beta ray Radionuclide composition	Frequency is determined by the decision of local administration taking the radiation condition into account. However it should not be less than once in a year.									

Table D 2.3.6.5 Analyses types, contents and conduction frequency of drinking water quality control at centralized water supply systems before it reaches the distribution pipelines

Analyses types and contents	Sampling and water quality analyses conduction frequency (number of analyses in a year)									
	Groundwater					Surface water				
	Number of people consuming water from the given water intake facility (thousand people)									
	< 10	10-20	20-50	50-100	> 100	< 10	10-20	20-50	50-100	> 100
1	2	3	4	5	6	7	8	9	10	11
<u>Brief control</u> Total microbe number, number of bacterium of colibacillus group (coli-index), smell, taste, turbidity, hydrogen indicator (pH)	12	12	24	24	52	52	90	120	180	380-720
Residual aluminum, residual chlorine, residual ozone, fluorine, manganese, iron, chlorides.	Residual chlorine control during water disinfection by chlorine should be done once in an hour. Residual ozone control should be done once in an hour. Control of other components added during water preparation process should be done not less than once in 24 hours.									
<u>General physical and chemical control</u> arsenic, nitrates, nitrites, lead, fluorine, iron, general stiffness, manganese, copper, polyphosphates, sulfates, solid residue, chlorides etc.	2	4	6	6	12	6	6	12	12	24
<u>Special virusologic and parasitologic control</u> colibacillus, cysts of pathogenic intestinal protozoa, heminth eggs	With instructions of the State Sanitary Epidemiologic Control agencies					3	3	6	6	12
<u>Special toxicologic control</u> Barium, boron, cadmium, molybdenum, nickel, mercury, selenium, strontium, chromium, cyanides, volatile halogen containing carbohydrates, benzol, benzapilene, pesticides, phenol, chlorophenol, as well as other polluting chemical compounds	1	2	3	3	6	3	3	6	6	12
	During water disinfection using chlorine, the frequency of control of chlorinated carbohydrates should be increased by 2-3 times									
<u>Special radiation control</u> Total radiation activity of alpha and beta ray Radionuclide composition	Frequency is determined by the decision of local administration taking the radiation condition into account. However it should not be less than once in a year.									

3) Information

For the document O'zDSt "Drinking water. Hygienic requirements and quality control"

- i) Developed by Scientific Research Institute (SRI) of sanitation, hygiene and professional diseases of the Health Ministry of RU (SRISH&PD of HM of RU), department of hygiene and health at Tashkent pediatric medical institute (TashPMI) and by the department of communal hygiene at the Second Tashkent State medical Institute (TashStateMI-2).
- ii) Executives:
 - Director of SRISH&PD of HM of RU, head of department of communal hygiene at the Second Tashkent State medical Institute, member of Science Academy of RU, doctor of medical sciences, Professor Iskandarov T.I.
 - Head of SRISH&PD of HM of RU laboratory, doctor of medical sciences, Professor Ilinski I.I.
 - Head of department of hygiene and health at Tashkent pediatric medical institute, candidate of medical sciences Iskandarova Sh.T.
- iii) Proposed by Scientific Research Institute of sanitation, hygiene and professional diseases of the Health Ministry of RU.
- iv) Approved and put in force by the Order no. 104 dated 09.03.2000 of Health Ministry of RU.
- v) First control is to be conducted after 3 months of its implementation
- vi) First ever implementation.

(2) Quality of Surface Water for WTPs

Table D 2.3.6.6 (1) and (2) show monthly analysis results of intake water quality (Boz-su Canal) for Kadirya WTP in 2001 and 2002. Table D 2.3.6.7 shows monthly analysis results of intake water quality (Boz-su Canal) for Boz-su WTP in 2002.

Table D 2.3.6.8 (1) and (2) show monthly analysis results of distribution water quality for Kadirya WTP in 2001 and 2002. Table D 2.3.6.9 shows monthly analysis results of distribution water quality for Boz-su WTP in 2002.

Table 2.3.4.6 (1) Monthly Intake Water Quality of Kadirya WTP in 2001

Month	Number of colonies		Coli. index		Turbidity			Ammonia	Nitrites	Chlorides	Alkalinity	Hardness	pH
	min.	max.	min.	max.	min.	ave.	max.						
Jan.	0	77	0	19	3	15.8	120	0	0	2.97	1.73	1.82	8.45
Feb.	2	28	<500	>240000	3	28.2	380	0	0	2.87	1.65	1.76	8.53
Mar.	3	74	600	70000	11	46.14	492	0	0	3.25	1.75	2.29	8.46
Apr.	3	98	<500	>240000	18	215.0	9200	0	0	3.12	1.71	2.54	8.36
May	7	22	<500	>240000	8	67.6	1200	0	0	2.87	1.71	2.52	8.57
Jun.	3	76	<500	>240000	8	18.2	38	0	0	2.82	1.61	2.29	8.44
Jul.	5	19	<500	>240000	11	20.97	200	0	0	2.90	1.37	1.81	7.43
Aug.	4	107	<500	>240000	7	11.05	12	0	0	2.73	1.26	2.29	7.35
Sep.	5	22	<500	24000	6	8	13	0	0	2.86	1.40	2.03	7.72
Oct.	6	129	<500	>240000	4	6.03	7	0	0	2.92	1.62	2.29	7.70
Nov.	5	77	600	24000	4	7.86	30	0	0	2.88	1.56	2.38	7.83
Dec.	8	127	<500	>240000	6	19.6	57	0	0.01	3.03	1.47	2.39	7.83

Table 2.3.4.6 (2) Monthly Intake Water Quality of Kadirya WTP in 2002

Month	Number of colonies		Coli. index		Turbidity			Ammonia	Nitrites	Chlorides	Alkalinity	Hardness	pH
	min.	max.	min.	max.	min.	ave.	max.						
Jan.	7	18	<500	2300	7	10.7	15	0	0	2.73	2.06	2.45	8.08
Feb.	4	14	900	2100	7	30	25.6	0	0	2.63	2.01	2.22	8.03
Mar.	6	12	<500	1400	17	38	219	0	0	2.77	2.08	2.69	7.98
Apr.	6	44	<500	24000	14	38	407	0.005	0.005	2.79	2.01	2.63	8.02
May	6	69	<500	24000	9	13.8	29	0	0	2.97	1.90	2.05	7.94
Jun.	6	244	600	24000	9	11.4	14	0	0	3.02	1.63	1.94	7.95
Jul.	4	32	<500	24000	10	13.3	82	0	0	3.02	1.64	2.20	8.00
Aug.	6	30	<500	24000	8	13.5	100	0	0	2.98	1.50	1.85	7.95
Sep.	6	172	<500	24000	9.1	10.9	12.0	0	0	2.88	1.35	1.75	8.10
Oct.	1	106	<500	24000	7	28.2	178	0	0	3.12	1.47	2.06	8.40
Nov.	2	107	<500	240000	8	27.4	140	0	0	3.25	1.65	2.22	8.50
Dec.	2	18	<500	240000	7	10.5	47	0	0	3.02	1.76	2.16	8.43

Table 2.3.4.7 Monthly Intake Water Quality of Boz-su WTP in 2002

Month	Number of colonies		Coli. index		Turbidity			Ammonia		Nitrites		Chlorides		Alkalinity		Hardness		pH	
	min.	max.	min.	max.	min.	ave.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
January	122	174	> 2380	> 2380	9	23.7	76	0	0	0	0	3.0	4.0	2.0	2.4	2.4	2.9	7.7	8.0
February	130	180	> 2380	> 2380	8	28.8	350	0	0	0	0	3.1	4.3	2.2	2.4	2.5	2.9	7.8	8.0
March	105	157	> 2380	> 2380	14	42.0	375	0	0	0	0	3.5	4.5	2.3	2.6	2.7	3.1	7.3	7.8
April	103	156	> 2380	> 2380	30	116.1	1370	0	0	0	0	3.8	4.5	2.4	2.8	2.6	3.3	7.7	7.9
May	105	265	> 2380	> 2380	20	62.5	1100	0	0	0	0	3.2	4.2	2.3	2.6	2.5	3.1	7.5	7.8
June	195	270	> 2380	> 2380	20	31.3	58	0	0	0	0	3.1	4.2	2.1	2.5	2.4	2.8	7.7	7.9
July	230	395	> 2380	> 2380	26	37.6	216	0	0	0	0	3.3	5.1	1.8	2.2	2.0	2.5	7.5	8.0
August	309	370	> 2380	> 2380	22	27.7	44	0	0	0	0	3.0	4.0	1.8	2.0	1.8	2.5	7.7	7.9
September	293	368	> 2380	> 2380	20	28.6	30	0	0	0	0	3.2	4.3	1.9	2.0	2.0	2.6	7.8	8.0
October	208	360	> 2380	> 2380	9	23.1	80	0	0	0	0	3.2	4.2	2.0	2.2	2.2	2.9	7.7	8.0
November	240	315	> 2380	> 2380	12	19.7	55	0	0.08	0	0.02	3.0	3.5	2.0	2.2	2.2	2.7	7.8	8.1
December	135	279	> 2380	> 2380	11	24.0	50	0	0	0	0	3.0	3.6	2.0	2.2	2.3	2.8	7.9	8.0

Table D 2.3.6.8 (1) Monthly Distribution Water Quality of Kadirya WTP in 2001

No.	Item	Units	GOST	Month											
				Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	Temperature	C°	3351-46	2.5	3.5	6	11	12	15	14.5	12	15	13.5	10	6
2	Color	C°	3351-74	0	0	0	0	0	0	0	0	0	0	0	0
3	Flavor		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
4	Odor by 20°/60°		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
5	Turbidity	mg/L	3351-74	0.8	1.4	1.5	1.3	1.2	0.9	1.1	1.2	1	1.3	0.9	1
6	Aluminum residual	mg/L	18165-89	0	0	0	0	0	0	0	0	0	0.168	0	0
7	Chlorine residual	mg/L	18190-72	0.34	0.35	0.32	0.36	0.35	0.34	0.37	0.35	0.46	0.46	0.46	0.46
8	General hardness	Mg-eqv/L	4151-72	2.45	2.5	2.66	2.45	2.25	1.85	1.54	1.9	1.95	2.2	2.2	2.2
9	Alkalinity	mg/L		1.9	2	2.13	2.01	1.9	1.66	1.66	1.9	1.49	1.73	1.73	1.84
10	Chloride	mg/L	4252-72	3	3.24	3.15	3.12	3.76	3.43	3.12	3.3	3.8	3.8	4.76	3.24
11	Nitrite	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
12	Ammonia	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
13	Nitrate	mg/L	18826-72	1.77	1.77	1.77	1.77	2.2	1.77	1.11	2.2	2.2	6.2	6.2	5.3
14	pH value	pH	2874-82	7.85	7.9	7.74	7.82	7.92	7.74	7.92	7.93	7.94	8.29	8.29	8.35
15	Sulfate	mg/L	4389-72	19.3	19.3	18.5	6.8	6.9	5.5	7.3	6.9	10	15	15	6.8
16	Fluoride	mg/L	4386-72	0.16	0.16	0.16	0.16	0.16	0.2	0.16	0.15	0.03	0.052	0.052	0.015
17	Iron	mg/L	4011-72	0.04	0.12	0.045	0.03	0	0	0	0	0.5	0.01	0.01	0.04
18	Solid residual	mg/L	18164-72	128	138	136	128	128	130	114	128	132	132	132	128
19	Colonies number	In 1 ml	18963-73	0	0	0	0	0	0	0	0	0	1	0	0
20	Coli- index	in 1000 ml	18963-73	<2	<2	<2	<2	<2	<3	<3	<3	<3	<3	<3	<3

Table D 2.3.6.8 (2) Monthly Distribution Water Quality of Kadirya WTP in 2002

No.	Item	Units	GOST	Month											
				Jan.	Feb.	Mar.	Apr.	may	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	Temperature	C°	3351-46	3	4	4.5	9.5	11	11	15	14	14	13	11	7
2	Color	C°	3351-74	0	0	0	0	0	0	0	0	0	0	0	0
3	Flavor		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
4	Odor by 20 ⁰ /60 ⁰		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
5	Turbidity	mg/L	3351-74	0.4	1.3	0.5	1.5	0.9	0.9	1	0.6	0.6	0.4	0.6	0.8
6	Aluminum residual	mg/L	18165-89	0	0.6	0.1	0.17	0.08	0	0	0.42	0	0	0	0.06
7	Chlorine residual	mg/L	18190-72	0.4	0.36	0.34	0.36	0.36	0.35	0.33	0.33	0.37	0.36	0.34	0.34
8	General hardness	Mg-eqv/L	4151-72	1.72	1.77	2.8	2.53	2.53	2.34	1.75	1.8	1.88	2.43	2.45	2.5
9	Alkalinity	mg/L		1.57	1.65	1.83	1.67	1.81	1.76	1.25	1.2	1.35	1.95	1.5	1.55
10	Chloride	mg/L	4252-72	3.61	3.73	3.98	4.06	3.86	4.45	3.5	4.28	4.04	3.23	4.02	3.3
11	Nitrite	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
12	Ammonia	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
13	Nitrate	mg/L	18826-72	1.77	1.7	2.21	1.33	1.77	1.33	1.99	2.21	1.59	1.33	1.33	1.55
14	pH value	pH	2874-82	8.44	8.49	8.35	8.24	8.54	7.4	7.3	7.15	7.64	7.64	7.65	8.18
15	Sulfate	mg/L	4389-72	18.2	15.1	19.3	15.8	6.1	9.5	10.1	13.5	11.2	11.7	9.6	11.1
16	Fluoride	mg/L	4386-72	0.16	0.16	0.12	0.18	0.14	0.14	0.17	0.23	0.09	0.92	0.096	0.072
17	Iron	mg/L	4011-72	0.01	0.01	0.0015	0.45	0.03	0.02	0.03	0.03	0.025	0.03	0.02	0.025
18	Solid residual	mg/L	18164-72	140	130	136	132	138	127	131	136	121	112	133	136
19	Colonies number	In 1 ml	18963-73	2	3	3	1	2	1	2	3	2	3	2	6
20	Coli- index	in 1000 ml	18963-73	< 2	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3

Table D 2.3.6.9 Monthly Distribution Water Quality of Boz-su WTP in 2002

No.	Item	Units	GOST	Month											
				Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	Temperature	C°	3351-46	13	13	10	17	17	16	18	19	24	24	17	13
2	Color		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
3	Flavor		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
4	Odor		3351-74	0	0	0	0	0	0	0	0	0	0	0	0
5	Turbidity	mg/L	3351-74	0.8	0.8	0.8	1.0	1.0	0.8	0.8	1.0	0.8	1.4	1.2	1.4
6	Residual active chlorine	mg/L		0.46	0.47	0.44	0.40	0.46	0.42	0.41	0.45	0.45	0.48	0.42	0.48
7	pH value	pH	2874-82	7.7	7.8	7.5	7.5	7.2	7.5	7.5	7.4	7.3	7.5	7.5	7.5
8	General hardness	Mg-equiv/L	4151-72	2.6	2.6	2.7	3.0	2.7	2.2	2.2	2.1	2.5	2.4	2.4	2.3
9	Alkalinity	Mg-equiv/L		2.3	2.3	2.5	2.5	2.5	2.1	2.0	1.9	2.0	2.1	2.1	2.0
10	Chloride	mg/L	4252-72	5.0	5.8	6.5	5.5	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0
11	Ammonia	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
12	Nitrite	mg/L	4192-82	0	0	0	0	0	0	0	0	0	0	0	0
13	Nitrate	mg/L	18826-72	2.6	2.4	2.2	2.8	1.7	1.8	2.6	2.8	2.8	3.1	3.3	3.1
14	Sulfate	mg/L	4389-72	14.5	13	14.5	21.4	17.1	13	18	19	19.7	16.5	19	16.5
15	Fluorine	mg/L	4386-72	0.12	0.2	0.24	0.09	0.14	0.07	0.1	0.07	0.07	0.07	0.07	0.18
16	Aluminum residual	mg/L	18165-89	0.12	0.2	0.21	0.18	0.14	0.25	0.21	0.27	0.08	0.12	0.13	0.09
17	Iron	mg/L	4011-72	0.02	0.04	0.04	0.09	0.05	0	0.01	0.04	0	0.01	0.02	0
18	Copper	mg/L		0	0.02	0.02	0.01	0.02	0	0	0.01	0	0.005	0	0
19	Solid residual	mg/L	18164-72	133	92	130	102	127	108	109	110	102	96	108	106
20	Total microbe number	In 1 ml	18963-73	0	0	1	2	0	1	2	1	1	2	1	1
21	Coli- index	in 1000 ml	18963-73	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

(3) Quality of Groundwater for WTPs

Table D 2.3.6.10 (1) to (4) shows water quality of groundwater from wells of Kibray IP.

Table D 2.3.6.11 (1) to (8) shows water quality of groundwater from wells of South IP.

Table D 2.3.6.12 (1) to (3) shows water quality of groundwater from wells of Sergeli IP.

Table D 2.3.6.13 (1) and (2) shows water quality of groundwater from wells of Kara-su IP.

Table D 2.3.6.14 (1) and (2) shows water quality of groundwater from wells of Kuiluk IP.

Table D 2.3.6.15 (1) and (2) shows water quality of groundwater from wells of Bectemir IP.

Table D 2.3.6.10 (1) Groundwater Quality of Kibray WTP

Constituent	Unit	Standard Value	Oct., 2003								
			1	2	3	4	5	6	7	8	9
Temperature	degree										
Color	degree	20	0	0	0	0	0	0	0	0	0
Taste	number	2									
Odor	number	2	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0
pH value		6 - 9	7.2	7.2	7.2	7.2	7.2	7.2	7.3	7.2	7.3
Total Hardness	meq/l	7	5.6	6.0	5.9	6.0	5.9	6.0	6.0	6.0	5.8
Alkalinity	meq/l										
Ammonia (NH4)	mg/l	0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0	0	0
Nitrate (NO3)	mg/l	45	24.81	19.93	19.93	21.75	21.75	19.93	22.59	28.57	43.50
Chloride (Cl)	mg/l	250	10.0	10.0	9.0	10.5	10.0	8.5	10.0	10.0	11.0
Sulphate (SO4)	mg/l	400	67.5	60.0	67.5	67.5	67.5	60.0	55.5	67.5	78.5
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0	0	0	0
Fluorine (F)	mg/l	0.7									
Total Solids (TDS)	mg/l	1000	430	410	384	346	430	430	454	384	386

Constituent	Unit	Standard Value	Oct., 2003									
			10	11	12	13	14	14a	15	16	17	
Temperature	degree											
Color	degree	20	0		0			0	0	0		
Taste	number	2										
Odor	number	2	0		0			0	0	0		
Turbidity	mg/l	1.5	0		0			0	0	0		
pH value		6 - 9	7.3		7.2	7.15		7.1	7.15	7.2		
Total Hardness	meq/l	7.00	5.9		6.0	5.7		5.6	5.8	5.8		
Alkalinity	meq/l			Repair Work			Repair Work				Repair Work	
Ammonia (NH4)	mg/l	0	0		0	0		0	0	0		0
Nitrite (NO2)	mg/l	3	0		0	0		0	0	0		0
Nitrate (NO3)	mg/l	45	49.62		47.84	39.86		37.22	49.62	45.18		45.18
Chloride (Cl)	mg/l	250	10.0		10	10.5		11	11.5	10.5		10.5
Sulphate (SO4)	mg/l	400	78.5		78.5	75		78.5	75	78.5		78.5
Total Iron (T-Fe)	mg/l	0.3	0		0	0			0	0		0
Fluorine (F)	mg/l	0.7										
Total Solids (TDS)	mg/l	1000	470		400	418		478	432	416		416

Constituent	Unit	Standard Value	Oct., 2003										
			18	19	20	21	22	23	24	25	26		
Temperature	degree												
Color	degree	20	0	0		0			0	0			
Taste	number	2											
Odor	number	2	0	0		0			0	0			
Turbidity	mg/l	1.5	0	0		0			0	0			
pH value		6 - 9	7.25	7.25		7.15			7.2	7.2			
Total Hardness	meq/l	7	6.00	6.35		6.25			6.00	6.00			
Alkalinity	meq/l				Repair Work		Repair Work	Repair Work			Repair Work		
Ammonia (NH4)	mg/l	0	0	0		0			0	0		0	0
Nitrite (NO2)	mg/l	3	0	0		0			0	0		0	0
Nitrate (NO3)	mg/l	45	43.5	45.18		49.62			49.62	49.62		57.14	57.14
Chloride (Cl)	mg/l	250	7.5	9.0		9.0			9.0	9.0		1.0	1.0
Sulphate (SO4)	mg/l	400	51.0	46.0		46.0			46.0	46.0		55.5	55.5
Total Iron (T-Fe)	mg/l	0.3	0	0		0			0	0		0	0
Fluorine (F)	mg/l	0.7											
Total Solids (TDS)	mg/l	1000	364	380		394			394	394		420	420

Table D 2.3.6.10 (2) Groundwater Quality of Kibray WTP

Constituent	Unit	Standard Value	Oct., 2003											
			27	28	29	30	31	32	33	34	35			
Temperature	degree													
Color	degree	20						0			0	0		
Taste	number	2												
Odor	number	2						0			0	0		
Turbidity	mg/l	1.5						0			0	0		
pH value		6 - 9						7.4			7.45	7.4		
Total Hardness	meq/l	7						3.55			3.9	4		
Alkalinity	meq/l		Repair Work	Repair Work	Repair Work	Repair Work			Repair Work				Repair Work	
Ammonia (NH4)	mg/l	0						0			0	0		
Nitrite (NO2)	mg/l	3						0			0	0		
Nitrate (NO3)	mg/l	45						11.91			5.76	6.64		
Chloride (Cl)	mg/l	250						9.5			9.5	10.0		
Sulphate (SO4)	mg/l	400						57			46	55.5		
Total Iron (T-Fe)	mg/l	0.3						0			0	0		
Fluorine (F)	mg/l	0.7												
Total Solids (TDS)	mg/l	1000						224			222	200		

Constituent	Unit	Standard Value	Oct., 2003											
			36	37	38	39	40	41	42	43	44			
Temperature	degree													
Color	degree	20	0								0	0	0	
Taste	number	2												
Odor	number	2	0								0	0	0	
Turbidity	mg/l	1.5	0								0	0	0	
pH value		6 - 9	7.4								7.4	7.5	7.4	
Total Hardness	meq/l	7	3.1								3.9	3.7	3.9	
Alkalinity	meq/l			Repair Work		Repair Work	Repair Work	Repair Work						
Ammonia (NH4)	mg/l	0	0								0	0	0	
Nitrite (NO2)	mg/l	3	0								0	0	0	
Nitrate (NO3)	mg/l	45	5.56								12.55	9.08	7.08	
Chloride (Cl)	mg/l	250	11								11	11	10.5	
Sulphate (SO4)	mg/l	400	67.5								55.5	60	55.5	
Total Iron (T-Fe)	mg/l	0.3	0								0	0	0	
Fluorine (F)	mg/l	0.7												
Total Solids (TDS)	mg/l	1000	204								158	190	206	

Constituent	Unit	Standard Value	Oct., 2003											
			45	46	47	48	49	50	51	52	53			
Temperature	degree													
Color	degree	20	0	0	0	0	0	0	0				0	
Taste	number	2												
Odor	number	2	0	0	0	0	0	0	0				0	
Turbidity	mg/l	1.5	0	0	0	0	0	0	0				0	
pH value		6 - 9	7.45	7.4	7.3	7.5	7.45	7.5					7.4	
Total Hardness	meq/l	7	3.75	4	4.5	4.25	4.35	4.45					4.5	
Alkalinity	meq/l													
Ammonia (NH4)	mg/l	0	0	0	0	0	0	0			Repair Work		0	Repair Work
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0					0	
Nitrate (NO3)	mg/l	45	11.91	6.64	8.19	6.64	5.31	6.64					10.2	
Chloride (Cl)	mg/l	250	11	9.5	10	10.5	10	11					10	
Sulphate (SO4)	mg/l	400	55.5	51	55.5	51	60	51					51	
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0					0	
Fluorine (F)	mg/l	0.7												
Total Solids (TDS)	mg/l	1000	200	260	230	240	246	260					204	

Table D 2.3.6.10 (3) Groundwater Quality of Kibray WTP

Constituent	Unit	Standard Value	Oct., 2003								
			54	55	56	57	58	59	60	61	62
Temperature	degree										
Color	degree	20	0					0			0
Taste	number	2									
Odor	number	2	0					0			0
Turbidity	mg/l	1.5	0					0			0
pH value		6 - 9	7.5					7.15			7.2
Total Hardness	meq/l	7	4.5					3.55			3.9
Alkalinity	meq/l			Repair Work	Repair Work	Repair Work	Repair Work		Repair Work	Repair Work	
Ammonia (NH4)	mg/l	0	0					0			0
Nitrite (NO2)	mg/l	3	0					0			0
Nitrate (NO3)	mg/l	45	5.76					7.08			6.64
Chloride (Cl)	mg/l	250	10.5					10.5			10
Sulphate (SO4)	mg/l	400	55.5					46			41.5
Total Iron (T-Fe)	mg/l	0.3	0					0			0
Fluorine (F)	mg/l	0.7									
Total Solids (TDS)	mg/l	1000	210					210			190

Constituent	Unit	Standard Value	Oct., 2003								
			63	64	65	66	67	68	69	70	71
Temperature	degree										
Color	degree	20	0	0					0		0
Taste	number	2									
Odor	number	2	0	0				0			0
Turbidity	mg/l	1.5	0	0				0			0
pH value		6 - 9	7.2	7.15				7.4			7.45
Total Hardness	meq/l	7									
Alkalinity	meq/l				Repair Work	Repair Work	Repair Work		Repair Work		
Ammonia (NH4)	mg/l	0	0	0				0			0
Nitrite (NO2)	mg/l	3	0	0				0			0
Nitrate (NO3)	mg/l	45	11.91	7.53				9.08			7.53
Chloride (Cl)	mg/l	250	10	10.5				10			10
Sulphate (SO4)	mg/l	400	46	44				39.5			41.5
Total Iron (T-Fe)	mg/l	0.3	0	0				0			0
Fluorine (F)	mg/l	0.7									
Total Solids (TDS)	mg/l	1000	216	210				236			216

Constituent	Unit	Standard Value	Oct., 2003									
			72	73	74	75	76	77	78	79	80	
Temperature	degree											
Color	degree	20		0		0	0	0			0	0
Taste	number	2										
Odor	number	2		0		0	0	0			0	0
Turbidity	mg/l	1.5		0		0	0	0			0	0
pH value		6 - 9		7.5		7.45	7.4	7.45			7.45	7.45
Total Hardness	meq/l	7										
Alkalinity	meq/l		Repair Work		Repair Work				Repair Work			
Ammonia (NH4)	mg/l	0		0		0	0	0			0	0
Nitrite (NO2)	mg/l	3		0		0	0	0			0	0
Nitrate (NO3)	mg/l	45		6.64		7.08	5.31	8.19			7.53	7.53
Chloride (Cl)	mg/l	250		10.0		10.5	9.0	9.5			9.5	9.5
Sulphate (SO4)	mg/l	400		37		39.5	60	55.5			55.5	46
Total Iron (T-Fe)	mg/l	0.3		0		0	0	0			0	0
Fluorine (F)	mg/l	0.7										
Total Solids (TDS)	mg/l	1000		246		254	252	230			248	254

Table D 2.3.6.10 (4) Groundwater Quality of Kibray WTP

Constituent	Unit	Standard Value	Oct., 2003								
			81	1g	2g	2p	3p	5p	7p	9p	13p
Temperature	degree		Repair Work	Repair Work		Repair Work	Repair Work	Repair Work	Repair Work	Repair Work	Repair Work
Color	degree	20			0						
Taste	number	2									
Odor	number	2			0						
Turbidity	mg/l	1.5			0						
pH value		6 - 9			7.4						
Total Hardness	meq/l	7									
Alkalinity	meq/l										
Ammonia (NH4)	mg/l	0			0						
Nitrite (NO2)	mg/l	3			0						
Nitrate (NO3)	mg/l	45			9.08						
Chloride (Cl)	mg/l	250			10.0						
Sulphate (SO4)	mg/l	400			55.5						
Total Iron (T-Fe)	mg/l	0.3			0						
Fluorine (F)	mg/l	0.7									
Total Solids (TDS)	mg/l	1000	200								

Constituent	Unit	Standard Value	Oct., 2003					
			14p	15p	16p	33p	34p	35p
Temperature	degree		Repair Work	Repair Work	Repair Work			Repair Work
Color	degree	20				0	0	
Taste	number	2						
Odor	number	2				0	0	
Turbidity	mg/l	1.5				0	0	
pH value		6 - 9				7.5	7.5	
Total Hardness	meq/l	7						
Alkalinity	meq/l							
Ammonia (NH4)	mg/l	0				0	0	
Nitrite (NO2)	mg/l	3				0	0	
Nitrate (NO3)	mg/l	45				8.19	3.99	
Chloride (Cl)	mg/l	250				14	14	
Sulphate (SO4)	mg/l	400				46	46	
Total Iron (T-Fe)	mg/l	0.3				0	0	
Fluorine (F)	mg/l	0.7						
Total Solids (TDS)	mg/l	1000	210	218				

Table D2.3.6.11 (1) Groundwater Quality of South WTP

Well No.	1												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree		16.4	14.0	17.0	16.1	17.1	18.0	18.2				16.7
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0	6.0	6.0	6.0	6.2	6.4	6.6				6.2
Alkalinity	meq/l		5.5	5.0	5.1	5.5	5.6	5.0	5.9				5.4
Total Hardness	meq/l	7	9.7	9.0	6.4	8.6	9.6	8.0	8.3				8.5
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45	20.37	25.69	23.94	20.23	23.47	23.03	23.17				22.84
Total Solids (TDS)	mg/l	1000	802			649		727					726
Sulphate (SO4)	mg/l	400	48.55			61.93		54.31					54.93
Chloride (Cl)	mg/l	250	21.78			20.45		24.79					22.34
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Well No.	2												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree		16.3	14.1	17.1	16.0	17.0	18.3	18.0				16.7
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.1	5.9	6.2	6.0	6.2	6.3	6.5				6.2
Alkalinity	meq/l		5.5	5.3	5.0	5.5	5.8	5.7	5.8				5.5
Total Hardness	meq/l	7	10.2	7.3	6.0	8.8	10.0	8.4	8.7				8.5
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45	21.26	29.93	25.69	25.69	26.13	26.58	25.25				25.79
Total Solids (TDS)	mg/l	1000	735			681		684					700
Sulphate (SO4)	mg/l	400	75.91			81.06		48.55					68.51
Chloride (Cl)	mg/l	250	26.23			22.72		26.97					25.31
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Well No.	3												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree			14.0	17.0	16.0	17.1	18.5	18.2				16.8
Color	degree	20		0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0	0	0
Odor	number	2		0	0	0	0	0	0	0	0	0	0
Taste	number	2		0	0	0	0	0	0	0	0	0	0
pH value		6 - 9		5.9	6.1	5.9	6.1	6.3	6.4				6.1
Alkalinity	meq/l			5.5	5.3	5.4	6.0	5.6	6.0				5.6
Total Hardness	meq/l	7		7.2	6.4	8.2	9.1	8.4	8.3				7.9
Ammonia (NH4)	mg/l			0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45		23.93	27.46	23.92	23.03	25.25	25.75				24.89
Total Solids (TDS)	mg/l	1000				523		420					472
Sulphate (SO4)	mg/l	400				66.66		51.84					59.25
Chloride (Cl)	mg/l	250				21.81		26.01					23.91
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Table D2.3.6.11 (2) Groundwater Quality of South WTP

Well No.	4												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree		16.0	15.9	16.9	15.7	17.0	18.1	18.1				16.8
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0	6.0	6.0	6.2	6.2	6.3	6.4				6.2
Alkalinity	meq/l		5.7	5.3	5.2	5.5	5.7	5.7	5.8				5.6
Total Hardness	meq/l	7	10.2	7.9	7.0	8.0	8.6	8.6	8.7				8.4
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45	23.03	22.59	23.92	29.23	29.23	26.58	23.17				25.39
Total Solids (TDS)	mg/l	1000	646			552		690					629
Sulphate (SO4)	mg/l	400	74.47			78.59		40.73					64.60
Chloride (Cl)	mg/l	250	21.78			25.45		25.96					24.40
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Well No.	5												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree		16.3	15.7	17.0	16.0	17.3	18.0	17.9				16.9
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0	5.9	6.0	6.3	6.2	6.4	6.4				6.2
Alkalinity	meq/l		5.5	5.1	5.3	5.4	5.8	5.5	5.7				5.5
Total Hardness	meq/l	7	9.1	7.5	7.4	7.8	8.6	8.4	8.1				8.1
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45	21.26	23.92	31.45	27.46	25.69	27.46	23.92				25.88
Total Solids (TDS)	mg/l	1000	534			492		636					554
Sulphate (SO4)	mg/l	400	55.75			93.41		43.00					64.05
Chloride (Cl)	mg/l	250	27.72			26.81		26.97					27.17
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Well No.	6												
Constituent	Unit	Standard Value	2003										Average
			1	2	3	4	5	6	7	8	9	10	
Temperature	degree		16.2	16.0	17.1	16.1	17.1	18.4	18.0				17.0
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.3	6.0	6.1	6.2	6.2	6.0	6.5				6.2
Alkalinity	meq/l		5.8	5.0	5.5	5.7	6.0	5.5	5.3				5.5
Total Hardness	meq/l	7	7.9	8.1	7.1	8.4	7.9	8.6	6.8				7.8
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0				0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0				0
Nitrate (NO3)	mg/l	45	22.59	27.46	29.23	27.46	25.69	23.03	25.25				25.82
Total Solids (TDS)	mg/l	1000	556			480		473					503
Sulphate (SO4)	mg/l	400	77.97			83.74		36.21					65.97
Chloride (Cl)	mg/l	250	28.71			24.99		30.27					27.99
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Table D2.3.6.11 (3) Groundwater Quality of South WTP

Well No.	7												
Constituent	Unit	Standard Value	2003										
			1	2	3	4	5	6	7	8	9	10	Average
Temperature	degree		16.3	16.2	17.2		17.0	18.3	18.0				17.2
Color	degree	20	0	0	0		0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0		0	0	0	0	0	0	0
Odor	number	2	0	0	0		0	0	0	0	0	0	0
Taste	number	2	0	0	0		0	0	0	0	0	0	0
pH value		6 - 9	6.2	6.1	5.9		6.0	6.2					6.1
Alkalinity	meq/l		5.6	6.0	5.4		5.2	5.7					5.6
Total Hardness	meq/l	7	7.7	6.6	7.2		7.8	7.1					7.3
Ammonia (NH4)	mg/l		0	0	0		0	0					0
Nitrite (NO2)	mg/l	3	0	0	0		0	0					0
Nitrate (NO3)	mg/l	45	25.69	22.59	21.26		25.25	23.03					23.56
Total Solids (TDS)	mg/l	1000	546					474					510
Sulphate (SO4)	mg/l	400	57.07					35.18					46.13
Chloride (Cl)	mg/l	250	33.16					30.01					31.59
Total Iron (T-Fe)	mg/l	0.3											#DIV/0!
Total Bacteria	no./ml	100											#DIV/0!
Intestinal Bacillus	no./1000ml	3											#DIV/0!

Well No.	8												
Constituent	Unit	Standard Value	2003										
			1	2	3	4	5	6	7	8	9	10	Average
Temperature	degree		16.4	16.1	16.8	15.8	17.5	18.4					16.8
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.1	6.1	6.1	6.2	5.9	6.4					6.1
Alkalinity	meq/l		5.7	5.5	6.1	5.3	5.4	6.1					5.7
Total Hardness	meq/l	7	7.3	6.6	6.4	8.4	7.1	7.3					7.2
Ammonia (NH4)	mg/l		0	0	0	0	0	0					0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0					0
Nitrate (NO3)	mg/l	45	23.47	16.83	20.37	16.83	23.03	23.03					20.59
Total Solids (TDS)	mg/l	1000	495			478		464					479
Sulphate (SO4)	mg/l	400	71.83			73.04		45.26					63.38
Chloride (Cl)	mg/l	250	31.68			24.54		26.97					27.73
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Well No.	9												
Constituent	Unit	Standard Value	2003										
			1	2	3	4	5	6	7	8	9	10	Average
Temperature	degree		16.3	16.1	16.8	15.7	17	18.3					16.7
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0	6.0	6.1	6.2	6.3	6.5					6.2
Alkalinity	meq/l		5.8	5.1	5.3	5.2	5.7	5.3					5.4
Total Hardness	meq/l	7	6.9	6.1	6.6	7.6	8.2	7.3					7.1
Ammonia (NH4)	mg/l		0	0	0	0	0	0					0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0					0
Nitrate (NO3)	mg/l	45	22.59	27.46	21.70	23.47	25.25	16.83					22.88
Total Solids (TDS)	mg/l	1000	635			362		475					491
Sulphate (SO4)	mg/l	400	73.53			49.74		46.11					56.46
Chloride (Cl)	mg/l	250	28.71			19.54		29.95					26.07
Total Iron (T-Fe)	mg/l	0.3				0							0
Total Bacteria	no./ml	100				0							0
Intestinal Bacillus	no./1000ml	3				3							3

Table D2.3.6.11 (4) Groundwater Quality of South WTP

Well No.	10		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.2	15.7	17.1	15.4	16.9	18.1						16.6
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.1	6.0	6.1	6.2	6.3	6.6						6.2
Alkalinity	meq/l		5.5	5.2	5.5	4.9	5.7	5.4						5.4
Total Hardness	meq/l	7	7.3	6.8	6.6	7.0	8.4	7.4						7.3
Ammonia (NH4)	mg/l		0	0	0	0	0	0						0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0						0
Nitrate (NO3)	mg/l	45	25.69	29.23	23.22	20.37	26.58	23.03						24.69
Total Solids (TDS)	mg/l	1000	580			494		485						520
Sulphate (SO4)	mg/l	400	59.05			64.19		57.95						60.40
Chloride (Cl)	mg/l	250	27.22			21.81		19.57						22.87
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	12		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.4	15.7	17.0	16.1	17.0	18.3						16.8
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.2	6.3	6.2	6.3	6.3	6.4						6.3
Alkalinity	meq/l		5.6	4.6	5.3	4.7	5.6	4.9						5.1
Total Hardness	meq/l	7	6.5	6.1	6.4	6.8	7.1	7.3						6.7
Ammonia (NH4)	mg/l		0	0	0	0	0	0						0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0						0
Nitrate (NO3)	mg/l	45	23.47	26.66	26.13	21.07	27.02	27.90						25.38
Total Solids (TDS)	mg/l	1000	701			411		416						509
Sulphate (SO4)	mg/l	400	78.54			83.74		40.94						67.74
Chloride (Cl)	mg/l	250	24.23			19.99		17.04						20.42
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	13		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree			15.6	17.0	16.0	17.1	18.4						16.8
Color	degree	20		0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0	0	0	0
Odor	number	2		0	0	0	0	0	0	0	0	0	0	0
Taste	number	2		0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9		6.1	6.4	6.3	6.2	6.5						6.3
Alkalinity	meq/l			5.5	5.5	4.7	5.5	5.1						5.3
Total Hardness	meq/l	7		7.2	6.2	7.2	7.6	7.4						7.1
Ammonia (NH4)	mg/l			0	0	0	0	0						0
Nitrite (NO2)	mg/l	3		0	0	0	0	0						0
Nitrate (NO3)	mg/l	45		29.23	25.65	27.46	27.46	27.90						27.54
Total Solids (TDS)	mg/l	1000				467		375						421
Sulphate (SO4)	mg/l	400				50.61		59.31						54.96
Chloride (Cl)	mg/l	250				16.36		18.84						17.6
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Table D2.3.6.11 (5) Groundwater Quality of South WTP

Well No.	14		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree			16.0	17.3	16.0	17.1	18.4						17.0
Color	degree	20		0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0	0	0	0
Odor	number	2		0	0	0	0	0	0	0	0	0	0	0
Taste	number	2		0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9		6.1	6.2	6.3	6.4	6.5						6.3
Alkalinity	meq/l			5	5.4	4.9	5.5	5.1						5.2
Total Hardness	meq/l	7		7.3	6.4	8.8	6.9	7.1						7.3
Ammonia (NH4)	mg/l			0	0	0	0	0						0
Nitrite (NO2)	mg/l	3		0	0	0	0	0						0
Nitrate (NO3)	mg/l	45		23.92	27.46	28.23	36.32	27.90						28.77
Total Solids (TDS)	mg/l	1000				527		564						545.5
Sulphate (SO4)	mg/l	400				68.03		35.18						51.61
Chloride (Cl)	mg/l	250				33.05		18.70						25.88
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	15		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.4	16.1	17.0	15.8	16.7	18.5						16.8
Color	degree	20		0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0	0	0	0
Odor	number	2		0	0	0	0	0	0	0	0	0	0	0
Taste	number	2		0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0	6.2	6.0	6.4	6.3	6.5						6.2
Alkalinity	meq/l		5.7	5.0	5.5	4.9	5.3	5.1						5.3
Total Hardness	meq/l	7	7.3	6.8	7.2	8.8	7.1	6.7						7.3
Ammonia (NH4)	mg/l			0	0	0	0	0						0
Nitrite (NO2)	mg/l	3		0	0	0	0	0						0
Nitrate (NO3)	mg/l	45	27.46	23.92	26.13	23.47	21.26	25.58						24.64
Total Solids (TDS)	mg/l	1000	612			508		470						530
Sulphate (SO4)	mg/l	400	68.03			61.48		57.84						62.45
Chloride (Cl)	mg/l	250	25.74			21.36		19.14						22.08
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	16		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree					15.7	16.9	18.7						17.1
Color	degree	20				0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5				0	0	0	0	0	0	0	0	0
Odor	number	2				0	0	0	0	0	0	0	0	0
Taste	number	2				0	0	0	0	0	0	0	0	0
pH value		6 - 9				6.3	6.4	6.4						6.4
Alkalinity	meq/l					5.0	5.0	5.0						5.0
Total Hardness	meq/l	7				9.8	7.3	6.9						8.0
Ammonia (NH4)	mg/l					0	0	0						0
Nitrite (NO2)	mg/l	3				0	0	0						0
Nitrate (NO3)	mg/l	45				29.23	31.01	25.58						28.61
Total Solids (TDS)	mg/l	1000				500		411						456
Sulphate (SO4)	mg/l	400				89.08		29.95						59.52
Chloride (Cl)	mg/l	250				20.90		18.70						19.80
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Table D2.3.6.11 (6) Groundwater Quality of South WTP

Well No.	17													
Constituent	Unit	Standard Value	2003										Average	
			1	2	3	4	5	6	7	8	9	10		
Temperature	degree		16.3	16.2	17.1	15.1	17.0	18.1						16.6
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.1	6.1	6.3	6.0	5.9	6.5						6.2
Alkalinity	meq/l		6.0	5.7	5.4	5.5	5.4	5.1						5.5
Total Hardness	meq/l	7	6.5	7.5	7.2	9.4	7.1	6.7						7.4
Ammonia (NH4)	mg/l		0	0	0	0	0	0						0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0						0
Nitrate (NO3)	mg/l	45	27.46	21.26	20.37	20.97	25.25	27.90						23.87
Total Solids (TDS)	mg/l	1000	467			473		508						483
Sulphate (SO4)	mg/l	400	59.66			71.01		43.00						57.89
Chloride (Cl)	mg/l	250	20.79			23.17		19.57						21.18
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	18													
Constituent	Unit	Standard Value	2003										Average	
			1	2	3	4	5	6	7	8	9	10		
Temperature	degree		16.1		17.2	16.0	17.1	18.7						17.0
Color	degree	20	0		0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0		0	0	0	0	0	0	0	0	0	0
Odor	number	2	0		0	0	0	0	0	0	0	0	0	0
Taste	number	2	0		0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	6.0		6.4	6.3	6.3	6.4						6.3
Alkalinity	meq/l		5.8		5.3	5.6	5.5	5.0						5.4
Total Hardness	meq/l	7	9.1		6.4	9.8	9.6	6.9						8.4
Ammonia (NH4)	mg/l		0		0	0	0	0						0
Nitrite (NO2)	mg/l	3	0		0	0	0	0						0
Nitrate (NO3)	mg/l	45	20.37		27.46	20.37	23.03	25.25						23.30
Total Solids (TDS)	mg/l	1000	777			504		504						595
Sulphate (SO4)	mg/l	400	49.38			54.11		36.21						46.57
Chloride (Cl)	mg/l	250	41.08			27.72		19.19						29.33
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	19													
Constituent	Unit	Standard Value	2003										Average	
			1	2	3	4	5	6	7	8	9	10		
Temperature	degree		16.1											16.1
Color	degree	20	0											0
Turbidity	mg/l	1.5	0											0
Odor	number	2	0											0
Taste	number	2	0											0
pH value		6 - 9	6.2											6.2
Alkalinity	meq/l		6.0											6.0
Total Hardness	meq/l	7	7.3											7.3
Ammonia (NH4)	mg/l		0											0
Nitrite (NO2)	mg/l	3	0											0
Nitrate (NO3)	mg/l	45	27.46											27.46
Total Solids (TDS)	mg/l	1000	375											375
Sulphate (SO4)	mg/l	400	60.07											60.07
Chloride (Cl)	mg/l	250	21.28											21.28
Total Iron (T-Fe)	mg/l	0.3												
Total Bacteria	no./ml	100												
Intestinal Bacillus	no./1000ml	3												

Table D2.3.6.11 (7) Groundwater Quality of South WTP

Well No.	20		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.2	16.5	17.0	16.7		18.1						16.9
Color	degree	20	0	0	0	0		0						0
Turbidity	mg/l	1.5	0	0	0	0		0						0
Odor	number	2	0	0	0	0		0						0
Taste	number	2	0	0	0	0		0						0
pH value		6 - 9	6.0	6.3	6.4	6.4		6.4						6.3
Alkalinity	meq/l		6.1	4.8	4.7	4.8		5.0						5.1
Total Hardness	meq/l	7	8.9	6.4	5.8	9.4		8.2						7.7
Ammonia (NH4)	mg/l		0	0	0	0		0						0
Nitrite (NO2)	mg/l	3	0	0	0	0		0						0
Nitrate (NO3)	mg/l	45	27.90	25.69	25.25	25.25		23.03						25.42
Total Solids (TDS)	mg/l	1000	527			446		440						471
Sulphate (SO4)	mg/l	400	40.53			85.12		57.43						61.03
Chloride (Cl)	mg/l	250	22.27			27.72		19.14						23.04
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	21		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.3	16.0	17.0			18.4						16.9
Color	degree	20	0	0	0			0						0
Turbidity	mg/l	1.5	0	0	0			0						0
Odor	number	2	0	0	0			0						0
Taste	number	2	0	0	0			0						0
pH value		6 - 9	6.1	6.2	6.4			6.5						6.3
Alkalinity	meq/l		5.5	4.9	4.9			4.7						5.0
Total Hardness	meq/l	7	7.5	6.3	6.0			9.0						7.2
Ammonia (NH4)	mg/l		0	0	0			0						0
Nitrite (NO2)	mg/l	3	0	0	0			0						0
Nitrate (NO3)	mg/l	45	25.69	23.92	27.46			23.58						25.16
Total Solids (TDS)	mg/l	1000	516					619						567.5
Sulphate (SO4)	mg/l	400	78.18					57.19						67.69
Chloride (Cl)	mg/l	250	16.33					18.70						17.52
Total Iron (T-Fe)	mg/l	0.3												
Total Bacteria	no./ml	100												
Intestinal Bacillus	no./1000ml	3												

Well No.	22		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.1	17.0	17.1	16.1	17.1	18.3						17.0
Color	degree	20	0	0	0	0	0	0						0
Turbidity	mg/l	1.5	0	0	0	0	0	0						0
Odor	number	2	0	0	0	0	0	0						0
Taste	number	2	0	0	0	0	0	0						0
pH value		6 - 9	6.1	6.1	6.3	6.2	6.2	6.4						6.2
Alkalinity	meq/l		5.7	5.9	5.7	5.8	5.6	4.6						5.6
Total Hardness	meq/l	7	8.1	8.4	6.2	9.6	8.6	9.0						8.3
Ammonia (NH4)	mg/l		0	0	0	0	0	0						0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0						0
Nitrate (NO3)	mg/l	45	21.26	25.58	14.83	16.84	25.25	16.83						20.10
Total Solids (TDS)	mg/l	1000	408			465		477						450
Sulphate (SO4)	mg/l	400	88.88			84.36		68.50						80.58
Chloride (Cl)	mg/l	250	19.08			27.72		23.62						23.47
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Table D2.3.6.11 (8) Groundwater Quality of South WTP

Well No.	23		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree			16.0	16.7	16.0	17.0	18.5						16.8
Color	degree	20		0	0	0	0	0						0
Turbidity	mg/l	1.5		0	0	0	0	0						0
Odor	number	2		0	0	0	0	0						0
Taste	number	2		0	0	0	0	0						0
pH value		6 - 9		5.9	6.2	6.4	6.1	6.5						6.2
Alkalinity	meq/l			5.4	5.7	5.3	5.3	5.3						5.4
Total Hardness	meq/l	7		6.3	6.2	8.6	8.2	7.6						7.4
Ammonia (NH4)	mg/l			0	0	0	0	0						0
Nitrite (NO2)	mg/l	3		0	0	0	0	0						0
Nitrate (NO3)	mg/l	45		16.83	31.45	25.69	23.03	27.46						24.89
Total Solids (TDS)	mg/l	1000				493		568						530.5
Sulphate (SO4)	mg/l	400				68.50		50.61						59.56
Chloride (Cl)	mg/l	250				23.17		21.31						22.24
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	2A		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.2	16.1	17.0	15.8	17.0	18.2						16.7
Color	degree	20		0	0	0	0	0						0
Turbidity	mg/l	1.5		0	0	0	0	0						0
Odor	number	2		0	0	0	0	0						0
Taste	number	2		0	0	0	0	0						0
pH value		6 - 9		5.9	6.0	6.1	6.3	6.4	6.3					6.2
Alkalinity	meq/l			6.0	5.4	5.5	5.8	5.1	5.5					5.6
Total Hardness	meq/l	7		7.7	7.2	5.8	8.2	9.2	10.0					8.0
Ammonia (NH4)	mg/l			0	0	0	0	0	0					0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0					0
Nitrate (NO3)	mg/l	45	21.26	27.90	27.46	27.46	27.46	25.75						26.22
Total Solids (TDS)	mg/l	1000	602			600		447						550
Sulphate (SO4)	mg/l	400	62.84			57.14		43.00						54.33
Chloride (Cl)	mg/l	250	30.69			23.17		38.84						30.90
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Well No.	5A		2003											
Constituent	Unit	Standard Value	2003											
			1	2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		16.3	16.1	17.1	16.0	17.0	18.4						16.8
Color	degree	20		0	0	0	0	0						0
Turbidity	mg/l	1.5		0	0	0	0	0						0
Odor	number	2		0	0	0	0	0						0
Taste	number	2		0	0	0	0	0						0
pH value		6 - 9		6.0	6.1	6.0	6.2	6.2	6.0					6.1
Alkalinity	meq/l			6.1	5.4	5.7	5.6	5.0	5.6					5.6
Total Hardness	meq/l	7		6.4	7.2	6.4	8.8	9.2	9.0					7.8
Ammonia (NH4)	mg/l			0	0	0	0	0	0					0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0					0
Nitrate (NO3)	mg/l	45	20.37	29.13	27.64	29.23	26.58	28.68						26.94
Total Solids (TDS)	mg/l	1000	661			526		568						585
Sulphate (SO4)	mg/l	400	49.58			51.43		40.94						47.32
Chloride (Cl)	mg/l	250	27.72			27.72		30.45						28.63
Total Iron (T-Fe)	mg/l	0.3				0								0
Total Bacteria	no./ml	100				0								0
Intestinal Bacillus	no./1000ml	3				3								3

Table D 2.3.6.12 (1) Groundwater Quality of Sergeli WTP

Well No.	1												
Constituent	Unit	Standard Value	2003										
			2	3	4	5	6	7	8	9	10	Average	
Temperature	degree		17.0	15.0	13.0	16.0	16.0						15.4
Color	degree	20	0	0	0	0	0						0
Taste	number	2	0	0	0	0							0
Odor	number	2	0	0	0	0							0
Turbidity	mg/l	1.5	0.18	0	0	0.18	0						0.07
pH value		6 - 9	7.1	7.5	7.4	7.0	7.2						7.2
Alkalinity	meq/l		3.8	4.6	4.7	4.5	4.5						4.4
Total Hardness	meq/l	7	7.6	7.5	5.7	6.4	6.8						6.8
Ammonia (NH4)	mg/l		0	0	0	0							0
Nitrite (NO2)	mg/l	3		0	0	0							0
Nitrate (NO3)	mg/l	45		22.50		21.19							21.85
Chloride (Cl)	mg/l	250		17.64		16.17							16.91
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0							0
Sulphate (SO4)	mg/l	400		125.9		86							106
Fluorine (F)	mg/l	0.7		0.35		0.39							0.37
Total Solids (TDS)	mg/l	1000	420	444	406	415	430						423
Total Bacteria	no./ml	100	1	0	0	0	0						0
Intestinal Bacillus	no./1000ml	3	4M3	M3	M3	M3	M3						M3

Well No.	3												
Constituent	Unit	Standard Value	2003										
			2	3	4	5	6	7	8	9	10	Average	
Temperature	degree			14.0	16.0	16.0	16.0	17.0	17.0	17.0	17.0		16.3
Color	degree	20		0	0	0	0	0	0	0	0		0
Taste	number	2		0	0	0	0		0	0			0
Odor	number	2		0	0	0	0	0	0	0	0		0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0		0.00
pH value		6 - 9		7.8	7.2	7.4	7.2	7.2	7.2	6.6	7.8		7.3
Alkalinity	meq/l			4.6	4.6	4.7	4.7	4.2	4.2	4.5	4.2		4.5
Total Hardness	meq/l	7		6.8	6.3	6.8	6.6	6.4	6.4	6.3	6.5		6.5
Ammonia (NH4)	mg/l			0	0	0	0	0	0	0	0		0
Nitrite (NO2)	mg/l	3		0	0	0.002	0	0	0	0	0		0.000
Nitrate (NO3)	mg/l	45		22.50		23.92			23.99	30.30	33.67		26.88
Chloride (Cl)	mg/l	250		15.60		15.68			15.23	16.18	15.71		15.68
Total Iron (T-Fe)	mg/l	0.3		0		0	0	0		0	0		0
Sulphate (SO4)	mg/l	400		183.94		73.3					74.07		110
Fluorine (F)	mg/l	0.7		0.33		0.32							0.4
Total Solids (TDS)	mg/l	1000		403	456	461	430	407	418		418		428
Total Bacteria	no./ml	100		0	0	4	0	2	0	0	0		1
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3	M3	M3	M3		3

Well No.	4												
Constituent	Unit	Standard Value	2003										
			2	3	4	5	6	7	8	9	10	Average	
Temperature	degree			14	12.0	15.0	14.0	18.0	18.0	17.0	16.0		15.5
Color	degree	20		0	0	0	0	0	0	0			0
Taste	number	2		0	0	0			0	0			0
Odor	number	2		0	0	0	0	0	0	0	0		0
Turbidity	mg/l	1.5		0	0	0	0	0	0	0	0		0.00
pH value		6 - 9		7.45	7.3	7.3	7.2	7.0	7.6	6.6	7.6		7.3
Alkalinity	meq/l			4.6	4.7	4.8	4.8	4.8	4.9	4.6	4.9		4.8
Total Hardness	meq/l	7		6.46	6.7	6.6	6.4	6.8	7.0	6.2	7.1		6.7
Ammonia (NH4)	mg/l			0	0	0	0	0	0	0	0		0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0	0	0		0
Nitrate (NO3)	mg/l	45		22.5		24.87			26.68	24.80	23.92		24.55
Chloride (Cl)	mg/l	250		15.68		16.17			16.66		14.76		15.82
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0	0	0	0		0
Sulphate (SO4)	mg/l	400		219.33		80.7					78.07		126
Fluorine (F)	mg/l	0.7		0.35		0.13					0.30		0.26
Total Solids (TDS)	mg/l	1000		422	420	443	453	412	450	408	409		427
Total Bacteria	no./ml	100		0	2	0	0	0	0	0	0		0
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3	M3	M3	M3		M3

Table D 2.3.6.12 (2) Groundwater Quality of Sergeli WTP

Well No.	5		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree		17.0	16.0		14	17.0	17.0	17.0	17.0	17.0	16.0	16.4
Color	degree	20	0	0		0	0	0	0	0	0		0
Taste	number	2	0	0		0				0	0		0
Odor	number	2	0	0		0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	1.02		0	0	0	0	0	0	0	0.13
pH value		6 - 9	7.2	7.3		7.4	7.2	7.1	7.3	6.5	7.3	7.3	7.2
Alkalinity	meq/l		4.8	4.6		4.8	4.4	4.5	5.0	4.5	4.9	4.9	4.7
Total Hardness	meq/l	7	6.8	6.5		7	7.2	6.4	6.4	6.6	6.5	6.5	6.7
Ammonia (NH4)	mg/l		0	0		0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0		0.002	0	0	0	0	0	0	0.000
Nitrate (NO3)	mg/l	45		24.81		24.81			21.97	23.04	25.34	23.99	
Chloride (Cl)	mg/l	250		21.07		19.6			22.37		20.94	21.00	
Total Iron (T-Fe)	mg/l	0.3	0	0		0	0		0	0	0	0	0
Sulphate (SO4)	mg/l	400		76.13		84.4					79.8	80	
Fluorine (F)	mg/l	0.7		0.35		0.33					0.32	0.33	
Total Solids (TDS)	mg/l	1000	382	444		476	453	412	437	441	422	433	
Total Bacteria	no./ml	100	0	0		1	0	0	0	0	0	0	0
Intestinal Bacillus	no./1000ml	3	4	M3		4	M3	M3	M3	M3	M3	M3	4

Well No.	6		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree		17.0	15.0	13.0	14.0	16.0	17.0	17.0		17.0	15.8	
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0			0		0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0.00
pH value		6 - 9	7.2	7.4	7.3	7.4	7.2	7.0	7.3		7.3	7.3	7.3
Alkalinity	meq/l		4.8	4.5	4.8	4.6	4.5	4.6	4.9		4.9	4.7	
Total Hardness	meq/l	7	6.8	6.9	6.5	7.6	6.4	6.6	6.6		6.7	6.8	
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0	0	0.002	0	0	0	0	0	0	0.000
Nitrate (NO3)	mg/l	45		21.79		20.73			23.04		23.92	22.37	
Chloride (Cl)	mg/l	250		23.03		23.03			21.42		21.42	22.23	
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0	0	0	0	0	0
Sulphate (SO4)	mg/l	400		184.76		75.3					77	112	
Fluorine (F)	mg/l	0.7		0.33		0.3					0	0.21	
Total Solids (TDS)	mg/l	1000	395	453	230	452	428	409	443		420	404	
Total Bacteria	no./ml	100		0	0	4	0	0	0	0	0	1	
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3	M3	M3	M3	M3	M3

Well No.	7		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree							15.0					15.0
Color	degree	20						0					0
Taste	number	2											
Odor	number	2						0					0
Turbidity	mg/l	1.5						0					0.00
pH value		6 - 9						7.2					7.2
Alkalinity	meq/l							4.8					4.8
Total Hardness	meq/l	7						6.4					6.4
Ammonia (NH4)	mg/l							0					0
Nitrite (NO2)	mg/l	3						0					0.000
Nitrate (NO3)	mg/l	45											
Chloride (Cl)	mg/l	250											
Total Iron (T-Fe)	mg/l	0.3						0					0
Sulphate (SO4)	mg/l	400											
Fluorine (F)	mg/l	0.7											
Total Solids (TDS)	mg/l	1000						423					423
Total Bacteria	no./ml	100						1					1
Intestinal Bacillus	no./1000ml	3						M3					M3

Table D 2.3.6.12 (3) Groundwater Quality of Sergeli WTP

Well No.	9		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree					17.0	16.0	17.0	17.0				16.8
Color	degree	20				0	0	0	0				0
Taste	number	2				0			0				0
Odor	number	2				0	0	0	0				0
Turbidity	mg/l	1.5				0	0	0	0				0.00
pH value		6 - 9				7.6	7.4	7.2	7.3				7.4
Alkalinity	meq/l					4.7	4.7	4.8	4.8				4.8
Total Hardness	meq/l	7				6.0	6.0	5.8	5.8				5.9
Ammonia (NH4)	mg/l					0	0	0	0				0
Nitrite (NO2)	mg/l	3				0	0	0	0				0.000
Nitrate (NO3)	mg/l	45				21.97			21.97				21.97
Chloride (Cl)	mg/l	250				23.03			22.37				22.70
Total Iron (T-Fe)	mg/l	0.3				0	0	0	0				0
Sulphate (SO4)	mg/l	400				114							114
Fluorine (F)	mg/l	0.7				0.13							0.13
Total Solids (TDS)	mg/l	1000				426	415	454	426				430
Total Bacteria	no./ml	100				0	0		0				0
Intestinal Bacillus	no./1000ml	3				M3	M3	M3	M3				M3

Table D 2.3.6.13 (1) Groundwater Quality of Kara-Su WTP

Well No.	1												
	Constituent	Unit	Standard Value	2003									
2				3	4	5	6	7	8	9	10	Average	
Temperature	degree			17.0	12.0	16.0	16.0	17.0	17.0	17.0	17.0	17.0	16.1
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	7.8	7.1	7.1	7.4	7.3	7.2	7.4	7.3	7.4	7.3	7.3
Alkalinity	meq/l		4.8	5.3	5.1	5.3	5.3	5.1	5.2	5.2	5.1	5.2	5.2
Total Hardness	meq/l	7	6.80	6.9	8.0	7.7	7.0	6.4	6.8	6.6	6.7	7.0	7.0
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0	0	0	0	0
Nitrate (NO3)	mg/l	45		32.96		32.96			31.54		31.54		32.25
Chloride (Cl)	mg/l	250		24.50		20.58			21.89		18.09		21.27
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0	0	0			0
Sulphate (SO4)	mg/l	400		80.65		62.6					0		47.75
Fluorine (F)	mg/l	0.7		0.24		0.28					0.3		0.27
Total Solids (TDS)	mg/l	1000	452	513	566	495	480	430	471	465	484	484	484
Total Bacteria	no./ml	100	0	0	0	0	0	0	0	0	4	0	0
Intestinal Bacillus	no./1000ml	3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3

Well No.	2												
	Constituent	Unit	Standard Value	2003									
2				3	4	5	6	7	8	9	10	Average	
Temperature	degree			16.0	10.0	15.0	16.0	17.0	17.0	17.0	17.0	17.0	15.6
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	7.5	7.4	7.4	7.3	7.3	7.3	7.4	7.3	7.4	7.4	7.4
Alkalinity	meq/l		4.2	4.6	4.5	4.7		4.7	5.0	5.0	5.1	4.7	4.7
Total Hardness	meq/l	7	6.4	6.1	6.5	6.3	6.2	6.2	6.2	6.6	6.3	6.3	6.3
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0	0	0	0	0	0	0	0	0	0
Nitrate (NO3)	mg/l	45		30.30		34.20			34.20		43.24		35.49
Chloride (Cl)	mg/l	250		20.58		20.58			21.42		20.94		20.88
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0	0				0
Sulphate (SO4)	mg/l	400		73.25		57.2					0		43.5
Fluorine (F)	mg/l	0.7		0.3		0.26					0.32		0.29
Total Solids (TDS)	mg/l	1000	381	443	574	486	475	452	485	430	486	468	468
Total Bacteria	no./ml	100	0	0	0	0	0	0	0	0	0	0	0
Intestinal Bacillus	no./1000ml	3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3

Well No.	Radiostation												
	Constituent	Unit	Standard Value	2003									
2				3	4	5	6	7	8	9	10	Average	
Temperature	degree			18.0	12.0	12.0	17.0		17.0	17.0	16.0	15.6	15.6
Color	degree	20	0	0	0	0	0	0	0	0	0	0	0
Taste	number	2	0	0	0	0	0	0	0	0	0	0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0	0	0	0	0	0	0	0	0
pH value		6 - 9	7.2	7.2	6.9	7.1	7.3	7.1	7.4	7.3	7.4	7.2	7.2
Alkalinity	meq/l		5.0	4.9	5.2	5.4		5.1	5.2	5.2	5.3	5.2	5.2
Total Hardness	meq/l	7	7.2	7.9	7.5	7.3	6.8	7.8	7.4	7.8	7.7	7.5	7.5
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0	0	0	0.002	0	0	0	0	0	0	0.000
Nitrate (NO3)	mg/l	45		32.06		37.03			43.95		42.53		38.89
Chloride (Cl)	mg/l	250		17.15		17.64			17.14		18.56		17.62
Total Iron (T-Fe)	mg/l	0.3	0	0	0	0	0	0					0
Sulphate (SO4)	mg/l	400		86.42		101.6					0		62.7
Fluorine (F)	mg/l	0.7		0.28		0.28					0.32		0.29
Total Solids (TDS)	mg/l	1000	481	501	581	550	485	510	572	452	537	519	519
Total Bacteria	no./ml	100	2	0	0	0	0		1	1	3	1	1
Intestinal Bacillus	no./1000ml	3	4	M3	M3	M3	M3	7	M3	M3	M3	M3	5.5

Table D 2.3.6.13 (2) Groundwater Quality of Kara-Su WTP

Well No.	Fayzibod		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree							17.0					17.0
Color	degree	20						0					0
Taste	number	2						0					0
Odor	number	2						0					0
Turbidity	mg/l	1.5						0					0
pH value		6 - 9						7.4					7.4
Alkalinity	meq/l							5.0					5.0
Total Hardness	meq/l	7						5.8					5.8
Ammonia (NH4)	mg/l							0					0
Nitrite (NO2)	mg/l	3						0					0
Nitrate (NO3)	mg/l	45						17.36					17.36
Chloride (Cl)	mg/l	250						27.44					27.44
Total Iron (T-Fe)	mg/l	0.3						0					0
Sulphate (SO4)	mg/l	400											
Fluorine (F)	mg/l	0.7											
Total Solids (TDS)	mg/l	1000						420					420
Total Bacteria	no./ml	100						0					0
Intestinal Bacillus	no./1000ml	3						M3					M3

Well No.	Ak-uy		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree									18.0	17.0	16.0	17.0
Color	degree	20								0	0	0	0
Taste	number	2								0	0	0	0
Odor	number	2								0	0	0	0
Turbidity	mg/l	1.5								0	0	0	0
pH value		6 - 9								7.5	7.4	7.5	7.5
Alkalinity	meq/l									4.5	4.3	4.5	4.4
Total Hardness	meq/l	7								6.4	6.0	5.7	6.0
Ammonia (NH4)	mg/l									0	0	0	0
Nitrite (NO2)	mg/l	3								0	0	0	0
Nitrate (NO3)	mg/l	45								26.05		21.97	24.01
Chloride (Cl)	mg/l	250								17.14		4.28	10.71
Total Iron (T-Fe)	mg/l	0.3								0	0	0	0
Sulphate (SO4)	mg/l	400											
Fluorine (F)	mg/l	0.7											
Total Solids (TDS)	mg/l	1000								379	379	0.5	253
Total Bacteria	no./ml	100								1	1	0	1
Intestinal Bacillus	no./1000ml	3								M3	M3	M3	7

Table D 2.3.6.14 (1) Groundwater Quality of Kuluk WTP

Well No.	1		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
			Temperature	degree						18.0	18.0	18.0
Color	degree	20	0	0			0	0	0	0		0
Taste	number	2	0	0						0		0
Odor	number	2	0	0			0	0	0	0		0
Turbidity	mg/l	1.5	0	0			0	0.15	0	0		0.03
pH value		6 - 9	7.2	7.3			7.3	7.2	7.5	7.0		7.3
Alkalinity	meq/l		4.9	4.6			4.6	4.8	4.7	4.7		4.7
Total Hardness	meq/l	7	7.0	7.9			6.6	6.0	6.0	6.0		6.6
Ammonia (NH4)	mg/l		0	0			0	0	0	0		0
Nitrite (NO2)	mg/l	3	0	0			0	0	0	0		0.00
Nitrate (NO3)	mg/l	45		23.92			31.54		26.05			27.17
Chloride (Cl)	mg/l	250		16.66			19.60		14.76			17.01
Total Iron (T-Fe)	mg/l	0.3		0			0	0	0	0		0
Sulphate (SO4)	mg/l	400		73.66								73.66
Fluorine (F)	mg/l	0.7		0.3								0.3
Total Solids (TDS)	mg/l	1000	342	434			422	319	412			386
Total Bacteria	no./ml	100	0	0			0	0	0	0		0
Intestinal Bacillus	no./1000ml	3	M3	M3			M3	M3	M3	M3		7

Well No.	2		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
			Temperature	degree						18.0	18.0	18.0
Color	degree	20	0	0	0	0		0	0	0		0
Taste	number	2	0	0	0	0						0
Odor	number	2	0	0	0	0		0	0	0		0
Turbidity	mg/l	1.5	0	0.05	0	0		0	0	0		0.01
pH value		6 - 9	7.3	7.0	7.3	7.3		7.2	7.3	7.0		7.2
Alkalinity	meq/l		5.0	4.6	4.8	4.8		5.0	4.8	4.8		4.8
Total Hardness	meq/l	7	7.4	6.7	6.8	6.8		6.4	6.8	7.0		6.8
Ammonia (NH4)	mg/l		0	0	0	0		0	0	0		0
Nitrite (NO2)	mg/l	3	0	0.01	0	0		0	0	0		0.00
Nitrate (NO3)	mg/l	45				31.54			28.88			30.21
Chloride (Cl)	mg/l	250				16.17			15.23			15.70
Total Iron (T-Fe)	mg/l	0.3		0	0	0		0	0	0		0
Sulphate (SO4)	mg/l	400				69.5						69.50
Fluorine (F)	mg/l	0.7				0.34						0.34
Total Solids (TDS)	mg/l	1000	325		570	348		408	426			415
Total Bacteria	no./ml	100	0	0	0	6		0	0	1		1
Intestinal Bacillus	no./1000ml	3	M3		M3	M3		M3	M3	M3		7

Well No.	3		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
			Temperature	degree						18.0	18.0	18.0
Color	degree	20	0	0	0	0		0	0	0	0	0
Taste	number	2	0	0	0	0		0	0	0	0	0
Odor	number	2	0	0	0	0		0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0.05	0		0	0	0	0	0.01
pH value		6 - 9	7.3	7.4	6.9	7.3	7.3	7.3	7.3	7.2	7.3	7.2
Alkalinity	meq/l		5.0	5.1	5.0	5.0	4.8	4.8	5.0	4.9	4.9	4.9
Total Hardness	meq/l	7	7.0	6.8	6.9	6.0	6.6	6.2	8.0	7.4	6.3	6.8
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0
Nitrite (NO2)	mg/l	3	0.002	0	0.01	0	0	0	0	0	0	0.00
Nitrate (NO3)	mg/l	45		26.06		26.05			27.47		45.19	31.19
Chloride (Cl)	mg/l	250		16.17		19.11			14.76		15.23	16.32
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0	0	0	0	0
Sulphate (SO4)	mg/l	400		64.61		105.8					73.2	81.20
Fluorine (F)	mg/l	0.7		0.34		0.39						0.365
Total Solids (TDS)	mg/l	1000	257	436	581	440	378	343	500			419
Total Bacteria	no./ml	100	0	0	0	0	0	6	0	2	0	1
Intestinal Bacillus	no./1000ml	3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3

Table D 2.3.6.14 (2) Groundwater Quality of Kuluk WTP

Well No.	6		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree							18.0				18.0
Color	degree	20	0	0			0	0				0
Taste	number	2	0	0	0	0	0					0
Odor	number	2	0	0	0	0	0	0				0
Turbidity	mg/l	1.5	0	0	0	0	0	0				0.00
pH value		6 - 9	7.4	7.4	6.8	7.5	7.3	7.3				7.3
Alkalinity	meq/l		5.0	5.0	4.9	5.0	4.8	5.0				5.0
Total Hardness	meq/l	7	7.2	6.7	7.4	6.0	7.4	6.6				6.9
Ammonia (NH4)	mg/l		0	0.0	0	0	0	0				0.00
Nitrite (NO2)	mg/l	3	0	0	0.01	0	0	0				0.00
Nitrate (NO3)	mg/l	45		26.05		26.05		0.00				17.37
Chloride (Cl)	mg/l	250		18.13		19.60						18.87
Total Iron (T-Fe)	mg/l	0.3		0.00	0	0	0					0.00
Sulphate (SO4)	mg/l	400				61.7		0				30.85
Fluorine (F)	mg/l	0.7		0.3		0.32						0
Total Solids (TDS)	mg/l	1000	357	436	591	365	415	398				427
Total Bacteria	no./ml	100	0	0	0	0	0	0				0
Intestinal Bacillus	no./1000ml	3	M3	M3	M3	M3	M3	M3				M3

Well No.	8		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree							18.0	18.0	18.0	15.0	17.3
Color	degree	20	0	0		0		0	0	0		0
Taste	number	2	0	0	0	0	0				0	0
Odor	number	2	0	0	0	0	0	0	0	0	0	0
Turbidity	mg/l	1.5	0	0	0.08	0	0	0	0	0	0	0.01
pH value		6 - 9	7.4	7.5	7.0	7.3	7.4	7.3	7.4		7.2	7.3
Alkalinity	meq/l		4.9	5.2	4.7	4.9	4.7	4.8	5.3	5.0	4.8	4.9
Total Hardness	meq/l	7	7.0	6.7	8.4	7.0	6.4	6.4	6.8	7.4	6.7	7.0
Ammonia (NH4)	mg/l		0	0	0	0	0	0	0	0	0	0.00
Nitrite (NO2)	mg/l	3	0	0	0.01	0	0	0	0	0	0	0.00
Nitrate (NO3)	mg/l	45		26.76		26.76		27.47			32.54	28.38
Chloride (Cl)	mg/l	250		18.13		19.11		18.56			14.76	17.64
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0	0	0	0	0.00
Sulphate (SO4)	mg/l	400		37.86		66.3		0				34.72
Fluorine (F)	mg/l	0.7		0.4		0.31						0
Total Solids (TDS)	mg/l	1000	375	368	574	442	492	414	425			441
Total Bacteria	no./ml	100	0	0	0	0	0	6	0	0	0	1
Intestinal Bacillus	no./1000ml	3	M3	M3	M3	M3	M3	M3	M3	M3	M3	M3

Well No.	9		2003									
Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree								18.0	18.0		18.0
Color	degree	20	0	0					0	0	0	0
Taste	number	2	0	0							0	0
Odor	number	2	0	0					0	0	0	0
Turbidity	mg/l	1.5	0	0					0	0	0.05	0.01
pH value		6 - 9	7.4	7.4					7.4	7.1	7.3	7.3
Alkalinity	meq/l		4.8	5.2					4.9	5.2	5.1	5.0
Total Hardness	meq/l	7	6.4	6.7					6.4	6.8	6.3	6.5
Ammonia (NH4)	mg/l		0	0					0	0	0	0.00
Nitrite (NO2)	mg/l	3	0.002	0					0	0	0	0.00
Nitrate (NO3)	mg/l	45		27.47					27.47		34.20	29.71
Chloride (Cl)	mg/l	250		18.13					18.56		13.33	16.67
Total Iron (T-Fe)	mg/l	0.3		0					0	0	0	0.00
Sulphate (SO4)	mg/l	400		58.02							70.8	64.41
Fluorine (F)	mg/l	0.7		0.25								0
Total Solids (TDS)	mg/l	1000	315	445					432			397
Total Bacteria	no./ml	100	0	0					0	0	0	0
Intestinal Bacillus	no./1000ml	3	M3	M3					M3	M3	M3	M3

Table D 2.3.6.15 (1) Groundwater Quality of Bectemir WTP

Well No.	Bektimir 1		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree			18.0	16.0	17.0	17.0	17.0	16.0	16.0	16.0	16.0	16.6
Color	degree	20		0	0		6	0	0	0	5		2
Taste	number	2		0	0	0	0			0	0		0
Odor	number	2		0	0	0	0	0	0	0	0		0
Turbidity	mg/l	1.5		0.2	0.35	0.35	0.29	0	0	0	0		0.15
pH value		6 - 9		7.7	7.6	7.4	7.7	7.6	7.5	7.2	7.7		7.5
Alkalinity	meq/l			2.6	2.9	2.7	2.8	3.1	2.4	3.1	3.2		2.9
Total Hardness	meq/l	7		3.8	5.0	3.0	3.2	4.0	2.8	4.0	3.8		3.7
Ammonia (NH4)	mg/l			0	0	0	0	0	0	0	0		0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0	0	0		0
Nitrate (NO3)	mg/l	45			8.86		5.67			5.00			6.51
Chloride (Cl)	mg/l	250			7.84		8.33			15.71			10.63
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0	0	0			0
Sulphate (SO4)	mg/l	400			38.68		29.60						34.14
Fluorine (F)	mg/l	0.7			0.21		0.22						0.22
Total Solids (TDS)	mg/l	1000		163	235	128	211	268	165	256	242		209
Total Bacteria	no./ml	100		0	0	0	0	0	6	0	0		1
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3	M3	M3	M3		M3

Well No.	Binokor 2		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree					15.0	17.0	17.0	16.0	17.0	15.0		16.2
Color	degree	20		0	0		3	0	0	0	5		1
Taste	number	2		0	0	0	0			0	0		0
Odor	number	2		0	0	0	0	0	0	0	0		0
Turbidity	mg/l	1.5		0.5	0		0.2	0	0	0	0.15		0.12
pH value		6 - 9		7.8	7.4	7.4	7.8	7.4	7.4	7.5	7.3		7.5
Alkalinity	meq/l			4.0	4.5	4.5	2.9	4.5	4.5	4.6	5.6		4.4
Total Hardness	meq/l	7		3.6	6.3	6.1	3.6	5.6	6.2	6.0	5.6		5.4
Ammonia (NH4)	mg/l			0	0	0	0	0	0	0	0		0
Nitrite (NO2)	mg/l	3		0	0	0	0	0	0	0	0		0
Nitrate (NO3)	mg/l	45			26.05		7.09			21.17	0.00		13.58
Chloride (Cl)	mg/l	250			16.66		7.84			16.18	0.00		10.17
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0	0	0	0		0
Sulphate (SO4)	mg/l	400			45.27		38.3						41.8
Fluorine (F)	mg/l	0.7			0.21		0.24						0.23
Total Solids (TDS)	mg/l	1000		176	402	420	214	377	370	399	382		343
Total Bacteria	no./ml	100		0	0	0	1	3	0	0	0		1
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3	M3	M3	M3		7

Well No.	Majnun-tol		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree			20.0	17.0	17.0	15.0	17.0					17.2
Color	degree	20		18	0		0	0					5
Taste	number	2		35	0	0	0	0					7
Odor	number	2			0	0	0	0					0
Turbidity	mg/l	1.5		0.25	0.15	0.32	0	0.48					0.24
pH value		6 - 9		7.7	7.6	7.6	7.7	7.7					7.6
Alkalinity	meq/l			2.7	2.8	2.8	3.2	2.5					2.8
Total Hardness	meq/l	7		3.6	4.2	3.6	4.0	3.0					3.7
Ammonia (NH4)	mg/l			0	0	0	0	0					0
Nitrite (NO2)	mg/l	3			0	0	0	0					0
Nitrate (NO3)	mg/l	45			8.86		5.30						7.08
Chloride (Cl)	mg/l	250			7.84		15.39						11.62
Total Iron (T-Fe)	mg/l	0.3		0	0	0	0	0					0
Sulphate (SO4)	mg/l	400			39.92		47.6						43.8
Fluorine (F)	mg/l	0.7			0.21		0.15						0.18
Total Solids (TDS)	mg/l	1000		165	218	198	281						216
Total Bacteria	no./ml	100		0	0	0	0	1					0
Intestinal Bacillus	no./1000ml	3		M3	M3	M3	M3	M3					M3

Table D 2.3.6.15 (2) Groundwater Quality of Bectemir WTP

Well No.	Binokor 3		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree								16.0	17.0			16.5
Color	degree	20							0	0			0
Taste	number	2								0			0
Odor	number	2							0	0			0
Turbidity	mg/l	1.5							0	0			0.00
pH value		6 - 9							7.5	7.3			7.4
Alkalinity	meq/l								4.7	4.5			4.6
Total Hardness	meq/l	7							5.6	6.4			6.0
Ammonia (NH4)	mg/l								0	0			0
Nitrite (NO2)	mg/l	3							0	0			0
Nitrate (NO3)	mg/l	45								26.66			26.66
Chloride (Cl)	mg/l	250								16.66			16.66
Total Iron (T-Fe)	mg/l	0.3							0	0			0
Sulphate (SO4)	mg/l	400											#DIV/0!
Fluorine (F)	mg/l	0.7											#DIV/0!
Total Solids (TDS)	mg/l	1000							375	399			387
Total Bacteria	no./ml	100							0	0			0
Intestinal Bacillus	no./1000ml	3							M3	M3			M3

Well No.	Binokor 5		2003										
	Constituent	Unit	Standard Value	2	3	4	5	6	7	8	9	10	Average
Temperature	degree						16.0	17.0	16.0		15.0		16.0
Color	degree	20		0			3.5	0	0		5		2
Taste	number	2		0			0				0		0
Odor	number	2		0			0	0	0		0		0
Turbidity	mg/l	1.5		0			0.25	0	0		0.1		0.07
pH value		6 - 9		7.4			7.8	7.4	7.5		7.5		7.5
Alkalinity	meq/l			1.7			2.8	4.4	4.7		4.7		3.7
Total Hardness	meq/l	7		7.4			3.6	5.4	5.6		5.8		5.6
Ammonia (NH4)	mg/l			0			0	0	0		0		0
Nitrite (NO2)	mg/l	3		0			0	0			0.004		0.001
Nitrate (NO3)	mg/l	45		25.34			5.67						15.51
Chloride (Cl)	mg/l	250		17.35			7.80						12.58
Total Iron (T-Fe)	mg/l	0.3		0			0	0	0				0
Sulphate (SO4)	mg/l	400		30.86			29.2						30.0
Fluorine (F)	mg/l	0.7		0.22			0.22						0.22
Total Solids (TDS)	mg/l	1000		430			226	405	398		380		368
Total Bacteria	no./ml	100		0			0	0	0		0		0
Intestinal Bacillus	no./1000ml	3		M3			M3	M3	M3		M3		M3

D2.3.7 Tariff

In this section, the following documents are presented;

- D 2.3.7.1 Uzbekistan Government Regulation: Ratification of Tariff Setting
- D 2.3.7.2 Resolution of the Cabinet of Ministers: the Law on Anti-Monopoly
- D 2.3.7.3 Sample of a receipt given to domestic customers

D 2.3.7.1 Uzbekistan Government Regulation: Ratification of Tariff Setting

Regulation
of Ministry of Finances of RU, Ministry of macroeconomics and statistics of RU,
Uzbek agency “Uzkommunhizmat”

**Ratification of “Regulation on definition of expenses
and introduction of profitability frontier
during fixing the tariffs on public services”**

*Registered by the Ministry of Justice of RU 04.08.2002
Registration number: 1059
(Legal from 14.08.2001)*

Under President’s of RU decree dated 17.04.2001 # UP-2832 of “new phase of poring of economical reforms in public services”, under Cabinet’s of Ministries of RU resolution dated 18.04.2001 # 178 “About additional measures for development of public services of population”, decree the following:

1. To ratify the attached “Regulation on definition of expenses and introduction of profitability frontier during fixing the tariffs on public services”
2. Present Regulation is legal in 10 days time from the moment of its state registration at the Ministry of Justice of RU
3. To find as null and void the “Methodic of expenses definition for forming the rates and tariffs on public services” (registration # 749, dated 16.06.1999) starting from the day of Present regulation enters into force.

Minister of Finance
Tashkent
03.07.2001
51

Nurmuradov M.

First Deputy Minister
of macroeconomics and statistics
Tashkent
03.07.2001
4-2 / 4-3-253

Bahramov A.

General Director
of Uzbek agency
“Uzkommunhizmat”
Tashkent
03.07.2001
01-629

Holmuhamedov U.

Approved by Ministry of Finances,
by Ministry of Macroeconomics and statistics
and by Uzbek agency's "Uzkommunhizmat"
resolution
dated 03.07.2001 # 51, # 4-2 / 4-3-253, # 01-629

Provision
on expenses cost definition and introduction of profitability frontiers
during fixing the tariffs on public services

The present provision (regulation) "on expenses cost definition and introduction of profitability frontiers during fixing the tariffs on public services" has been worked out, in accordance with:

President's of RU decree dated 17.04.2001 # UP-2832 "New phase of poring of economical reforms in public services";

Cabinet of Ministries of RU resolution dated 18.04.2001 # 178 "About additional measures for development of public services of population";

Regulation of production expenses and costs of products realization (work, services) and of order of financial results formation, approved by the resolution of the Cabinet of Ministries of RU dated 05.02.1999 3 54;

Resolution of the Cabinet of Ministries of RU "Ratification of normative acts in connection with conversion on self-repayment of public services" dated 30.07.1996 # 271;

Resolution of the Cabinet of Ministries of RU dated 21.09.2000 # 364 "Measures for realization of RU Law – "Natural Monopolies" and its attachment # 1 "The regulation of the order for prices (tariffs) fixing on the products (services) of subjects of natural monopoly".

Part I. General regulations

1. System of prices (tariffs) in public services field

There are free (contractual) and regulated price limits (tariffs) for public services in its field.

1. Director of self-financing municipal enterprise approves the free (contractual) prices (tariffs) for public services, coordinated with the public services customers under existing supply and demand (sales opportunities). Free (contractual) tariffs are formatted on the assumption of prime cost of production and of gross margins from realization of the services. The tariffs for large-scale consumers are formatted adjusted for value-added tax. Tariffs for sanitary cleaning services can exemplify.
2. Regulated tariffs are fixed for public services that providing by the objects of natural monopoly in water supply and sewerage system sphere, in production and transportation of heat energy, in gas transportation by pipelines. Regulated tariffs are also fixed for the services providing by enterprises-monopolists included to the State registry of enterprises-monopolists (e.g. on the services by realization of compressed gas, services for technical inventory of houses that been provided by cadastral agency of technical inventory to population and to large-scale consumers).

2. Order of state monitoring of the tariffs on public services provided by objects of natural monopolies and by enterprises-monopolists.

3. According to Cabinet of Ministries resolution dated 21.09.2000 # 364, the Ministry of Finance of Republic of Karakalpkstan, financial departments of regional hokimiyats and

main financial department of Tashkent hokimiyat fix the tariffs for the services relevant to the spheres of natural monopoly, such as: water and sewerage economy, production and transportation of heat energy (including resale) by the enterprises of public services system, ministries and department (exclude “Uzbekenergo” - State stock company, and Ministry of agriculture and water economy).

4. The objects of natural monopoly that are not included in the list of State managing bodies or in the list of self-financing departments, directly submit the projects of tariffs to the Body of price regulation.

Authorities of state and economic department submit the projects of tariffs or the limited level of the tariffs for the public services provided by the objects of natural monopoly that are included in the list of state managing bodies - to the Body of price regulation.

5. The objects of natural monopoly for introduction of prices (tariffs) or its limited levels for public services should apply to the Body of price regulation with application and with following documents in annex:

- a) Project of price (tariff) or its limited levels;
- b) Substantiation of the project, including the under mentioned indicators for the last reporting year and for the forecasting periods:
 - Cost of production (realization) of products (goods, services);
 - Breakdown of salary;
 - Breakdown of raw and materials cost
 - Breakdown of operating costs (additional charges, including allocation for depreciation);
 - Cost breakdown of gross margin, cost of period (including taxes and other compulsory payments);
 - Requisition in investments, that are necessary for reproduction;
 - Requisition in state subsidies or in other measures of state support.

In case of need, financial bodies can request other data that are necessary for decision making.

6. The body that approves the tariffs must take decision within one week period from the day of receiving all the necessary documents that were submitted for consideration of tariff's projects.

7. In case if the objects of natural monopoly submit the documents partly, or with economically unwarranted calculations – the Body of price regulation within 3 days time returns the tariffs projects for reworking with written substantiation of available defects.

The decision by approving of tariffs in those cases should been taken within 5 days from the day of getting all necessary and reworked documents.

Enterprises that provide the public services and that relevant to sphere of natural monopolies, after tariffs approval must publish new tariffs in mass media within 15 days of its entering into force.

8. On fixing the tariffs for population for heat supply services the financial authorities go by President's of RU decree “New phase of poring of economical reforms in public services” dated 17.04.2001 # UP-2832 in pursuance with this decree the phased conversion to self-repayment by population of heat supply services and hot water-service till 01.01.2006 is provided.

9. Tariffs (prices) for public services, provided by the enterprises-monopolists should been avowed at financial bodies located domestically. The enterprises-monopolists in local markets should avow the tariffs in regional financial departments, and enterprises-monopolists in national market – at the Ministry of Finance. The tariffs should be pertained to avow on the moment of enterprise-monopolist adding to the state list of enterprises. In this case the regulated tariffs can be set both fixed and limited.

10. While entering the tariffs for the public services, the enterprises-monopolists submit to the Body of price regulation the documents, analogously settled for subjects of natural monopolies, specified by the article – 5 of Present Regulation.

11. Enterprises-monopolists and objects of natural monopoly go by “Provision of production and realization charges and order of financial results forming” while the determining of costs production of public services. This Provision was approved by the Cabinet of Ministries of RU dated 05.02.1999 # 54, by the Present Provision, and by the corresponding normative and methodical documents of the Ministry of Finance of RU.
12. On formation of the tariffs on public services, the profitability frontier is fixed, for the purposes of stimulation of enterprises’ charges reduction that supply public services (gasification, hot water supply, central heating system, water supply, sewerage expenses and sanitary cleaning). The profitability frontier is – ratio of net profit to cost of production, not more that 10 %.
13. On approval or on next following prices and tariffs revision for housing-operational services and for public services - 10 % of tariffs increase are reimbursed at enterprises expenses that supply the public services and carry out the operational services of houses.
14. Public services that have being supplied for the population, are exempt from tax on value added, according to Direction of order of calculation and discharge of tax on value added for the produced and realized products (services) (regist. # 383 dated 29.12.1997). Hereby the enterprises of municipal, public services have dutiable and tax-exempt overturns that are exempted from the tax on value added.

Enterprises that supply public services (regardless of rendering services for population or to services to enterprises – wholesale customer) make the discharge of VAT only on positive, debit balance. That’s in the case of excess of VAT income for supplied services over amount paid tax by providers for used material resources for the whole activity.

3. The sources of disbenefits’ compensation of public services enterprises from credits granting for service payment and its registration on formation the tariffs on public services.

15. Particular categories of citizens are available to get the privileges for public services payment, in compliance with listing, approved by President’s of RU Decree “New phase of economical reforms exacerbation in public services” and in order fixed by “Regulation of order for privileges of population on public services payment” (Annex 2 to Cabinet’s of Ministries Decree, dated 18.04.2001, # 178).
16. Ministries, departments, enterprises, organizations that have departmental account on the balance, should compensate on own financial account the fall incomes from privileges for heating system services payment.
17. The losses of the incomes of heat supply enterprises (of Council of Ministries of the Republic of Karakalpakstan, regional hokimiyats, Tashkent city hokimiyat and other enterprises that provide the heat supply to population in fixed order by the decisions of the Government of republic) that came as the result of giving to particular categories of citizens privileges for heat supply services payment are compensated from local budget according to provided calculations/
18. For other kinds of public services (cold water supply, sewerage system and electric energy), the losses of the enterprises that provide these services by reduced charges – are compensated on account of incomes receiving from wholesale customer.
19. The compensation of the losses of “Boshcommungaz” enterprise, and Uzbek agency “Uzkommunhizmat” from realization of natural gas to particular categories of population

by reduced rate are accounted during the formation of the tariffs for natural gas purchasing from the provider.

Part II. Productive expenditures breakdown and public services realization

20. In accordance with “Provision of production expenditures breakdown and realization of the products (services) and the order of formation of financial results”, approved by the decree of the Cabinet of Ministries of RU dated 05.02.199 # 54, all expenditures divided into following groups:

Expenditures, that have been included to productive prime cost of product (service);

Expenditures, which have been included to the expenses of the period and that are accounted in income of main activity;

Expenses of financial activity of the enterprise that are accounted during the calculation of income or damage of economical activity;

Extraordinary losses that are accounted during calculation of the income and the damage before discharge of profits tax.

21. The expenses directly referred with the production of goods (works, services), conditioned by the technology and organization of production, are included to productive prime cost. Expenses directly referred with the production include direct and indirect material expenses, direct and indirect labour expenses, and other direct and indirect expenses, including overhead costs of productive character.

22. Expenses on reproduction of fixed assets are included to prime cost, as amortization (deterioration) at percents from basic (replacement) value of fixed assets, according to the servicing period.

23. Expenses that form the productive prime cost of services, are grouped according to economical supply by under mentioned items:

- Productive material expenses (after deduction of recurrent waste value);
- Expenses for the salary of production character;
- Allowances on social insurance, that are referred to production;
- Amortization of fixed assets and non-material assets of production character;
- Other expenses of productive importance.

4. Productive and material costs.

24. Productive and material costs are the following:

a) Bought raw and materials that are comprised of produced goods, and form its basis or the raw and materials can be necessary component for goods' production (work realization, rendering of services).

Material costs are considered by fixed norms of withdrawal while estimated calculation of prime cost.

b) Purchased materials that being used in the process of goods' production (works or services) for providing of normal technological process and for packing the products, spending for other productive needs (testing carriage, monitoring, maintenance, reconstruction and exploitation of equipments, buildings, etc). The spare parts for equipments repair, deterioration of tools, of devices, of implements and of other labour

- utility that are not relevant to the main facilities, deterioration of coverall and of other less-worth subjects;
- c) Losses in the limits of natural wastage norms of wealth in production sphere;
 - d) Purchased component parts and semi raw materials that are subject to setting up or additional processing in prospect on present economy object;
 - e) Purchased fuel of all sorts, expendable for technological aims (coal, gas, oil, gasoline, etc.);
 - f) Purchased energy of all sorts (electricity, heating, compressed air), expendable for technological, transport and other productive and economical needs of the objects (expenditures for production of electricity and other sorts of energy, produced by the object itself, and for transformation and transmission of purchased energy to the place of consumption, are included to correspondent costs elements).
25. Production works and services that have being done by other juridical and physical persons and also by internal departments of the object that are not relevant to the main activity.
- Production works and services mean the realization of some activities for goods' production, raw and materials processing, testing carriage for evaluation of the quality of used raw and materials, monitoring of fixed technological process, repair of main productive funds and etc.
- Transport services of other juridical persons for shipment inside of the object (passing over of raw, materials, tools, parts, semi manufactured products and other goods from basis warehouse to manufactory and delivery of finished goods to storehouses). So the transport services are also the related to the productive services.
26. Cost of material resources that shown in "Material expenditures" is formed on the strength of purchase, additional charges, and commissions, paid by foreign economical enterprises. Cost of material resources is also formed on the strength of costs of commodity exchange services, including broker's services, customs duties, payment for transportation, holding and delivering that have been carried out by other juridical persons.
27. Expenditures, related to delivery (including handling works) of material resources by transport and by staff of economic unit, must be added to corresponding items of productive costs (labour costs, depreciation on fixed assets, financial expenses, etc.).
28. The expenses of economic unit for boxing and packing purchasing, received from the providers of material resources should be added to the cost of material resources.
29. Due to expenditures for material resources that have been included to production prime cost – the cost of back wastage is excluded and the cost of boxing and packing by the price of its actual realization, use and warehousing is excluded also.

5. Labour costs of productive format.

30. The under mentioned items are included to labour costs of productive format:
- ✓ Accrued salary of productive format for actual done work is performed on the strength of piece rate, tariffs rates and officials' salary in accordance with accepted forms and systems of labour payment of economic unit, including compensation outpayments specified of basic documents for accountability of capacity;
 - ✓ Additional charges to tariff rates and to salaries for professional skill, for tuition;
 - ✓ Compensating outpayments coherent with working regime and working conditions, including:

- a) Perks and fringe benefits to tariff rates and to salaries for working at night time, overtime work, for working on week-ends, on holidays (day offs), specified by the time-table of technological process;
- b) Perks and fringe benefits for shift working, for combination of professions and the extension of service zones;
- c) Perks for the work in arduous, destructive working conditions, in natural-climatic conditions, including salary perks for continuity of employment in such conditions, by the registry of professions and by the list of jobs that been approved by the Government of Republic;
- d) Outpayments, conditioned by regional regulation of labour payment, including the regional coefficient for the work in waste, waterless and high lands that been accrued in accordance with current legislation;
- e) Payment for unused working time, such as:
 - According the existing legislation, payment of regular (annual) and additional leaves, compensation for unused regular (annual) and additional leaves, payment of promotional hours for adolescent, work break for the mothers for child feeding, and the payments for the time used for medical inspection;
 - Outpayments to the employers that are on forced leave with partial refund of main salary;
 - Labour payment to the workers that are not rolled in the staff of economical unit. Payment for work implementation done by them (workers) due to contracted agreement of civil-legal form, including works contract, if accounts with the workers for performed work have being done by economic unit directly;
 - Payment to employers-donors for medical inspection days, for days of giving blood for transfusion and days-off given after each day of giving blood for transfusion;
 - Labour payment for realization of State liabilities (military rally, assemblies in emergency, etc.);
- f) Other kinds of outpayments included according with fixed procedure to the wage-bill of employers, participating in productive process.

6. Social insurance allocations, related to production.

31. Obligatory allocations of social format by the norms that been fixed by legislation to wage-bill.
32. Allocations to non-governmental pension fund, allocations to free medical insurance and other kinds of optional, free insurance.

7. Amortization of fixed assets and nonmaterial assets of productive function.

33. Amounts of amortization allowances (accrued deterioration), figured due to primary (recovery) cost of productive fixed assets including purchased by leasing and that been approved in fixed order and adding the accelerated amortization, performed in compliance with legislation.
34. Deterioration (amortization) of nonmaterial assets of productive function is referred to prime cost of products (work, services) monthly by norms calculated by economic unit, on

the strength of primary cost and the duration of its exploitation (but not more than the period of activity of economic unit). The standards of deterioration of nonmaterial assets (except goodwill) are set for the period of 5 years, but not more than the period of economic unit activity, in case if it is impossible to determine the duration of nonmaterial assets exploitation. The deterioration of Goodwill is accrued as per NSBU # 7.

8. Other costs of productive function.

35. The charges for productive process services:

- a) Charges for raw, materials, fuels, energy, tools, devices and other labour facilities providing to the production;
- b) Maintenance charges of fixed assets in working conditions (charges for technical examination and service, for realization of jobbing, overhaul maintenance and heavy repair);
- c) Charges, referred to technical service and maintenance of in-house engineering networks and equipments of dwelling-house.

The conducting of remedial maintenance (jobbing, overhaul, and heavy) of productive fixed assets by the economic unit itself should be added to the prime cost of products (works, services) by corresponding elements of productive charges (material charges, labour costs and other).

In case of need the economic units of particular branches by authority of Minister of Finance of RU can establish the reserve assets for remedial maintenance conducting. The allocations to that reserve are shown in "Other costs of productive function" element and accrued because of estimated cost of charges and because of systematic of remedial maintenance conducting of each fixed assets. The norm of allocations is being revised at the end of each reporting year, and in case of need the norm of allocations can be increase or reduce for the new financial year;

- g) Charges for providing fireproofing, security and for other special demands provided by the rules of technical exploitation of economic unit, for monitoring and control of its activity.

Charges for out-departmental security can be refer to productive prime cost of goods (works, services) only in the case of availability of specific demands to present production that is conditioned the existence of security.

- h) Expenditures incidental to current rent of productive fixed assets relative to productive activity;
- i) Operating costs incidental to maintenance and exploitation of funds of nature conservation importance (treatment plants, ash-traps, filters and other conversation measures and expenditures of burial of ecological dangerous, adverse wastes, payment for the services performed by other enterprises for reception, keeping and elimination of ecological dangerous, adverse wastes, effluents treatment, other sorts of operating conservation expenditures), including the payments for pollution emissions on environment within the mark standards;
- j) Expenditures for providing the normal working conditions and accident prevention incidental to features of production and that provided by legislation; such as - (appliance and maintenance of fencing, other appliances of noncapital character that are providing accident prevention. Appliance and maintenance of disinfection plants, wash-rooms, bathrooms, laundries on production (where the rendering of such services to the employers incidental to the features of workplaces with specific devices (noncapital character), providing with coveralls, shoes, protective equipments, and in statutory cases – providing with special food; maintenance and

- reparation of boilers, heaters, baths, checkrooms and lockers for coveralls, dryers, recreation room);
- k) Cost of free given subjects, according to actual legislation (including uniform, get-up, special food) that will be kept in private continuous use (or the sum of credits in connection with its realization by reduced price);
 - l) Expenditures for maintenance and service of technical means of administration, communication centers, signaling means; other technical means of administration, computing centers, referred to production process;
 - m) Productive staffs' travel expenses that are referred to production process in the limits of fixed standards;
 - n) Allowances in connection with losing the work-ability due to injury at work, paid on base and without decision of corresponding competent authorities. Allowances payout for professional diseases;
 - o) Measures for welfare and health protection, directly related with employers operation in productive process;
 - p) Expenditures for obligatory certification of the products (services), except capitalized;
 - q) Expenses for transportation of the employers to work place and back in the directions that are not servicing by public transports;
 - r) Expenses for obligatory insurance of productive workers and productive assets;
 - s) Expenses for warranty reparation and for guaranty maintenance of the goods that have the warranty lifetime;
 - t) Payment to medical authorities for employers' medical examination that are engaged at production in accordance with legislation.

Part III. Period expenses.

- 36. The expenditures and costs those are not incidental to productive process directly pertain to period expenses: such as – expenditures on administration; expenditures on realization of the products and other expenditures of general economic importance.
- 37. Natural monopoly enterprises, and the enterprises those are registered in State list of economical subjects and are holding the dominant positions at commodity markets of RU – while the determination of required profit should allow for the following articles of “Period expenses”

9. Expenses on rendering of services.

- 38. The expenses on rendering of services are:
 - a) Markets outlet survey (marketing, advertising expenses) in the limits of fixed standards;
 - b) Disbursements on cash manage and encashment of takings;
 - c) Other expenses on realization.

10. Administrative expenses.

- 39. The administrative expenses are:
 - Labour payments, itemized in article # 5 of Part II of Present Regulation, referred to the employers of Administration staff;

Allocations on social insurance, itemized in article # 6 of Part II of Present Regulation, referred to the employers of Administration staff;

Expenses on maintenance, rent of official passenger's car and official minibuses;

Expenses on organization and administration of economic subject and its structural departments;

Expenses on maintenance and servicing of technical means of administration, communication centers, signaling means; other technical means of administration, computing centers those that are not referred to production process;

Payment to communication centers, rendering of services (telephone station);

Payment for domestic and international calls in the limits of fixed standards;

Payment on maintenance and deterioration (amortization) of fixed assets of administrative importance;

Allowances on maintenance of superior enterprises and unit of juridical persons;

Travel expenses for administrative staff in fixed limits;

Expenses of representation in the limits of fixed standards;

Current expenses incidental to maintenance and exploitation of funds of nature conservation importance that are not refer to productive process in direct way, including payments for pollution emissions on environment within fixed limits.

11. Other operational expenses.

40. Other operational expenses are:

a) Expenses on personnel training and reeducation, exclude the staff for working at over introduced economic subject within established standards;

b) Payment for consulting and informative services;

c) Payment for auditors' service, including the payment for audit conducting under initiative of one of partners (owners) of economic subject;

d) Health care measures and recreation organizing. These measures are not referred to workers, employers' involvement in production process directly;

e) Compensation and stimulating outpayments:

Compensation under the decision of the government of RU;

Payment for the time of enforced absenteeism or implementation of less-paid work in accordance with legislation of RU or under decision of economic subject itself;

Additional charges in case of temporary loss of work ability until actual earnings, established by legislation;

Wage to the workers, employers of dominant working place, to the workers and specialists of economic subject during the training in the system of skill development and personnel reeducation;

Payment on additional leave to woman's who have two or more children at the age till 12, or child-disabled at the age till 16, according to legislation;

f) Repayments and expenses that are not accounted during the charge of salary:

Expenses of payoffs of monthly child home care allowance for two years after child bearing according to legislation;

Allowances to pensions, lump sum payments to retiring labour veterans;

Allowances to employers, excused by economic subject due to reorganization, staff reduction according to legislation;

g) Expenses on maintenance of the Health care objects, childhood, preschool centers, recreation camps and stock housing objects (including allocations for depreciation and expenses for all kinds of reparation measures) within established standards, fixed by Bodies of State authorities in regions;

- h) Expenses on maintenance of tied up productive capacities and objects (except expenses, compensated at other sources expenses);
- i) Payment of banking services and depository;
- j) Obligatory payments to budget; taxes, dues, allocations to special off-budget funds, paid in accordance with legislation and referred to the expenses of economic subject;
- k) Revealed credit balance of VAT, in case of supplier's burden tax excess for used material resources over received sum of same tax for services rendered.

12. Expenses of reporting period, excluded from taxable basic in future.

41. Expenses on installation and preparation of new types of goods production of duplicate and in bulk production. Expenses on installation and preparation of technological processes:

Noncapital expenses that are referred to the development of technologies and organization of production and that are referred to improving of work quality, increasing the credibility, durability and other operational facilities, implemented during production process;

Expenses on resourcefulness and rationalization of production that came as result of experimental works conducting, making and testing of models and samplings done by the inventions and innovative proposals, by organizing the exhibitions, competitions and certification, including other inventory and innovative measures; royalty payment and other expenses.

Part IV. Financing activity expenses.

42. The expenses of financing activity are:

Payment for servicing of short-term and long-term banking credits within the limits of discount rates, established by Central Bank of RU;

Expenses for interest payment of property leasing;

Other financing activity expenses.

Part V. Formation of financial results (effects).

43. The financial results (effects) of economic subject activity are specified by following indicators:

Gross margin from sales of goods (works, services) (settled as the difference between net revenue from sales and productive prime cost of realized goods (works, services) ;

Income from main activity (settled as difference between gross margin from sales of goods and period expenses plus other comings or minus other materials from main activity);

Income from Communal-economic activity (calculated as: sum of revenue from main activity plus incomes and minus expenses on financial activity);

Income before taxes (calculated as: income from communal-economic activity plus extraordinary revenues and minus extraordinary expenses);

Net income (income before taxes after deduction of income taxes minus other taxes and payments, established by legislation);

Earning capacity from main activity (calculated as ratio of net income to productive prime cost).

Part VI. Order of tariffs rating on public services on water and sewerage services, heating energy production and transportation.

44. The whole technological cycle of work should be included on calculation of the expenses on communal services. Technological cycle of work that include the production and realization of services directly to consumer.

E.g., the prime cost of water supply services includes the expenses on maintenance and servicing of intake headings, pumping stations, treatment plants, engineering networks, including in-house ones.

At the same time, some sorts of works such as; technical service of in-house networks can be passed, transferred to other enterprises by agreement of subcontract, but the expenses for implementation of these works are included to prime cost of water supply services.

Expenses on capacity of heating energy and maintenance of heating networks, including in house; expenses on monitoring of serving inputs, automatic devices for water temperature regulation, water pressure and water expenditure regulation – are added, included to composition of services on production and transportation of heating energy.

45. On achievements of the results requested by the customers (rating of servicing quality) the economical prices and tariffs show the social required expenses on production and realization of services, also these tariffs give the opportunity of profitable work of enterprises of water and sewerage economy, and also give the opportunity of profitable work for production and transportation of heating energy.

46. New system of calculation of central heating and hot water supply stipulates phased reimbursement of the expenses of heat supply enterprises by population, starting from 2001 until 01.01.2006, according with established Decree of the President of RU “New phase of poring of economical reforms in communal services” dated 17.04.2001 # UP-2832 by task of annual reducing of state subsidy level.

47. Under the circumstances practice of setting 2 groups of tariffs is kept on transition period:
First group – are the tariffs, the communal enterprises use on rendering of services to other enterprises (wholesale consumers);

Second group – are the tariffs for communal services for population.

13. Water supply and water draining.

48. The calculation of the tariffs on water and sewerage services is cleared separately on water supply services and sewerage services.

49. According with actual normative elements of law the losses are envisaged on forecasting calculation of expenses.

Material expenses on water supply service are fixed out of the volume of pumped water, consumption rate of chemical agent for 1m³ water purification and established prices on chlorine, coagulants and on other stocks.

The expenses on power energy and lighting energy are calculated in pursuance of volume of pumped water on artesian and river drain, specific consumption rate of electric energy and of actual, operational tariffs on 1 kilowatt/per hour and on 1 kilowatt of fixed capacity.

50. In sewerage services the material expenses are calculated through the volume of effluences pass and purification, got by drain.

Material expenses – are chlorine and bleach, using for disinfection before discharge outlet of treated effluences to basins. The volume of expenses is calculated by multiplication of sum of treated sewerage liquors on fixed specific consumption rate of materials and on value on materials.

51. Period expenses and financing activity expenses are divided among water supply and sewerage services rateably of main salary of productive staff on calculation formation of these services.
52. On assessment of rate of economically sound tariff, it is necessary to define the incomes of enterprises on the volumes of given water (effluences) with recording of all consumers of services. The incomes of enterprises on the volumes of given water (effluences) are summed from productive prime cost for specific reporting period (quarter) with the perspectives of present branch development for proximate period (quarter) and estimated impact of external factors (change in price on energy resources, materials, transportation tariffs, tariff rates and officials' salaries) and required amount of income.

$T_{\text{average tariff}} = C + I$ (amount),

Wherein: $T_{\text{average tariff}}$ – average economically sound tariff for 1m^3 of water (1m^3 of effluent);

C – productive prime cost of 1m^3 of water (1m^3 of effluent);

I – required income that provides the profitability of work of water supply and sewerage enterprises (period expenses and financial activity expenses) as for 1m^3 of effluent).

In this case the profitability of main activity is rated (ratio of net income after taxes to productive prime cost) and calculated value of this indicator is stipulated in tariff project. In case if calculated value of profitability is more than 10%, than on rating of the tariff the profitability at the rate of 10% is included and correctives are entered to forecasting expenses.

During prices, tariffs approval on water supply and sewerage services – 10% from prices and tariffs' increase is reimbursed due to incomes of water supply and sewerage enterprise (disquisition of internal reserves for reduction in expenditures).

53. Tariff rating for other wholesale consumers includes the privilege amounts for water supply and sewerage services that are not reimbursed by fixed tariffs for population that are given to particular categories of population of RU according to the legislation of RU, and it also includes VAT.
54. According to level of accomplishment of housing stock the rates of water supply and sewerage services payment are calculated per 1 person in a month on the strength of the fixed tariffs for population and standards of water (sewerage) consumption, established by Council of Ministries of the Republic of Karakalpakstan, regional hokimiyats and by Tashkent city hokimiyat. In case of installed water meters, payment is done by meter reading.

14. Production and transportation of heat energy.

55. The tariffs rating for heat supply services for whole-sale consumers is calculated due to normative expenses for heat energy production, basis on predictable price increase for energy resources, materials, tariffs for transportation, salary, normative period of heating season and required income (see formulas – item #52 of Present Regulation).

In this case the profitability from main activity is calculated (ratio of net income after taxes to productive prime cost) and in tariff project the calculated value of this indicator is forecasted. In case if the calculated value of profitability is more than 10%, then while tariff calculation the profitability at the rate of 10% of is included. And the correctives are bringing to predictable expenses and income.

While tariffs (prices) approval for water supply and sewerage services the 10 % of price (tariffs) increase are reimbursed at the cost of revenues of heat supply enterprise (survey of internal reserves of expenses reduce).

56. The following tariffs are fixed for the population:

For central heating services – 1m² of heating space per month;

For hot water supply in case if there are no water meters – for 1 person per hour;

In case if there are water meter (for hot water) – for 1m³ of hot water;

If there is the meter, recorded the quantity of expendable heat and heat carrier – for 1 Gkal of heating energy and for 1m³ of hot water at one time (Present Regulation does not introduce the tariff rating and payment rates for the heating energy meters, because the population doesn't have specified meters installed);

57. Tariffs on central heating and hot water supply for population are calculated through:

Prime cost of expenses for 1 Gkal of heat;

Fixed tariffs for whole-sale consumers;

Rated heat energy, used for heating of 1 m² of heating space and for heating of 1m³ Gkal of water, calculated by heat energy provider by “Temporary method on calculation of thermic capacity and consumption rate of fuel, electro energy and water for output of heat energy by boiler-houses in the system of Ministries of public services of RU” approved by the Minister of public services, dated 31.031997, #29;

Part of compensation of expenses by the population for output and transportation of heat energy for central heating and hot water supply, according with schedule of conversion on self-repayment, approved by President's of RU decree “New phase of poring of economical reforms in public services” dated 17.04.2001 # UP-2832.

58. Compensation of difference in tariffs for heat energy, released to the population by heat supply enterprises of territorial municipal-operational units of Republic of Karakalpakstan, of Uzbekistan regions and of Tashkent city, and by other enterprises providing the heat supply services to the population in established order by the decisions of Government of Republic, should be conducted by following order:

- a) Budget reimbursement is conducted regardless of whether the heat energy was elaborated by the enterprise or was received from other way purchased by free prices;
- b) The difference in tariffs of budget reimbursement includes: (that are not covered by the assets of population)
 - The difference between the tariff on heat energy, released to whole-sale consumers and established, fixed tariff for population at the rates that been settled by President's of RU Decree “New phase of poring of economical reforms in public services” dated 17.04.2001 # UP-2832;
 - Disbenefit, losses of heat supply enterprises for giving the privileges in payment of heat supply services to particular categories of population, according to legislation of RU.

The features of prime cost calculation are the following items:

- a) The losses of heat energy by heat supply enterprises are stipulates in established standards, in accordance with operating normative acts while forecasting, predictable calculation;
- b) The prime cost of heat supply enterprises is established on the basis of preventive maintenance and maintenance of boiling-rooms and heating networks, according to fixed rules;
- c) The expenses, while heat realization on central heating and on hot water supply at one time, should be calculated rateably to heating quantity and hot water supply.

59. According to consumption as per seasons of the year the whole-sale consumers effect payment for the services of heat supply enterprises:

Central heating payment– during heating season, period;
Hot water supply - monthly, during a year.

60. The population effects the payment for the central heating services of heat supply enterprises evenly every month during the year, regardless of the duration of heating period. For hot water supply, population pays by fixed tariffs monthly, during the year.

61. Pattern calculation of tariffs for central heating services on 1m² of heating place and hot water supply in case if there are no meters – on 1m³ of hot water, is attached in the Annex of present Regulation.

15. Final provision.

62. The present Regulation is agreed with State Committee of RU by demonopolization and development of business competition.

First Deputy Chairman
27.06.2001

D. Ahmedov

Annex to
Provision
on expenses cost definition and introduction of profitability frontiers
during fixing the tariffs on public services.

Model calculation of tariff rating for population

For central heating service on 1m² of heating space as per 1 month.

Intensity of use of heat energy for central heating for 1m² of heating space per month is – 0.019 Gkal*.

Complete prime cost of 1 Gkal included profitability (wholesale tariff without VAT) – 3'500 soums.

Tariff for central heating on 1m² is: 3'500 x 0.019 = 66.5 soums.

The compensation part of expenses by population for central heating services in 2001 – was 31% (according the schedule, approved by President's of RU Decree, dated 17.04.2001, # UP-2832).

Tariff on 1m² of heating space is 20.6 soums. (66.5 x 0.31).

For hot water supply for 1 person per month (In case if there are no meters).

Intensity of use of heat energy for hot water supply for 1 person per month – is 0.178 Gkal*.

Complete prime cost of 1 Gkal (wholesale tariff without VAT) including 10% profitability – is 3'500 soums.

Tariff for hot water for 1 person per month – is:

3'500 x 0.178 = 623 soums.

The compensation part of expenses by population for hot water supply services in 2001 – was 42% (according the schedule, approved by President's of RU Decree, dated 17.04.2001, # UP-2832).

Tariff for 1 person per month – is 262 soums. (623 x 0.42).

* Note

Intensity of use of heat for central heating and hot water supply is calculated for each region (particular locality) by "Temporary method on calculation of thermic capacity and consumption rate of fuel, electro energy and water for output of heat energy by boiler-houses in the system of Ministries of public services of RU" approved by the Minister of public services, dated 31.03.1997, #29).

For 1 m³ of hot water for population, with installed meters.

1 Gkal of heat energy for all consumers – is 3'500 soum/Gkal (without VAT).

Additional data:

Temperature of hot water in supply pipe – is 70.1⁰C;

Normative annual average heat loss in supply pipe – is 33559.76 m³/per hour (as per data of the meters on heat source);

Annual average of source water temperature, using fro hot water preparation – is 11.94⁰C.

Annual averages of temperature reduce of water in supply pipe, because of the losses to environment:

$\Delta t = 91.06 \times 10^6 / 33559.76 \times 10^3 = 2.7^{\circ}\text{C}$

Wherein; 10⁶ coefficient of conversion of Gkal to Kkal;

10³ - Coefficient of conversion of t to kg.

Average temperature of hot water, provided to population:

$T_{\text{tw}} = 70.1^{\circ} - 2.7^{\circ} = 67.4^{\circ}\text{C}$

Enthalpy of hot water is settled by formula:

$$i = 0.001 (67.4^{\circ} - 11.94^{\circ}) = 0.05546 \text{ (Gkal/m}^3\text{)}$$

Tariff for 1m³ of hot water:

$$T_{iv} = 3'500 \times 0.05546 = 194 \text{ soums/m}^3$$

The compensation part of expenses by population for hot water supply services in 2001 – was 42% (according the schedule, approved by President's of RU Decree, dated 17.04.2001, # UP-2832).

Tariff for 1m³ of hot water for population is 81.5 soums (194 x 0.42).

If consumer uses over standards, than the payment will be 194 soums for 1 m³ over norms.

For example, 4 m³ of hot water were actually used in one month, according to meter reading.

3.2 m³ - is water expenditure for 1 person per month (105 liters per day)

4.0 – 3.2 = 0.8 m³ over normative consumption of hot water.

3.2 m³ x 81.5 soum = 260.8 soum

0.8 m³ x 194 soum = 155.2 soum

Total: 416.0 soum.

D 2.3.7.2 Resolution of the Cabinet of Ministers: the Law on Anti-Monopoly

Resolution of the Cabinet of Ministers of the Republic of Uzbekistan Dated September 21, 2000, #364 On measures of implementation of the Law of the Republic of Uzbekistan “On natural monopolies”

In pursuance of the Law of the Republic of Uzbekistan “On natural monopolies” and for the purpose of activity regulation implementation of subjects of natural monopolies the Cabinet of Ministries resolves:

1. Establish that the Ministry of Finance of the Republic of Uzbekistan shall be authorized body of price regulation for activity of subjects of natural monopolies.
2. Approve Regulation on order for price (tariffs) determination on goods (works, services) of the subjects of natural monopolies in accordance with annex 1
3. Paragraph one of chapter II of Regulation on Fund of price regulation, approved by resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 22.07.97, #368, after words “The order of prices (tariffs) and extras formation and appliance (approved by Cabinet of Ministers of the Republic of Uzbekistan dated 31.03.97, #165), supplement with words “Regulation on order of prices (tariffs) formation on goods (works, services) of subjects of natural monopolies.
4. Declare void decision of the State of the Republic of Uzbekistan according to annex 2.
5. To the ministries and departments to bring departmental normative certificates in accordance with present Resolution within one month period.
6. Control over implementation of present Resolution shall be assigned on Deputy Prime Minister of the Republic of Uzbekistan Azimov R.S.

Chairman of the Cabinet of Ministers
Karimov I.

Annex 1
To the Resolution of the Cabinet of Ministers
Dated 21.09.03, #364

Regulation

On order of prices (tariffs) formation on goods (works, services) of subjects of natural monopolies.

I. General provisions

1. Present Regulation is elaborated in accordance with the Clause 7 of the Law of the Republic of Uzbekistan “On natural monopolies” and shall establish the order of prices (tariffs) formation or their frontier levels on goods (works, services), produced and sold by subjects of natural monopolies (hereinafter referred as goods).
2. Prices (tariffs) or their frontier levels on goods, produced and sold by subjects of natural monopolies (except tariffs on universal mail services and telecommunications) shall be approved by the Ministry of Finance of the Republic of Uzbekistan or on its assignment by the Ministry of Finance of the Republic of Karakalpakstan, financial departments of districts and Tashkent city (hereinafter referred as body of price regulation)
Tariffs on universal mail services and telecommunications shall be established by specially authorized body in the sphere of mail services and telecommunications on adjustment with the Ministry of Finance of the Republic of Uzbekistan.

II. The order of formation, consideration and approval of prices (tariffs)

3. Subjects of natural monopolies that are not in the composition of state or economical administration bodies, submit drafts of prices (tariffs) for consideration directly to the body of price regulation.

In cases when subjects of natural monopoly is in the composition of state or economical administration bodies, drafts of prices (tariffs) or their frontier levels on goods, sold by subject of natural monopoly, are submitted for consideration to the body of price regulation by bodies of state or economical administration.

4. For prices (tariffs) formation or their frontier levels on goods, subjects of natural monopolies shall turn to the body of price regulation with application and enclosing the following documents:
 - a) Draft of prices (tariffs) or their frontier levels;
 - b) Verification to the draft of prices (tariffs) or their frontier levels that include the following indexes for the last reporting period and period under prognosis;
 - Cost of production (sale) of goods;
 - Interpretation of salary;
 - Interpretation of raw material and stocks cost;
 - Interpretation of operating costs (additional charges, including allocation for depreciation);
 - Interpretation on gross profit, expenses of the period (including taxes and other binding payments);
 - Requirement in investments that are needed for reproduction;
 - Requirements in state subsidies and other measures of state support.

In case of need, body of price regulation shall have the right to request other information that is necessary for making the decision.

5. By determination of production expenses, subjects of natural monopoly shall obey the Regulation on composition of production expanses and products (works, services) sale and on order of financial results formation, approved by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 5.10.99, #54 and appropriate departmental normative methodical documents of the Ministry of Finance of the Republic of Uzbekistan.
6. Body of price regulation shall make the decision within one month period since the day of receiving all necessary documents for consideration of the drafts of prices (tariffs) or their frontier levels.
7. In cases of submission of documentation on price verification in not full scale or with not verified financial calculations by subjects of natural monopolies, body of price regulation within three weeks period returns draft of prices (tariffs) for rework with verification in written form.

Decision on approval of prices (tariffs) in such cases is made within five days period since the day of receiving of full block of reworked documents.

On making the decision on prices (tariffs) level the body of tariff regulation considers their effect on prices of consumer products.

8. Decision of the body of price regulation on approval of prices (tariffs) or their frontier levels on goods, produced and sold by subjects of natural monopolies, shall be obligatory published in mass media not later than 15 days before their coming into effect.
9. By determination of frontier levels of prices (tariffs) on goods that are produced and sold by subjects of natural monopolies, the subjects of natural monopolies shall have the right singly reduce their level with following informing of the body of price regulation.
10. Subjects of natural monopoly that implement supply of goods outside of the republic, settlement of supplies is accomplished on contract (free) prices.

III. State control over formation and appliance of prices (tariffs).

11. State control over observance of the present Regulation is implemented by the State Committee of the Republic of Uzbekistan on demonopolization and development of competition and its subdivisions (hereinafter referred as State Antimonopoly Committee).
12. For control implementation State Antimonopoly Committee shall have the right to request from the bodies of state and economical administration or subjects of natural monopoly materials on verification of established prices (tariffs) or their frontier levels.
13. In cases of reveal that the charge for the goods is higher than the price established by the body on price regulation, state antimonopoly body on the basis of held inspections, makes decision on levy of unfoundedly received income (profit) to the Fund of price regulations of the Ministry of Finance of the Republic of Uzbekistan.
Unfoundedly received income (profit) shall be defined as difference between applied and established price (tariff) multiplied on the volume of sold goods for the period of inspection.
14. By reveal the facts of not compliance by subjects of natural monopolies terms of new prices (tariffs) or their frontier levels commissioning, unfoundedly received income is determined as a difference between newly issued and earlier effective prices (tariffs) multiplied on the amount of goods sold for the period of abridgment days against envisaged by the Legislation.
15. Means (income, profit) received by subjects of natural monopolies as a result of violation of the Regulation on order of prices (tariffs) formation on goods (works, services) of subjects of natural monopolies, penalty fined for violation of pointed Regulation at a rate of 100% of not legally received means shall be withdrawn on special off-budget account of the Fund of price regulation of the Ministry of Finance of the Republic of Uzbekistan.

IV. Responsibility of subjects of natural monopolies for violation of Legislation.

16. For violation of the legislation "On natural monopolies" to the subjects of natural monopolies sanction in accordance with the Law of the Republic of Uzbekistan "On competition and limitations of monopoly activity on commodity markets" shall be applied.


Annex 2
To the Resolution of the Cabinet of Ministers
Dated 21.09.03, #364

List of void documents of the Government of the Republic of Uzbekistan.

1. Paragraph 4 of point 2 of the Resolution of the Cabinet of Ministers dated 7.02.94, #54 "On phased transition of public services to self-repayment".
2. Point 1 of the Resolution of the Cabinet of Ministers dated 8.09.94, #453 "On tariffs for electricity supplied to population"
3. Point 2 of the Resolution of the Cabinet of Ministers dated 8.09.94, #454 "On transition to contract (free) prices on coal, natural and liquefied gas supplied to population"
4. Paragraph 1 of point 5 of the resolution of the Cabinet of Ministers dated 2.12.95, #476 "On development of small hydro energy in the Republic of Uzbekistan".
5. Paragraph 3 of point 2, section III of the order for prices (tariffs) formation and control over their appliance approved by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 31.03.97, #165 "On measures of implementation of the Law of the Republic of Uzbekistan "On competition and limitations for monopoly activity on commodity markets".

D 2.3.7.3

Sample of a receipt given to domestic customers

Хабарнома		Тошкент шаҳар ДУК «Сувсов» трест		
Дата: 31.07.2003		Суб рақами 20210000200101489001		
ОҚ : ТАШКЕНТ-17		Уй - жой ажтимоий банки Меҳнат бўлими МФО 00423		
Оқно: 17 №: 8		ИНН 201052713		
ВОДЕКАНАЛ		Шахсий ҳисоб варани <u>306875</u>		
Водоканал		Ф. И. О. <u>АСМАН Р.Б.</u>		
ИМО: 2021000060010100003		Маълумоти <u>ул. Мухитдиқова 10 кв. 43</u>		
P/C: 2021000060010100003				
Пеня : 0.00				
Сумма : 522.72				
Кассир: Гладничева Н.Б.				
кассир 		Тўлов тури	Миясуми	Миқдори
		Начисленк сув	<u>267,36x1</u>	
		Осана сув хизмати		
		<u>07.08.2003г.</u>		<u>522,72с.</u>
		Пеняси		
		ЖАМИ:		