INTEGRATED MANAGEMENT OF INDUSTRIAL EFFLUENTS IN MONTEVIDEO, URUGUAY

Ing. Quím. Alicia Raffaele[1], Quím. Mary Yafalián[1], Lic. Hernán Méndez[1], Antuanet Calero[1]

[1]*Unidad de Efluentes Industriales, Intendencia Municipal de Montevideo, Lucas Píriz 2357, Montevideo, Uruguay.*
e-mail: araffaele@csanea.imm.gub.uy

Summary

Within the Department of Montevideo, the smallest of the 19 political/administrative divisions of the Republic of Uruguay, is concentrated most of the country's industries; most of Uruguay's service activities; and almost half of the country's population. Montevideo's water network is served mainly by the Pantanoso and Miguelete rivers, and by the Bay of Montevideo, which are closely bound to human activities.
The high degree of contamination found in the city's channels originates mainly from the dumping of sewage and industrial effluent, and the indiscriminate disposal of solid wastes.
The main objectives are:
- Optimizing technical resources (public and private) and identifying weaknesses and strengths.
- Reducing pollution loads contributed by Montevideo's industries.
- Working in a holistic manner, with the continuous participation of the community.
We largely met the objectives, particularly in reducing pollution loads. During the period under review, there were economic crises (1999, 2002) which contributed to a reduction in the volume and number of industries. However, the reduction of pollution loads went beyond that attributable to the economic slowdown. Since 2003, there has been an important industrial revival and yet the trends are still declining.

Introduction

Establishment of Priorities

We prioritized the development of a Monitoring Program for Industrial Effluents, complemented by the Program of Bodies of Water and Environmental and Health Education, initiated in 1997. It is regulated by municipal regulations: "Plan for the Reduction of Industrial Pollution Source" (Resolution 761/96) to pose three phases with increasingly stringent limits. This requirement was carried out gradually, thus allowing its adaptation by small businesses that could not afford a large investment in a short period of time.

To recover the watercourses and to improve the environmental quality of the Department and its inhabitants, there were orchestrated: construction of health infrastructure; rehabilitation of networks and interceptors; industrial effluent control; elimination of uncontrolled discharges of waste and other pollutant inputs.

Basic Objectives of the Program:

- Assessing the impact of discharges to watercourses, and their temporary variation.
- Analyzing the degree of implementation of the Plan for the Reduction of Pollution, informing the population every six months through the press.
- Controlling discharges to the sewerage network, improving its maintenance.

Methods

Significant to the realization of this Monitoring Program was major participation and commitment of the Chamber of Industry, the National Directorate of Environment and other communal units, specifying a Plan of Industrial Decontamination and a Program of Monitoring Industrial Effluents.

In 1997, there were identified and categorized those responsible for 90% of industrial pollution, according to their actual or potential contribution:

Priority 1: Generating more than 85% of pollution given by the industries program. Sampling frequency: quarterly.

Priority 2: Sampling rate: biannual.

Priority 3: The remaining 10% are not members of the Program because of low flow or contaminant level. They are on an annual surveillance basis, until changes justify their entry into the program.

From the year 1997 and to date has been running the Monitoring Program. It assesses the industrial situation depending on the type of discharge (collector, watercourse, ground infiltration), the branch and the water body receiver. Every six months is published in the press the results of this evaluation and the degree of compliance with regulations. Also every six months, performance targets are analyzed and documents are produced with situation analysis.

Results and Discussion

By the end of 2009, the greatest contribution of industrial pollution was attributable to 26 companies in Priority 1: 81% flow, 90% oils and fats, 89% BOD5, 86% Sulphides, 95% Chromium, 67% Lead.

Since the start of the program, there has been a significant expansion of industries and to a lesser extent the discharge flow. However, industrial restructuring, the implementation of quality systems and environmental management, monitoring and control together with civic monitoring, have achieved reductions: 81% oils and fats, 28% BOD5, 57% Sulphides , 81% Chromium, 94% Lead.

The measures taken reduced the discharges made to the most degraded watercourses (Brooks Pantanoso and Miguelete), implying a positive environmental impact. Further improvement is projected over the life of the sewerage network, thus improving the quality of people's lives.

There was found to be a growing interest and participation by citizens through complaints and the establishment and training of environmental commissions. This prompted improvements between the related industries and the community. For the first time, the industries became more open in their relationship with the population, thus driving more and better information.
The execution and implementation of the program has also involved the creation of jobs (technical area of environmental): preparation of reports, works or reforms required, etc..

Conclusions

The experience was an innovative tool to solve problems and reduce pollution of Montevideo's waterways. It makes for a course of action in improving processing operations carried out by companies and the quality of water. This can serve as a methodology for other problems. It has impacted positively within the municipal organization, given that the modality of work is based on the coordination and efficient use of resources, a priority for countries with economic shortfalls such as ours. It permits the creation of a foundation for new policies and management strategies, and contributes to sustainability in municipal management.
By way of illustration, the following table summarizes where there are reductions in the total loads of the main control parameters since the Program began in 1997 and until the last assessment.

Fecha	Industrias Activas con vertido	Caudal (m^3/día)	Grasas	DBO_5	SST	Cr T	Sulfuros	Pb
			(kg/día)					
11/1997	78	18.162	17.108	21.328	6.326	294	133	31
11/2007	94	18.740	3.261	15.305	2.260	55	57	1,8
% de Variación 11/ 97- 11/ 07	**+ 21 %**	**+ 3,2 %**	**- 81 %**	**- 28 %**	**- 64 %**	**- 81 %**	**- 57%**	**- 94 %**