CHAPTER 2

INSTITUTIONAL FRAMEWORK AND INDUSTRIAL WATER POLLUTION LEGISLATION

The objective of this chapter is two-fold. First, to describe the institutional organization and norms regarding industrial water pollution regulation in Uruguay, and second, to describe the actual effluents control policy implemented by the municipal and national governments, along with descriptive statistics of the inspections and enforcement actions performed by these two offices on a representative sample of industrial plants in the city during July 1996 – October 2001. These descriptions are complemented in Chapter 3 with the description of the evolution of water quality of the city waterways, the evolution of total discharges of the monitored plants, and violations to emission standards.

The most important findings of this Chapter are the following. Both the municipal government of Montevideo and the national government have jurisdiction over industrial water pollution control in the city. This institutional organization is both the result of the historical evolution of water pollution legislation and an informal agreement between them that took place in 1995, which was aimed at saving scarce monitoring and enforcement resources. The agreement fulfilled this objective but coordination between the two offices is poor, preventing better results. The pollution control instruments used are uniform emission standards defined in terms of concentrations of pollutants, not in terms of quantities discharged. Nevertheless, rather than simply enforcing emission standards, water pollution control is centered on the existence and correct operation of a

treatment technology. In fact, the legislation does not sanction violations to emissions standards, only misoperation of the treatment plant. Recognizing very low compliance rates and the difficult economic situations of the industrial plants of the city, the municipal government of Montevideo implemented the "Industrial Pollution Reduction Plan" that relaxed the emissions standards during a considerable period of time to allow the firms to incorporate abatement technology. Fines have been very rarely applied despite frequent violations. Finally, the only economic incentives to curb emissions in the Uruguayan legislation are fiscal benefits for investments in abatement technology.

2.1 INSTITUTIONAL FRAMEWORK

Jurisdiction over industrial water pollution in Montevideo is shared by the National Environment Office (Dirección Nacional de Medio Ambiente, DINAMA), of the Ministry of Housing, Zoning and the Environment (Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, MVOTMA) and the Department of Environmental Development (Departamento de Desarrollo Ambiental), of the Municipal Government of Montevideo (Intendencia Municipal de Montevideo, IMM). The allocation of responsibilities between these two offices can be summarized as follows. The Department of Environmental Development of the IMM, through its Industrial Effluents Unit (UEI), is responsible for monitoring industrial effluents and watercourses quality, and for enforcing effluent emissions standards and the correct operation of

effluent treatment plants.[7] This unit is also the regulatory office to which the plants report. The task of the National Environment Office (DINAMA), through the Department of Environmental Control (DCA), is to give permits for industrial discharges when they determine that a firm has a treatment plant that enables it to comply with emission standards. In other words, the DCA is in charge of "initial compliance", while the UEI is in charge of "continuous compliance".

This institutional organization is both the result of the historical evolution of water pollution legislation and an informal agreement between the DINAMA and the IMM that took place in 1995.

With respect to the evolution of the legislation, the first national norms that directly regulated water pollution were approved in the years 1978 (Water Code) and 1979 (Decree 253/79). Between 1980 and 1990 the enforcement of these norms was the responsibility of the Ministry of Transport and Public Works (Ministerio de Transporte y Obras Públicas, MTOP). In 1990 the Ministry of the Environment was created and all the responsibilities regarding water quality were transferred to its National Environment Office (DINAMA). Today this is the national environmental authority responsible for developing, implementing, enforcing and evaluating the national environmental protection policy. But the Municipal Government of Montevideo (IMM) has been in charge of supplying and maintaining the city sewage system from the beginning of the century. It was at the municipal level that the first regulations concerning industrial water pollution appeared in the sixties, almost twenty-five years before the creation of the Ministry of the Environment. If we add that the Ministry of the Environment suffers

[7] Water ambient quality monitoring was transferred to the Hygiene Laboratory of the IMM in 2002.

important budget constraints that prevent the complete swapping of responsibilities, it is very easy to understand why the IMM continues to play a role as significant as the DINAMA with respect to industrial water pollution in the city of Montevideo.

The other factor that shapes the present institutional organization is an agreement that took place in 1995 between the IMM and the DINAMA. This agreement established that the IMM would periodically monitor emissions in Montevideo while the DINAMA would be in charge of approving effluent treatment plants. But though the division of responsibilities was clear in theory, it was not so in practice. For example, the DINAMA continued to monitor plants even when they were not investing in their treatment plants. Moreover, the "Industrial Pollution Reduction Plan" implemented by the IMM between 1997 and 1999, which relaxed emissions standards during that period (and in some cases indefinitely), complicated the coordination of actions between both offices and led to the breakdown of the agreement in 2002. In spite of these problems, the agreement was beneficial in conserving scarce government resources. The DCA's staff is composed of only five persons, who are not only in charge of monitoring and enforcing water pollution legislation, but also monitoring and enforcing the rest of environmental legislation, including air pollution, evaluation of impact assessment analysis, toxic and non-toxic waste, and any episode of environmental damage in general, like oil spills in the Uruguayan coast. Staffing is a bit better at the UEI, where seven persons work, but they are only in charge of industrial emissions in Montevideo.

2.2 LEGISLATION

2.2.1 The 1967 and 1968 Municipal Norms on the Disposition of Waste Waters by Industrial Firms[8]

These norms are a landmark in the national water pollution regulation for two reasons. First, they repealed all previous norms legislating water pollution in Montevideo. Second, they were extremely important in shaping present municipal and national water pollution policy. They envisaged water pollution control based on the presence and correct operation of treatment technology rather, than just directly enforcing emission standards, which continues to be the national regulatory approach to industrial pollution control today. Even more specifically, they set the basic criteria, information demands, procedures and sanctions of the present industrial water pollution control policy in the country. These are described in the following paragraphs.

First, all industrial plants are required to have an effluent treatment plant that allows them to comply with emissions standards and by this way obtain the Industrial Discharge Authorization permit. Second, changes in a production process must be accompanied by reforms in the treatment plant in order to maintain the permit. Third, plants must have a "competent professional" responsible for the construction and operation of the treatment plant, as well as the truthfulness of reports.

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[8] Ordenanza sobre la Disposición de Aguas Residuales de los Establecimientos Industriales del Departamento de Montevideo, Decreto N° 13.982 de la Junta Departamental de Montevideo, 1967, and Reglamentación de la Ordenanza sobre la Disposición de Aguas Residuales de los Establecimientos Industriales del Departamento de Montevideo, Resolución N° 16.277 del Intendente Municipal de Montevideo, 1968.

Fourth, the municipal norms also defined emission standards for organic and inorganic pollutants for industrial plants emitting to waterways and those emitting to the sewage system. The former were more stringent. These standards were defined in terms of concentration levels. No legal limits were established on the quantity of pollutants emitted.

Except for the types of pollutants covered and the values of emission standards, which have been redefined, the rest of the provisions just described (including the steps of the Industrial Discharge Authorization process) have been identically incorporated into the National Decree 253/79, which presently regulates water pollution control in the entire country.

2.2.2 Water Code of 1978 [9]

The Water Code was passed ten years after the municipal norms described above. It represents the first attempt to fill legal "holes" regarding water use in the national jurisdiction. The contribution of the Water Code was to establish four general principles around which water quality control policy would build on (articles 144 to 147). The first of these principles is the prohibition to dump substances or materials harmful to animal, human health or the environment into waterways. The second is the permission of the previous activities when the national interest is superior to water conservation. The third principle is empowering the corresponding Ministry to establish maximum emission levels for discharges and to impose effluents treatment. Lastly, establishing (minimum and maximum) sanctions for violations, which could consist of monetary fines or

[9] Código de Aguas - Decreto-Ley N ° 14.859 de 1978

revocation of the discharge permit and criminal penalties. By these dispositions the Water Code created the legal basis for future de facto disputes on municipal versus national jurisdictions over water pollution.

2.2.3 National Decree 253/79 [10]

This Decree was enacted in 1979 (with amendments in 1988, 1989 and 1991) to rule articles of the Water Code. It is the most important norm regulating water pollution in Uruguay today, determining ambient standards for waterways, emission standards for industrial effluents and penalties for non-compliance. However, in all respects the Decree is an application of the previous municipal norms to the national level. The most important differences between the Decree 253/79 and the former municipal norms are the following four points.

First, it transferred the Industrial Discharge Authorization process, previously in the hands of the IMM, to the national government. The amount of information supplied by the firms to the DINAMA in the application process for a discharge permit is very large (MVOTMA, 1995). They provide information regarding the production process (including maximum daily and monthly production, average water consumption, daily quantities of inputs used), a description of the characteristics of effluents and solid wastes generated, information on conditions of receptor bodies at the point of discharge, time schedules for the construction of the treatment plant and a description of its operation and maintenance. The rationale for requiring all this information is that, since the emission standards are defined in terms of concentration levels, all that regulators have to do to

[10] "Decreto 253/79, Normas para prevenir la contaminación ambiental mediante el control de contaminación de aguas, 1979."

ensure that a firm is in compliance is to monitor the existence and correct functioning of a treatment plant capable of treating the firm's effluents. But in order to do this, the regulator must first demand the firm to report detailed characteristics of its production processes.

Second, the Decree redefined emissions standards in three aspects. First, their levels were redefined. Second, they included more pollutants. And third, they included plants infiltrating emissions into the soil. But the emission standards continue to be defined in terms of maximum allowable concentration levels of pollutants per effluent volume, not in terms of maximum quantities of pollutants. The only related regulation states that the total volume of effluent discharged must not be greater than 2.5 times the average volume emitted during an activity period for plants emitting to the sewage system, and 1.5 times for plants emitting to watercourses. These measures would prevent temporary overloads that could produce permanent effects on watercourses. The Decree also established that discharge authorizations are conditioned on the capacity of the municipal sewer, and that the Ministry of the Environment can mandate firms to control effluent volumes.

After interviewing IMM inspectors, consultants and engineers in charge of industries' treatment plants about this issue, one can conclude that there is not consensus (even among environmental engineers) on why the legislation sets emission standards in terms of concentration levels without controlling the total volume of effluents discharged. The only justification in its favor is that if all effluents received by a watercourse comply with concentration emission standards, then the concentration levels in the watercourse will never exceed the levels in the effluents. However, there is a growing consensus that

the legislation needs to be moved towards the regulation of quantities of pollutants emitted. This is explicitly mentioned in the Environmental Agenda of Montevideo 2000 and 2002 (IMM, 2000 and 2002).

Third, the Decree also established the corresponding fines for non-compliance. Fines are set as an increasing function of the number of violations in record. The minimum and maximum amounts, along with the range of possible fines, increase with the number of past offenses. The legislation does not specify the criteria for choosing the amount of the fine within the possible range established by the Decree, given the type of violation. This is a consequence of the types of activities sanctioned. Not operating a treatment plant correctly can cover a wide range of illegal activities. Therefore, "the severity of the violation" is left to the discretion of the inspector, who certainly also considers other aspects such as the previous disposition and cooperation of the plant manager. Nevertheless, the inspectors do not determine fines. In the case of the IMM, the amount of the fine determines who has the final decision: the Director of the Department of Environmental Development, the Municipal Major (Intendente) or the Municipal Legislative (Junta Departamental), respectively. In the case of the DINAMA, it is the Secretary of the Environment (Ministro) who has the final decision.

From the structure of fines it can be concluded that the first interest of regulators is that firms apply for the Industrial Discharge Authorization permit. Once the application is submitted, the regulator focuses its enforcement efforts on the construction schedule of the treatment plant. After the treatment plant is finished, the enforcement strategy of regulators is focused on the correct operation of the treatment plant.

The most striking feature regarding the sanction system is that violations to emission standards are not penalized. Fines only sanction non-compliance with dispositions in the application for discharge permits or the correct operation of the treatment plant. This is a major difference with the classic treatment of enforcing emission standards, where sanctions are an increasing function of the extent of the violation to the emission standard. Although striking, it may be consistent with the actual policy approach. Compliance with emission standards is impossible if the firm does not have a treatment plant. Regulators mandate the firm to construct a treatment plant such that, given its reported characteristics, the firm is able to comply with emission standards. This means that once the permit is granted all that regulators need to worry about to assure that emission standards are met is to monitor and enforce the correct operation of the treatment plant.[11] Thus, sanctions applied to firms with treatment plants only penalize inadequate operation of the plant.

Finally, the Decree 253/79 also set Ambient Standards. Watercourses are divided in four categories: Class 1: waters for human consumption; Class 2: waters for recreational purposes and irrigation; Class 3: waters for preserving the environment and the irrigation of products not directly consumed by humans; Class 4: waters crossing urban or suburban areas and for irrigation of products not consumed by humans. Different ambient standards were defined for each category. Standards for waters in Class 1 are the more stringent. These standards are defined for an important number of organic and inorganic pollution parameters. The Decree committed to the Ministry of the

[11] Of course, one reason for not complying could be that the reported characteristics and volumes of the production process could have changed. For this reason, the legislation also allows regulators to require plants to carry out the necessary treatment plant reforms to comply again with emission standards.

Environment the task of classifying watercourses, in coordination with other institutions. But this classification was never undertaken. Consequently, emission standards are currently the only standards regulating industrial pollution.

2.2.4 Industrial Pollution Reduction Plan[12]

In 1996, within the Urban Sanitation Plan for Montevideo, the Department of Environmental Development of the IMM enacted this resolution with the objective of improving the level of compliance to emission standards by the industries in Montevideo.

The resolution, named the Industrial Pollution Reduction Plan, relaxed the emissions standards set by the National Decree 253/79 and established a time schedule by which they would converge again to the original levels. The Plan was based not only on the recognition, on the part of the IMM, of the low compliance rates of the industrial sector with emission standards, but on the recognition of declared difficult economic situation as a possible explanation for the low compliance rates. The Plan did not cover all pollutants subjected to standards in the Decree 253/79. Pollutants covered depended on the industrial branch and on the point of discharge, water courses or municipal sewers.

The Plan gave the firms considerable time to implement changes in abatement technology. Starting on March 1st 1997, the industries had almost three years before the standards converged again to the Decree 253/79 levels, in December 31st 1999. A second observation is that regulators recognized wool washing plants and tanneries as the industries facing the greatest difficulty in complying. These plants had laxer standards in each period, and even more surprisingly, the BOD_5 standards for these two types of

[12] Resolución Municipal N° 761/96, Plan de Reducción de la Contaminación de Origen Industrial, February 26th, 1996.

plants emitting to municipal sewers converged to a value that is higher than the one fixed by the National Decree 253/79 (3,000 mg/l and 1,000 mg/l for wool plants and tanneries, respectively, compared to 700 mg/l set by Decree). According to conversations with inspectors at the Department of Environmental Control of the DINAMA, these inconsistencies have generated problems in enforcement because firms argue that they are complying with municipal standards while the DINAMA requires adjustments to meet emission standards set by the National Decree.

2.2.5 The experience with emissions charges[13]

Contemporaneously with the Industrial Pollution Reduction Plan the IMM approved the creation of emissions charges for those industries with effluent concentration levels larger than the emissions standards. In fact, this was not an emissions tax in the classical sense but rather what is called an emission tax with thresholds.[14] Under an emission tax with thresholds the polluting firm pays $t(e-e_0)$, where t is the tax, e is the level of emissions and e_0 is the emissions standard. The norms distinguished industries that were emitting to municipal sewages and watercourses. The former would pay an Additional Charge (Tasa Adicional) and the latter would pay a Special Charge (Tasa Especial). But despite the difference in name, they were both very similar. Both would be calculated by multiplying the Basic Charge (Tasa Básica, a linear function of the cubic meters of tap water consumed) by a factor larger than one but not

[13] Articles 42 to 45 of the "Decreto de la Junta Departamental N° 26.949", December 14th, 1995.

[14] I here use the terms tax and charge interchangeably, but in fact there is a very important difference between them in the Uruguayan legislation, a difference that was central to its failure.

larger than fifteen. The final factor would be determined as a function of the number of pollutants in the effluents with concentration levels above the standards and the level of these violations.

These charges were never implemented because the Chamber of Representatives (Cámara de Diputados) repealed them in the following year through a mechanism of the Uruguayan Constitution, by which at least a thousand citizens can present a petition for such a repeal before the Chamber. The arguments behind the repeal were mainly two. One was the political economy argument behind any tax; it would raise costs to the industrial community. A second argument was that the charge was unconstitutional. Municipal governments in Uruguay can only create charges ("*tasas"*) if these are directly related to a service provided by the municipality. In this case the service was the sewage system, but the legal argument of the opposition in the Chamber of Representatives was that since the charge was based on cubic meters of tap water consumption and not on cubic meters of effluents discharged to the sewage system the charge was not really a "*tasa*" but an *"impuesto"* (tax), which only the national government can create, according to the Constitution. The issue was exacerbated by the charge imposed on industrial plants emitting directly to watercourses because in these cases there was no sewage service involved.

2.2.6 The General Law for the Protection of the Environment

Finally, since November 2000 the country has a "General Law for the Protection of the Environment". This law declares that the conservation of the environment is in the national interest, affirms the right of people to live in a healthy environment, the duty to

abstain from actions that cause depletion, destruction or pollution in the environment and commits the state and public entities to promote a model of sustainable development. Its Article 13 establishes fiscal benefits for investments in abatement technology. This article is the only piece of legislation in Uruguay concerning water pollution control that provides an economic incentive to curb emissions.

2.3 ACTUAL POLICY

The objective of this section is to describe how the water pollution control policy is implemented in practice given the institutional framework just described. In this part I describe the strategic plan that guides the municipal government control policy and the inspection strategies of both the municipal and national governments. Finally, I present descriptive statistics of the number of inspections and enforcement actions performed by these two offices on a representative sample of industrial plants in the city during June 1996 – October 2001.

2.3.1 The Urban Sanitation Plan

The strategic plan which guides the IMM control policy was outlined in the Urban Sanitation Director Plan (Plan Director de Saneamiento Urbano), in execution since 1992 with funds from the Inter-American Development Bank. In general terms, this is a plan for the extension of the municipal sewage system to several parts of the city. Concerning the water pollution policy, these works would reduce effluents discharged to city streams by redirecting them into the sea through two discharge pipes. Towards this objective the

IMM undertook the third stage of the Urban Sanitation Plan for the city of Montevideo (PSUIII).[15] This plan is key to understanding the pollution control policy of the IMM and it needs to be taken into account when interpreting the empirical results in Chapter 8 of this dissertation regarding the effectiveness of the emissions standards enforcement policy. Apart from work on the city sewage collection system, the objectives of the PSUIII included: (1) the development of a Monitoring Program for controlling industrial pollution and the quality of the city's water bodies, and (2) to increase the institutional capacity of municipal units in charge of the enforcement of industrial emissions standards. (I.M.M., 2001; Multiservice – Seinco – Tahal, 2001b).[16] The Monitoring Program was executed between 1999 and 2001 by the private consortium Multiservice-Seinco-Tahal (SEINCO). The major activities of the Monitoring Program included: (a) inspection, supervision and sampling of industries to determine level of compliance with emissions standards; (b) an industrial census determining characteristics of pollutants discharged and their potential environmental risk, treatment systems and efficiency levels; (c) classification of industrial firms by sector and size; (d) establishment of the monitoring frequency, duration and procedure of emissions by industry class; (e) a study of the treatment and discharge of industrial sludge; (f) establishment of the monitoring frequency, duration and procedure of water courses, and (g) design of indicators of water quality. The Program also included an amendment proposal for the Decree 253/79.

[15] Contract signed in November 1996, Loan 948/OC-UR

[16] http://www.imm.gub.uy/ambiente/amb_saneamiento.htm#etapas

2.3.2 Self reports

Industrial water pollution in Uruguay is based on a system of self-reporting. Self-reports are sent to the Industrial Effluents Unit of the IMM, although some plants send them also to the Department of Environmental Control of the DINAMA voluntarily.

Reports include monthly levels of (1) production, (2) tap and underground water consumed, (3) energy consumed (electricity, wood, fuels), (4) number of employees and days worked, and (5) volumes of emissions and their concentrations of pollutants. Reporting periods are November – February, March – June and July – October. Inactivity periods should also be reported. Failing to send a report on time and in the correct form could lead to fines to the industry and an observation to the professional in charge. In theory, the plants have to send the reports within the two weeks that follow each reporting period. But actually this requirement is not enforced; plants do not have a clear due date for submitting their reports.

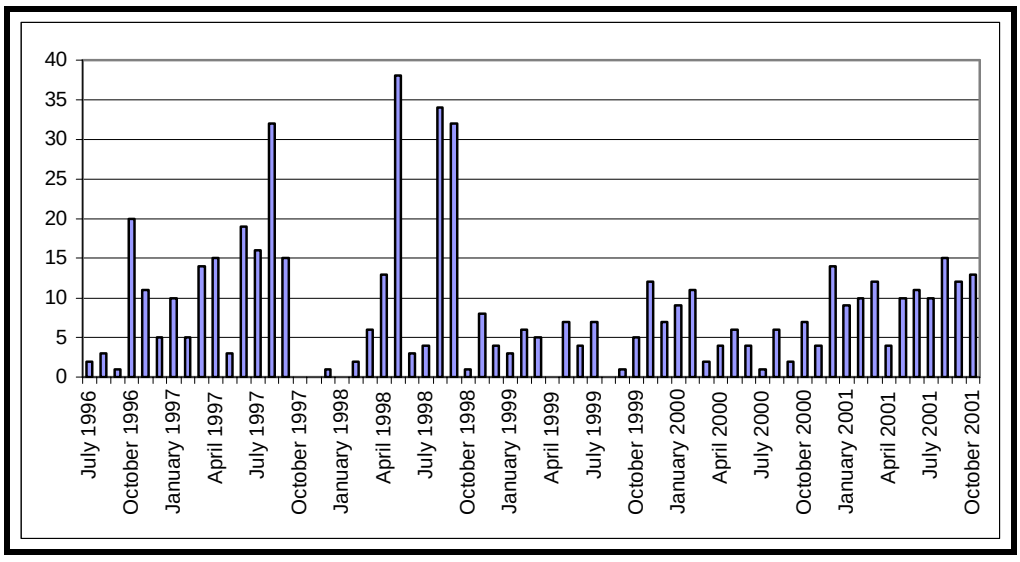
2.3.3 Inspections and Fines

Two types of regular inspections exist, with and without effluent sampling. Sampling inspections are those in which the inspectors take samples from the plant's effluents for latter analysis. These inspections always include an evaluation of the treatment plant performance as well as general questions regarding the economic situation of the firm, including changes in levels of production, or special events that could affect the effectiveness of the effluents treatment process. Non-sampling inspections include the latter evaluation and general questions but they do not include a sample of the plant's effluents. Possible reasons for not sampling may be that the plant is

not working at the time of the inspection, or that the plant is not discharging at the time of the inspection.[17]

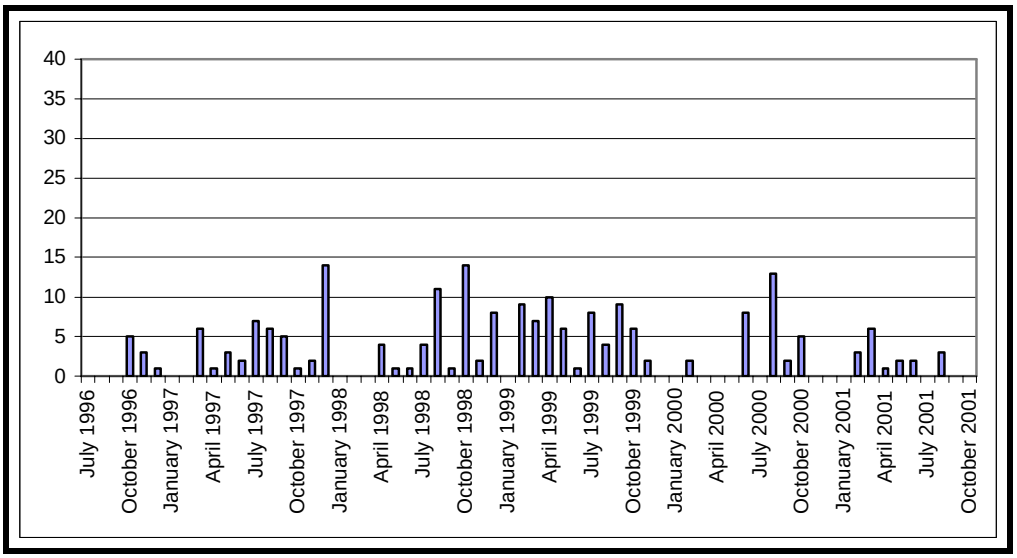
A first look at the number of inspections performed by the IMM on a sample composed of 74 industrial plants responsible for more than 90% of the industrial pollution in the city suggests that the IMM increased the monitoring frequency during the implementation of the Industrial Pollution Reduction Plan, between March 1997 and December 1999. (See Figure 2.1). Nevertheless, the peaks observed in some months of 1997 and 1998 reveal that IMM inspectors conducted special monitoring campaigns in those months due to the delay in the implementation of the Monitoring Program by SEINCO. It is interesting to note that IMM inspectors received extra IADB-financed payments for these campaigns.

Figure 2.1: Number of Inspections by the IMM



[17] This discontinuity of discharges presents a problem for the DCA inspectors, who have very rigid time schedules for inspections in Montevideo because they also have to inspect firms in the rest of the country.

Figure 2.2: Number of Inspection by the DCA



With respect to the DCA monitoring and enforcement policy, simple analysis of its data regarding the number of inspections performed and the plants inspected does not support the story about the IMM being in charge of continuous compliance and the DCA in charge only of initial compliance. There is no clear relationship between those plants most inspected by the DCA and those that incorporated abatement technology during the period. It looks like, even after controlling for special campaigns conducted by the DCA and NGOs (possibly as a result of some external funding availability), the DCA was also interested in assessing continuous compliance. It is true though that the DCA inspected a lot less than the IMM, as can be seen in Figure 2.2. In fact, during the period July 1996 - October 2001, out of a total of 760 inspections by the two regulatory offices, the city government unit (UEI) conducted a total of 549 inspections on the same 74 plants and the DCA only performed 211. Furthermore, 401 of the UEI inspections (73%) were sampling inspections, while for the DCA the number of sampling inspections was 122 (58%).

Finally, it is interesting to note that that fines were very rarely levied in spite of extremely frequent reported and discovered violations. For example, even though forty one percent (41%) of the BOD_5 monthly levels of emissions reported by sixty-nine plants during July 1997 and October 2001 were out of compliance, the IMM levied only 11 fines and the DCA only four fines during the same period. But I defer this discussion until the next Chapter.