TECHNICAL VALIDATION OF THE COMPACT SYSTEM OF WASTE WATER TREATMENT MODEL FACET STP

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Abstract

The aim of this study has consisted of the accomplishment of an experimental project of technological development of follow-up and control of the conditions of functioning of the plants of treatment of domestic waste water FACET series STP. They retire later, the information obtained in the follow-up realized in the Center of the New Technologies of the Water (CENTA) along thirteen months of functioning of the equipments.

Introduction

Thanks to the Center of the New Technologies of the Water (CENTA) from Carrión de los Céspedes' Experimental Plant the Project has developed; " Test of Evaluation of Prototypes System pilots of Treatments of Waste water: Technological innovation in the Sector ". The above mentioned Test of Evaluation has applied itself to determine the behavior of the unit FACET model STP operating with domestic waste water. For it, there have taken as a reference the reports of check realized by the EPA (Environmental Protection Agency) waste water treatment systems .

Methods

The treatment plant FACET STP on which the study has been realized, treats itself about a system which technology consists of a biological process of long aeration and recirculation of active sludge (Tchobanoglous et al, 1991), followed by a tertiary treatment of disinfection and deodorization by means of ozone. The installed model is designed for the treatment of a maximum flow of 62.5 m3/d. The dimensions of the equipment are: 5,3x2,4x2,7 m.

The unfluent one behaves before refined to the chamber of aeration. In this chamber there takes place the degradation of the organic matter, thanks to the continued injection of oxygen by means of a air compressor that it provides with the oxygen necessary for

the direct injection across a few diffusers, allowing besides the fact that the generated turbulence favors the contact and the ideal formation of bacterial sludge. Once passed the necessary time of retention, the water goes on to the chamber of decantation across a biological filter in order to favor the separation of the solid particles, this chamber, is kept pressurized favoring that the whole sludge settles. These sludges are re-circulated towards the chamber of aeration by means of an air lift system, with the aim to support a relation of constant MLVSS in the reactor, necessary for the survival of the microorganisms in charge of the bacterial purification. The liquid once clarified goes on to the chamber of disinfection across a manifold, where the injection of the ozone is realized. The ozone takes place by means of a generator placed inside the cabin of control from the surrounding air, and one introduces in the chamber of unload by means of a bomb that permanently and in a closed circuit, he inhales water of the chamber of disinfection - unload and returns it once ozonitation. The already treated effluent one disburdens for gravity.

The installation and putting in march of the station filter system of waste water was realized during November 13, 2007, since it is a question of a compact system, for his placement simply the help of a derrick was necessary, once located one proceeded to the electrical and mechanical connection of the equipment and filled with water beginning this way the putting in march of the EDAR.

The aims of the test of evaluation have been:

- Determination of the percentages of reduction of BOD5, COD, TDS, N, P.
- To determine the basic requirements for the operation and maintenance of the system.
- Determines the fulfillment of the exit of the system with the values established in the Royal decree Law 11/95 (transposition of the European Board 91/271) developed in the Royal decrees 509/1996 and 2116/1998).

The program of sampling has consisted of the accomplishment of captures of weekly samples during a period of time of 12 months, aliquots have been analyzed both of the unfluent one and of the effluent one of the sewage treatment plant, in case of the effluent brute, 24 samples have taken integrated for 24 hours and in turn you prove to be punctual of the effluent one.

Results and discussion

Later to the initial period of putting in march, the test of evaluation realized has divided in two phases due to a modification effected in the chamber of aeration so that in the second stage the biological reactor was divided in two zones: anoxic–aerobic (1er Period: February, 2008 to June 2008, 2 ° Period: June, 2008 to October, 2008) with the aim to study the percentage of elimination of nutrients in the process. The flow of residual brute water has been kept between 20,6–30,2 m^3/d with an average value registered of 28,6 m^3/d. Can be observed later the parameters and results obtained of COD, BOD5 and TDS both of the unfluent one and of the effluent one, as well as the percentages of reduction.

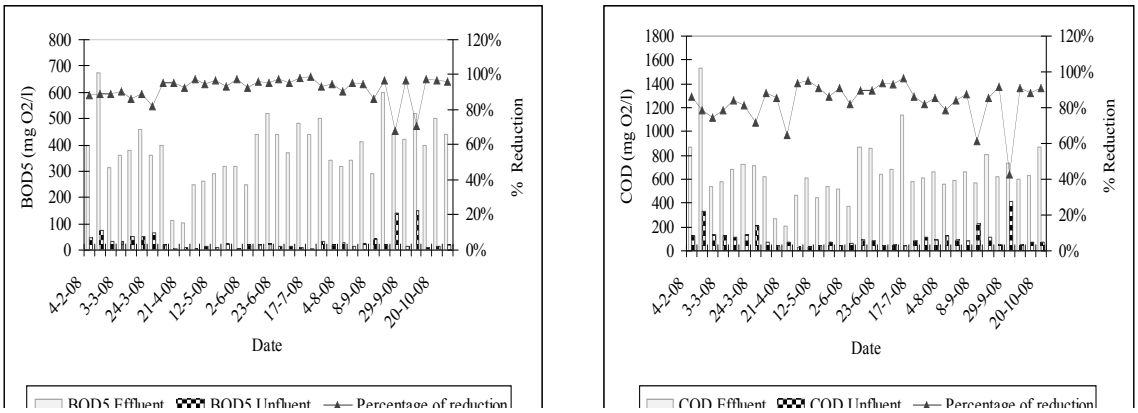

Figure 1. COD's values and BOD5 of unfluent and effluent and percentages of reduction.

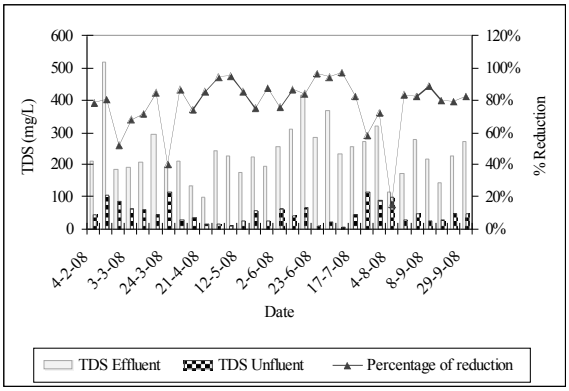

Figure 2. TDS's values of unfluent and effluent and percentages of reduction.

Conclusions

To the results of the Test of Evaluation, with a total of 35 samples analyzed (18 in the first period and 17 in the second period), there have been applied to them the limits that the Royal decree establishes Law 11/95 and his development in the Royal decrees 509/1996 and 2116/1998. The percentage of breaches appears later in both described periods, expressed both in concentration and in minimal percentage of reduction:

	BOD_5			COD		
	Number of analytical that they break	Concentration	Percentage	Number of analytical that they break	Concentration	Percentage
Period I	0	38,80%	0%	2	22,20%	11,10%
Period II	1	29,40%	5,80%	3	17,60%	17,60%

Table 1. Percentage and number of breaches

References

Tchobanoglous, G. y Burton, F.L. (1991). Wastewater Engineering: Treatment, Disposal and Reuse. Metcalf y Eddy, 3° Edition, 1991.