WASTEWATER TREATMENT TECHNOLOGIES APPLIED IN CONFORMITY WITH THE EUROPEAN ENVIRONMENTAL POLICIES

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Abstract: *Increasing industrialization degree and its complexity has made studies of the environmental impact assessment to be a necessity. Enforcement of national legislation in line with European legislation going to need to implement wastewater treatment technologies that treatment levels to be above 90% for not influence the quality of the receiving water. In the present work are compared wastewater treatment technologies. Based on monitored values of physico-chemical indicators are the advantages and disadvantages. It is also studied and their compliance with environmental policies in the wastewater treatment .*

Key words: *wastewater treatment technologies, european legislation, surface water quality.*

1. INTRODUCTION

Protection of surface water quality is established by the European legislation [1,2,3,4]. Directive 2000/60/EC establishing a framework for the protection of inland surface waters , transitional waters , coastal waters and groundwater , to prevent and reduce pollution, promote sustainable water use , protect the aquatic environment , improve the status of aquatic ecosystems and mitigate the effects of floods and droughts ; Directive 91/271/EEC (amended by Directive 98/15/EC) concerning urban waste water treatment aims to protect the environment against the adverse effects of discharges of urban wastewater and industrial discharges . Romanian legislation in the field of wastewater treatment and waste subscribe European water quality directives . Thus the wastewater is regulated by the Water Law from 1996 supplemented by additions and normative quality of surface waters and by Government Decision approving the norms nr.188/2002 discharge of wastewater into the aquatic environment and supplemented by Government Decision no. 352/2005. Predictions were made about the load of the sewage systems and also of the treatment stations in order to be able to appreciate properly the disposal method. These predictions follow the EC Directive 271 (1997). The best solution at this moment is to use sludge in agriculture. Therefore, sludge quality must follow the current legislation (GD 344, 2004) [1].

Compliance with these regulations is done by applying the correct treatment technologies. This paper aims to assess treatment technologies in accordance with effluent quality standards imposed by European legislation and Romanian.

2. CHOICE OF WASTEWATER TREATMENT TECHNOLOGIES

In wastewater treatment process there are three categories of processes:
-primary treatment -removal the material in the suspension;
-secondary treatment-usually in this step is removing organic materials through anaerobic or aerobic treatment;
-tertiary or advanced treatment - takes place eliminating the rest of compounds that could not be removed in the second stage but the high cost.

Analysis of water quality indicators presented above is based on technical quality standards of NTPA 001/2005 and 002/2005 presented in table 1 and 2 (the most important indicators).

Tabel 1 – *NTPA – 001/2002-* Water quality indicators for sewage systems and wastewater treatment plant influent [3]

No.	Indicators	Units	Maximum admissible value
1	pH	pH units	6,5-8,5
3	PHOSPHOR	mg/dm^3	1
4	SUSPENDED SOLIDS	mg/dm^3	35
5	COD	$mgO2/dm^3$	125

6	BOD	$mgO2/dm^3$	25
8	NITRATES	mg/dm^3	25
9	NITRITES	mg/dm^3	1
16	CHROMIUM	mg/dm^3	1
17	COOPER	mg/dm^3	0,1

Tabel nr.2 – NTPA – 002/2002-wastewater treatment plant effluent for discharge in surface water [3]

No.	**Indicators**	**Units**	**Maximum admissible value**
1	Temperature	^0C	40
1	pH	pH units	6,5-8,5
6	PHOSPHOR	mg/dm^3	5,0
2	SUSPENDED SOLIDS	mg/dm^3	350
3	BOD	$mgO2/dm^3$	300
4	COD	$mgO2/dm^3$	500
8	NITRATES	mg/dm^3	25
9	NITRITES	mg/dm^3	2
16	CHROMIUM	mg/dm^3	1,5
17	COOPER	mg/dm^3	0,2

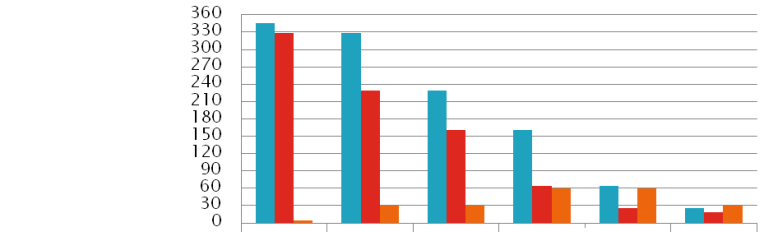
For correct assessment of the treatment technologies have been taken into consideration data from industrial wastewater treatment plants in the present paper were presented their averages [5,6,7]. Such values were compared at entry and exit from the treatment plant through the application of primary and secondary treatment process and determine appropriate treatment.

For assessing treatment process that lead to the right choice of technology were considered the following parameters: suspended solids, BOD, COD, and N2.

3. RESULTS AND DISCUSSION

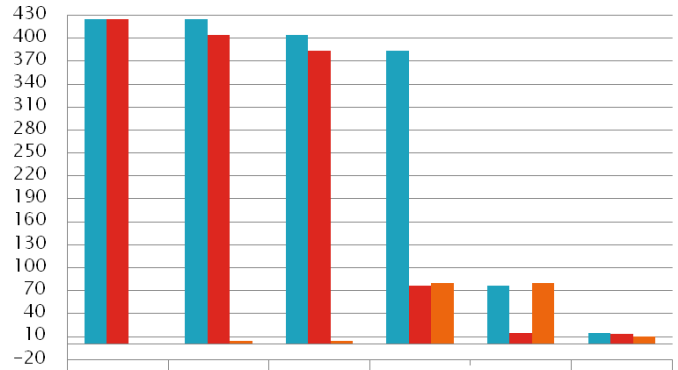
In Figures 1,2,3,4, are given physico-chemical values before and after treatment and *c*orresponding the degrees of wastewater treatment process. For indicators determination at the time of the sampling, it was used the:

- pH- meters Metter-Toledo for pH determination;
- VELP Systems for BOD;
- thermoreactor for COD;
- UV-VIS spectofotometer for N2.



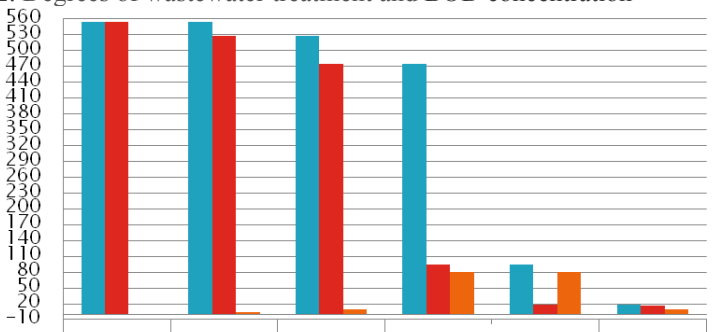
	FIRST STAGE			SECONDARY STAGE		SECONDARY DECANTER
mg/l SUSPENDED SOLIDS, INFLUENT	345	327.75	229.425	160.598	64.239	25.696
mg/l SUSPENDED SOLIDS, EFFLUENT	327.75	229.428	160.598	64.239	25.696	17.987
WASTEWATER TREATMENT DEGREE ,%	5	30	30	60	60	30

Figure 1. Degrees of wastewater treatment and suspended solids concentration



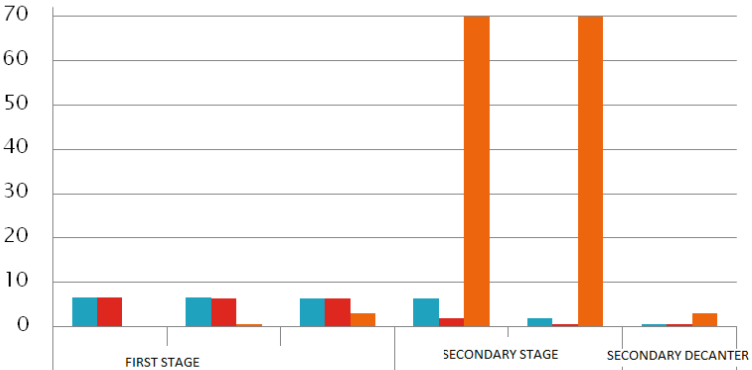
mg/l BOD INFLUENT	425	425	403.75	383.563	76.713	15.343
mg/l BOD EFFLUENT	425	403.75	383.563	76.713	15.343	13.808
WASTEWATER DEGREE %	0	5	5	80	80	10

Figure 2. Degrees of wastewater treatment and BOD concentration



mg/l COD INFLUENT	425	425	403.75	383.563	76.713	15.343
mg/l COD EFFLUENT	425	403.75	383.563	76.713	15.343	13.808
WASTEWATER DEGREE %	0	5	5	80	80	10

Figure 3. Degrees of wastewater treatment and COD concentration



mg/l N2 INFLUENT	425	425	403.75	383.563	76.713	15.343
mg/l N2 EFFLUENT	425	403.75	383.563	76.713	15.343	13.808
WASTEWATER DEGREE %	0	5	5	80	80	10

Figure 4. Degrees of wastewater treatment and N2 concentration

4. CONCLUSIONS

In 2009 , in Romania has started the rehabilitation program of treatment plants that had outdated equipment, worn and corroded. After rehabilitation aimed to reduce discharges from plants , reducing operating costs and water costs. Once the plan has been implemented , based on information provided by the Romanian waters, was made an analysis of the data to see if improvements to the station had a positive impact on surface water quality [9].

In 2013 , according to data corresponding to the station shown that discharges were reduced BOD5 10 mg / l COD, 15 mg / l , SS 17.98 mg / l and for N 10 mg / l. WWTP rehabilitation impact is positive on surface water bodies, water quality is superior compared to previous years

Comparison of treatment processes in accord with European legislation leads to the following conclusions:

- it will be analyze effluent treatment plant characteristics and the receiver, the existing and future conditions ;
- it will take into account the receptor potential contamination by hazardous substances caused by leaking / draining water from industrial sites (including rainwater);
-avoid groundwater contamination in case of damage the integrity of the sludge drying beds (infiltration to groundwater) ;
- it will take account of any malfunctioning of the sewerage network- damage, leaks, blockages;
- impose special conditions for monitoring industrial units and conditional takeover wastewater sewage system [3];
-implement inspection program, pre- treatment facilities , technology modernization of equipment, wastewater flow metering , auto - monitoring);
- implement the plans preventing and combating accidental pollution for industrial units locations.

To make a choice of treatment technologies must study effective treatment process to eliminate persistent organic pollutants and will determine the influence of operating parameters on process performance.

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