



## MONITORING THE QUALITY OF SURFACE WATER FROM PLOIESTI AREA, ROMANIA ♦

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**Abstract:** The availability of a water supply adequate in terms of both quantity and quality is essential to human existence. Water pollution may be defined as the presence of impurities in such quantity and of such nature as to impair the use of water for a stated purpose. In this paper we follow the main parameters which are important in water quality and influence in time that.

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## INTRODUCTION

Water pollution is a dynamic and complex process. The intensity of pollution depends on the nature of polluting substances, quantity and frequency of them, the modality of entering in the receiver, the dilution process, etc. Low and charging wastewater varying with civilization developed around water bodies. There is one biological unstable balance in the emissary, who has a fluctuation between limits [1]. Dilution and the degree of mixing of the wastewater with emissary is an essential factor for the pollution process. During the discharge of a wastewater at the bank between channels, the mixing process is possible by long distances when discharging occurs into the river.

The factors which influence the wastewater mixing with emissary water are:

- hydrological and hydrodynamics characteristics of the river;
- river depth, breadth of river, surface wave-current;
- wastewater quality and discharging modality in the emissary.

A polluted river and the polluted area from a river means that mainly the biological modifications about the trophy network [2, 3].

## RESTRICTIONS FOR WASTEWATER DISPOSAL

The wastewater disposal in natural receiver has to respect the legislation of water NTPA-001/2002 [4] which represents Water Pollution Control Act (WPCA) for all surface waters in Romania. This legislation can control some aspects of water quality and the maximum limits for polluted substances. The WPCA has been mandated by the Environmental Protection Agency in order to establish standards for wastewater discharges. If industry discharges in the municipal collection systems, the industrial wastewater has to be pre-treated. The limits are presented in table 1.

*Table 1. Water-quality parameters and limits described in Standard Methods [5]*

<b>Water type</b>	<b>Parameter</b>	<b>Maximum limits</b>
Wastewater disposal in natural receiver after treatment in wastewater plant	pH	6.5 - 8.5
	COD-Mn, mg O <sub>2</sub> /dm <sup>3</sup>	-
	COD-Cr, mg O <sub>2</sub> /dm <sup>3</sup>	150
	Nitrogen, mg/dm <sup>3</sup>	30
	Total suspended solids, mg/dm <sup>3</sup>	150
	Dissolved inorganic solids, mg/dm <sup>3</sup>	2,000
	Settleable solids, mg/dm <sup>3</sup>	20
	Detergents, mg/dm <sup>3</sup>	0.5
	BOD <sub>5</sub> , mg O <sub>2</sub> /dm <sup>3</sup>	150

## EXPERIMENTAL

The experimental study represents the periodic analysis of the surface water. This periodic analysis respects the standards (table 2).

*Table 2. Standards for principal constituents of tests [5]*

Parameter	Measuring unit	Analysis methods
pH	pH units	SR ISO 10523-97
Total suspended solids	mg/dm <sup>3</sup>	STAS 6953-81
BOD <sub>5</sub>	mg O <sub>2</sub> /dm <sup>3</sup>	STAS 6560-82; SR ISO 5815-98
COD-Cr	mg O <sub>2</sub> /dm <sup>3</sup>	SR ISO 6060-96
Free ammonia	mg/dm <sup>3</sup>	STAS 8683-70
Total nitrogen	mg/dm <sup>3</sup>	STAS 7312-83
Nitrates	mg/dm <sup>3</sup>	STAS 8900/1-71; SR ISO 7890/1-98
Nitrites	mg/dm <sup>3</sup>	STAS 8900/2-71; SR ISO 6777-96
Settleable solids	mg/dm <sup>3</sup>	SR 7587-96
Detergents	mg/dm <sup>3</sup>	SR ISO 7825/1-96; SR ISO 7825/2-96
Dissolved inorganic solids	mg/dm <sup>3</sup>	STAS 9187-84

The period for analysis starts on March 2005 and ends in February 2006. For that we follow next steps:

- when the samples are collected, SR ISO 5667 should be respected, samples should be collected downhill by discharge canals or overflow
- verify the collect point for register of any modification which is possible to appear;
- choose the moment and the type of samples collection;

There are seven points for this study in order to collect the samples, which cover all areas from Ploiesti. For analysis, the following equipment has been used:

- portable pH-meter;
- photometer PhotoLab S12;
- thermo reactor CR 2200;
- measuring system OxiTop;
- Merck apparatus.

## RESULTS

The results of the tests are presented in figures 1 - 7. In all figures is represented the average monthly result.

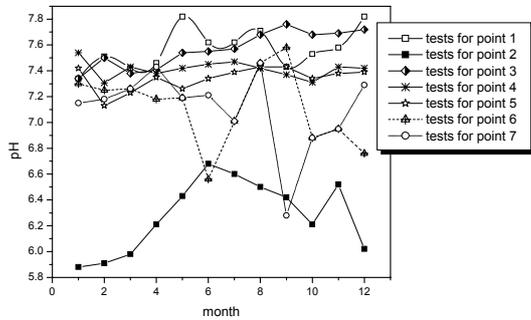


Figure 1. pH of surface water in Ploiesti area

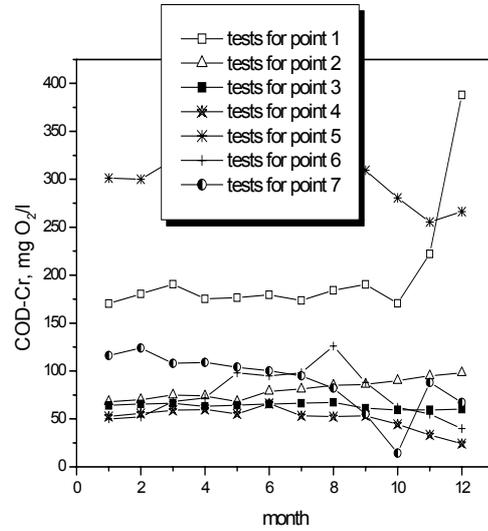


Figure 2. COD-Cr of surface water in Ploiesti area

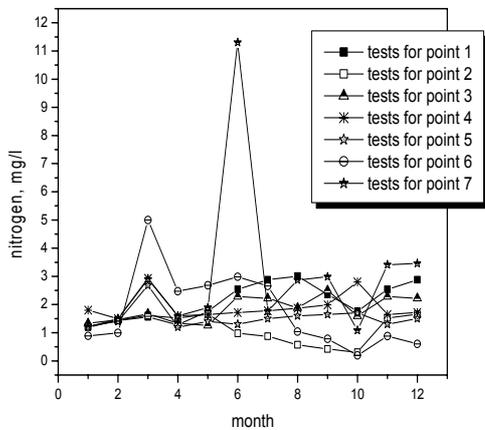


Figure 3. Nitrogen content of surface water in Ploiesti area

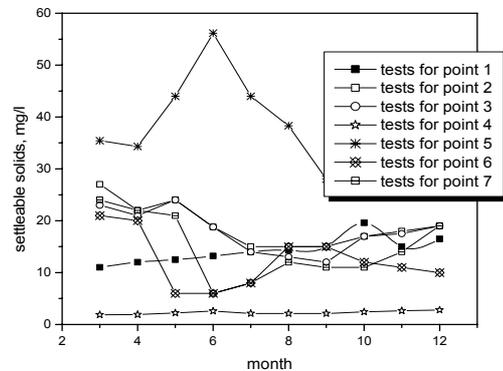


Figure 4. Settleable solids content of surface water in Ploiesti area

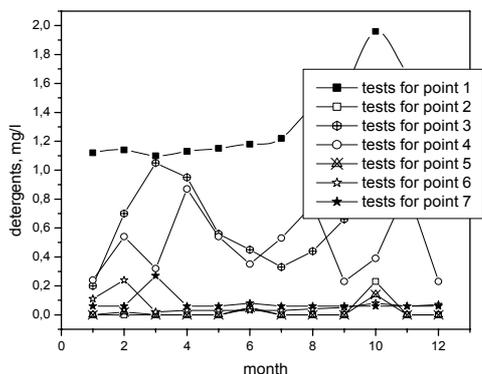


Figure 5. Detergents content of surface water in Ploiesti area

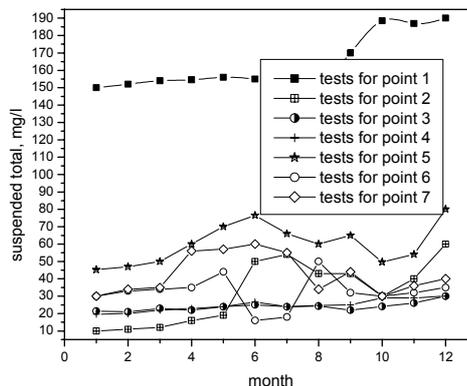


Figure 6. Total suspended solids content of surface water in Ploiesti area

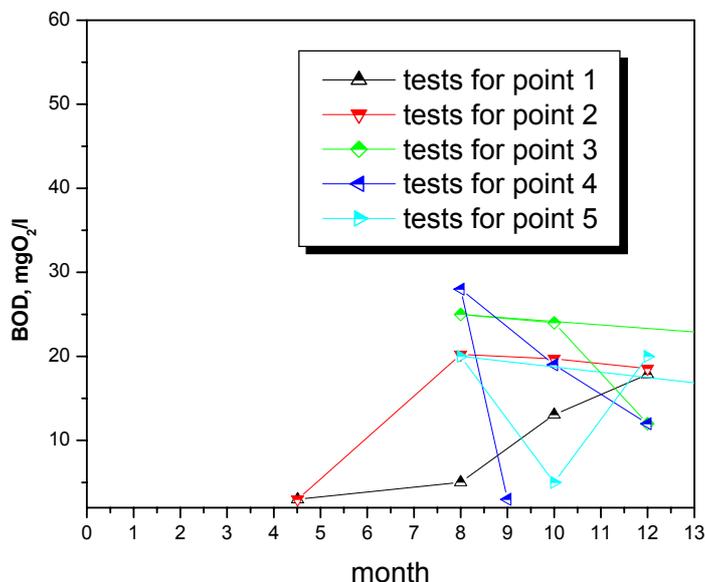


Figure 7. Biochemical oxygen demand (BOD<sub>5</sub>) of surface water in Ploiesti area

## CONCLUSIONS

1. There are many dissolved substances undesirable in water. Suppressing all of them is possible, in order to obtain a compound whose characteristics are more objectionable than those of either of the original materials.
2. Biologically active suspended solids may include disease-causing organisms, as well as organisms such as toxin-producing strains of algae.
3. Most natural waters will have a population of microorganisms that will consume the organic substances. The presence of toxic materials in the water will invalidate the BOD result.

4. The nitrogen is the limiting factor in aquatic plant growth. Water contamination by nitrogen can cause serious problems.
5. The oxygen-demanding nature of biodegradable organics is of utmost importance in natural water systems.

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