THE WRITING OF EIS FOR ELECTRIC PROJECTS IN MEXICO

Luis E. Montañez-Cartaxo
Environmental Impact Assessment Vicemanager
Environment Protection Division
Federal Commission of Electricity (CFE)
Mexico

1. Introduction

The preparation of major reports, like environmental impact statements (EIS), implies specific problems. It is the sort of report that often gives writers ulcers.

This paper deals mainly with the process of writing an EIS for electric projects from a theoretical point of view: organization, preparation, drafting and scheduling. An analysis is made of 29 EIS presented by the Federal Commission of Electricity (CFE) to the Mexican environmental authority over the last three years, which include a wide variety of projects, from 4.5 km-long distribution lines (69 kV) and 440 km-long transmission lines (400 kV) to combined cycle generation plants with up to 700 MW installed capacity.

2. Characteristics of CFE environmental impact statements (EIS)

According to Mexican law, an EIS is the document through which someone lets anybody know, based on studies, the environmental impact, significant and potential, that a work or activity might cause, and the way to avoid or reduce it in case it's negative. In esence, it is the document on which the correct planning of a project is based and justified.

There are two types of EIS according to Mexican legislation: particular and regional. The first one is the most common for electrical projects. The second one applies when the influence area of a project is regional and not only local, like in hydroelectric projects. In both cases the document structure is similar; it consists of eight chapters but in the regional modality the analysis of environmental impacts is much greater, as can be seen in table 1.

The Mexican Secretariat for the Environment and Natural Resources (SEMARNAT) is the authority in charge of reviewing the EIS and approving or rejecting the project form the environmental standpoint. The approval is almost always restricted to the compliance of certain conditions established by the authority, additional to those mitigation and compensation measures established in the EIS by the proponent. According to the law, SEMARNAT has up to 60 working days (around 3 months) to review an EIS, time period that can be extended up to 60 additional days if SEMARNAT considers that the project is exceptionally big and complex.

Table 1. The eight chapters of EIS in Mexico

Chapter	Particular modality	Regional modalito
1	General information about the project, the promoter and the person responsible for the EIS	General information about the project, the promoter and the person responsible for the EIS
2	Project description	Description of the works or activities to be undertaken and of the development plans
3	Entail with the environmental legislation and, if the case, with land use regulation	Entail with the planning and law regulations
4	Description of the environment system and discussion of the environmental problems in the zone of influence of the project	Description of the regional environment system and discussion of the development and deterioration of the region
5	Identification, description and evaluation of the environmental impacts to be produced	Identification, description and evaluation of the environmental impacts to be produced, including cumulative and residual effects in the region
6	Preventive and mitigation measures to be applied regarding environmental impacts	Strategies to prevent and reduce environmental impacts, including cumulative and residual effects in the region
7	Foreseable environmental scenarios and, if the case, evaluation of alternatives	Foreseable environmental scenarios of the region and, if the case, evaluation of alternatives
8	Description of the methodology and technical elements used to make the EIA	Description of the methodology and technical elements used to make the EIA

Putting these requirements in practical terms, the main questions to be addressed in an EIS are:

Topic	Question
Description of the acti vity or project to be developed	Which are the most evident project attributes and weaknesses?
Description of the basic parts of the activity or project	What are the project stages and activities and any other induced by it that could cause environmental impacts?
Description of the environment conditions before the project	What are the biophysical, social and economic conditions in the zone where the project is to be developed?
Most significant elements of the environment	Which are those elements and what is their condition?
Area of study for the EIA	What are the project implications regarding environmental impacts and protected areas, and how is it related to land use regulations and development proposals?

Topic	Question
Identification of impacts	What are the effects the project will produce on the environment and its most significant elements, including synergic and cummulative impacts?
Alternatives	Is the selected alternative the best one from the project purpose and functionality standpoint and at the same time the one that guarantees the environmental balance in the region?
Identification of mitigating measures	What are the logic and viable measures to mitigate the significant environmental impacts of the project?
Appraisal of the residual impacts	What are the negative situations that will persist even after the mitigating measures are applied?
Monitoring program and control	Which impacts are to be considered in the monitoring plan? Which parameters are to be evaluated? Which activities are to be undertaken, with what frequency and sampling characteristics? Which are the indicators to be selected in order to appraise the efficiency of the plan?

The analysis of 29 EIS of CFE projects presented to and approved by the environmental authority during the last three years show that, on the average, they are 330 pages long, and include around 110 tables, 60 figures, and 50 photographs and maps, as shown on table 2. These projects go from a short 4.5 km-long transmission line to a 440 km-long one and several combined cycle stations with up to 700 MW capacity; no hydroelectric project is included.

Table 2. Data of 29 EIS from CFE projects

Chapter	Pages	Words	Tables	Figures	Photos
1	7.7	1060	1.9	0.7	0.0
2	48.9	13520	17.4	5.6	6.1
3	23.6	6772	4.2	3.8	0.1
4	110.5	31916	50.4	21.7	8.8
5	43.1	10646	19.4	6.7	0.1
6	10.5	3298	1.7	0.5	0.0
7	12.3	2980	1.7	2.2	0.5
8	18.4	4565	3.8	1.0	10.5
Appendixes	59.2	12582	16.1	15.2	25.2
Totals	334.2	87340	116.5	57.5	51.5

Some of these documents have been prepared working a little bit against the clock; this has lead to acceptable EIS but there is room for improvement. So, in the next section, a working plan for environmental statements preparation is

proposed, considering that it might be helpful not only to CFE but to other utilities too.

3. Programming an EIS

The production of a long document like an EIS requires team effort and a special organization of the activities. According to Scott (1984), the relevant aspects of this organization are:

- *Leadership*

Identification of the team leader who will take the responsibility and have the authority for the preparation of the report. The team leader is responsible for all the participants in the EIS preparation to understand their functions and responsibilities and end their tasks on time and within budget; and prepare the document according to the official guidelines for EIS of the electric sector, issued by the environmental authority, SEMARNAT.

- *Issuing authority*

If different from the leader, the person who will take responsibility for the the report issue.

- *Report control group*

Key people who will control contributions to the report. Ideally, such a report control group should consist of the group leader, plus representatives (preferably heads) of all departments who will make a contribution and people who worked in the environmental impact assessment.

- *Planning and progress control arrangements*

Meetings of the group at sufficiently frequent intervals to monitor progress and sustain impetus.

- *Schedule*

This implies a statement of what needs be done and when. A process is a series of actions, changes and functions to be done in order to reach certain goal. In this sense, the preparation of an EIS is not an isolated event; it's an evolutive and iterative process. That is, many of the activities involved are repatedly analised.

A long report like an EIS requires a tough discipline to write secuential drafts. Scott (1984) suggests a four-stage approach:

Draft 1 to get the skeleton right
Draft 2 to get the content right
Draft 3 to get the style right, and
Draft 4 to get the presentation right

Scott (1984) says that " [...] writers naturally worry when they see for themselves that an early draft is illogical. Both they and their critics can all too easily be magnetised into criticising and amending paragraphs and grammar, and even words, at all too early stage. Is is wasteful of time and energy to do so. The disciplined approach, both for writer and for his superiors and colleagues, pays dividends.

[...] It is always difficult to schedule the preparation of a major report. [...] There are two ways of averting this trauma. One is the traditional: 'Think it out very carefully, making generous allowances. Then whatever the answer is, multiply it by four.' The alternative is to seek a more logical approach."

So, the scheduling of activities can be made according to Scott's suggestion. The person in charge of writing an EIS needs one hour per 1 200 words[1] (approximately four pages) at each one of the four drafting stages to prepare, construct and reconstruct a document.

Also according to Scott (1984) " […] concentration sags if one concentrates for a whole day on writing –and anyway it is impracticable since we all have other demands on our energy and cannot commit ourselves utterly to writing. My unit of measurement for scheduling is therefore 'half days'."

On this basis, a schedule for a report of say 12 000 words (around 40 pages) would be:

Activity	Half days
Preliminary discussion and preparation	2
Secondary preparation and dictation of Draft 1	3
Colleague's reading time and discussion	2
Draft 2	3
Discussion	2
Draft 3	3
Discussion	2
Draft 4	3
Total	20

As shown in table 2, the average number of words in a CFE environmental impact statement is 87,340, included words and data on the tables; the shortest EIS has 40,400 words and the longest has 149,200 words, including the appendixes. In order to estimate the time it would take to prepare an average EIS for a CFE project according to Scott (1984) recommendations, let's take the average number of words, the four drafts procedure, and consider that the person in charge of preparing the document requires one hour of work per 1,200 words for each one of the drafts.

So, 72.8 hours are required for each draft. Considering half day as the time unit in order to schedule the preparation of the EIS, 18 half days are needed for

[1] Scott (1984) says 1 000 words, but in Spanish technical language you use more or less 20% more words than in English

each draft. Assuming that in CFE the discussion of each draft could be 50% more efficient than what Scott (1984) says (1.33 instead of 2 half days for 12,000 words), the following schedule would result:

Activity	Half days
Preliminary discussion and preparation	3
Secondary preparation and dictation of Draft 1	18
Colleague's reading time and discussion	10
Draft 2	18
Discusión	10
Draft 3	18
discusión	10
Draft 4	18
Total	105

Thus, on the average, the EIS for a CFE project would take theoretically around 4.8 months to be produced. Of course this time period should be only dedicated to the report; it doesn't include the time periods needed to, for example:

- make the environmental and social studies that serve as base line, i.e., field measuremets and polls, laboratory tests, population surveys, gathering paper and electronic information, etc.
- analyse the environmental and social impacts
- design mitigation and compensation measures
- design the environmental monitoring program
- prepare drawings, figures and photos to be included in the EIS

The complete program of activities is shown in fig 1, in which the time scale is divided in two parts. On the left side, the time unit varies, depending on the type of electric project and/or the specific environmental and social conditions at the site; on the right side the scale corresponds to the period needed to prepare the EIS: 4.8 months. Note the bold line almost at the bottom of the figure, indicating that the project design goes along intertwined with the environmental and social studies; it cannot be completed until those studies end and are fully incorporated in the final design.

4. Conclusion

Preparing an EIS is a difficult task; it is evolutive and iterative; it can only be succesfully approached within a multi and interdisciplinary (should it be named transdisciplinary?) team.

On one side, an EIS is to be written in plain language, so it is easily understood by decisionmakers and the public. But more or less sophisticated methods of analysis are employed in evaluating impacts, so it also must provide a clear technical picture of the environmental impact assessment undertaken. The writer must comply with those two competing objectives.

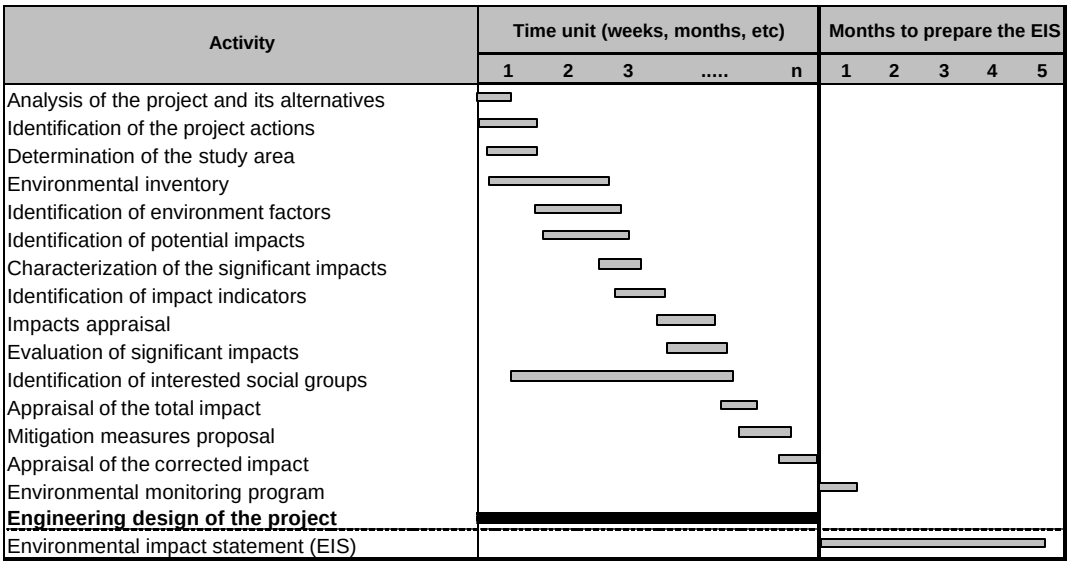

Fig 1. Timetable of activities related to EIS preparation

5. References

Scott, B. (1984), "Communication for Professional Engineers", Thomas Telford Ltd, London

6. Acknowledgements

The writer wishes to thank the Federal Commission of Electricty (CFE) authorities for allowing the publication of this paper and for the time allocated to prepare it.