THE CURRENT STUDY WATER QUALITY IN THE TOWN OF GORJ DRAGUTESTI

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ABSTRACT: Regarded for a long time as a gift of nature, water becomes more and more one of the global issues of humankind, a factor of influence of all the important domains. The alarming rate of the depletion of this resource it is a problem of analysis and reflection both on a national scale but also on a global scale, for whose resolutions requires the combined efforts of scientists from everywhere and of the political factors of decision. The complex nature of water management, in which are involved different sectors of the society and the economy, it requires the cooperation and coordination of the actions, among those who have the duty to administrate the water. Basically the efforts of all the factors involved must focus toward the use, development and protection of the water resources in an equitable and reasonable manner, respectively by applying the concept of sustainable water management.

KEY WORDS: Wastewater treatment, Dragutesti, Ph, total suspended materials.

1. INTRODUCTION

Geographically speaking, the village of Dragutesti is situated in Oltenia area, in the south-west of Romania, in Gorj county, being situated at the limits of the Parang Mountains from the Mountain Range of Carpati. The 45th parallel crosses the north limit of Dragutesti village, being known as a village large in size as a surface, both with plains and hills.

Dragutesti village is located at 7 km from the center of Targu Jiu city, a well known comercial center of Gorj county, having around 5218 inhabitants.

The watercourse in which are evacuated the domestic wastewater is Amaradia creek. This is an affluent on the left side of Jiu, the junction being right on Dragutesti village. The land on which is built the treatment station is situated oin Dragutesti village at about 100m from the nearest house. Buliding this treatment station ensures the quality protection of the creek Amaradia.

When the treatment station was buits it was, in general, pursued the valuing of the land insuitable for other uses and also valuing differences in level of gravity to drain the raw water and the treated one.

The domestic wastewaters that are being collected by the sewerage network and led to the treatment station have the following sources:

- domestic sewerage water resulted form the needs of domestic waters form individuals households;
- domestic waste water resulted form the necessity of satisfying the needs of water fom the public institutions;
- wastewater from economic activities in the area) public alimentation, trade, industry, etc);

Since the village Nou – Iasi, from Dragutesti, had a sewerage network with a length of over 20 years, with an advanced wear, with a non-functional and undersized treatment station for the need of the village,

with the help of SAPARD funds it was achieved a sewerage network and a new treatment station.

The retention tank has the role of equalizing the water flote and homogenization of the composition of wastewater. From this with the help of a pump, the water is being pumped in the home from which it takes place the taking over into the treatment station. The treatment station is a one piece type, an anaerobic type with a biological step, the maximum daily flow is on 210 m^3 / zi (2,4 l/s) and has the following components: a mechanical grill, storage tanks- grease, electromagnetic flowmeter, a tank of equalizing and pomping, a compact pumping sewage type N2-Resetilovs- an automatic system that makes the mechanical-biological waste built from the following pieces: a primary decanter, an aeration tank, a second decanter, instalations of disinfection with ultraviolets.

The disposal of the primary sludge is being made gravitational toward the instalation of sludge dewatering in bags and removing them through agriculture. The conditions of applying the instalation are determined by the hydraulics and organics loads. The instalation corresponds to a hydraulic load of 120 m^3/a day. The determination of the hydraulics load is shown in the table below.

Table 1. Application values

Nr.crt.	Parameter	Measurement units	Value		Allowed deviations from value	
			calculated	allowed	Per day	Per hour
1	Temperature wastewater	^{0}C	13÷17	10÷25	±2^{0}C	±2÷3^{0}C
2	pH		7	6,5÷8,5	±0,1÷0,2	±0,3
3	Hydraulic loading					
	Per day	m^3/zi	120	25-120	-	-
	Per hour	m^3/h	4,7	8,26	-	-
4	BOD_5 -biological oxygen consumption	mg/l	183	50÷183	±10%	±20%
5	COD- - chemical oxygen consumption	mg/l	300	100÷300	±10%	±20%
6	SS- suspended solids	mg/l	253	50÷253	±10%	±20%
7	N_{total} –azot	mg/l	32	0÷32	±10%	±20%
8	P_{total} - fosfor	mg/l	8	2÷8	±10%	±20%
9	Chlorides	mg/l	50	30÷300	±10%	±20%
10	Detergents	mg/l	12,5	0÷12,5	±10%	±20%
11	Sulphates	mg/l	30	0÷50	±10%	±20%
12	Alkalinity	mg/l	100	50÷100	±10%	±20%
13	Greases and lubricants	mg/l	100	0÷100	±10%	±20%
14	Index coli	buc/l	10^6	10^6÷10^8	±10%	±20%
15	Mineralization	mg/l	1000	500÷2000	±10%	±20%

The application of the station for the biological treatment of the domestic wastewater needs the solving the following problems:

- the mechanical treatment of the wastewater from the large discharge pipes;
- the mandatory removal of the sand from the wastewater;
- sediments processing;
- primary sedimentation;
- supplying sewage in the station;
- the foundation from under the station;
- the joints of the connections.[1]

EXPERIMENTAL

Measuring the pH is performed by an electrochemical method with the help of a machine called pH-meter.

The suspended matters are determined by the gravimetric method (of weighing). It is being filtred a particular sample volume, well homogenized on a filter paper, weighed beforehand to a constant weight, their drying until constant weight is made at 105^0 C and the weighing is being made at an analytical balance.

An effective assessment of the wastewater treatment station requires an onging control through physical, chemical and bilogical analysis. To reveal if the wastewater discharged falls within the rules laid down by the legislation, and also the way in which these water influence the envoy water quality, have been sampled and performed physical-chemical analysis from four different points:

- input treatment plant;
- exhausting of the treatment plant;
- Amaradia upstream river discharge the wastewater treatment plant;
- Amaradia downstream river discharge wastewater treatment plant.
- intrare staţie de epurare;
- evacuare staţie de epurare;

There have been analyzed a series of chemical indicators specific to chemical contamination in households.

RESULTS AND DISCUSSIONS

The results of the tests carried out during the years 2014, 2015 are shown in the following tabels:

Tab 2. The values obtained for pH

Determinations	Month	Years			
		2014		2015	
		entry	evacuation	entry	evacuation
pH	January	7,33	7,66	7,82	7,62
	February	7,58	7,32	7,79	7,59
	March	7,43	7,89	7,65	7,45
	April	8,02	8,16	7,66	7,46
	May	8,36	8,03	-	-
	June	7,65	8,10	-	-
	July	7,13	7,00	-	-
	August	7,14	8,23	-	-
	September	6,99	7,50	-	-
	Octomber	7,37	8,10	-	-
	November	7,45	7,94	-	-
	December	7,49	8,05	-	-
	Mediate	7,37	7,72	7,49	7,83

Table 3. Values obtained for total suspended matters

Determinations	Month	Years			
		2014		2015	
		entry	evacuation	entry	evacuation
Total suspender matter	January	70	61	58	46
	February	84	73	66	53
	March	79	62	70	57
	April	66	58	78	60
	May	72	65	-	-
	June	62	46	-	-
	July	94	58	-	-
	August	86	65	-	-
	September	98	64	-	-
	Octomber	83	65	-	-
	November	71	58	-	-
	December	61	50	-	-
	Mediate	77,16	60,41	68	54

In the determinations made for the treated water discharged from the treatment plant the interpretations of results was made in accordance with NTPA 001/2002 regarding the establishment of the loading limits with pollutants of the industrial and municipal wastewater discharged into natural receivers.

For tests carried out in the river water from Amaradia in the two sections of samples, the interpretation was made in accordance with the Order of the Ministry of Environment and Water No.161 / 2006 for approving the Norms concerning the classification of surface water quality to environmental status of watercourses.

There were made the following determinations for the samples taken from the four points specified above: pH, suspended solids. To calculate the efficency of the treatment plant are used the follonwing mathematical relationships.[3]

$$2014 \rightarrow E_f = \frac{B - B'}{B} \cdot 100 \quad (2.1)$$

$$2015 \rightarrow E_f = \frac{C - C'}{C} \cdot 100 \quad (2.2)$$

In which :

- B means the medium value of the indicators determined at the entrance in the treatment plant in the year 2014; B' means the medium values of the indicators determined at the evacuation from the treatment plant in the year 2014; C represents the medium value of the indicators determined at the entrance of the treatment plant in the year 2015; C' means the medium value of the indicators determined at the evacuation from the treatment plant in the year 2015

For the indicator of the suspended solids NTPA 001/2002 has a limit at the evacuation of 35 mg/L.

The medium values obtained in the threee years analyzed for this determination shows us that the permitted limit is exceedeed every time even if the treatment plant shows a high efficiency in this purpose.

The efficency of the treatment plant for removing the suspended solids is:

- arriving to eliminations of bacterias) with the help of UV in the

$$2014 \rightarrow E_f = \frac{B - B'}{B} \cdot 100 = \frac{77,16 - 60,41}{77,16} \cdot 100 = 21,70\%;$$

$$2015 \rightarrow E_f = \frac{C - C'}{C} \cdot 100 = \frac{68 - 54}{68} \cdot 100 = 20,58\%.$$

The interpretations of the results is made under te Ministry of Environment and Water Order no. 161/2006 approving the Norms regarding the classification of surface water in order to determine the ecological status of watercourses.

According to this law, a good chemical estate of a water is touched only when all the quality indicators that characterize the chemical estate are established according to the quality standards for water.

From the medium values obtained in the three years for the pH can be noticed that:

- in the year 2014, pH had a medium value of 7,69, the Amaradia creek was situated about between the limits of quality, according to the Order 161/206;
- in the year 2015, pH had a medium value of 7,72, the Amaradia creek was situated about between the limits of quality, according to the Order 161/206;

CONCLUSIONS

Domestic wastewater from the village Dragutesti contain organic matter and mineral in suspensions, colloidal also in sollution, and also bacteria and protozoas, which are the main source of energy that remains the only source put to the dispositions of biochimical nature of organic matters.

In the treatment plant of Dragutesti village are made the following:

- Large solid bodies and suspensions, using grids and screens;
- Sedimentation or settling of suspended solids decanted, performed in decanters;
- Desinfecton of the water (reducing until desinfection installation
- In order to determine the efficiency of the wastewater treatment plant were monitored a number of physico-chemical indicators both for wastewater entering the treatment plant and also for the discharged ones and have been observed as follows:at the indicator total suspended materials both on entry and for the discharge limit values of NTPA001/2002 have been exceeded, which provides the permitted limit values for the waters discharged into the environment.

Improper treatment plant efficiency is due to either:

- overloading the instalation;
- large loading with suspended solids;
- Improper operation thereof.

Amaradia creek is the emissary who treated the municipal waste waters of this station. Samples were taken upstream and downstream exhaust treatment plant and it was found that both upstream and downstream as the creek Amaradia fall in quality class I under Order 161/2006.

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