

Environmental Supervision on Expansion and Maintenance of Roads

MAGLIO, Ivan Carlos - Phd. Environmental health

MAGLIO, Leonardo Machado - Specialist in environmental management

MONTEIRO, Guilherme Monteiro – Environmental Engineer

NEDER, Eduardo Alves – Environmental Engineer

PPA - Política e Planejamento Ambiental LTDA

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1 INTRODUCTION

This paper discusses the hypothesis that adverse environmental occurrences arising during the implementation, expansion or maintenance of roads can be solved by the method of environmental supervision that can also be carried out by the entrepreneur himself and the case of the road authority in São Paulo State was used for this purpose.

The National Policy on the Environment was set forth in Brazil, by Law Nº. 6938 of August 31, 1981. The policy defines the principles and objectives for guidance as well as a set of management instruments to be applied— which are currently at different stages of development and implementation.

Among these instruments, Environmental Licensing is highlighted as one of the most effective for planning and management and most often applied in the context of national environmental policies. The goal is to control the environmental impacts of activities and projects that utilize natural resources or are regarded as effectively or potentially polluting.

Another important instrument emphasized is the Environmental Impact Assessment, which is made prior to the implementation of projects that significantly affect the environment for contemporary environmental management in Brazil. As set forth in the policy, the environmental licensing is characterized by three distinct phases: PL - Preliminary License, in the preliminary stages of planning activity; IL - Installation License for the implementation of the activity according to approved plans and projects; OL - Operating License for startup of activities in accordance with the provisions of the IL and OL.

The construction phase, after issuance of IL, is highlighted by the need to monitor forecasts made in environmental studies to ensure the elimination and mitigation of predicted impacts and to eliminate the inherent risks of carrying out the works. Further, it monitors the implementation of corrective measures for environmental restoration and compensation, appropriate construction methods and all requirements set forth in environmental studies and issued licenses. It is precisely at this stage that still insufficient environmental efforts are applied to improve the performance and environmental quality of the projects.

For this purpose, public and private entrepreneurs are creating in Brazil various instruments for environmental monitoring, among them the Environmental Supervision of projects carried out by the entrepreneur himself, that is the central focus of this paper.

This is the case of the “*Departamento de Estradas de Rodagem (DER/SP)*”, the road authority in São Paulo State, that since 2007 has set forth as part of its environmental policy a standard for Environmental Supervision of road work which aims at: “The implementation of works directed to verify compliance with environmental requirements defined in environmental law.” (DER/SP, 2007a, pg.3).

Road works are linear projects, which like other infrastructure projects generate impacts to the physical, biotic and socioeconomic resources in the areas of deployment, such as vegetation removal, erosion, silting of water bodies and interference with neighboring populations. The hypothesis that this paper proposes to demonstrate is that adverse environmental occurrences arise during the implementation phase of roadwork can be solved by the method of environmental supervision, stressing the importance of this Environmental Management instrument.

2 BRAZILIAN ENVIRONMENTAL LICENSING

The main guideline of the Brazilian Environmental Licensing is the concept of "environmental command and control." This concept of Environmental Management is based upon environmental enforcement, by the government, of economic activities, a practice that relies on a set of mechanisms, emphasizing compliance with the standards set forth for pollution control, which must be met by economic activities.

Currently, from an environmental point of view, this political guideline cannot be applied alone, as an "end of pipe" measure, i.e. it must not only be applied in the control of pollution effects at the end of the operation process of the project, but must be linked to the minimization of environmental impacts and cleaner production, thus applying to all the lifecycle of the project, aiming at environmental sustainability and continuous improvement.

According to Moreira (2001), the Brazilian Environmental Command and Control (Enforcement) Policy is applied to projects generating environmental impacts. It is an instrument used by public agencies to prevent environmental degradation and to apply the penalties provided for in current legislation to offenders, which plays a key role in ensuring the quality of life and protection of natural ecosystems. The federal, state and local governments are responsible for the application of Environmental Enforcement and, according to Sánchez (2008), this activity is carried out by government agents in the fulfillment of the State's police power.

Although supervision is a key instrument for the policy of "command and control", it is insufficient in view of the large number of enterprises generating environmental impacts. The difficulty of enforcement has always occurred, even when the environmental agencies controlled only industrial emissions to air, water and soil, which are considered an "end of pipe" control action. The challenge increased after CONAMA Resolution 01/1986 expanded the range of projects to be monitored, and set forth the requirement to control all types of environmental impacts, and not just emissions of polluting sources.

For projects subject to the process of Environmental Impact Assessment (EIA), those requiring more control due to their complexity, the deficiency are even greater given that inspections are carried out by sampling. In these cases, a complement to the government environmental enforcement is essential, and it can be done by the environmental supervision carried out by the entrepreneurs or their environmental consultants.

3 ENVIRONMENTAL SUPERVISION

With the evolution of environmental policies, especially after the World Conference on Environment and Development held by the United Nations (UN) in Rio de Janeiro in 1992, where the concept of sustainable development gained momentum, environmental policy based only on the concept of "command and control" performed by the State should be enforced by the environmental responsibility of the other partners. Further instruments of environmental management arise inspired by the concept of sustainable development, where economic, political, social, cultural and environmental development are balanced, meeting the needs of current generations without compromising the capability of the future ones.

With this paradigm shift, several new environmental management instruments began to emerge, and protective measures have changed “end-of-pipe” processes to environmentally safer alternatives, such as cleaner production, with emphasis on prevention and the elimination or mitigation of environmental impacts.

The Environmental Supervision, therefore, has been applied in Brazil as an instrument to support the entrepreneurs to follow the requirements of environmental licenses and also constraints of environmental studies. For this purpose detailed measures of mitigation and compensation are applied together with the environmental programs.

The author Sánchez (2008) defines Environmental Supervision as an activity performed by the entrepreneur for the purpose of verifying compliance with legal requirements by employees, contractors or any other party hired by the enterprise. Therefore the objective is to verify the compliance with environmental measures. The results of the Environmental Supervision can also be used by the environmental agency to extend its control over the projects.

Voluntarily enterprises seeking environmental certification and that aim at continuous improvement of their processes have been adopting this instrument before submitting to audit processes of certification bodies. It is the case of DER/SP that created its Environmental Policy, and a set of technical instructions, which highlights the Technical Specification for Highway Environmental Supervision of Projects that guides the Environmental Supervision of its projects.

3.1 Key aspects of the Technical Specification for Environmental Supervision of the DER/SP

According to the “Departamento de Estradas de Rodagem (DER/SP)”, the road authority in São Paulo State, there are different technical procedures to be adopted for environmental supervision in implementation, duplication, construction, recovery and improvements of highway projects. That is why, in 2007 the “DER/SP” set forth in its environmental policy, a Technical Specification to conduct Environmental Supervision.

Prior to the supervision of the work, the “DER/SP” or a contractor must develop a Basic Environmental Plan (PBA) to apply environmental measures for mitigation during the entire construction phase. The mitigation and compensation measures of the impacts generated by the project are detailed in that plan, as well as the conditions and restrictions made by the environmental agency established in the Enterprise Preliminary License (PL) and in the environmental studies. This document is a requirement preceding the request for the Installation License (IL) of projects in Brazil.

Another document which is previously issued by “DER/SP” and serves as a guideline for implementing the environmental supervision is the Environmental Control Program of work (ECP). Its function is to organize the implementation of preventive, corrective, mitigating and compensatory actions in the construction phase, based on the engineering design of the project and the peculiarities of the affected region. The procedures of the Environmental Supervision in road works follow these activities:

- Planning of the activities according to the work to be performed and a socio environmental study of the affected area or region;
- Monitoring or obtaining environmental legislation and licensing in accordance with the activities in the civil work;
- Inspection and monitoring of services performed, recording incidents and non-conformities;
- Technical meetings with stakeholders, such as inspectors, supervisors and contractors for the solution of non-conformities;

- Preparation of monthly reports and periodic environmental monitoring required by environmental agencies and a completion of the work Environmental Report.

Periodic technical inspections are carried out for the identification and register of environmental incidents and non-conformities. All the stretches along the work must be covered, in addition to filling out records of occurrence of environmental monitoring, environmental reporting, photographic survey report and statement of nonconformity. The person in charge of the work must accompany the inspection.

When the outcome of the procedure caused or will cause some sort of unplanned impact on environmental quality, the fact should be reported immediately to the "DER/SP" as an environmental non-conformity. It is then described as a negative environmental occurrence. According to the Technical Specification for conducting Environmental Supervision by "DER/SP" the definition for Environmental Occurrence is: "...the result of an intervention or procedure of work that has caused or will cause, changes in environmental quality, such as landslides and other processes of surface dynamics in general, silting, leakages or others which should be properly recorded, assessed and monitored by the Environmental Supervision" (DER/SP, 2007a, pg.8).

The Severity of impacts will be defined by the environmental supervisory staff, considering the following factors:

- Non-compliance with environmental legislation;
- Destruction of vegetation beyond that allowed by the environmental license;
- Opening of support areas without prior authorization;
- Leakage of contaminants in water or soil;
- Release of waste in water resources and unsuitable locations;
- Burning of material in the open air.

The environmental non-conformities are negative occurrences, which can be subdivided according to the severity, by the environmental supervisor, namely:

- Low: when it poses no hazard to the environment nor to workers;
- Average: when it can come to pose risks to the environment and workers;
- High: present risks to the environment, workers and others.

In works considered of great environmental interference, the environmental supervision staff must submit a monthly Report of Environmental Supervision awaiting approval of the "DER/SP" for continued construction. This report should include non-conformities, notifications and information on the environmental performance of the work at the time.

At the end of all inspections along the civil work, environmental quality, compliance requirements, environmental licenses and authorizations should be included in an environmental report of work completion. This should also comprise irregularities and open items identified and documented.

Thus, this document will serve as a reference for issuance of the Final Certificate of Environmental Compliance of the Project supporting the application for an Environmental Operating License at environmental agencies when appropriate.

4. DISCUSSIONS AND RECOMMENDATIONS

It was concluded that Environmental Supervision is an adequate instrument to prevent, minimize and ensure that mitigation measures are effectively applied as a necessary complement to environmental enforcement activities which are performed in sample form or when environmental authorities complain.

It was observed that the inspection by the environmental agency is required, but how it is performed, considering the existing procedures and the number of projects both new and of recovery to be inspected, shows even more clearly the need for complementary action by the entrepreneur himself in search of a better environmental performance. Therefore, the importance of the Environmental Supervision stands out, as well as the fact that periodic reports can complement the official control and inspection made by the environmental agency.

It was concluded that Environmental Supervision also allows the entrepreneur to incorporate a posture directed towards continuous improvement of his works and projects as one of the fundamental features of his Environmental Management procedures, a fact increasingly acknowledged by society in pursuit of environmental sustainability.

Finally, it is noted that as with any management instruments, both Environmental Licensing and Environmental Supervision require constant improvements. In the future, the environmental licensing process applied in Brazil could be upgraded to encompass efforts of entrepreneurs concerned with environmental management. Accordingly, Environmental Supervision may be a means to promote shared management, that includes auto-control as a feature to be incorporated by the Official Licensing System.

Self-monitoring of environmental quality in the projects carried out by means of continuous and repetitive measurements of parameters in Environmental Licensing can also be considered as a supplement to official control and monitoring performed by the environmental agency.

In the case of Environmental Supervision, experience showed that some recommendations applicable to the “DER/SP” standard are important for the improvement of this instrument in general:

- Apply sanctions and penalties to contractors with poor environmental performance;
- Improve environmental performance indices;
- Environmental monitoring: repetitive measurement, descriptive or continuous, or systematic observation of environmental quality. (CETESB, 2011)
- Create performance certificates;
- Presence of environmental technicians on the staff that carries out the works;
- Environmental Education training for officials in charge of carrying out the works;

Some of these actions are already performed by highway agencies of the São Paulo State, however, it was concluded that the imposition of sanctions and penalties to those causing successive damage to the environment, such as suspension of payments and direct influence on the final certification performance of the enterprise stand out as a way to make the procedure of Environmental Supervision more effective.

Creation of a standard for Environmental Certification that allows selecting contractors for their environmental performance in the construction phase, as we have seen, is an issue that depends on modifying the bidding legislation, however, it is essential for improving the environmental management system, that influences government and contractors to choose their service providers, forcing builders to comply with this new reality.

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