

ENVIRONMENTAL IMPACT ASSESSMENT OF WASTE WATER TREATMENT PLANTS AND ARTICULATION OF EIA PROCEDURE AND ENVIRONMENTAL AUTHORIZATION PROCEDURE

CONTRIBUTES FOR THE INCREASEMENT OF THE EIA PROCEDURE

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ABSTRACT

Environmental Impact Assessment (EIA) is a transversal and preventive tool of environmental policy that aims to assure that the environmental effects caused by a certain development are properly considered in decision-making process. By anticipating and avoiding the impacts, EIA ensures a balance between human activities and natural resources preservation, helping the project to achieve the most sustainable integration with the local environment.

The dynamic and complexity of EIA process leads to a constant need to improve some procedures in order to ensure the effectiveness and efficiency of its objectives. Among other several issues that have been identified to improve the consistency and transparency of EIA process, it can be emphasized the improvement of the Environmental Impact Statement's (EIS) quality and its evaluation process.

In a way to contribute for better consistent criteria for the EIS preparation and review, the primary objective of this study is working out guidelines on the information to be contained in EIS and a checklist for EIS formal review of environmental information, both for Waste Water Treatment Plants developments. These documents are in a draft version but the final propose is turning them in official documents.

The transversal feature of the EIA system leads to an inter-relationship with other tools, namely the Environmental Authorization Procedure which ensures the integrated pollution prevention and control (IPPC). Whenever it is possible there are some advantages in promoting the connection of these two instruments. Therefore another objective of this study is analysing the potential articulation of these procedures and working out guidelines for the elaboration of existent swine installation's EIS, which requires IPPC procedure.

Keywords:

Environmental Impact Assessment; Environmental Impact Statement Preparation and Review; Waste Water Treatment Plants; Environmental Authorization Procedure; Swine Installations.

1. INTRODUCTION

Environmental Impact Assessment (EIA) is a key instrument of European Union environmental policy.

EIA is a process for identifying the environmental effects (positive and negative) of proposed developments before development consent is granted. For this reason, EIA aims to guarantee that the consequences of a development on the environment are duly considered in the final decision of its approval.

EIA statutory requirements derive from European Communities Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (as amended by Directive 97/11/EC and Article 3 of Directive 2003/35/EC). The national law derives from this Directive and it was published in the first place in 1990.

Since then, EIA legal regime has suffered several changes, especially with the publication of the Decree no. 69/2000 of 3rd May, and the amendments published in the Decree no. 197/2005 of 8th November. In this way, it has been possible to adapt the EIA regime to the successive requirements and needs, walking towards its global improvement.

In order to assure a higher efficiency and effectiveness of the EIA process, important issues have been identified. Some of them are improvement proposals for the elaboration and evaluation processes of Environmental Impact Statements (EIS).

To assure a better consistency of the criteria used on the EIA documents preparation, it is intended to elaborate a set of guidelines for the preparation of EIS of Waste Water Treatment Plants (WWTP). These guidelines aim to integrate a future Technical Guide for the Environmental Impact Assessment of this kind of projects. This Guide will constitute a supporting document to all the actors in EIA process, particularly to the developers of WWTP projects.

The criteria consistency of EIS evaluation can be assured by the elaboration and application of a checklist for the analysis of the EIS conformity of WWTP projects.

This checklist may be used by Commissions who make the evaluation of EIS of this kind of projects. The main objective of this list is to harmonize and to systemize the appreciation criteria used by the different Commissions.

The EIA procedure and the Environmental Authorization procedure, in the scope of Integrated Pollution Prevention and Control (IPPC), are two of the most relevant instruments of national and communitarian environmental policy. Both of them aim to prevent or reduce the negative environmental impacts of projects and activities in a way to reach a balance between the human activities and the preservation of the natural resources.

On a communitarian level this instrument is established by the Council Directive 96/61/EC of 24th September of 1996 (IPPC Directive). This Directive imposes a requirement for industrial activities with high pollution potential to have a permit – an environmental permit. On a national level the environmental permit is regulated through the Decree no. 194/2000 of 21st August.

These two instruments have an independent legal regulation and procedure but they have a set of common and interrelated technical elements. For this reason it becomes useful to evaluate the integration potential of some procedure stages and this documentation, in a way to aspire simplification, consistency and celerity of these processes.

In consequence of the articulation of these processes, it is intended to elaborate a document which main objective is to speed up the Environmental Authorization procedure, particularly for existent swine installations that has been also subjected to EIA procedures.

2. EIA PROCEDURE

EIA is a process for anticipating the effects on the environment caused by a certain development. The primary objective of the EIA process is to ensure that projects which are likely to have significant effects on the environment are subject to an assessment of their likely

impacts. The aim of EIA is to prevent, reduce or offset the significant adverse environmental effects of development proposals, and enhance positive ones.

An Environmental Impact Statement (EIS) is the central document produced as a result of EIA process. This document presents a compilation of the technical studies used for the evaluation of the potential impacts as well as the predictable evolution of the situation without project and the measures to prevent, to minimize or to compensate negative impacts.

When the identified effects are considered unacceptable, they can be avoided or reduced during the design process. The EIA procedure begins with the project design stage where it is decided whether an EIS is required or not. If it is required, the scope of the study is determined; therefore the EIS is prepared as part of the application for development consent.

Projects can be evaluated in different phases – previous study or execution project. It is required that the EIS has suitable information for each phase. In a way to increase a better integration of the environmental components in the conception of the project, it is profitable that the EIS will be presented at the earliest stage of the definition of project.

The approach adopted by the Directive is that EIA is mandatory for all Annex I projects on the basis that these project classes will always have significant environmental effects. In the case of Annex II projects, Member States must determine on a case-by-case basis or on the basis of thresholds or other criteria (such as site sensitivity), or a combination of both approaches, whether or not a project should be subjected to EIA. The national legislation was based in the same principles.

EIA process includes various phases and involves diverse entities, abilities and documents, since the moment of the decision to advance with a project until its closure. According to the national EIA system, the main procedure activities of EIA are: screening, scoping, EIS preparation, EIS technical evaluation, decision by environmental authorities, and post-evaluation.

The competent entities examine the EIS – in Portugal, by a Commission of evaluation. The initial evaluation stage should generally observe both the structure and the methods of an EIS. On a later stage, there are sent some copies of the study to statutory consulters while making it also available to the public.

The Commission of evaluation will review and analyse the EIS to establish if the environmental information that is submitted by a developer to a competent authority, as part of an EIA procedure, is adequate to inform the decision on development consent.

Finally, with all important elements, the competent authority (in Portugal, the Environmental Ministry) makes its decision to refuse or grant permission, after regarding the information contained on the report of the Commission of evaluation.

3. STUDY CASE – ENVIRONMENTAL IMPACT ASSESSMENT OF WWTP PROJECTS

3.1 Present Situation of the Sanitation Services

The urban wastewater sanitation constitutes one of the more relevant questions for the development of the modern societies and its service levels constitute indicators of the population's life quality.

In order to achieve the national sanitation goals, it is essential to endow the country with the necessary drainage and treatment wastewater infrastructures. Once as the wastewater discharge on an environmental receiver constitutes an important aspect, by the likely negative effects on the environment and the public health, the strategy that may have been taken is the WWTP construction and/or rehabilitation.

However, the WWTP implementation and exploration originates a set of significant environmental impacts that must be considered in its process of conception, construction and working. For this reason this type of project has been included on the EIA legal system.

The predominance of the multimunicipal concessionaire systems in the supply of the “high”

services (responsible for the WWTP infrastructures) and the predominance of the direct management municipal systems in the “low” services (collectors systems) are both verified. This fact elapses of the strategically importance that is attributed to the “high” services for the conduction of the State politics in this sector. This fact also allows an important expansion of treatment systems.

The service levels of the wastewater sanitation systems are still below the praised national goals and the communitarian averages. The strategically national plan for this sector (PEAASAR¹), for the period 2000-2006, foresaw a service level of 90% in draining and treatment of wastewater. In 2005, these levels were 72% and 65%, respectively. The objectives of PEAASAR 2000-2006 will be kept for the period 2007-2013.

Despite the actual situation is far from the ideal objectives, there have been some important improvements during the last years. However, it is verified that the sanitation service levels have a heterogeneous regional distribution, not only in the treatment but also in the draining.

3.2 Accomplishment of Environmental Objectives of the Water Framework Directive

The domestic and industrial effluents discharges for an environmental receiver, namely the surface water, contributes for the degradation of the water resource status, by the alteration of its chemical, biological and physico-chemical elements.

In order to fulfil the environmental objectives of the Water Framework Directive (WFD) it is essential to proceed to the identification of the regions with higher pressures caused by the effluent discharges and where the wastewater treatment infrastructure is further needed.

The WFD imposes the characterization of river basin districts, by each Member State. By the analysis of the main conclusions of the Portuguese report, it is possible to know the current situation of the water bodies in the

national river basin districts, mainly in what it confers to the degradation of the superficial waters status due to emission of effluents which do not respect the minimum quality requirements. Crossing this information with the current service levels for sanitation systems, it is possible to identify the regions with bigger necessities of intervention, namely in what respects to the implementation of WWTP.

It is concluded that the Minho and Lima river basin district (in Portuguese, RH1) and the Vouga, Mondego and Lis river basin district (RH4) are, simultaneously, regions with the low wastewater treatment levels and with the larger number of superficial water bodies in risk to not reach the WFD objectives.

The discharge of treated effluents on an environmental receiver contributes for the significant improvement of superficial water quality. For this reason, the increment of treatment level constitutes the initial step to reach the ecological good status conditions. For such, the WWTP construction or rehabilitation should be viewed as a necessary and essential step, preventing that the wastewaters are unloaded in the water bodies without treatment.

3.3 Environmental Impacts of WWTP Projects

The positive effects inherent to the WWTP working are evident and undeniable – for the improvement of the water quality which is returned to the environmental receiver, with advantageous implications for the environment and the public health. However, in many cases, the expected environmental benefits are not verified due some conception and construction errors and deficiencies in its working. The construction and exploration activities of these infrastructures originate a set of environmental impacts that must be considered since the beginning of the project conception.

In order to carry out the Communitarian Directives and the national strategies, it has been foreseen an increment of the development of WWTP projects in the next years, as the rehabilitation and adaptation of the

¹ Plano Estratégico de Abastecimento de Água e Saneamento de Águas Residuais.

existent installations. Thus, it is also foreseen an increment of the environmental pressures prosecuted by these projects, whether in its construction phase or during its functioning.

Among the several environmental impacts associated to the WWTP working, it can be distinguish the sludge production and the odour emission.

The environmental impacts associated to the sludge management were linked to the amounts and characteristics of this sub-product. Due to physical-chemical processes involved in the treatment, the sludge tends to concentrate heavy metals as well as potentially pathogenic organisms present in wastewaters.

However, sludge is rich in nutrients such as nitrogen and phosphorous and contains valuable organic matter that is useful when soils are depleted or subjected to erosion. The organic matter and nutrients are the two main elements that make suitable the spreading of this kind of waste on land as a fertiliser or as an organic soil improver.

For these reasons, the use of sewage sludge in agriculture is the privileged option by the European politics. The Sewage Sludge Directive 86/278/EEC of 12th June 1986 seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way to prevent harmful effects on soil, vegetation, animals and men.

The spreading of untreated sludge on the ground can generate contamination problems, both soil and water resources, putting the public health at risk. The released odour can cause inconvenience to the populations in the neighbourhoods of the spreading area.

The solutions currently used in Portugal begin to present some impediments and it becomes pertinent to bet in alternative final destinations, like the energy valorisation through co-incineration of sludge with other wastes. In a way to reduce its impacts, it can also be underlined the necessity of implementation of a political strategy on a national level for the sewage sludge management.

The inconvenience caused for the emitted odours by a WWTP constitutes one of the biggest impediments to the acceptance of its localization for the involving populations.

There are some strategies for the WWTP odour mitigation and these measures can be implemented in the project conception phase or in the exploration phase. The most valuable option is related with the integration of mitigation measures in the project conception phase, starting with its correct requirements.

The implementation of strategies for the management of the odour emissions passes through the use of preventive measures for its production or through the treatment of the odoriferous saturated air. These last methods are more usual in the national WWTP.

4. ENVIRONMENTAL AUTHORIZATION PROCEDURE

Industrial processes produce a considerable amount of pollution and for this reason the European Union has a set of common rules for permitting and controlling industrial installations in the IPPC Directive of 1996.

The IPPC Directive (Integrated Pollution Prevention and Control) is about minimizing pollution from various industrial sources through the EU. Operators of industrial installations covered by Annex I of the IPPC Directive are required to obtain an authorisation (Environmental Permit) from the authorities in the EU countries.

The environmental permit establish the measures to prevent or reduce the emissions of these installations for the air, the water or the soil, as well as the prevention and the control of the noise and the production of wastes, in order to reach a high global level of environmental protection.

Despite of this instrument of environmental authorization had been already consecrated in the Portuguese law in 1987 (Law no. 11/87 of 7th April), just more lately this instrument had a specific regulation through the Decree no. 194/2000 of 21st August. This Decree, also designed by IPPC diploma, came to

establish the principle of the environmental permit for the polluting activities and to prescribe the procedure for its obtainment.

5. COMPARATIVE ANALYSIS OF EIA AND ENVIRONMENTAL AUTHORIZATION PROCEDURES

The exploration of an industrial activity or the implementation of a project requires a previous authorization from the competent entity. According to the respective type and characteristics, projects and activities exist that require EIA and Environmental Authorization procedure, simultaneously or in various stages, if there are some alterations to the initial project.

The attribution of an environmental permit to an installation is only possible after the emission of an environmental declaration, favourable or conditionally favourable, by the competent authority of the EIA system.

In order to speed up these procedures, the national authority for Environmental Authorization procedure, APA (Agência Portuguesa do Ambiente), consent that the permit attribution procedure can elapse at same time that EIA procedure, safeguarding that the environmental permit is only emitted after a favourable decision in EIA process.

The information and documentation demanded in the scope of the EIA process present more complexity than the necessary to the environmental authorization process. When the EIA procedure has occurred at less than three years, some required elements for the attribution of the environmental permit do not need to be presented if that had been before.

In the EIA process does not exist an explicit reference to the implementation of the best available techniques (BAT). Through the introduction of BAT in the EIS, the final report of the Commission of evaluation and also within the environmental declaration would benefit the preventing and minimizing principle and would allow an easier relationship between the requirements of the EIA and of the environmental authorization. With this

alteration, it would prevent that the environmental permit asks for the same or very similar measures that the ones displayed in EIA and it would also help its application for the developer/operator.

Both of the two procedures ask for the presentation of monitoring plans and its results. A better coordination between both monitoring plans would be an important benefit for both processes, in order to prevent the discrepancy in asked elements and the impediments to its implementation for the developer/operator.

The common activities in both processes are the preliminary evaluation, the public consultation and the technical evaluation. Both the preliminary and technical evaluation phases have specific features from the elements in analysis. However, it would be also advantageous for the environmental authorization procedure the integration of EIA technician perspectives. This stage already occurs in a less formal way, when it is necessary some clarifications about the antecedent impact assessment.

Another common phase is the public consultation. When the project has been subjected to EIA in a previous phase, the period of public consultation for the environmental authorization is reduced. It is important a better articulation between these both public consultations and it may occur with only one phase and just one document, since public opinions reflect on similar aspects.

6. STUDY CASE – ENVIRONMENTAL AUTHORIZATION OF EXISTENT SWINE INSTALLATIONS

The time limit for the environmental authorization of existent swine installations is 30th October of 2007 and the great majority of installations from this sector enclosed for IPPC diploma had not initiated its process at a convenient time.

This fact can constitute a serious situation in an environmental point of view because it has the possibility that some installations declare an inferior number of animals in a way to avoid the environmental authorization procedure.

Pig breed sector encloses some activities which cause significant environmental impacts. In many cases these negative effects are responsible for the accentuated degradation of the environment quality and it causes a great number of population complaints on the involving area to its implementation.

In a general way, the main environmental problem of intensive pig activity is the faeces production which has a high amount of nutrients, especially nitrogen. This fact is expressed in effluents and odours that can affect directly or indirectly the water, the air and the soil.

The superficial and the underground water resources can be affected by the direct discharge of effluents without treatment or by the effluents spreading on the soil.

The air emissions are majority diffuse and the characteristic pollutants are the ammonia and the methane, those resultants from the anaerobic decomposition of faeces and other organic dust. The spreading of effluents in the ground releases odours and it constitutes an aspect of great influence in the life quality of the involving populations.

The main negative impacts in the soil are caused by the incorporation of organic substance and nutrients proceeding from the faeces. A great amount of nutrients can contribute for the underground and superficial water contamination and for the promotion of water bodies' eutrophization.

7. METHODOLOGY

The guidelines for the preparation of a Technical Guide of WWTP projects have been based on legal requirements for the EIS content, described on the Decree no. 197/2005 of 8th November, and the structure of the information that was indicated on Ordinance Decree no. 330/2001 of 2nd April.

The working methodology has been focused in the research and documental analysis and also the consultation of specialized technicians who have experience in the involved areas. It has also consulted

and analysed several EIA processes of WWTP projects which has APA (Agência Portuguesa do Ambiente) as the EIA authority.

The required elements for the characterization of the existent environmental situation which is likely to be affected by the implantation of a WWTP had been systemized, according to the different environmental describers. The identification of inherent impacts to the implantation and exploration of this kind of project has been done for two different stages of the project – construction and operation. It was also synthesized a set of generic minimization measures applied to WWTP projects, most usually monitoring plans and some elements that used to be present on a following phase – with the deliver of a conformity report of the project with the environmental declaration (in Portuguese, RECAPE).

The elaboration of the checklist to the EIS conformity analysis has been based on a list published for the European Commission (“EIS Review Checklist”) that has a generic application for any type of project.

This checklist, for the analysis of EIS conformity of WWTP projects, was based on the elements in the EIS guidelines which are a way to guarantee the coherence between the demanded elements in an EIS and the elements that will be appreciate by a Commission.

The conformity analysis should have to be based on interpretation of the systemized conclusions – if there are some relevant aspects with insufficient information, and overall if this information is considered vital for the evaluation of the project, the EIS must be considered non conform and the non conformity declaration should be duly justified by the pointed out aspects.

The document “Guidelines for the Elaboration of EIS of existent Swine Installations” was based on the content and typical structure of an EIS, on the analysis of EIS and environmental permits of swine installations and also in the consultation of specialized technicians with experience in these areas.

8. RESULTS

The results of the study are: a set of guidelines for the elaboration of EIS of WWTP projects which aim to integrate a Technical Guide for the environmental impact assessment of these type of projects; a checklist for the analysis of the EIS conformity of WWTP projects; and a set of guidelines for the elaboration of EIS of existent swine installations that also needed a environmental permit.

The guidelines for the elaboration of documents for an EIA process of WWTP projects have been based on the compilation of the most important elements to include in an EIS, a proposal of scoping (in Portuguese, Proposta de Definição do Âmbito) and a conformity report of the project with the environmental declaration of competent authorities (in Portuguese, RECAPE).

The Checklist to the EIS review phase, particularly to support the determination of its conformity, intends to clarify and to harmonize the criteria used for analyse of the information contained in EIS, in a way to minimize the inherent subjectivity of the evaluation process.

The preparation of these documents presented some difficulties. The information contained in the Guide is suitable to the generality of the cases and it is necessary to adapt them to the particular aspects of a project or the environmental conditions. About the Checklist, it is necessary to evaluate if the information of the EIS is relevant and enough and this analysis introduce an unavoidable subjective component. On the guidelines for elaboration of swine installations EIS, it was necessary to articulate the necessities of the EIA process with the ones of the environmental authorization procedure.

It can be also underlined the complexity of the elaboration of documents that aim to reach an official acceptance which need to be adapted and recognized by certain entities. The two first documents still are in a preliminary version whereas the third one it is available for consultation in the APA web site.

9. FINAL CONSIDERATIONS

In a way to contribute for the improvement of the EIA process it has been pointed out and explored two central aspects – the improvement of the EIS elaboration and appreciation processes and the articulation between the EIA procedure and the environmental authorization procedure.

To reach the first objective it has been elaborated a technical guide for WWTP projects which aims to assist at the EIS elaboration and a supporting checklist for the analysis of its conformity which promote the objectivity and uniformity of the review stage.

The necessity of these documents arises from the reconnaissance of different methodologies and analyse levels of some environmental components boarded in an EIS and from the non adequacy of the scoping of some factors studied to a type of project. When these aspects are associated to different evaluation criteria it leads to distinct approaches that tend to influence the global effectiveness of EIA process.

The main purpose of the “Guide for Environmental Impacts Assessment of WWTP Projects” it is to provide some orientations that allow the definition of the depth and the adequacy of the elements to include on an EIS and other documents of the EIA process. In such a way it is possible to increase the quality of these documents which are becoming more concise and focused in the relevant environmental aspects, with a reduction of inherent time, effort and costs to its preparation.

This Guide also aims to contribute for the transparency and credibility of the EIA process and for the normalized format of the environmental declaration. There were related a set of typical mitigation measures on the Guide that could be indicated on the environmental declaration, allowing that this document might be focused on the specific measures.

The main objective of the “Checklist for the Analysis of the EIS Conformity of WWTP Projects” is to assist the EIS technical review of this kind of projects. This list allows a systematization of the EIS information and a

more efficient identification of existing gaps and omissions, in way to conclude about its conformity or non conformity.

The achievement of these two objectives by an integrated system and with the contribution of diverse participants makes possible the transparency of the process and the involvement of the different parts in way to conjugate experiences that lead to the improvement of the final result.

The Guide and the Checklist aim to help developers and their consultants to prepare a better quality EIS and also help competent authorities to review them more effectively.

In a subsequent phase it has foreseen the cooperation with the IRAR (Instituto Regulador de Águas e Resíduos) for the Guide publication. This cooperation can guarantee the necessary integration of the economic viewpoint of this regulating organism and the effective operation of the guide contents, through the consultation and participation of operators of sanitation systems. The functionality of the Checklist will be surveyed through its application by the Commissions of evaluation of this type of project, in the APA.

The preparation of "Guidelines for the Elaboration of EIS of existent swine installations" has been induced by a specific need, related to the urgency of fulfilment of stated periods for the emission of environmental permits of these installations. As the stated period for the emission of environmental permits it is until 30th October of 2007 it had been possible that EIA process and environmental authorization procedure elapses simultaneously.

It can be also underlined the possibility of a single procedure for the implementation of the EIA Directive and IPPC Directive as it happens with some of Member State as in Spain.

In a way to promote the harmony between the essential conditions for the improvement of environmental values and population's life quality with the best conditions for the industrial development, it becomes essential to bet in reconciling mechanisms. As the economic sector needs to adapt to the environmental requirements it is also

essential that the operational and legal mechanisms adapt to difficulties of the sectors by the development of facilitating mechanisms to the legislation fulfilment.

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