



EL MOLINO AND SAN MATIAS HYDROELECTRIC PROJECTS

ENVIRONMENTAL IMPACT STUDY VOLUME III OF V CHAPTER 10

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10 ABANDONMENT AND FINAL RESTORATION PLAN

10.1 OBJECTIVES

- Reshaping the terrains changed by the construction and operation of the El Molino hydroelectric project, to leave them in similar conditions to those existing before the starting of its construction.
- Recover the modified areas by the construction and operation of the El Molino hydroelectric project, when it is decided not to continue with its operation.

10.2 JUSTIFICATION

During the construction of the El Molino hydroelectric project, modifications to the terrain will be generated, which must be managed properly in order not to leave remnant effects of the construction.

In addition, if it is decided not to continue with its operation, the entire infrastructure of El Molino hydroelectric project should be removed and the ground recovered, to ensure the elimination of the effects that were generated during the operation.

10.3 REGULATIONS

- Decree 2820 of 2010. By which regulates Title VIII of the Act 99 of 1993 on environmental licenses.

10.4 IMPACTS TO CONTROL

- Increasing the concentration of particulate matter and gases.
- Increase in sound pressure levels
- Alteration of the river dynamics
- Changes in water quality
- Changes in water availability
- Changes in the physical and chemical properties of the soil
- Modification of the landscape
- Changes in the Ichthyic community of San Matias River.
- Changes in the structure of the aquatic biotope and biocenosis
- Loss or fragmentation of habitats
- Changes in vegetation covering
- Generation of expectations.
- Generation of nuisances to the community

10.5 TYPE OF MEASURE

- Prevention, compensation.

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10.6 STAGE:

In the final construction phase and as a condition to satisfactory receiving of the Project facilities, and during the dismantling of the project.

10.7 GOALS AND MONITORING INDICATORS

The goals for this program are:

- Recover at least 70% of the susceptible area to be treated.
- Properly dispose of the 100% of the solid waste generated during the execution of this activity.

Which may be assessed using the following indicators:

- Treated Area / Area susceptible to treatment.
- Waste generated in dismantling and abandonment / Waste properly disposed.

10.8 ACTIVITIES TO DEVELOP

10.8.1 At the end of the construction

Once construction is completed, a review of the Management Plan Programs to verify the fulfillment of their goals.

There will be a detailed review of the documents and records that were produced during the execution of the programs that were part of the Environmental Management Plan. Including among others: information meetings, complaints and grievances records, pruning and logging records, monitoring of air and water, records of implemented training, minutes of satisfaction of the arrangements of damages to third parties, program evaluations for the restitution of economic activities, advances in the entrepreneurship program.

From the basis of these reports it will be evaluated if the programs are completely fulfilled and in which one of them there were inconvenient; what solution was given and, if it was effective or not. In this review, it is additionally included the verification of the delivery acts of satisfaction on works carried out by contractors.

The review of information will be complemented with field trips that will allow verifying the facts.

It will be verified to the full extent if the obligations established in the grants by CORNARE were fulfilled.

Finally, if it is found that there are impacts that have not been addressed satisfactory and may become as environmental liabilities, the pertinent measures will be defined in order to be applied, and the compliancy and effectiveness of these will be verified during the following six months. In the case that in this period of construction time an impact continues to be manifested, corrective actions shall continue to be applied until it is neutralized.

Other activities to be developed at the end of the construction of El Molino hydroelectric project are:

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- **Demolition of buildings and hard surfaces**

Hard Surfaces built during the execution of the facilities such as offices, warehouses, workshops, small squares plaza, parking lots, sewers, ditches, wells, structures along the road, sedimentation and other, that will not be used in the stage of operation, must be removed in an orderly manner, trying to generate the least amount of debris. All materials that can be recycled or reused should be removed from the project area by the contractor.

Included in this activity is the removal and disposal of all signal poles, fences, sheds, screens, waste collection containers, among others.

For the implementation of this activity, the working area must be delimited and properly marked, to ensure the safety of the people associated with the project, as well as the population that is settled in the influence area of the project.

- **Collection and Disposal of debris**

The resulting material from the demolition that cannot be recycled will be disposed in one of the deposit zones of El Molino hydroelectric project.

All the materials that can be recycled as containers, scrap metal, clinging, cables, among others; will be collected in its entirety by each contractor.

- **Recovery of compacted surfaces**

All the surfaces of small plazas, workshops, camps, industrial plants and roads will be scarified to a depth of at least 20 cm, or in its defect covered with a layer of bare soil material, before its revegetalization.

- **Reconfirmation**

In all the sites where the natural surface of the ground has been modified, such as reservoirs, canals, ditches, wells, structures along the road, sediments, among others, must be restored, to the extent possible as it had the original topographic conditions.

- **Landscape deposit areas**

As provided in the management program and materials disposal, these areas and all those that need, must have a closing program, which includes the site final designs and the recovery activities of the landscape.

- **Signaling of risk areas**

Those sectors that have undergone strong modifications of its topography, depth or stability due to the effects of excavations, which cannot be handled properly, should be properly marked, indicating the limitations of use and the kind of risk to be taken when the site is being used.

It must be delivered to the contractor a record or certificate equivalent to a closing environmental certificate that will serve to demonstrate the correct completion of the works. Finally, it must carry out the consolidation of information in a document and submit a full report to the community.

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10.8.2 When the Project operation ends.

The activities described below, are the guidelines that must be adjusted to the current environmental regulations for the operation time of the hydroelectric project.

Up to date is the current Decree 2820 of 2010, where it is established in Article 40 that:

" When a project, work or activity requires or needs to start its phase of dismantling and abandonment, the owner shall submit to the competent environmental authority, with at least three (3) months in advance, a study containing the following:

- A) The identification of environmental impacts present at the time of initiation of this phase;*
- B) The plans of dismantling and abandonment; which will include manage measures of the area, the activities of final restoration and other pending actions;*
- C) The prints and location maps of the infrastructure object of dismantling and abandonment;*
- D) The obligations arising from the administrative acts by identifying the issues to fulfill and the fulfilled, attaching to the effect the respective substantiation.*
- E) The costs of the activities for the implementation of the dismantling and abandonment phase, and other outstanding obligations to fulfill."*

In compliance with the provisions of the decree mentioned above, shall be considered, among others, the following activities:

- Inform the municipalities administrations in the influence area of the project, about the completion of its operation.
- Inspect the area involved and assess the buildings, machinery or equipment to be removed, in order to prepare a work program.
- Assess whether part or the entire infrastructure to dismantle can be donated to any public or private institution, which requires such infrastructure.
- Rehabilitate and restore the offices area, workshops and access roads. This includes the demolition of all hard surfaces associated with the project, such as foundations, ditches, settlers.
- Properly dispose the waste generated in the demolition of hard surfaces. The concrete waste that cannot be recycled will be laid down in a deposit designed for this effect; the material that can be recycled or reused should be removed from the project influence area.
- In the event of hazardous waste being generated, these should comply in accordance with the Decree 4741 of 2005 or the replacement rule.

Attention must be placed on the excavation and removal of any type of contaminated soil as product of accidents, so that the surface is in similar conditions to those of the immediate surroundings and prepared to withstand any other use that has to be made.

It should also be careful with those components of the towers or buildings containing grease, oils or fuels, which should be drained and cleaned using grease traps, in addition the fluids and elements resulting from these procedures shall be stored in suitable containers for this purpose, and prepared according to the regulations.

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- If the topographic modifications are somewhere with stability problems or restriction, they must be properly signalized, indicating the limitations of use and the kind of risk for future use of the site.
- Do post - abandonment monitoring, to verify the effectiveness of the works, which will consist in the inspection of the area after the execution of the Abandonment Plan.

10.8.2.1 Collection

- Demolish the collection and settler's works; at the beginning, the weir will not be demolished, although a technical inspection of the structure must be performed, in order to early detect any anomaly that might generate some type of risk.
- Remove all hard surfaces; scarifying them down in a depth of at least 20 cm, or being covered with a layer of bare soil material before its revegetalization.
- Reshape as far as possible the original topographic conditions.

10.8.2.2 Conduction Tunnel and discharge channel

- Close the conduction tunnel in such a way that its access is blocked.
- The tunnel portals of entry must be filled and refined according to the topography prior to the project, adding a layer of soil and vegetation that corresponds to the area.
- The access roads leading to the entrance of the tunnel should be closed, as long as they are not used by the community to enter their premises.
- Points of entry to the tunnel must be properly referenced, to allow, if necessary, its possible use in facilities such as water supply, pipe line of multiple uses, communication roads among others.

10.8.2.3 Power house/Substation output

- Carry out the disconnection and power grid of the used equipment for the generation of energy.
- Dismantle and remove the equipment and facilities that are part of the power house.
- Blocking the access routes, in case that they are not used by the population.
- Proper disposal of generated hazardous waste, thereby fulfilling the requirements established in the Decree 4741 of 2005.
- Evaluate the power house equipment useful life, to be reused for subsequent facilities of electric generation.

10.8.2.4 Access Roads

The built access roads for the construction phase and subsequently used in the operation stage, which are considered of importance to the community of the direct influence area, will be delivered to the corresponding local authorities to take charge of their respective maintenance.

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The ones that are not being used, must be disabled and conform the landscape, joining the existing landforms in the influence area.

10.9 APPLICATION SITE

This program will be implemented in the direct influence area of the project. For the El Molino hydroelectric project, includes the Veredas of El Molino, Campo Alegre and Los Mangos.

10.10 SCHEDULE

The program will be implemented once the construction is finished, and when it's decided to finish the project operation.

10.11 BUDGET

Program costs are covered within the value of the project.

10.12 RESPONSIBLE

Owner of the project.