
ENVIRONMENTAL AUDITING IN MÉXICO

CALDERON BARTHENEUF, J.L.

Under Attorney for Environmental Audit, Federal Attorney for Environmental Protection,
Periferico Sur 5000, 4° Piso, Col. Insurgentes Cuicuilco, México, D.F, E-mail:
auditamb@correo.profepa.gob.mx

SUMMARY

This paper is a follow-up of the paper I presented at the "Fourth International Conference on Environmental Compliance and Enforcement" held in Chiang Mai, Thailand in April, 1996. The title was "The Mexican Environmental Audit as a Voluntary Norm". Its contents referred to the general situation of México before the practice of environmental auditing, the reasons to develop this non-binding tool as a policy, the industrial response, and some results obtained up to August 1995.

In this document you will find information related to actual results of environmental audits carried out, the typical benefits for industry after the audit, the "Clean Industry" certificate, the relationship with ISO 14001, the environmental auditors evaluation process and the strategy to involve small enterprises in the audit program.

1 INTRODUCTION

As it has been demonstrated in many countries, command and control policies are necessary but not enough to get all the environmental improvement facilities can reach nowadays.

According to our experience, for many facilities the possibility to obtain a sanction for not being in compliance with environmental regulations, becomes an important motivation to decide to obey the laws and avoid these sanctions. At same time, it is also true that they can protect the environment beyond regulations through voluntary and concerted policies. The environmental audit offers to public and private factories the opportunity to participate with the authority in the development of different activities for their environmental improvement, taking into account both policies.

Through the Audit, it is possible to obtain results that are difficult to get with coercive actions, especially for very big or very complex facilities (refineries, smelters, etc.). Its voluntary nature makes it possible to carry out a precise evaluation in detail for the total productive process, but it is impossible to do it by means of a unilateral surveillance visit.

As a result of this minute and precise examination, the environmental audit allows facilities to program the realization of all the corrective and preventive activities, including the substitution of obsolete equipment.

For these reasons, The National Environment Program of 1995 and the amendments to the General Law of Ecological Balance and Environmental Protection realized in 1996, describe the audit as the most important voluntary tool in our environmental policy to accomplish the environmental regulations and protect the environment of our country, beyond the law.

2 THE ENVIRONMENTAL AUDIT

Article 38 bis of the actual General Law defines the environmental audit as the methodological evaluation of the facility's operations according to its pollution sources and management risk situations, as well as the performance levels with respect to environmental regulations, international safety parameters and good operation and engineering practices in order to define the preventive and corrective measures necessary to protect the environment.

Under this definition, we can notice the following points: First, the environmental audit is not a simple review, but a methodological evaluation, previously established in the "Terms of Reference," a document that has been revised and actualized, so it is possible to use it to audit all type of productive processes.

In the second place, the environmental audit determines compliance with environmental regulations and when Mexican regulations do not exist for some issues, it is possible to use international regulations as a reference. Therefore, the audit is an integral evaluation about the facility's overall environmental performance and operations.

In the third place, due to the fact that the objective of the audit is compliance with regulations and the protection of the environment, after detecting deficiencies in the process, it is necessary to identify all the preventive and corrective measures to achieve and maintain optimal environmental protection status.

3 THE AUDIT PROCESS

An environmental audit comprises the following three stages;

3.1. Planning or Pre-Audit

At this stage a detailed activity program describing the type of tests and analyses to be performed is prepared. All the planning and decision making about how the environmental audit is to be carried out is performed during this phase, as well as the gathering of all the relevant information regarding the facility to be audited, especially the productive process, products and raw materials.

The procedures and analyses carried out at this stage must comply with the applicable legal provisions; best efforts must be made in order to cover all those areas within the audited business which may have an impact on the environment, whether or not all potential sources of pollution are individually regulated.

3.2. "In situ" Assessment or Audit

This is one of the most important stages in the entire process. During this phase all those studies and evaluations needed to make a sound diagnosis of environmental performance and the scheduling of remedial measures must be carried out.

The audit team must perform all tasks in regard to sampling, analyze, and monitors according to a program based on the Terms of Reference. Officials from the State Delegations of the Federal Attorney for Environmental Protection (PROFEPA) normally are in touch with the facility's personnel during the audit.

The process of assessing an industrial facility requires evaluation and studies, both inside and outside the facility.

The studies undertaken inside the facility encompass identification and evaluation of stages of industrial process involving both hazardous materials and wastes. Special attention must be given to the facilities, personnel, organization, layout, programs and procedures as well

as the review, analysis and evaluation of technical records and registers. Throughout this stage a fruitful exchange of information among those involved is encouraged for the parties to gain a better understanding of the origin of the problems or deficiencies uncovered.

The work outside the facility consists mainly of collecting and analyzing the information related to the natural environment, socioeconomic conditions and applicable provisions of environmental laws as well as the actual or potential environmental impact generated by the facility.

The legal analysis must be concerned with all environmental legal instruments, and also it must cover other areas, such as those relating to health and safety issues in the work place.

The audit report and the executive summary are the most time consuming of the stages of the process. Though it is true that there are no deadlines for the accomplishment of each audit phase, it is estimated that a full auditing process may take between six to ten months, depending on the complexity of the processes used by the facility, its geographical location, the degree of difficulty of the various aspects to be dealt with, etc.

It should be pointed out that, during the course of an audit, we avoid inspection visits while the audit is being performed, although there is no legal impediment to prevent any authority from carrying out such kind of visits. In fact, both in the Working and the Environmental Compliance Agreements, inspection and supervision duties are expressly preserved, due to the fact companies are working toward compliance.

Regarding the need to advise other authorities about the undertaking of an audit, it is the responsibility of private parties to directly inform them. Despite this, in PROFEPA we are working to have a specific coordination scheme among federal, state and municipal authorities as a result of these activities. In December 1997 we signed an agreement with the Water National Commission regarding the environmental audit program. Based on this agreement, they have refrained from inspecting those private parties who are carrying out an environmental audit. A similar response has been made by other authorities.

3.3. Post-Audit activities

It is at this stage that a final report is prepared, based on the information gathered, which includes the conclusions arising from each process assessed.

The final report contains an account of the audit results which includes: an Executive Summary, an Audit Report, and a Technical and Photographic Appendix.

The audit results (Action Plan) must be included in the Environmental Compliance Agreement to be subscribed to by PROFEPA and the industry representative. The signing of this agreement sets forth the basis for those actions to be undertaken by the private party within strict schedule, in order to remedy the deficiencies uncovered during the audit.

3.3.1. Audit Follow-up

Given that the audit process results in the preparation and implementation of the appropriate remedial plan, PROFEPA expressly reserves its right to undertake visits and monitoring in order to verify that the obligations accepted and scheduled in the Action Plan are being strictly fulfilled.

If a private party fails to perform the actions by the deadlines agreed upon, or if any irregularity is detected during a follow-up visit, PROFEPA may impose those sanctions contemplated under the General Law of Ecological Balance and Environmental Protection. Normally, these visits are made every three months, whether or not the industry has submitted a report on the activities undertaken in order to fulfill obligations under the Agreement.

Where such visits or monitoring show that the private party has not abided by terms of the Environmental Compliance Agreement, we may also impose administrative sanctions. Through these Agreements, private parties are granted extensions to comply with environmental laws and regulations, which in the final analysis, do not contradict the compliance provisions set forth by law.

One of the most important parts of the environmental audit program is the way PROFEPA agrees with the private parties on the steps to be taken in order to remedy the deficiencies uncovered during the assessment process; these steps are expressly reflected in the schedule of actions and times appended to the respective Agreement. Normally this schedule includes bar graphs depicting dates for initiation and conclusion of each one of the remedial actions to be undertaken by the audited party.

4 RESULTS 1995-1998

Under the Program, from August of 1995 to June of 1998, 901 audits have been concluded and 69 in process, totaling 970 audits (see table 1). Some of the companies whose Action Plans have been worked out based on environmental audits are Petróleos Mexicanos (PEMEX), National Railroads of Mexico (FNM), Federal Electricity Commission (CFE), Nestlé Co., Ford Motors Co., General Motors, Grupo Cementos Mexicanos (CEMEX), Celanese Mexicana, Industrias Resistol, Nissan Mexicana, Grupo Acerero del Norte, Colgate Palmolive, Cervecería Cuauhtémoc, Cervecería Moctezuma, Cervecería Modelo and Grupo Peñoles.

As related to the relevance of the Audit Program in the environmental context of the North America Free Trade Agreement (NAFTA), the President of the United States, William J. Clinton, submitted to the Congress the survey on the operation and effects of the North American Free Trade Agreement, and said, *"The Mexican Government has instituted an innovative auditing program to promote industry leadership in voluntary compliance. The program has grown to maturity since its initiation in 1992, with 274 facilities entering the program in 1996. As of April 1997, 617 facilities have completed environmental audits, and 404 have signed Action Plans to implement recommended improvements to attain, continually assure, and exceed compliance. The Action Plans represent more than \$ 800 million in environmental improvement investments in Mexico."*

Another significant aspect of the Program, has been the development of the terms of reference for some of the most important industrial activities of the country as: solvents and painting fabrication, metallurgy, chemical and pharmaceutical industry, micro and small industry, hotels and hospitals.

Table 1 The National Environmental Audit Program 1992-1998
Number of Audits Conducted (by Year - by Sector)

Sector	1992-1994	1995	1996	1997	1998		Total
					Concluded	In Progress	
Public	54	12	67	87	51	35	306
Private	192	167	108	130	33	34	664
Total	246	179	175	217	84	69	970

These 970 audits have been conducted across the country, more than 50% were carried out in: Mexico State (100), Veracruz (82), Chihuahua (73), Coahuila (63), Tabasco (52), Nuevo León (49), Tamaulipas (41) and Puebla (40).

The most important sectors in terms of number of audits conducted are: petrochemical with 193 facilities, chemical with 150 installations and automotive with 103 facilities. Almost all these facilities belong to the high risk type.

5 FINANCIAL DATA

At the beginning, PROFEPA financed the environmental audits to introduce and evaluate the potential benefits of this tool as well as to promote its application in all industrial sectors. At this point in time, it is no longer necessary to pay for audits, because factories pay them with their own resources.

It is important to mention that during the period from June 1992 to June 1998, 970 environmental audits of companies and establishments have been conducted representing an investment of 90 million pesos by PROFEPA. As a result of these activities, Action Plans for 487 of these companies have been signed, entailing an investment by the companies of 8,500 million pesos to acquire and install pollution control devices and to modify their productive processes.

Among the companies audited, Federal Government enterprises stand out, such as PEMEX's petrochemical complexes and refineries, CFE's power generation plants, National Mexican Railroads, etc. To have an idea about the required budgets, PEMEX by itself has spent more than \$ 2 billion USD in carrying out audits and paying corrective and preventive activities to comply with Action Plans.

6 CERTIFICATION AS CLEAN INDUSTRY

Under Article 38 bis of the Ecological Balance and Environmental Protection General Act, PROFEPA formalized the grant of a Certification as "Clean Industry" to the companies that fulfill the technical specifications established in the Action Plans derived from effected environmental audits in a timely manner, and permanently maintain environmental protection programs.

On April 1st of April 1997, the President of Mexico granted the first 80 certificates. Of the total audited companies, 161 have received a "Clean Industry Certificate" as a special recognition to have fulfilled the entire Action Plan.

To date, after the environmental audits, these installations work with more safety processes and comply with regulations related to air quality, waste water and hazardous wastes management standards. At the same time, they have introduced important improvements in their processes and therefore have obtained important savings in energy, raw materials, accident insurance payments, reduction of labor accidents, etc.

These certificates is in force for one year and they can be extended for the same period of time. A previous application by the company and results of a review by an audit team are requested so that there is a guarantee that conditions under the which facility was granted a certificate are being maintained undisturbed or have been surpassed.

7 ENVIRONMENTAL AND ECONOMIC BENEFITS

In 1997, the Sub-Attorney of Environmental Audits carried out a survey to capture the opinion of the companies with respect to economic and operational benefits of the audit program. The following results were obtained:

Table 2 Consumption of Raw Materials and Generation of Wastes

Concept	Levels In Audit	Present Levels	Annual Reduction
Consumption of supply water m ³ /yr.	53,960,000	43,000,00	10,960,000(*)
Residual Waters Exhaust m ³ /yr	19,000,000	16,000,000	3,000,000
Liquid hazardous wastes lts/yr.	20,000,000	16,000,000	4,000,000
Solid hazardous wastes tons/yr	110,000	95,000	15,000
Liquid fuels lts/yr	126,000,000	90,000,000	36,000,000
Gaseous fuels m ³ /yr	2,000,000,000	2,251,000,000	(+)251,000,000
Pollution to the atmosphere tons/yr	1,900	300	1,600(**)

(*) Sufficient volume to supply a city of 100,000 inhabitants during 1 year.

(**) Data of 3 companies, reduction of 84%.

(+) In this case the amount increased because they changed from liquid to gaseous fuels.

Other results:

- 85% of the companies expressed benefits due to the environmental audit concerning compliance with legislation on waste water emissions; 76% on air emissions; 62% on noise reduction levels; 90% on soil and subsoil pollution control; 95% on hazardous wastes management; and 95% about lower levels of risk in their facilities.
- Concerning economic benefits, 52.4% of 21 companies expressed cost savings derived from the environmental audit and implementation of the corresponding action plan and 47.6% of those remaining indicated they have not obtained benefits or they did not have this type of data because they did not have a reliable evaluation system.

The following data are very meaningful figures of cost savings in 8 companies: 10.79 million pesos annually, of this amount 35.8% represented a decrease in water supply; 23.8% by the residual water exhausts; 13.9% by contributions to the IMSS; 10.8% in electrical energy consumption; 9.5% by payment of insurance rates and 5.7% by avoiding possible sanctions. These savings, compared with the investments agreed among the PROFEPA and audited companies (\$30.77 million), means that the total investment would be recovered in three years in constant dollars.

- About social benefits, industries expressed the following opinions:

- 85.7% of industries indicated improvements in their relationships to the federal, state and municipal authorities; 66.7% mention that the relationships to their neighbors or in their community was more favorable.
- 91% of the audited companies asserted that they have improved the management of environmental information and 100% considered that the audit encourages prevention and environmental protection.
- In 62% of the cases, facilities had optimized human and material resources and 52% of the companies expressed the fact that the audit had increased their competitiveness.
- Companies also expressed more order and cleanliness in the facility, as well as an increase in the environmental responsibility in their personal.

8 ENVIRONMENTAL AUDITORS

Among modifications to the Ecological Balance and Environmental Protection General Act in December 1996, is a new mandate for the Federal Attorney for Environmental Protection to establish a system for evaluation and approval of environmental auditors. Therefore PROFEPA integrated an "Evaluation and Approval Committee for Environmental Auditors." This committee is constituted by representatives of Universities, professional institutions, professional associations and organizations of the industrial sector. To date, we have established four environmental auditor categories to be consistent with areas and technical aspects implemented during all environmental audits, such categories are:

- a. Auditing coordinator;
- b. Environmental Auditor in water, air and soil pollution;
- c. Environmental Auditor in risk and response matter of environmental emergencies; and
- d. Environmental Auditor in dangerous materials and hazardous wastes management.

The evaluation and methods for auditor approval as well as the non-governmental participation, will provide certainty to the population and a greater specialization of the environmental audit services. The Committee will value objectively the capacity and real experience of the auditors. To date, there are 107 professionals approved as auditors representing all different scientific and technical specialties: environmental sciences, chemistry, civil, electrical and mechanical engineering, as well as biology and geology among others.

9 REGIONAL CENTERS FOR SUPPORTING THE ADMINISTRATIVE ENVIRONMENTAL MANAGEMENT IN THE INDUSTRIAL SECTOR

Mexico's Environmental Program 1995-2000 includes in its policies the need to increase enforcement and environment protection levels through voluntary programs. This includes policies to promote co-responsibility and organized participation among different groups and social sectors involved in environmental management processes and sustainability of natural resources.

Consistent with this policy, PROFEPA has promoted the creation of Regional Centers in the States of Coahuila, Monterrey and Puebla, involving the sponsorship of Industrial Chambers and Industrial Associations, as well as the participation of Universities and Federal State and Municipal Authorities. One of the activities established for the Centers is the promotion and implementation of low cost environmental audits for small and micro industries.

10 ISO 14001

PROFEPA, U.S.A. Environmental Protection Agency and Environment Canada as well as official NAFTA documents recognize the Mexican Environmental Audit as a compliance guarantee. Its effectiveness to protect the environment beyond the law has been recognized too.

In contrast, while the Mexican, USA and Canadian Environmental Authorities recognize that the environmental management systems standard ISO 14,001 of the International Organization for Standardization is a potential tool for helping environmental compliance, they also recognize that it is not a guarantee for compliance. In our case, this standard does not fulfill the environmental protection requirements established by PROFEPA in its voluntary National Environmental Audit Program.

11 CONCLUSION

The Reference Terms for Environmental Audits as well as the policy for voluntary compliance established by PROFEPA has proven to be highly successful for achieving higher levels of environmental compliance and general environmental performance and can be adapted to the domestic conditions of any country.