

## Experiences in the first pulp mill project submitted to the environmental impact assessment system in Chile

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*The opinions stated in this document are the sole responsibility of the author and do not necessarily reflect the opinion of the National Commission on the Environment (CONAMA).*

### ABSTRACT

This case study concerns the first environmental impact assessment conducted on a cellulose project in Chile. The project site was in Southern Chile (Region X). The facility was to discharge its effluents into the Cruces River, along the banks of which a Natural Reserve and a RAMSAR site are located.

What follows is an analysis of the procedures established during the voluntary implementation of Environmental Impact Assessment in Chile, the benefits to be derived from using Terms of Reference, the assessment criteria that were taken into account to protect the sheltered area, and the difficulties encountered in determining the significance of the ensuing impacts.

### INTRODUCTION

This document discusses the Review and Assessment of the Environmental Impact conducted on the Valdivia Project. The proposal was for the construction of a new Kraft pulp mill with a 550,000 tonne/year output capacity, which would make a significant contribution to the national economy (investment is estimated at US1.3 billion), given the fact that it would generate major revenues from export sales on the world market.

The introduction of new pulp mill plants was highly probable given Chile's vast forestry resources and current cellulose prices on the international marketplace. Central and Southern Chile, which present comparative advantages in terms of the proximity of raw materials and abundant watersheds – indispensable for running this type of industry – were particularly appropriate locations.

The Environmental Impact Assessment for the Valdivia Project was of great significance given its voluntary nature and the geographical location and sheer magnitude of the project. It has established an important precedent for future environmental impact assessments. A salient feature of this project –

See Topic 6

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*Assessing*

the construction of a bleached Kraft pulp mill – is its location upstream from the Cruces River Natural Reserve and the discharging of effluents into this watercourse. This project had to be evaluated on the basis of extremely demanding criteria which precluded even minimal alterations to this Natural Reserve, which is included in the RAMSAR Convention on 'Wetlands of International Significance, particularly as a habitat for Waterfowl'. This is the only stretch of Chilean wetland with the necessary characteristics for inclusion in this category. Furthermore, this Convention binds the State of Chile to place particular emphasis on the safeguarding and protection of this ecosystem.

The project was voluntarily included in the Environmental Impact Assessment System (EIAS) in October 1995, and it secured its environmental approval in May 1996. The assessment procedures used were the result of two years' experience in both the public sector, which evaluates the projects, and the private sector, which conducts the Environmental Impact Study (EIS) and presents them to the authorities for review purposes. For this specific project, the authorities issued Terms of Reference (ToR) to be used in conducting the Study. The ToR established the minimum content requirements for carrying out an Environmental Impact Study (EIS).

This case study addresses the particulars that were involved in analyzing synergistic and cumulative effects, the procedures used in reviewing the Environmental Impact Assessment, as well as the criteria and background information which served as the decision-making basis in evaluating the project's effects on the ecosystem of the RAMSAR-protected Cruces River Natural Reserve.

### **NATURE AND SCOPE OF ISSUES**

The Environmental Impact Assessment for this project was carried out at a time when Chile still lacked regulations for the establishment of consistent procedures and criteria to address this issue.

Notwithstanding the above, the Environmental Impact Assessment System (EIAS) considers that the environmental assessment of a project provides the Regional Commission on the Environment (COREMA) with information deemed sufficient for that authority to issue a well-founded resolution that will assign a certain environmental approval to the project. The requirements include a consideration of the technical aspects of the project, a balanced summary of the objections raised by the community, the measures promulgated in the mitigation, remediation and indemnification plans, environmental follow-up or monitoring, the environmental approval either approving or rejecting the project, the environmental conditions or demands under which permits would be issued (if the project is approved) and mention of the public entities with competent jurisdiction in overseeing and monitoring the project.

In other words, should the project be approved, it would not only receive its environmental qualification but also all related environmental permits. Failure by the EIA to include the necessary requirements or background information for the issuing of these permits will also prevent the authorities from issuing an approval for the project.

The ToR provided by the authorities for the conduct of this study failed to render an accurate definition for, and limits to, the most relevant aspects of the assessment, incorporating all environmental components (climate and weather, air quality, geology, geomorphology, hydrology, water quality, vegetation and flora, fauna, socio-economic aspects, infrastructure, archaeology, landscape) and requiring a detailed description of each component. The authorities' lack of experience in determining the area of influence of the project, given its magnitude and location, accounts for these difficulties. Moreover, since the Valdivia Project was the first of its kind (cellulose) to be included in the EIAS, everyone was concerned that excessive zeal in defining the limits of the requested data would lead to the exclusion of important aspects from the assessment. Thus, the State would have been to blame for any impact generated by the project and not included in the ToR.

The project filed with the authorities for the issuance of ToR was by then well defined, having already established its exact location, the concept engineering and the technology to be used, i.e. a project not adaptive to substantial modifications. There was also a preset timetable for the start-up of activities, construction and installation.

The EIS for the Valdivia Project presented a description of a project at the concept engineering stage. However, much detailed and indispensable background information required for the granting of sector permits connected with the EIAS in Chile had not been included.

The Environmental Impact Assessment for this Study suffered from major shortfalls in the identification and analysis of the environmental effects arising from the project, particularly with regard to the Cruces River Natural Reserve. In this sense, the Study Baseline was painfully incomplete in most of its components (e.g. hydrology, water quality, aquatic vegetation and flora, land-based and aquatic fauna, socio-economic aspects), which precluded building a real scenario of the project's area of influence and of the environment without the project.

Furthermore, several factors were not considered in the assessment, e.g. the impact of emissions into the atmosphere (viz. the transformation of SO<sub>2</sub> into sulphuric acid) and the disposal and handling of solid waste generated by the project.

#### **PROCESS AND PROCEDURAL CONTEXT**

While the environmental impact assessment was being carried out, several aspects were considered that had been provided in the Environmental Law

which promulgated the EIAS as well as other instruments applicable within the context of the voluntary system and established by CONAMA.

The following aspects are significant:

- ToR were laid down for the preparation of the EIS. The Study contemplates the environmental components that must be considered for assessment purposes and the minimum requirements established by the authorities to review the EIS. However, this document carried no legal force to be established as a mandatory requirement during the review process. Under the Environmental Law, the authorities have 120 days to issue a project's environmental approval. The following action is taken during this period:
- the Environmental Impact Study is reviewed by the State bodies deemed environmentally competent by virtue of the characteristics of the project, its emplacement and potential to affect either resources or communities protected under the Environmental Law. The following entities participated in the review: Regional Planning and Coordination Office, Regional Water Bureau, Regional Highway Department, Regional Housing and Urban Development Office, National Forestry Corporation, Farming and Livestock Service, National Fishing Service, National Tourism Service, Valdivia Public Health Bureau, and National Bureau of Maritime Territories and Merchant Marine.
- These entities reviewed the EIA in light of the established ToR and sectoral criteria. They then sent their comments to CONAMA and requested clarification or revision of EIS data which they deemed necessary for a proper understanding and assessment of the project.
- CONAMA used the collected data to prepare a report in which it requested clarification, further elaboration or revision of information from the applicant, pointing out the most serious shortcomings revealed by the Study.
- Once the queries were answered and the problems resolved, CONAMA drafted a Technical Report on the basis of the reports issued by the competent entities. This Technical Report sets forth all relevant precedents from an environmental standpoint, requisite action to comply with the environmental regulations, and confirms that the necessary background data has been furnished for the issuance of the sectoral environmental permits related to the project.

Lastly, the competent authorities (COREMA) were called upon to give the project an environmental qualification, including any applicable conditions or restrictions.

Based on the Study's characteristics, the project owner was required to clarify several aspects in connection with the project. Salient among the problem areas were the following:

- The completion of the hydrology baseline, which should at the very least consider water flow measurements during a given annual cycle and include all seasonal fluctuations. This completion of the baseline was of vital significance in assessing the impact caused by the diversion of water for running the pulp mill, as well as the impact on water quality in the Cruces River due to effluent discharge.
- The EIS only mentioned the eventual design of a sanitary landfill for the disposal of solid waste generated by the project. However, the Study failed to provide any information on where the landfill would be located, the baseline data, and the impact assessment for the site. The authorities demanded that further information be delivered in connection with the landfill for environmental impact assessment purposes. Moreover, the Public Health Bureau required the data in order to issue the sanitary permit – sectoral environmental permit – for the construction and operation of the waste site.
- The air pollutants to be generated by the project would include 2.24 tonne/day of particulate matter and 13.2 tonne/day of SO<sub>2</sub>. These emissions would have an impact on air quality in terms of primary effects (human health) and secondary effects (natural resources). The EIS failed to provide an accurate determination of the magnitude and extent of the impact generated by these emissions.
- This project provided for the arrival of 3500 people during the construction stage of the plant. Workers would lodge in the communities neighbouring the mill site, such as San José de la Mariquina, Lanco and Máfil, the largest of which had a population of merely 2500. A request was therefore filed to assess the socioeconomic and cultural impacts on that towns, as well as to account for the impacts caused by an eventual increase in the demand for infrastructure and services.
- One of the most problematic issues faced during the environmental impact assessment was the presence of the RAMSAR site within the Project's area of influence. In fact, this Reserve lies 30 km downstream from the mill site and is fed by the Cruces River. The Reserve operates under the auspices of the National Forestry Corporation (CONAF)

and is the only RAMSAR site in Chile, as ratified by an Executive Order issued in 1981.

EIS results indicate that the Reserve would be affected by project-related environmental impacts of moderate to minor significance, in particular with regard to exotic nutrients which could possibly alter the ecosystem.

Nevertheless, the public entities in charge of reviewing the project refuted the accuracy of the assessment, since the flow of exotic nutrients to the Reserve would be far greater than those presented in the Study. The authorities thereafter demanded that the future impacts on the RAMSAR site be reassessed.

### **APPROACH TAKEN**

Following the official request for more information on the topics mentioned above, the applicant delivered a revised Study that incorporated the following additional data:

- Update and analysis of maximum water flows in the Cruces River.
- Water quality monitoring programme to be carried out in the summertime.
- Information on solid waste disposal, which is still found deficient in terms of eligibility for the respective permit. Not only was the location provided tentative in nature, but it was also outside the influence perimeter of the EIA project. The authorities were therefore unable to render an opinion on the environmental viability of the landfill.
- The report mentions the synergistic effects on the Reserve produced by a combination of factors, such as the discharge of organic matter, increased temperature and minimum river flow. However, since no data were provided in connection with this effect, the authorities were unable to determine whether an impact would be generated on the receiving watercourse or not.
- Data were furnished in connection with socioeconomic impacts, albeit still insufficient for environmental assessment purposes.

The predicament of the Cruces River Natural Reserve merited the attention of the Head of the Special Policy Department of the Chilean Foreign Affairs Ministry, in order to clarify how Chile would live up to the environmental commitments assumed by the government when this Reserve qualified as a RAMSAR site. These obligations include the comprehensive protection and preservation of the conditions which make this site unique, and the Special Policy Department had in its possession data that revealed the fragility of this area as regards its self-preservation. Following consultation with the

public entities related to the RAMSAR site, the Department concluded that the project's features would generate environmental impacts to the detriment of the aquatic environment and its biodiversity – in short, a violation of applicable environmental regulations.

The work conducted by the public entities that participated in reviewing the Study was enhanced by information provided by some NGOs that took up this issue. The NGOs voiced their concern for the RAMSAR site and for certain species that inhabit the local ecosystem and are classified as endangered. Scientists and non-governmental organizations vehemently opposed the project and came to the defence of the Natural Reserve, arguing that the effluents would be discharged into the river that runs through the site and greatly impair its viability.

On the other hand, the large investment sums considered for the project and the distinct possibility of new jobs engendered great expectations among the local population. In recent years, the region had been mired in an important economic depression, and the potential new job sources to be generated by the project raised hopes that the situation would finally be reversed.

Finally, CONAMA issued a Technical Report concluding that – in light of the information furnished by the Environmental Impact Study – it was unable to qualify the project as environmentally viable, given that it had failed not only to demonstrate compliance with environmental regulations, but also to assure that the proposed mitigation action would fend off adverse effects on the quality and quantity of renewable resources, or on protected resources or areas of environmental value.

## **RESULTS AND IMPLICATIONS**

The COREMA is in charge of assigning environmental approvals to projects or activities, certifying their viability from an environmental viewpoint. The COREMA is a collegiate body made up of the Regional Intendant, the Regional Ministerial Secretariat, the Province Governor, Regional Councilmen and the Director of CONAMA. This particular COREMA made decisions about this project on the basis of the following background information:

- the Technical Report prepared and certified by the Technical Committee;
- a balanced summary of the observations made by the local population; and
- other considerations, such as regional and local development policies, public opinion, an analysis of the social and economic costs and benefits that the project or activity would generate for the country, region, community, State etc., adherence to international treaties etc.

The Environmental Impact Assessment System (EIAS) is intent on establishing a uniform procedure to analyze environmental permits in any

single instance; therefore, the Technical Report must be conclusive in its determination of whether the requisite data and requirements provided by law have been delivered in order for the competent environmental State authorities to issue the applicable permits. There was no way the Technical Report could be favourable for the project if the EIA lacked information that was necessary for a positive decision to be reached in connection with any particular permit. Such a departure from established procedure would have completely frustrated the original intent of the EIAS.

The COREMA finally agreed to approve the project, albeit establishing multiple environmental restrictions and the obligation to evaluate several project aspects environmentally.

#### *The Natural Reserve*

The Technical Report prepared by CONAMA, with data contributed by competent entities, concludes that the information furnished in the EIA and the review thereof by the Technical Committee precludes the making of any assurances as to the presence or generation of impacts in the Natural Reserve. Even if the project were to adhere to the benchmark emission standards established for plant effluents, this safeguard would still fall short of preventing significant adverse impacts from being generated in terms of alterations to the characteristics of the protected site.

The conditions which COREMA established in order to approve the project were based on the Technical Report prepared by the Technical Committee, the additional background information furnished by the applicant and the data included in the project's EIS. What follows is a detailed account of the conditions.

The industrial effluents from the pulp mill must be treated by the primary and secondary treatment systems provided in the EIS. Moreover, and with the intention of protecting the Natural Reserve and RAMSAR site, the applicant will be required to opt for any of the following alternatives for the discharge of effluents:

- discharge into the Cruces River, calling for the incorporation of a tertiary treatment system that will operate on the terms to be established by COREMA; or
- discharge into a stream or body of water other than the Cruces River and not directly communicating with, or flowing into, the Natural Reserve.

Furthermore, any option chosen would be subjected to an environmental assessment submitted for approval by COREMA. Regardless of which alternative the applicant chooses, the assessment must include a study of the effects of consuming a given amount of water from the Cruces River and discharging it into another stream or body of water. All of the above is aimed at evaluating potential impacts on the Natural Reserve.



### *Disposal and treatment of solid industrial waste*

The applicant must implement a disposal system for solid industrial waste, to be located in a suitable area within the limits which the EIS establishes for the mill site. This sanitary landfill must comply with all applicable environmental regulations and abide by the EIAS. A detailed profile on the types and quantities of the waste to be dumped in the sanitary landfill must also be included. Particular emphasis was placed on information regarding the degree of toxicity of the waste and the compatibility among waste materials from a reactive point of view.

### *Water supply and consumption*

Consumption of water from the Cruces River was limited to the maximum figure, established in the EIS, of 900 l/s, for both process and cooling water. Also, should the water flow on the Cruces River border on the minimum flow rate limits and/or be deemed by the General Water Bureau as cause for concern, the applicant must consult with CONAMA and the General Water Bureau for the implementation of measures conducive to the prevention of undesirable environmental impacts as soon as possible, in order to stave off irreparable damage to the aquatic environment.

### *Emissions into the atmosphere*

It was recommended that the applicant consider the implementation of a control system for SO<sub>2</sub> to reduce plant emissions. This measure cannot be imposed by the authorities as the project meets the environmental quality standards currently in force in Chile. However, emissions from the pulp mill would create a zone where environmental quality would fall close to the maximum authorized limit. This would be caused exclusively by the installation of the mill, since no other sources of this type of emissions exist in the vicinity.

### *Monitoring or follow-up plan*

Stations must be set up in areas adjoining the Cruces River Natural Reserve and in the protected site itself during the first three years of the plant's operation, aimed at monitoring water quality. Standardized essays and protocols must be used with key Chilean species in order to account for the effects on the Reserve's ecosystem components.

The applicant must constantly monitor smokestack emissions and air quality for sulphur dioxide concentrations (SO<sub>2</sub>). Moreover, permanent monitoring of weather conditions is necessary in order to check the emission levels stipulated by the EIS and undertaken by the applicant.

## LESSONS LEARNED

### *Terms of Reference*

Several problems have arisen from the existence of ill-adapted ToR which, moreover, have no binding force in so far as the preparation of the EIS (given the voluntary nature of this system) and are based on a predetermined project that was conceived without any community involvement. These issues are as follows:

- a voluminous Environmental Impact Study full of unnecessary details;
- the relevant aspects of the project were identified during the EIS review and not while preparing the ToR or the Environmental Impact Study;
- loss of time and money because irrelevant or inapplicable information is not deleted;
- separate presentation of environmental impacts; not accounting for synergistic or cumulative effects from the combination of environmental factors and project emissions and discharges;
- competent authorities must decide on the basis of information furnished by the Technical Report prepared by competent entities and relevant aspects for regional development, political and social factors, among others; and
- Terms of Reference must be adapted to each specific project, since they assist in identifying relevant impacts even prior to the environmental assessment. They are also helpful in defining the practical areas in which the authorities shall require the applicant's commitment.

### *Significance of impact assessment*

The approval of any given project and the conditions established for its execution hinge directly on how impact significance is interpreted.

Assessment criteria or methodologies used in this project were found wanting in the following areas:

- environmental quality and emission standards currently in force in Chile (very few as of now);
- fundamental criteria to allow for a broad and consensus-based comparison of aspects not currently regulated;
- methodology guidelines to focus environmental assessment on the aspects deemed most relevant to this type of project and to the emplacement thereof ; and
- in the specific case of the Natural Reserve's ecosystem, additional

assessment instances had to be established that would include the participation of environmental experts. The goal was to achieve consensus in assessing the significance of the impacts and not leave this task to the decision-making process, since the latter takes non-environmental aspects into account.

On the other hand, project owners must include environmental variables from the conceptual stage, and regard them with the same relevance as the technical and economic aspects. Incorporating environmental factors in the decision about the feasibility of a project affords the following benefits:

- determining a proper location for the project in order to diminish potential environmental impacts;
- substantially minimizing environmental degradation since impacts are forestalled;
- minimizing potential conflict with affected communities or environmental activists;
- expediting the Environmental Impact Assessment procedure; and
- establishing precedents to facilitate the environmental assessment process for other investors wishing to participate in this type of project.

### **DECISION-MAKING**

The following is deemed necessary, given the characteristics of the project, Chile's transition to democracy from an environmental standpoint, and especially the evolution made by environmental impact assessments:

- Keep the authorities (COREMA) informed as to the progress being made in reviewing the Environmental Impact Study, and the project and the opinion of the community most directly affected by it, prior to making the final decision, in order to keep undue pressures at bay.
- Begin the Environmental Impact Assessment process early enough to allow for modifications.
- Support and strengthen the technical review of the EIS to reduce uncertainty when making the final decision.

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