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DETERMINATION OF REASONS OF THE WATER CONTAMINATION ON THE INTAKE IN WOLIN INCLUDING THE RECOVERY MEASURES PREVENTING THE SIMILAR CONTAMINATION

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Abstract

The water intake situated at Rybacka Street in Wolin was established in the beginning of the 20th century. It is situated in the close vicinity of the existing apartment and business buildings and the water and sewage systems as well.
On the fenced parcel ca 50x80 m besides the objects of:

- building of the water-supply station,
- warehouse – workshop building with sanitary facilities,
- household building,
- building of the current generating plant,

are situated the deep-water wells No. 6 and No. 9 now in the operational use. The other deep-water wells being now in the operational use are the well No. 10 situated at Rybacka Street in the distance ~ 90 m from the intake parcel border as well as the well No. 5 situated in the distance ~ 220 m from the parcel border.

Key words: water intake, water-supply station, pumping units, hydrophore tanks, gravellers

GENERAL CHARACTERISTICS OF THE WATER INTAKE

The water-supply station is the standard solution with the hydrophore tanks, iron and manganese removers as well as chlorinators for feeding sodium hypochlorite.
Equipment of the water supply station has the following parameters:

- hydrophore tanks (2×6.3 m^3),
- gravellers, manganese removers and iron removers Ø1.8 m with aerators (4 units),
- compressors WAN-E (2 units),
- main water meter (1 unit),

The water, supplied through the pipelines Ø100 from the wells 5, 6, 9 and 10 is mixed before the hydrophore tanks. Quantities of the water from the particular wells can be dosed through the adjustment of the respective valves on the pipelines.

The wells No. 10, 9, 6, 5 have the following depths:

well No. 10 h = 27.50 m
well No. 9 h = 26.00 m
well No. 6 h = 28.00 m
well No. 5 h = 72.00 m

pumping units G80 and G100 are installed in the wells.
Water consumption amounts to ca 800 m^3/day, with the permission for the maximal outlet of 1 300 m^3/day (2 400 m^3/day). Absence of the equalising tanks is the reason of the periodical water shortages in the hours of the biggest consumption by the inhabitants. It manifests itself in the low pressure of the water in the network and absence of the water on higher floors of the buildings.

TESTING PERFORMED

In the mid October 2003, the water testing performed by the Laboratory of Municipal Hygiene of the District Sanitary – Epidemiological Station in Kamień Pomorski has shown the presence of bacteria of coli group and coli bacteria of faecal type in the water-supply network, water-supply station and thereafter in the deep-water wells No. 10, 9 and 6. By the decision of the District Public Sanitary Inspector in Kamień Pomorski dated 04/11/2003 it was ordered "to perform the continuous, effective disinfection of the water supplied to the municipal pipe network, until the reasons of the contamination having been found and removed". It is characteristic, that it has been contaminated the water in the shallower deep-water wells with the depth up to 26-28 m (No. 6, 9, 10) however the water in the well No. 5, being 72 m deep and situated far from the urban buildings was found as free from any bacteriological contamination.
Actions performed by the user of the water intake and of the water-supply system i.e. by Zakład Gospodarki Komunalnej i Mieszkaniowej, aimed at the effective disinfection of the water supplied to the municipal network resulted in the elimination of the bacteriological contamination. Intense dosing of sodium hypochlorite resulted however in deteriorating the water taste as well as in the water turbidity being the result of freeing the banks in the municipal network, moreover it has been damaged the bed in manganese removers.
In spite of the fact, that the bacteriological contamination of the water in the wells, water supply station and water pipe network has disappeared, the Municipal Laboratory of PSSE in Kamień Pomorski conducted still the regular water testing, the findings of which are attached thereto in the elaborated tables and graphical specifications.
Additionally, the water testing performed by the Laboratory Department of the Municipal Hygiene of WSSE in Szczecin in mid December of 2003 for the presence of chlorine compounds, has shown that the water is fully fit for the human consumption.
It was also performed the testing of a water sample collected from Dziwna River in Wolin in the area of the water intake, performed by the Expert of West-Pomeranian

Voivode within the scope of the water-law proceedings of Jan Markowski, M.Eng.Sc. the testing results show the chloride contents amounting to 541.5 mg Cl/dm^3.

CHARACTERISTICS OF THE WATER SAMPLE TESTING RESULTS PRESENTED IN THE TABULAR FORM AND IN THE GRAPHICAL WAY

Table 1. Specification of results of the potable water testing in the wells No. 5, 6, 9, 10, includes the data of measurements in the particular wells in days 29/10-03/11/2003. It results from them explicitly, that the water was bacteriologically contaminated in the wells No. 10, 9, 6.

Table 2. Specification of results the potable water testing in the hydrophore station: raw water and treated water, takes into account the data of measurements of days 20/10/2003-06/01/2004, and it results from them, that the raw water on the intake station inlet was bacteriologically contaminated in days 20/10/2003-03/11/2003, and the treated water on the station outlet was bacteriologically contaminated in days 20-30/10/2003.

Table 3. Specification of the potable water testing results for the municipal outlet points covers the data of measurements in days 13/10/2003-16/12/2003. It results from them, that the water in the municipal network was bacteriologically contaminated in days 13-20/10/2003. It should be additionally mentioned that the water supplied to the outlet points is characterised by the exceeded admissible concentrations of manganese, periodically of iron and ammonia.

- **water testing results for the wells No. 5, 6, 9, 10**
- total coli bacteria count in 1ml of water (72h) – fig. No. 1
- total coli bacteria in 1ml of water (24h) – fig. No. 2
- coli group bacteria count in 100 ml of water – fig. No. 3
- faecal type coli group bacteria count – fig. No. 4
- chlorine contents – fig. No. 5
- ammonia contents – fig. No. 6
- manganese contents – fig. No. 7
- **water testing results for the hydrophore station (raw and treated water)**
- total coli bacteria count (72h) – fig. No. 8
- total coli bacteria count (24h) – fig. No. 9
- coli group bacteria count – fig. No. 10
- faecal type coli group bacteria count – fig. No. 11
- ammonia contents – fig. No. 12
- iron contents – fig. No. 13
- manganese contents – fig. No. 14
- **water testing results for the municipal outlet points (Świerczewskiego Stret, ZGKiM)**
- total coli bacteria count (72h) – fig. No. 15
- total coli bacteria count (24h) – fig. No. 16
- ammonia contents – fig. No. 17
- iron contents – fig. No. 18
- manganese contents – fig. No. 19

Tabela 1

Specification of the potable water testing results address: Wolin – hydrophore station

No.	Determination name	Maximal acceptable value	Object												
			Date												
			Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water	Raw Water
			20/10/ 2003	27/10/ 2003	29/10/ 2003	30/10/ 2003	31/10/ 2003	02/11/ 2003	02/11/ 2003	03/11/ 2003	26/11/ 2003	02/12/ 2003	02/12/ 2003	16/12/ 2003	06/01/ 2004
			RESULTS												
1	Total colony creating bacteria count in 1 ml of water (72h) 22°C	100	5	2	48	11	32	12	11	17	13	16	8	7	2
2	Total colony creating bacteria count in 1 ml of water (24h) 37°C	20	1	1	1	1	2	3	1	17	3	3	1	2	1
3	Coli group bacteria count in 100 ml of water	0	28	50	80	122	50	70	80	25	8	1	0	0	0
4	Faecal type Coli group bacteria count in 100 ml of water	0	0	0	56	90	25	60	85	30	3	2	0	0	0
5	Enterococcus count in 100 ml of water	0	0	0	22	0	0	0	0	0	0	0	0	0	0
1	Turbidity	1	3.5	-	-	-	-	7.0	6.6	5.0	5.0	-	-	-	-
2	Reaction	6.5-9.5	7.5	-	-	-	-	7.6	7.6	7.9	7.3	-	-	-	-
3	Alkalinity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Chlorides	250	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Ammonia	0.5	0.70	-	-	-	-	0.72	0.75	0.68	0.58	-	0.60	-	-
6	Nitrites	0.5	0.006	-	-	-	-	0.006	0.006	0.003	0.006	-	-	-	-
7	Nitrates	50	1.33	-	-	-	-	1.33	1.33	1.33	0.44	-	-	-	-
8	Iron	0.20	1.30	-	-	-	-	3.00	2.10	1.70	1.5	-	-	-	-
9	Manganese	0.05	0.23	-	-	-	-	0.23	0.23	0.20	0.25	-	-	-	-
10	Free Chlorine	0.3	-	trace	-	0.03	0.01	trace	trace	0.02	trace	0.02	trace	none	-
Water fitness															

No.	Determination name	Maximal acceptable value	Object												
			Date												
			Pure Water 20/10/ 2003	Pure Water 27/10/ 2003	Pure Water 29/10/ 2003	Pure Water 29/10/ 2003	Pure Water 30/10/ 2003	Pure Water 31/10/ 2003	Pure Water 02/11/ 2003	Pure Water 02/11/ 2003	Pure Wa-ter 03/11/ 2003	Pure Water 12/11/ 2003	Pure Water 26/11/ 2003	Pure Water 02/12/ 2003	Pure Water 16/12/ 2003
			RESULTS												
1	Total colony creating bacteria count in 1 ml of water (72h) 22°C	100	2	4	64	-	22	6	1	1	1	2	2	2	1
2	Total colony creating bacteria count in 1 ml of water (24h) 37°C	20	1	1	1	-	1	2	1	1	1	1	1	1	1
3	Coli group bacteria count in 100 ml of water	0	11	45	75	-	113	0	0	0	0	0	0	0	0
4	Faecal type Coli group bacteria count in 100 ml of water	0	0	0	52	-	95	0	0	0	0	0	0	0	0
5	Enterococcus count in 100 ml of water	0	0	0	42	-	0	0	0	0	0	0	0	0	0
1	Turbidity	1	0.8	-	-	-	-	-	0.5	0.6	0.8	1.0	1.0	-	-
2	Reaction	6.5-9.5	7.4	-	-	-	-	-	7.7	7.6	7.6	7.4	7.4	-	-
3	Alkalinity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Chlorides	250	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Ammonia	0.5	0.28	-	-	-	-	-	0.75	0.66	0.74	0.70	0.51	-	-
6	Nitrites	0.5	0.003	-	-	-	-	-	0.013	0.01	0.013	0.003	0.046	-	-
7	Nitrates	50	2.2	-	-	-	-	-	0.38	1.77	1.33	1.80	0.44	-	-
8	Iron	0.20	0.18	-	-	-	-	-	0.20	0.24	0.26	0.26	0.38	-	-
9	Manganese	0.05	0.15	-	-	-	-	-	0.02	0.05	0.05	0.12	0.15	-	-
10	Free Chlorine	0.3	trace	trace	-	0.5	0.03	0.5	0.3	0.50	0.20	none	0.03	0.02	0.3
Water fitness			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES

Table 2

Specification of the potable water testing results address: Wolin – wells No. 5, 6, 9, 10

No.	Determination name	Maximal acceptable value	Object										
			Date										
			well 10	well 10	well 10	well 9	well 9	well 9	well 6	well 6	well 6	well 5	well 5
			29/10/ 2003	02/11/ 2003	03/11/ 2003	31/10/ 2003	02/11/ 2003	03/11/ 2003	31/10/ 2003	02/11/ 2003	03/11/ 2003	30/10/ 2003	03/11/ 2003
1	Total colony creating bacteria count in 1 ml of water (72h) 22°C	100	73	1	9	>300	-	31	>300	52	16	1	12
2	Total colony creating bacteria count in 1 ml of water (24h) 37°C	20	1	1	2	100	-	5	35	22	11	1	1
3	Coli group bacteria count in 100 ml of water	0	21	0	2	5	-	1	>100	<100	30	0	0
4	Faecal type Coli group bacteria count in 100 ml of water	0	0	0	1	8	-	8	>100	<100	50	0	0
5	Enterococcus count in 100 ml of water	0	55	0	0	0	-	0	0	0	0	0	0
1	Turbidity	1	-	4	8	-	6	5	-	9	9	-	2
2	Reaction	6.5-9.5	-	7.5	7.5	-	7.5	7.6	-	7.5	7.9	-	8.1
3	Alkalinity	-	-	-	410	-	-	31-	-	-	225	-	350
4	Chlorides	250	-	-	154	-	-	360	-	-	275	-	399
5	Ammonia	0.5	-	0.80	0.83	-	0.55	0.54	-	0.55	0.46	-	1.28
6	Nitrites	0.5	-	0.033	0.042	-	0.02	0.006	-	0.02	0.006	-	0.003
7	Nitrates	50	-	4.43	4.00	-	2.21	0.44	-	2.21	1.77	-	NW
8	Iron	0.20	-	3.00	4.00	-	6.4	2.00	-	10.0	5.6	-	0.83
9	Manganese	0.05	-	0.4	0.4	-	0.3	0.4	-	0.3	0.35	-	0.02
10	Free Chlorine	0.3	-	-	-	0.01	-	-	-	-	-	0.01	-

Table 3

Specification of the potable water testing results address: Wolin – municipal outlet points

No.	Determination name	Maximal acceptable value	Object / Date													
			Prosta Street	Zam-kowa Street	Konop-nickiej Street	Zam-kowa Street	Świer-czew-skiego Street	Świer-czew-skiego Street	Świer-czew-skiego Street	Nursery	UMiG	ZGKiM	Nursery	UMiG	ZGKiM	ZGKiM
			13/10/2003	13/10/2003	13/10/2003	20/10/2003	20/10/2003	27/10/2003	29/10/2003	30/10/2003	30/10/2003	30/10/2003	31/10/2003	31/10/2003	31/10/2003	02/11/2003
1	Total colony creating bacteria count in 1 ml of water (72h) 22°C	100	-	-	-	4	6	10	5	1	1	1	2	3	2	2
2	Total colony creating bacteria count in 1 ml of water (24h) 37°C	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Coli group bacteria count in 100 ml of water	0	8	17	10	4	6	0	0	0	0	0	0	0	0	0
4	Faecal type Coli group bacteria count in 100 ml of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Enterococcus count in 100 ml of water	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0
1	Turbidity	1	0.8	0.8	0.5	0.3	0.2	-	-	-	-	-	-	-	-	-
2	Reaction	6.5-9.5	7.5	7.4	7.4	7.6	7.5	-	-	-	-	-	-	-	-	-
3	Alkalinity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Chlorides	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Ammonia	0.5	0.56	0.83	0.61	0.09	0.57	-	-	-	-	-	-	-	-	-
6	Nitrites	0.5	0.01	0.02	0.016	0.01	0.003	-	-	-	-	-	-	-	-	-
7	Nitrates	50	0.88	0.88	0.44	2.6	1.33	-	-	-	-	-	-	-	-	-
8	Iron	0.20	0.17	0.18	0.10	0.06	0.05	-	-	-	-	-	-	-	-	-
9	Manganese	0.05	0.12	0.07	0.10	0.12	0.10	-	-	-	-	-	-	-	-	-
10	Free Chlorine	0.3	-	-	-	trace	trace	trace	-	0.5	0.5	0.01	-	0.10	0.01	trace
	Water fitness		NO	NO	NO	NO	NO	YES	YES	NO	NO	YES	YES	YES	YES	YES

No.	Determination name	Maximal acceptable value	Object													
			Date													
			Zam-kowa Street	Nur-sery	ZGKiM	UMiG	ZGKiM	Nur-sery	UMiG	UMiG	ZGKiM	Nur-sery	ZGKiM	ZGKiM	UMiG	Nur-sery
			02/11/ 2003	03/11/ 2003	03/11/ 2003	03/11/ 2003	12/11/ 2003	12/11/ 2003	12/11/ 2003	26/11/ 2003	26/11/ 2003	26/11/ 2003	02/12/ 2003	16/12/ 2003	16/12/ 2003	
1	Total colony creating bacteria count in 1 ml of water (72h) 22°C	100	1	1	11	1	5	3	6	1	1	1	9	2	2	2
2	Total colony creating bacteria count in 1 ml of water (24h) 37°C	20	1	1	1	1	1	1	1	1	1	1	2	2	1	2
3	Coli group bacteria count in 100 ml of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Faecal type Coli group bacteria count in 100 ml of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Enterococcus count in 100 ml of water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Turbidity	1	0.4	-	-	-	1.5	1.5	1.8	1.0	0.6	1.0	-	-	-	-
2	Reaction	6.5-9.5	7.5	-	-	-	7.5	7.4	7.5	7.5	7.5	7.3	-	-	-	-
3	Alkalinity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Chlorides	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Ammonia	0.5	0.77	-	-	-	0.70	0.96	0.70	0.51	0.36	0.46	-	-	-	-
6	Nitrites	0.5	0.006	-	-	-	0.091	0.013	0.02	0.082	0.164	0.098	-	-	-	-
7	Nitrates	50	0.44	-	-	-	0.44	0.44	0.88	0.44	0.44	0.44	-	-	-	-
8	Iron	0.20	0.20	-	-	-	0.35	0.37	0.65	0.33	0.06	0.25	-	-	-	-
9	Manganese	0.05	0.15	-	-	-	0.19	0.09	0.15	0.12	0.10	0.16	-	-	-	-
10	Free Chlorine	0.3	0.15	0.01	trace	0.01	none	none	none	trace	trace	trace	0.02	0.05	0.10	0.10
Water fitness			NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES

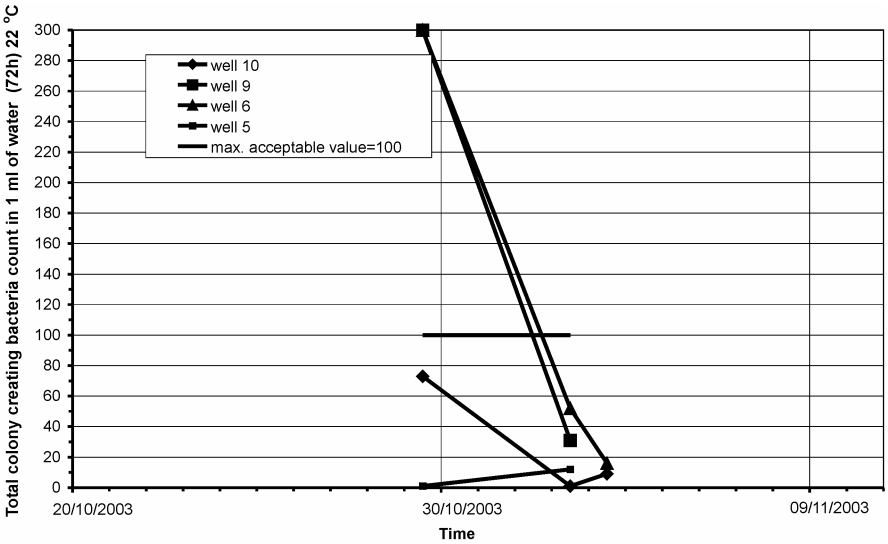

Fig. 1. Water testing results in wells 5, 6, 9, 10

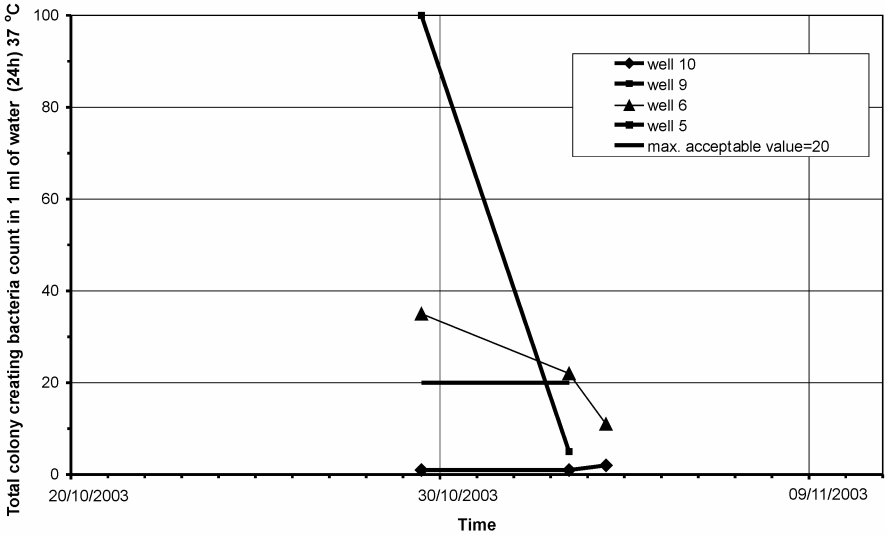

Fig. 2. Water testing results in wells 5, 6, 9, 10

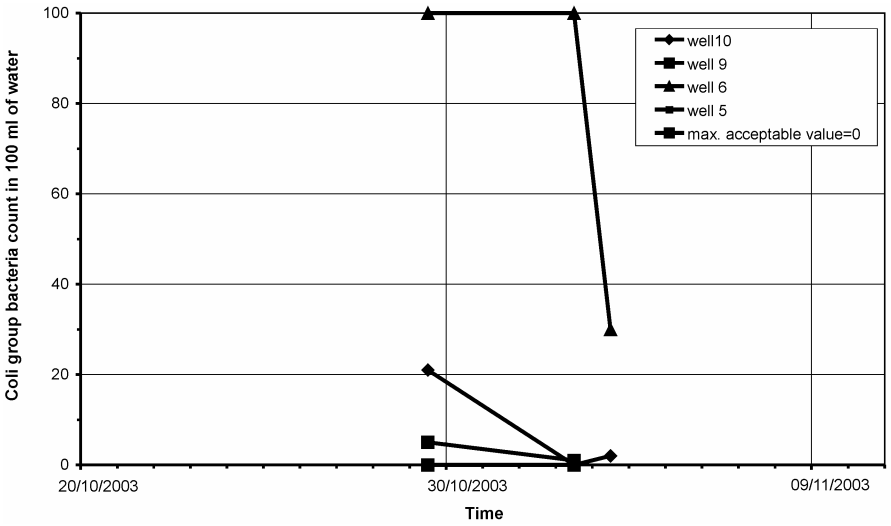

Fig. 3. Water testing results in wells 5, 6, 9, 10

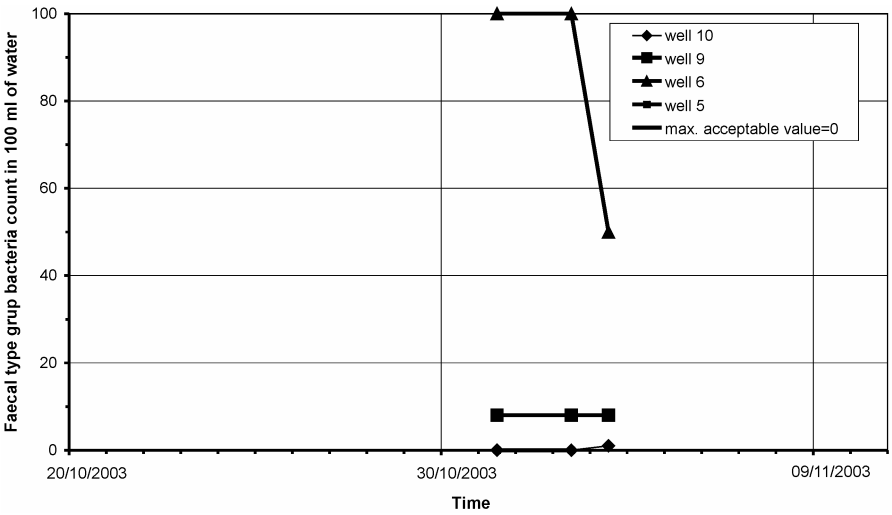

Fig. 4. Water testing results in wells 5, 6, 9, 10

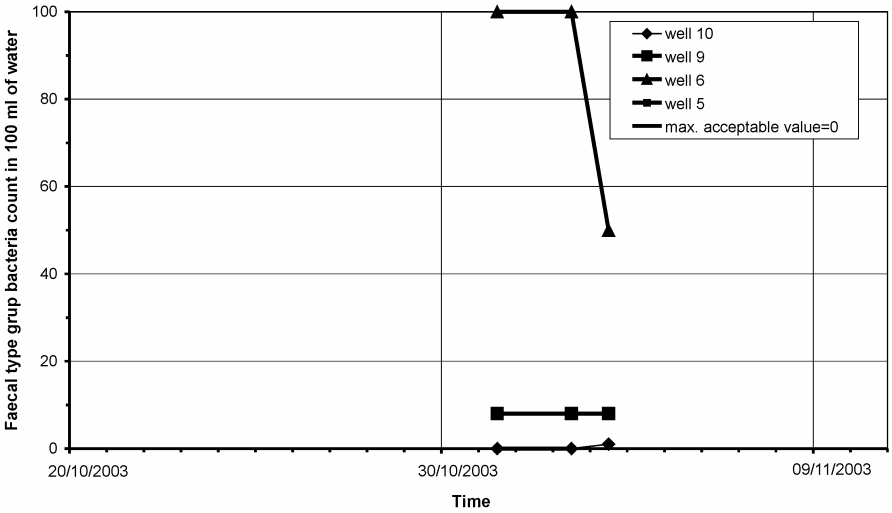

Fig. 5. Water testing results in wells 5, 6, 9, 10

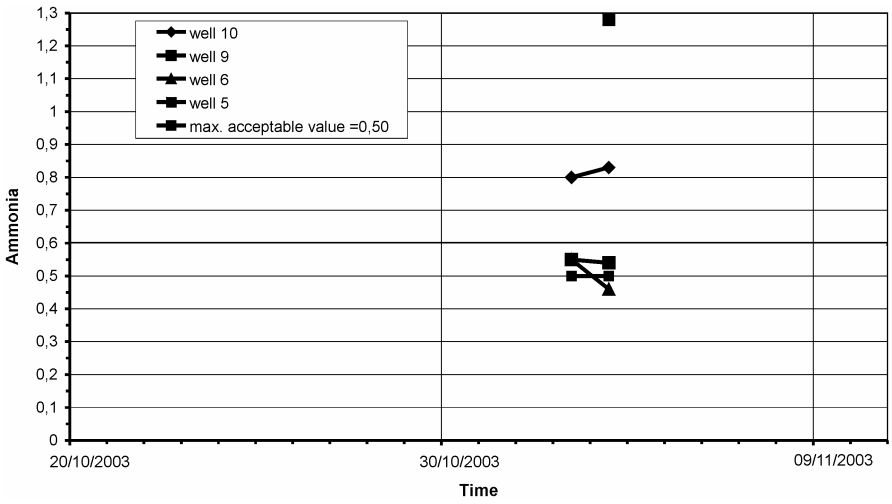

Fig. 6. Water testing results in wells 5, 6, 9, 10

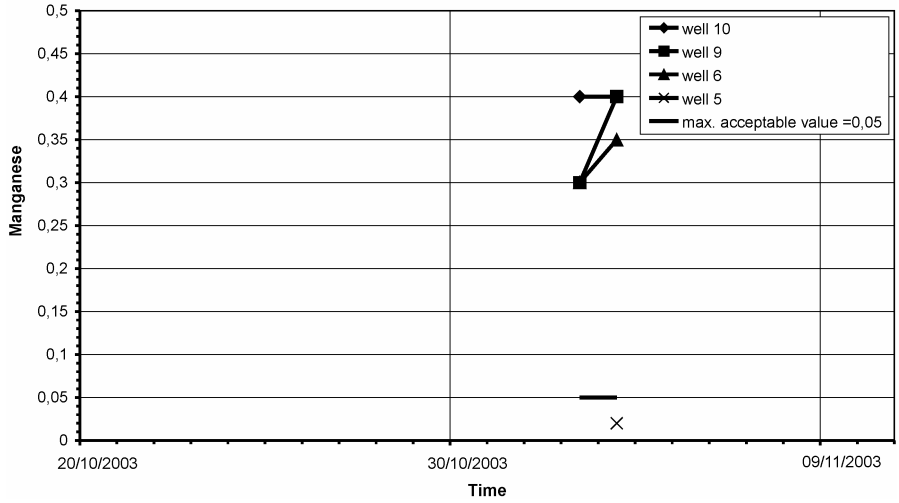

Fig. 7. Water testing results in wells 5, 6, 9, 10

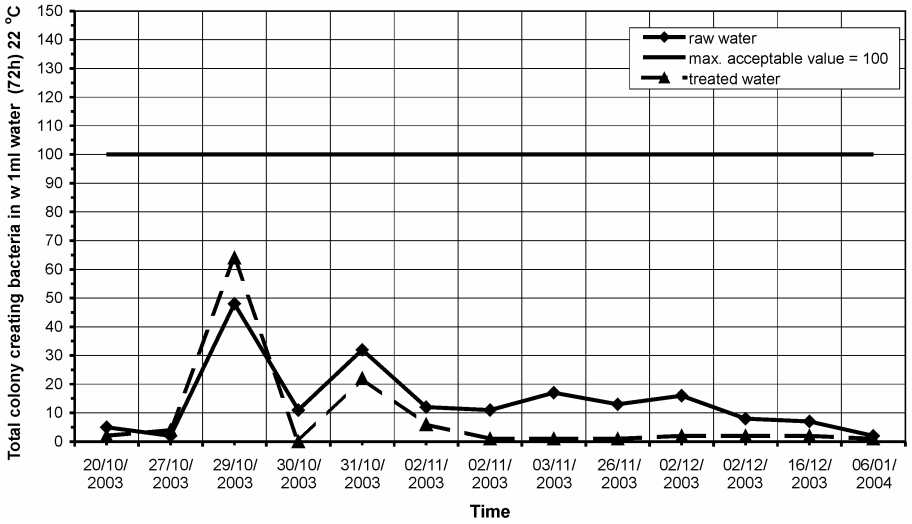

Fig. 8. Water testing results in hydrophore station (raw and treated water)

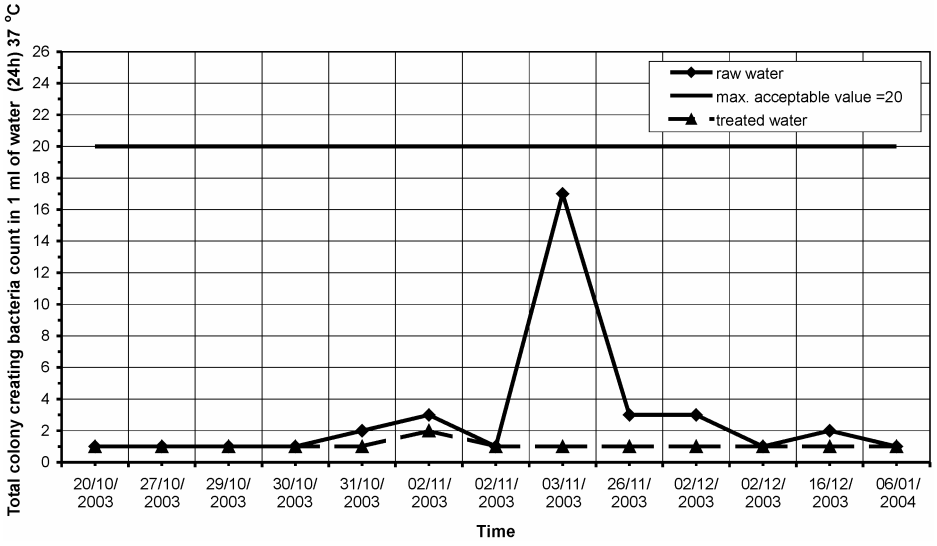

Fig. 9. Water testing results in hydrophore station (raw and treated water)

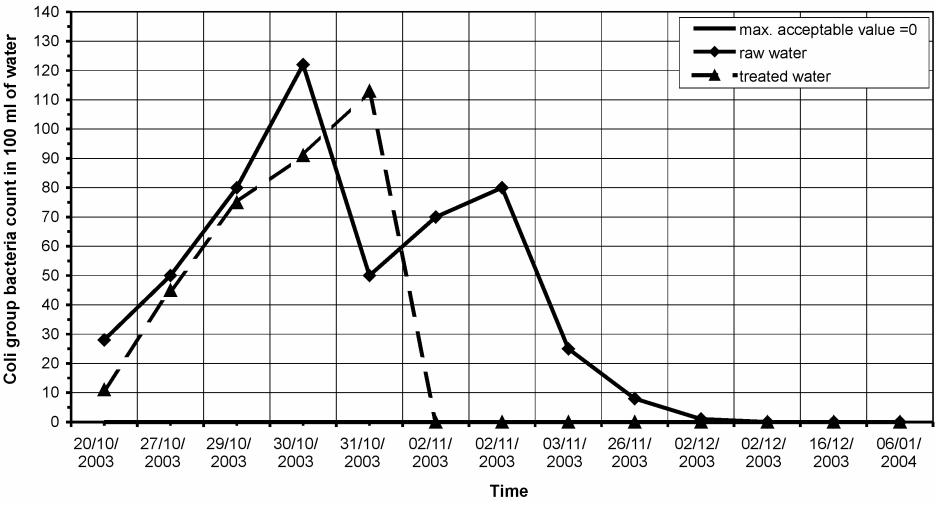

Fig. 10. Water testing results in hydrophore station (raw and treated water)

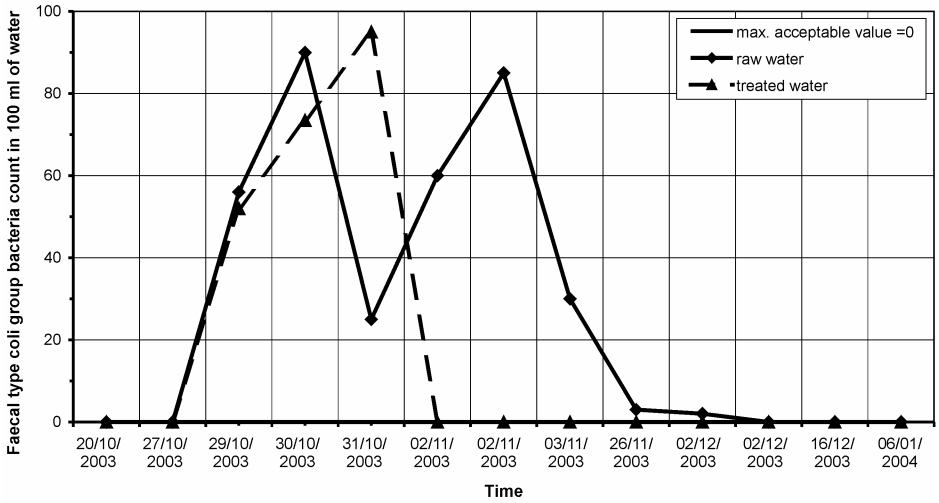

Fig. 11. Water testing results in hydrophore station (raw and treated water)

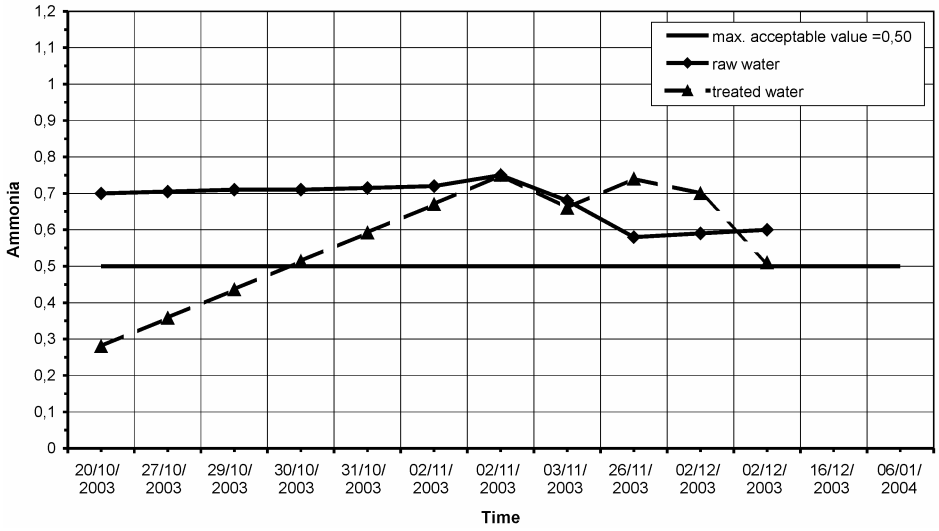

Fig. 12. Water testing results in hydrophore station (raw and treated water)

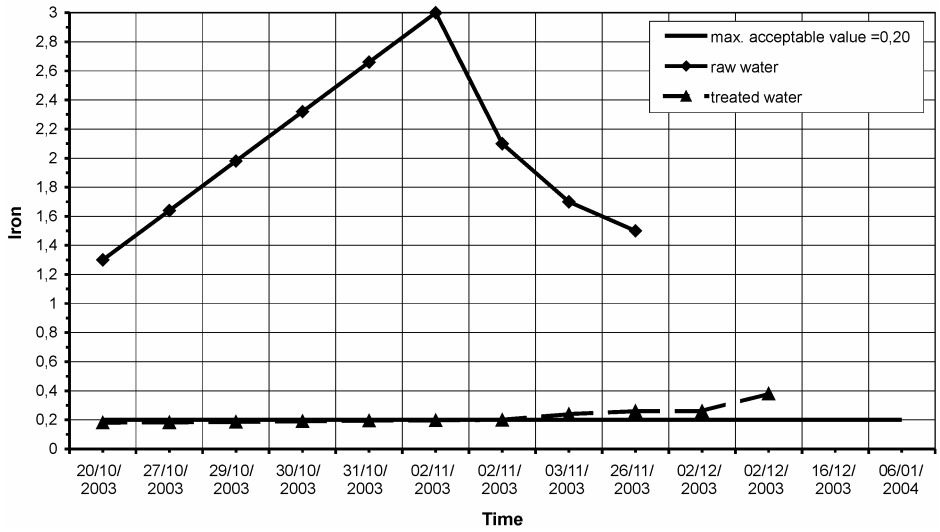

Fig. 13. Water testing results in hydrophore station (raw and treated water)

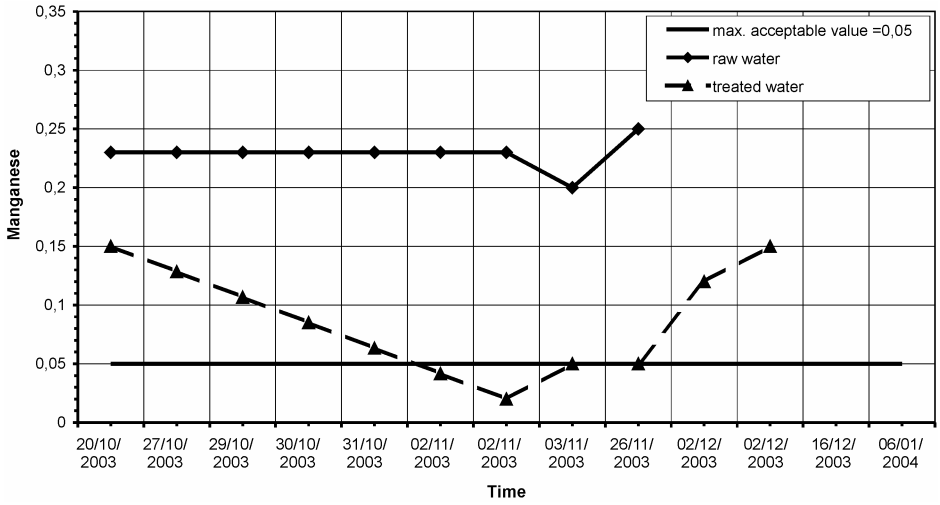

Fig. 14. Water testing results in hydrophore station (raw and treated water)

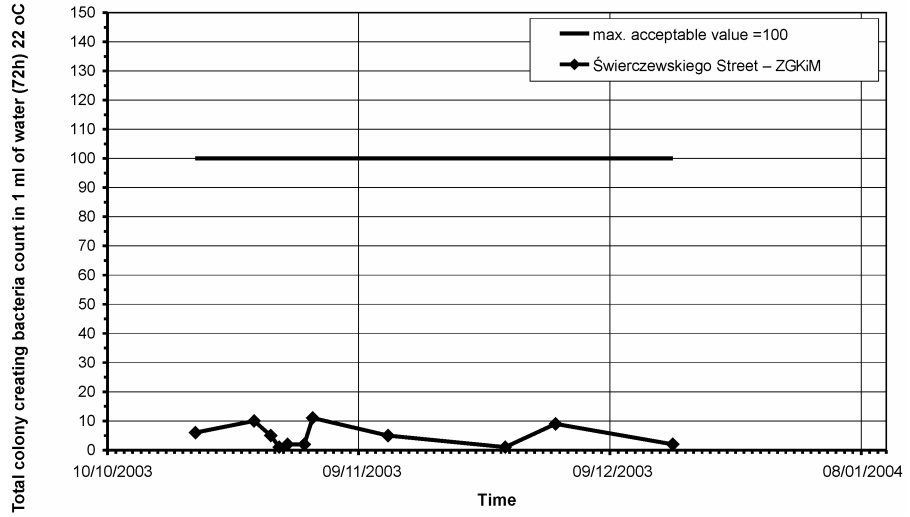

Fig. 15. Water testing results in the municipal outlet points (Świerczewskiego Street – ZGKiM)

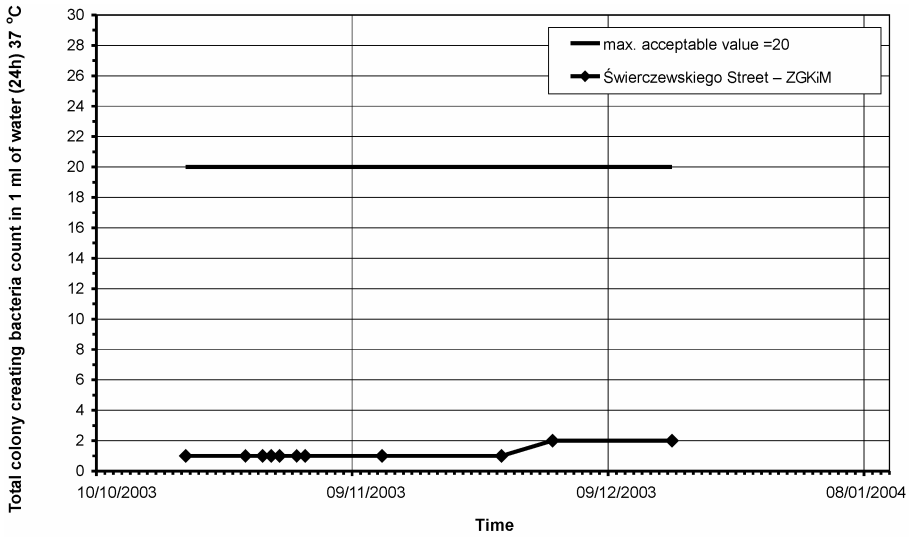

Fig. 16. Water testing results in the municipal outlet points (Świerczewskiego Street – ZGKiM)

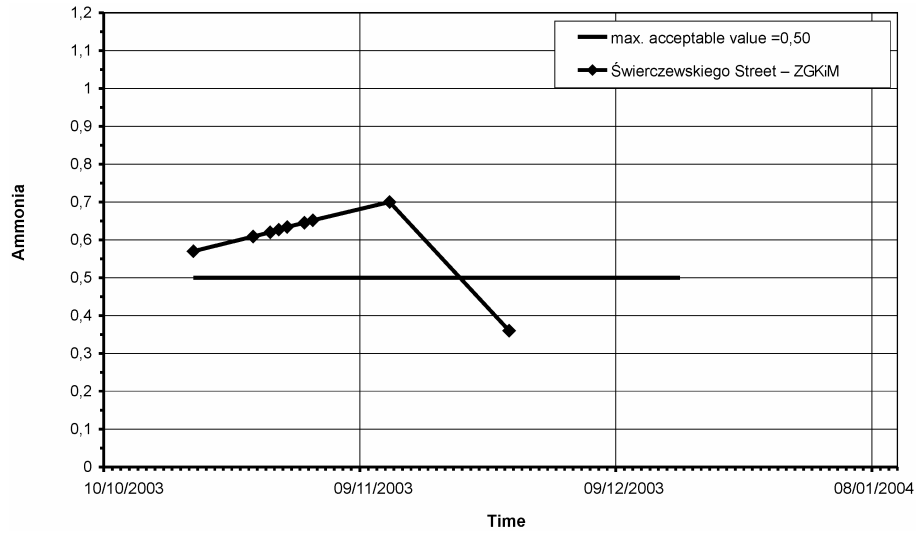

Fig. 17. Water testing results in the municipal outlet points (Świerczewskiego Street – ZGKiM)

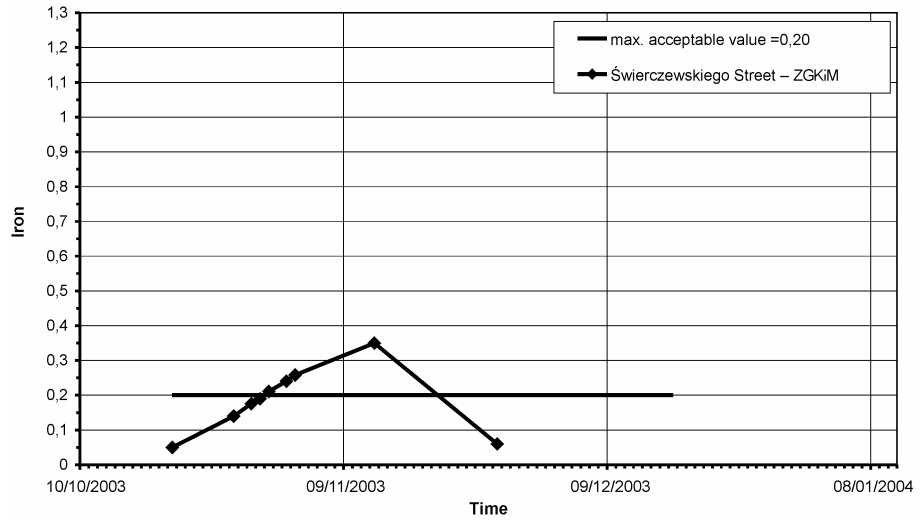

Fig. 18. Water testing results in the municipal outlet points (Świerczewskiego Street – ZGKiM)

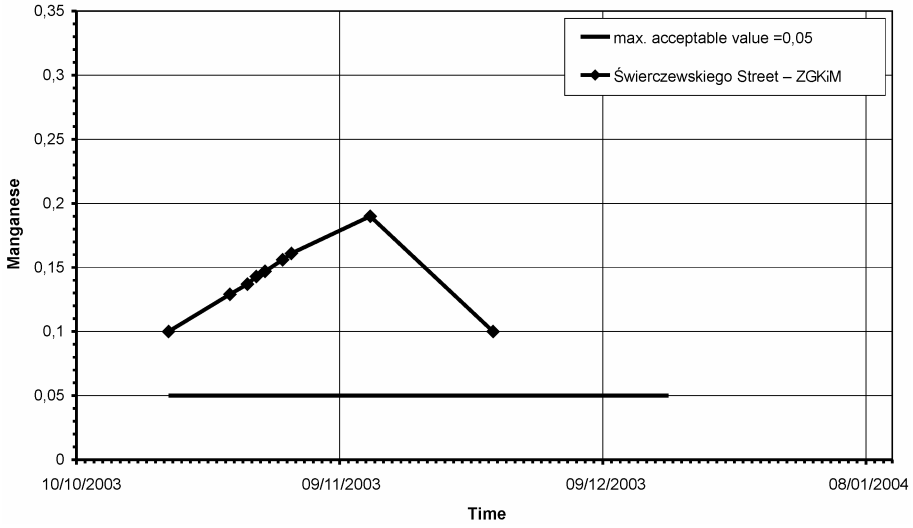

Fig. 19. Water testing results in the municipal outlet points (Świerczewskiego Street – ZGKiM)

Table 4

Extreme chloride concentrations in years 1993-2003

Year	Concentration in mg Cl / I		
	minimal value	average value	maximal value
1993	1 160	2 217	3 600
1994	120	1 831	4 050
1995	460	1 796	3 680
1996	170	1 701	3 950
1997	81	1 772	4 122
1998	332	1 187	3 168
1999	95	983	4 049
2000	385	1 638	4 393
2001	265	1 249	3 218
2002	127	1 253	3 290
2003	504	1 653	3 492

Table 5

Dziwna River 1.2 km before its estuary to the sea – bridge in Dziwnów

Date	Electrolytic conductivity	Sulphates	Chlorides	Faecal type Coli titre
	µ S/cm	mg SO_4/l	mg Cl/I	ml/bacteria
13/01/2003	5 640	348.0	1 625.0	2.50
10/02/2003	2 170	143.0	504.0	3.00
10/03/2003	4 720	236.0	1 406.0	3.00
07/04/2003	11 130	497.0	3 492.0	3.00
05/05/2003	4 780	252.0	1 384.0	3.00
02/06/2003	4 500	223.0	1 279.0	1.10
14/07/2003	4 060	194.0	1 072.0	2.50
11/08/2003	6 010	335.0	1 768.0	1.10
08/09/2003	5 680	336.0	1 592.0	2.50
06/10/2003	8 820	403.0	2 640.0	2.50
03/11/2003	6 150	355.0	1 805.0	1.10
01/12/2003	4 720	265.0	1 270.0	3.00
12/01/2004	6 730	408.0	2 179.0	3.00

CONCLUSIONS

Basing on the thorough analysis of the above-presented materials it has been found that the reason of the water contamination on the water intake in Wolin with coli bacteria as well as faecal type coli bacteria can be the following reasons:

- failure to comply with and to observe the conditions for the land development of the protection zones of the water intake objects
- improper localisation of the water intake objects in the close vicinity of the housing and business buildings
- leaky sanitary sewage system in the close vicinity or nearby the water intake objects
- leaky sanitary sewage tanks without outflows (septic tanks) that were not liquidated
- construction of elements of the deep piling within the frames of the quay repair. Piles 13 metres deep were founded in the layer being in the direct contact with the aquiferous deposit of the deep-water wells No. 6, 9, 10. It made it possible the temporary penetration of the contaminated waters of Dziwna River to the aquiferous layer through the bore-holes in the previously “relatively tight” river bed.

RECOMMENDATIONS

Thorough analysis and realisation with the participation of the Municipal Office of all requirements contained in the Decision of the Provincial Office in Szczecin, Ref. No. of files OSB-8/6226/3/95 dated 28/03/1995 regarding the intake protection zones.

Because there is no impermeable layer in the geological profile, it is impossible to avoid the contamination of the aquiferous layer by the polluted surface waters. The only reasonable solution for the future would be the change of the water intake objects localisation.

It should be performed the inspection of the existing sanitary sewage system and rainwater drainage system in the particular protection zones using the sewage camera.

Possible leakages should be repaired; the inspection should be carried out regularly (periodically).

It should be verified the existence of the connections to the sanitary sewage system and rainwater drainage system in the areas, where existed the septic tanks (they can be leaky). It should be eliminated the possible wastewater flow through those tanks to sewers.

To summarise, the above recommendations should be considered in two aspects:

- in the near future, to liquidate the problems with the supply to the Wolin population of the necessary quantity of the potable water, it should be constructed the water tanks with the capacity amounting to the daily outlet ca 800 m^3 as well as the pumping station II°.
  Particularly important is to keep the full serviceability of the water disinfection equipment for the case of appearance of one of the potential threats.
  It should be implemented new water disinfection technologies, e.g. using chlorine dioxide;
- to sanify the situation fully, i.e. to eliminate totally the threats specified above, it should be constructed a complex of the water intake objects out of the city borders, taking into account the possibility to supply other agglomerations of Wolin Island from the same water intake.

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USTALENIE PRZYCZYN SKAŻENIA WODY NA UJĘCIU W WOLINIE WRAZ Z PODANIEM ŚRODKÓW ZARADCZYCH ZAPOBIEGAJĄCYCH PODOBNEMU SKAŻENIU

Streszczenie

Zasadniczym czynnikiem, który był powodem zanieczyszczenia wody na ujęciu w Wolinie było skażenie warstwy wodonośnej prowadzonymi w roku 2003 robotami hydrotechnicznymi na nabrzeżu Dziwnej.

Biorąc pod uwagę fakt ustania przyczyny skażenia ujęcia, potwierdzony uzyskiwanymi badaniami wody surowej uważamy, że dalsze stałe prowadzenie dezynfekcji wody jest bezzasadne.

Zakładając, że zjawisko skażenia warstwy wodonośnej może w przyszłości wystąpić (powtórzyć się), uważamy za zasadne ciągłe monitorowanie jakości wody ujmowanej (surowej).