

Ground water pollution in Mitrovica and surroundings

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Abstract:

Due to its large use, water is considered as the most important resource in XXI century, and sometimes this century is called as century of water.

In order to protect the water quality and to promote the rational use of water, United Nations declared the 22nd of March as World water day (the resolution A/RES/47/1993), whilst the period 2005 – 2015 is declared as Second International Decade of water.

In normal living conditions a man needs 1-2.5 l of drinking water per day, whereas the daily expenses in developed countries are much bigger (up to 1500 l per day).

Regions (countries) with less than 1700 m³ water per capita per year are considered as countries in water deficit. The drinking water quantity in Kosova is approximately 1600 m³ per person per year, and consequently Kosova belong to the range of poor drinking water countries in Europe and wider.

The surface water quality in Kosova is not satisfying, whereas in Mitrovica region the state is concerned. By rapid industrial development, concentration of population in urban areas, inadequate treatment of waste waters and their discharge in water flows (rivers), the quality of surface and ground waters in Mitrovica area is decreasing.

In the best way, it can be explained by comparison of water quality in valleys (where untreated waste water is discharged) and the quality of water in river resources points, where the water quality is good. The topic of this paper we will be the state of surface waters in two main rivers of Mitrovica: Ibri and Sitnica.

Key Words: Surface water, pollution, Mitrovicë, River

Introduction

Mitrovica is based on north of Kosovo region. This part of Kosovo is known as the main part on natural resources (raw material industry), and also the most polluted city not just in Kosovo, but also in Europe.

pollution of the Mitrovica region is due to the usage of the natural resource wealth (it is supposed that almost half of the natural resources in Kosovo 49.7% is concentrated in Mitrovica region¹), intensive development in metal-stone with color, chemical industry, and above all, this may be due to the wrong location of the industry and the technical equipment that have been used for so many year in this company. A big number of the filthy objects in a relatively small area, high level of exploitation, terrain, non adequate urban development, etc, which overall all the above has been transported or transferred in a high level of the pollution in this part of Kosovo by affecting the life of the population living in Mitrovica and surroundings.²

Ground water in Mitrovica and its surroundings

The main rivers in Mitrovica are; Ibri, Sitnica, Lushta, the Trepca. Most of the pollution of the rivers is because it passes through the urban areas, which at the same time is the centre of the industry, and moreover, the water that comes from the industry and the water that it has been used for home purposes is been thrown in the rivers without any treatment.

Water that comes from Iber, before enters Mitrovica it is classified as s second class, once the river Iber has exited Mitrovica, which it has accepted water from the rivers Sitnica and Lushte, also it has accepted or joint with these rivers, having in mind the water that has been used by the population of the Mitrovica citizens, this river is classified as a class four in regards to the pollution.

¹ Prostorni plan opštine K.Mitrovice, Knjiga1, Zavod za urbanizam Vojvodine, Novi Sad 1993, fq 3.

² Dragan N., Degradicija zivotne sredine u SAP Kosovo. Collection work from the congress XIII of the geography of the RSFJ, Geographic community of Kosovo , Pristina 1991.,page 379

Table 1. The quality of the rivers in Mitrovica³

	Category before the urban zone	Category after the urban zone
Ibri	II	IV
Sitnica	III	IV

Sitnica river, till it entered the village Vragoli it is classified as a class three in regards to the pollution, however, after it has accepted water from Prishtevka and water from the industry of the “Electroekonomise” in Kastriot (Obiliq), this river becomes as a class four.⁴ Two of the main attractions in relation to the rivers in Mitrovica with the region are made from the rivers Iber and Sitnica.

Table 2. The filthiness that these rivers in Mitrovica with the region contain (mg/l)⁵

River	PH	O ₂ wasted	COD	BOD ₅	NO ₂	NO ₃	NH ₄	P	Pb	Cu	Cd	Zn
Sitnica	5,10	4,07	6,88	9,84	0,17	5,50	3,12	3,2	0,5	0,19	0,025	2,4
	8,72	5,58	70,40	20,7	14,2	38,3	17,50	7,85	8,0	1,90	0,20	9,2
Ibri	7,10	4,31	4,76	8,29	0,16	2,0	0,75	7,5	0,29	0,19	0,019	1,1
	8,80	6,48	58,6	13,79	12,5	31,5	3,13	8,2	1,66	2,9	0,20	4,6

Ibri. – Throughout the process that the rivers pass through Mitrovica, and has joined Sitnica, and the water that it has been used by the borough citizens, this river is classified one of most polluted rivers in Europe.

From the industrial objects of “Trepca” corporation, used water goes directly on Iber, which contains; leaden, zinc, and cadmium while having in mind that these are the main elements of pollution that it goes into the river.

Results that controls the polluted water, that it comes from the “Kombinat” corporation “Trepca”, which they are thrown on Iber in a period from January 1996 till April 1997, have proved that contamination of many elements, it overtakes maximum level that it is permitted. Therefore, elements that have contaminated this river are such as; from metallurgy leaden, throwing water which contain very high level of KMnO₄ in other words 1.3 times, zinc 1.5 over the maximum level that it is permitted ; from the industrial chemical departments; phosphate SO₄ one time over the permitted level, cadmium for 147 times more that it is permitted which it comes from the main collector, and zinc 9.3 times over the permitted level, also cuprum 1.5 and cadmium for 129 times which it stays in the water from the chemical that are released from this industry, specially form the part of the industry where the development of the accumulators takes part; zinc 4.4 times and cadmium for 18 times over the permitted level.⁶ Late results (after the war in 1999) show that, due to the non functioning of this industry, the level of the filthiness has dropped by one level, but still the level of the pollution is high, especially when the river joins with Sitnica.

Table 3. The main filthiness that contains in the river Iber – Kelmend (Lipe) 2003-2005⁷

	Ph	O ₂ wasted	COD	BOD ₅	NO ₂	NO ₃	NH ₄	Saturat. O ₂
2003	8.09	5.21-III	20.9-IV	8.67-III	0.50-III	5.81-II	3.26-IV	58.5-IV
2004	7.79	8.7-I	48.6-V	11.6-IV	0.26-II	6.65-II	2.20-IV	83.8-III
2005	7.88	9.89-I	30.1-V	4.19-II	0.39-III	8.42-II	4.22-IV	97.9-II

During the period of March-September 2004, not just in Kelmend, analysis of the river Iber have been done also in Mitrovica and in Koshtove (6 km before entry in to the city).

³ Report on the ambient in Kosovo

⁴ Base mirror of the Hydro-economics of KSA of Kosovo, Institute for Hydro-economics “Jaroslav Cerni” Belgrade 1983, p. 47.

⁵ Korca B., Jusufi S., Shehdula M., Bacaj M., Collection of paper based on the filthiness of the Kosoven rivers. Science Conference, development of technical-technology, Pristina 2002, page 199.

⁶ Marko Knezevic, Ranko Simonovic, Ekoloski problemi Kosovske Mitrovice, Fizico-geografiski procesi na Kosovu-III, Naucnoistrasivacki projekat, Prishtine 1998, fq.55-81.

⁷ The above table is taken from the Hydrometeorology Institute of Kosovo.

Table 4. The main filthiness that contains in the river Iber – Mitrovica and Koshtove, March-September 2004 and 2005⁸

	Ph	O ₂ wasted	COD	BOD ₅	NO ₂	NO ₃	NH ₄	Satur. O
Mitrovica	8.21	9.57-I	15.6-III	3.10-II	0.15-II	2.4-I	2.96-IV	85.5-II
2004-2005	8.0	13-I	30.6-V	8.4-III	0.15-II	2.3-I	4.2-IV	135-I
Koshtove	8.16	7.02-I	18.8-III	2.6-I	0.08-I	3.8-I	1.27-III	66.2-II
2004-2005	8.2	12.6-I	14.2-III	1.3-I	0.09-I	1.5-I	2-III	124-I

If we compare the above analysis of the river Iber before and after they join with Sitnica, the point we can see how worse it gets, and how badly increases the level of filthiness once Iber has joined Sitnica. By continuing with the filthiness of the river Iber, not just from joining Sitnica, but also water that it has been used by the industry nearby, and the rubbish that it has been thrown on the bridge of the river, and once it rains the rubbish is pulled in the river which it increases the contamination of the water. In a distance of 3.5 km the bridges of the river Iber and Sitnica are disposed roughly 33 millions tone of rubbish of every kind, with a very high level of contamination, and having in mind that this rubbish contains elements of metal and non-metal germs, which all together can have a very highly effect Kosovo, as a human living in this region, including other non human living thing.

Sitnica - This River has the highest level of pollution, it is categorized as level four. This river while passes through out of Kosovo, it is been used by most of the industries in the region as a place of throwing their used water, which it has been used for production process, contaminated, and thrown in Sitnica river.

Before the war in Kosovo 1999, the main factor of pollution of this river used to be the production company in Ferizaj, which used to produce oil, also the production of Paper Company in Lipjan, Metal production in Janjeva, Mining of Magnezit "Golesh" in Magure, Textile and Milking production in Fush Kosova, industrial objects in Vushtrri etc. The highest level of the contamination in this river are; power plant, Cobble treatment, guano factory, textile production company in Kastriot, and also chemical industry, zinc electrolysis, artificial production garbage, production company of accumulators in Mitrovica etc. Above all, this industrial development that contributes on the pollution of Sitnica River, most of the boroughs the wastage it is thrown or dumped in this river, sadly enough this contributes quite a lot to the pollution of this river. At the water gathering location of Iber and Sitnica, there are above 40% of the population of Kosovo living in this region. Having a non-adequate location of wastage in the boroughs, it does contribute up to the highest degree of contamination. Therefore, till 1990's, most of the wastage from the borough was thrown next to the river, whereas in Mitrovica there are many deposit of industrial left over active and passive, which they are; the deposit chemical industrial (fosfogips), zinc-passive metallurgical and also the deposits of metal-rock of zinc which is even now days active.

Analyses of biochemical for the water have been gathered since 1965, but they are not in order or correct. The other problem is that the samples have not been taken on the specified places (stations).⁹

Throughout Sitnica, from Ferizaj till it joins Iber in Mitrovica, on this river are thrown approximately 100 million m³ industrial water per year, from which 83% of this polluted water are thrown form "Elektroekonomis" of Kastriot and from "Trepca" in Mitrovica without being processed or sterilized.

Table 5. The main filthiness that contains in the river Sitnica – Mitrovica 2003-2005¹⁰

	Ph	O ₂ wasted	COD	BOD ₅	NO ₂	NO ₃	NH ₄	Satur. O
2003	8.04	8.33-I	16.65-III	9.21-IV	0.95-IV	9.65-II	3.80-IV	42.46-IV
2004	7.72	7.39-I	36.68-V	8.38-III	0.39-III	8.95-II	2.70-IV	71.70-III
2005	7.93	8.59-I	39.01-V	3.54-II	0.43-III	10.37-II	4.62-IV	82.38-II

From the corporation of "Elektroekonomis" in Kastriot, the most dangerous element that it pollutes Sitnica is Phenol. The measure of Phenol in the river of Sitnica is over the level that it is permitted, which it has affected even the water under the ground. Therefore, the measure that has been done in 15 small places that water has been gathered near to Sitnica in Vushtrri it is found that Phenol is

⁸ The above table is taken from the Hydrometeorology Institute of Kosovo.

⁹ Dragoljub Labus, Vodoprivredni problemi u slivu Sitnice, "Buletin"5, FSHMN, Pristina 1978 fq 317-333.

¹⁰ The above table is taken from the Hydrometeorology Institute of Kosovo.

present between 50 up to 150 microgram per liter. Even on some small places that water has been gathered in Mitrovica are registered that a very high level of Phenol has been found, the high level has reached up to 540 microgram per liter.

Rivers that are first class it should not exist the presence of Phenol, whereas on the rivers that are classified as a second class, Phenol should be permitted not more than 0.01 mg/l, which is also VML.¹¹ If it exist Phenol over the permitted level in a river, it is dangerous for any existing life-been that uses this water for any purposes.

Such cases that have Phenol over the permitted level are very often, but cases sporadic of pollution are a measure over permitted, even higher than VML, such cases were in 198, 1985 (170 days had a presence of Phenol, than the case in April 1998 that it has been noted that there was a very high presence of Phenol in Sitnica and in Iber.¹² The latest case in relation to the above, with a very high level of Phenol was in January 2003, when the existence of Phenol in Sitnica and Iber it was much over the VML (Maximum measure that it is permitted).

The measure of Phenol at this period of time it did reach up to 88 times over VML, and three times more than the category four (0.3 mg/l), based on reports released by IHMK's. Whereas, based on the measure that was done by KFOR filthiness was for 165 over VML, and 5.5 times over the permitted level of contaminated with Phenol in the rivers that are categorized as level four, which it includes Sitnica as well.¹³

Sitnica is one of the famous river for fishing, now due to the effect of the contamination from industrial and other factors, now days Sitnica has been created as a river that no fish or living thing exist. It should be also mentioned that years ago Sitnica was a river that used to be frozen for up to 60 days, whereas now days this does not happen.

From the rivers in Mitrovica there are not just Iber and Sitnica, but there are few other small rivers which they are; Lushta and Trepca river, which they are not much different than Iber or Sitnica in regards to the contamination.

Based on the analysis (25 parameters) produced by the World Organization of Health, in relation to this rivers, also analysis of water that it has been released from the industry in production of metal-rock, and many other chemical materials, and also analysis that are produced from their filthiness, it has come to a conclusion that the state of this rivers for supply with water, fishing, recreation, this water is as follows;

- River Iber before it joins Sitnica and the entry in the city, can be used for all purposes,
- River Iber after passes through the city, before it joins Sitnica, it is contaminated by the locals of the citizens that do live in the city. At this stage, this water can be used for plant watering, but fishing is not preferred due to the danger that is caused by many factors.
- River Sitnica before it joins any water that it has been released by the industrial corporation, it is that much contaminated that this water can be used only for plant watering. Even though at this stage this water might have organic substance from the industry in Kastriot, it has to be controlled the quality of this water by farmers.
- River Iber after it joins Sitnica; it shouldn't or can not be used for any purpose.
- River Trepca, since it does accept a highly measure of water from the industry, it should not be used by any means or it should not be used for any purpose.
- River Lushta is a river that it has been used by the villagers for throwing the water that it has been used for their purposes (i.e. toilets, cleaning, etc), and other contaminations, it is very dangerous for the population or citizens in the region.¹⁴

Pollution from industry and waste water

Changes or effects that this rivers do face are after they do enter parts of the populated region, and from the industrial zone, it shows that the main factor of pollution of these rivers that they do pass throughout Mitrovica with the region, are water that comes from the industry and water that has been used by the population of the region.

Polluting substances that are thrown in these rivers is non-organic and organic. On the contamination of non-organic do take place the following elements; metals, which they are leaden, zinc, cadmium,

¹¹ Grupa autora, Ekologija i zaštita životne sredine. Podgorica, 1992, page 262.

¹² UNEP/OCHA Assessment Mission. "Phenol spill in Sitnica and Iber river sitem", Raport 17-26 February 2003, Geneva, 2003, page 15

¹³ Mr.sc. Sami Behrami, Proceset demografiko-ekonomike dhe ndryshimet mjedisore ne Mitrovic me rrethinë, Punim magjistrature(dorshkrim), FSHMN-Departamenti i Gjeografisë, Prishtinë 2007 fq 118-131.

¹⁴ Prostorni plan opštine, Osnove plana Titova Mitrovica, ZUP-Prishtine I IAU Srbije- Beograd, Prishtine Beograd, 1988, fq.49

fluorspars etc, whereas on the organic substance contamination do take place composite extremely dangerous which they do contain Phenol.

Rivers Iber and Sitnica during a year they do take approximately 83 million m³ contaminated water from the industry in Kastriot and Mitrovica. The majority of this contaminated water is thrown in Sitnica (91%), which it makes this river as a collector of industrial water.

Just from the metal-rock from "Trepca", in a period of just a year, there are thrown over 150 ton leaden, 500 ton zinc and 900 ton fluoride. Also from other factors that we have not mentioned above, contamination has been thrown in these rivers.

Table 6. Metal contamination on the industrial water in Mitrovica

Reparti	Element (mg/dm ³)				
	pH	Pb	Zn	Cu	Cd
Accumulator	1.12	4.0	1.6	0.45	0.02
Electrolysys	2.35	2.2	300	1.58	1.25
Fac. guano	1.70	1.5	11.1	0.25	0.12

Contaminated water from the industry and from population nearby, it continues to effect water over the ground. Therefore, in 1971 from a high level of contaminated water that it was thrown in Sitnica (42.0 million m³), that they have been gathered from the industry and that they have been thrown in the river 94% (39.5, million m³), whereas from the population nearby it was approximately 5.9% (2.5 million m³).¹⁵

By 1985, there was approximately 51.5 million meter cub contaminated water was thrown on the rivers in Mitrovica with the region, 48.5 million or 94% comes from different parts of the industry, and 2.30 million m³ or 3.9% comes from the population living nearby. It is supposed that by 2000 contamination it has increased by up to 90.7%, and contamination caused by the population living nearby it has increased up to 6.1% as a result of the increasing number of the population in the region.¹⁶ By 1985 in Mitrovica from the necessary level of water (54.8 million m³) for the industry should have been used 92.8% (50.9 million m³), whereas for the population use should have needed 4.7% (2.6 million m³) of the total level of water. In 2000 it was supposed that just from the industry water to be used should have been 90.6%, and by the population living nearby should have been used 6.2% of the total level of water. In Kosovo it was supposed that only for industrial purposes to be used approximately 77.8% and for the populations need approximately 14.7% of the total.¹⁷

Implants for water decontamination have not been in process, many other elements that have been thrown in the water have not been adequately treated. Zinc electrolysis and other chemicals that they have been thrown in the water or rivers, have not functioned as they should have had, or it can be said that this chemical elements have not have any effect what's-o-ever.

Most of the contamination it comes from the unsuitable or by non adequate management, i.e. the contaminated water that is gathered by the industry is based very close to the river, and when it heavily rains, the contaminated water that is based next or close to the river moves into the river Iber and Sitnica.

Due to the non-function of industrial objects of "Trepca" (accumulator, chemicals from the industry, electrolysis etc), the level of contaminated water from the industry at the moment for sure is lower. However, at the same time the level of contamination that it is caused by the borough it has increased (by concentration of the population in the region), therefore contamination in the rivers in question are caused entirely by the industries and the boroughs, especially borough of Mitrovica with the region.

¹⁵ Rozhaja D., Jabllanovic M., contaminated and supporting the living ambient. University of science and nature, ETMM of Kosovo, Pristina 1083, page 315.

¹⁶ Hydro-economic base of KSA in Kosovo, directory of hydro-economic in Kosovo and institute for hydro-economy "Jaroslav Qerni" Beograd 1983, page 68.

¹⁷ Hydro-economic base of KSA in Kosovo, directory of hydro-economic in Kosovo and institute for hydro-economy "Jaroslav Qerni" Beograd 1983, page 81.