

CHAPTER 6. ENVIRONMENTAL MANAGEMENT PLAN

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1 INTRODUCTION

The Environmental Management plan is an environmental management tool which allows planning, defining and facilitating the application of environmental and social measures to prevent, mitigate and control the environmental impacts generated by the construction and operation activities of the Project.

The plan has a set of measures targeted to prevent, mitigate, repair or compensate the potential environmental impacts of the Project, as per the following definitions:

- **Mitigation measures:** have as goal to prevent or decrease the adverse effects produced by a work or action of the project, or by any of its parts at any execution phase. Those impacts that may not be completely prevented through avoiding the execution of such work, it will have to be minimized or decreased through an adequate limit or reduction of the magnitude or length of it, or through the implementation of specific measures.
- **Repair measures and/or restoration:** have as goal to replace one or more components or elements of the environment into a similar quality to the one it had before the damage was caused or, in the case of not being possible, re-establish it to its basic properties.
- **Compensation measures:** have as goal to produce or generate an alternative positive effect and equivalent to an identified adverse effect which will include the replacement or substitution of the natural resources or elements from the affected environment, by other of similar characteristics, class, nature and quality.
- **Risk prevention measures:** its target is to avoid having unfavorable effects on the population or the environment due to eventual situations of risk towards the environment, identified in the environmental impact prediction and assessment.

This Plan is based on what has been established in articles 58 to 62 of D.S. N° 95, General Secretariat of the Presidency: "Environmental Impact Assessment System Regulations", and comprises the following contents:

- Mitigation, repair or restoration and compensation plan.
- Risk prevention measures and accident control plan.

2 OBJECTIVES

The main goal of the Environmental Management Plan is to prevent, mitigate, correct or compensate adverse effects and optimize the positive effects caused over elements from physical Mean, biotic Mean, human Mean and constructed Mean by the execution of the "Electric Transmission Lines Maitenes S/S-Alfalfal S/S and Alfalfal Power Plant II-Alfalfal S/S" through application of environmental-technical measures and compliance of the current diverse environmental standards in the country.

This target will be reached according the following specific objectives:

- Proposal of a set of mitigation, repair or compensation measures of adverse effects significant to the environment that might come from the execution of the Project.
- Structuring actions to face risk and environmental accident situations during the execution of the Project in

its construction and operation stages.

- Establishing alignments to answer in an appropriate and quick way before any contingency may occur during the development of activities of the Project.

3 MITIGATION, REPAIR OR RESTORATION AND/OR COMPENSATION MEASURES PLAN

According to letter h) article 12 of SEIA Regulation, this Chapter contains a mitigation, repair and/or compensation measures plan, which describes those measures that will be adopted to eliminate or minimize the adverse effects of the Project according to the assessment done in Chapter 5, and repair and/or compensation actions to be adopted when necessary.

On the other hand, a risk prevention and accident control measure plan is presented containing operational measures and design criteria to avoid or minimize the occurrence of accident situations of risk towards the environment and the population.

According to the results from the assessment the significant adverse effects of the Project, analyzed in Chapter 5, establish the following mitigation, repair or restoration and/or compensation measures presented next:

Table 6-1 Mitigation, repair or restoration and /or compensation measures proposed for the Project

STAGE	IMPACT	MEASURES
COMPONENT: Quality of Air		
Construction	ICA1: local, temporary and intermittent deterioration of the air quality	<p>In order to mitigate the impact ICA1, the following measures will be carried out:</p> <ul style="list-style-type: none"> ■ Trucks with material moving outside the working faces will be covered with canvases to avoid the leakage of material. ■ An adequate maintenance of the equipment, vehicles and machineries will be performed (in specialized garages) in order to minimize atmospheric emissions. ■ If storage of fine granulometry materials is done in an area of the Project, these will be covered with plastic or fabric canvases until these are re-used in the same spot. <p>Engines will be turned off while vehicles and machineries area stopped and without operating.</p>
COMPONENT: Noise		
Construction	IR1: Noise generation over receptors near the Project	<p>In order to mitigate the IR1 impact associated to measurement point A, the following measures will be carried out:</p> <ul style="list-style-type: none"> ■ Use of mobile barriers which will be located in the working faces, specially, surrounding the concrete and mixer trucks, besides the specific activities such as material cutting. These barriers will have a minimum height of 2 m and a minimum density of 10 kg/m², for instance OSB of 15 mm thickness (see Annex 7). ■ Unnecessary entrance of heavy machineries and, in general, the installation of any noisy source near to the adjacent real estate will be avoided. ■ The corresponding maintenances to the equipment will be done in order to keep them in conditions similar to new. ■ A correct use of the equipment that have noise control systems by default will be managed, for instance, not opening the compressors gates or any other machinery that might have an ionization booth. ■ The amount and length of idle equipment in the site will be limited; especially the one generated by engines of trucks during the waiting period. ■ All the used equipment in the construction site will have escape systems and mufflers recommended by the manufacturer to keep the associated noise at lower level. ■ The use of horns in the work location will be banned. For such effects, the truck driver will be notified by written. ■ Additionally, it is contemplated a community management Plan, informing about the activities programmed to be developed, for example about the occurrence of noisy events such as the construction of

STAGE	IMPACT	MEASURES
		foundations, time and hours they will last for and will be carried out over point A.
COMPONENT: Flora and vegetation		
Construction / Operation	IFV1: Decrease of arboreal foliage cover	<p>The environmental management measures considered for the IFV1 impact, are the following:</p> <ul style="list-style-type: none"> ■ Educating the workers of the Project on the needs to know and protect the flora and vegetation existing in this area. ■ Prohibit logging and firewood collection in the area by the workers. ■ Additionally, this Project will incorporate the release of environmental protection actions committed by Alto Maipo Hydroelectric Project, consisting in road sings enabled with images of the conservation interest species existing in the zone, and information about its logging. These sings will be displaced in tourist or visitors influx areas.
COMPONENTE: Vertebrate fauna		
Construction	IF1: Alteration of the quality of Habitat	<p>The environmental management measures considered for the IF1, are the following:</p> <ul style="list-style-type: none"> ■ Performing a rescue of specimens of reptiles and micro mammals, in order to reallocate them in nearby areas, out of the direct influence area of the Project. ■ Workers of the Project will be trained (through brochures and talks) in order to create conscience and procedures of protection of fauna, and restrictions in terms of persecution, scaring away and hunting. Contractors will keep an update a log of the training activities and participants per camp site or working face. <p>This Project will incorporate the release of environmental protection actions committed by Alto Maipo Hydroelectric Project, consisting in road sings enabled with images of the conservation interest species existing in the zone, and information about its hunting prohibition and biological importance. These sings will be displaced in tourist or visitors influx areas.</p>
COMPONENT: Landscape		
Construction	IP1: : Alteration of the visual quality of the landscape	<p>As compensation measure to the IP1 impact for UP3 (Aucayes Stream), contemplates:</p> <ul style="list-style-type: none"> ■ The construction of a lookout in the future access road to Alfalfal II Power Plant, in the area next to the auxiliary forebay of Maitenes Power Plant, from where it will be able to have panoramic views of the valley. ■ The design of it will be established according to the aesthetic and environmental criteria in order to avoid the generation of new landscape impacts, as well as affecting the existing vegetation in the area.

Source: Self Elaboration.

4 RISK PREVENTION MEASURES AND ACCIDENT CONTROL PLANS

The Risk prevention measures and accident control plan are comprised by:

- Preventive environmental measures.
- Risk prevention measures and accident control.

4.1 Preventive environmental measures

In order to prevent eventual risk situations to the environment identified in the environmental impact prediction and assessment, the Project contemplates the following measures.

Table 6-2 Preventive measures

STAGE	IMPACT	MEASURES
COMPONENT: Archaeological and Cultural Heritage		
Construction	Without associated impact	With the goal of identifying potential archaeological remains underground the surface, a permanent archaeological monitoring during the activities of land movement (excavations) associated to the construction of the foundations will be provided.

Source: Self Elaboration.

4.2 Risk prevention measures and accident control plan

According to what was stated in Title VI of SEIA Regulation, the risk prevention and accident control measures have as goal to avoid unfavorable effects rising in the population or the environment.

As well as the accident control measures have as goal to allow efficient intervention in the events altering the ordinary development of a project or activity therefore can cause damage to life, health or to the environment.

From that standpoint, the risk prevention and accident control measures during the construction stage is addressed towards the contractors because part of the works of the Project will be done by third parties. This document is applicable to all the works of the Alto Maipo Hydroelectric Project, it will run in all the contractor's work and/or services that AES Gener S.A. performs with third parties applicable to the current project framework, with the goal of protecting the physical integrity of people that provide services in its facilities, as well as preventing those accident risks committing both human resources as natural resources of the company. Details of this document are presented in Annex 3, and it is mainly comprised of:

- General regulations.
- Risk prevention accountability.
- Safety Rules
- Personal protection equipment.

- Preventive and prohibition signs.
- Risk detection methodology.
- Risks identification and specific prevention measures.

AES Gener S.A. also has a Risk Prevention Plan and accident control associated to the construction and maintenance of aerial lines, as well as a procedure of work with tension and vegetation management, which are presented in the following paragraphs. Additionally, in Annex 3 the emergency and eventual spillage management plans within the facilities of the Cordillera Complex are presented, where the Maitenes and Alfalfal substations area included, ran during the operation stage of the project.

4.2.1 **Construction and maintenance of the aerial lines**

i) Objective

A safety standard to reduce the risk of people to potential hazards presented once they perform routine works of construction and maintenance to the aerial lines are presented. This standard defines the necessary approach to improve the chances of identifying high risks and to establish risk controls at the start of the works.

Compliance of the standard will guarantee that:

1. There is a process to perform the Work Safety Analysis for the high risk tasks for those which do not have a written procedure.
2. Compliance and get passed the requirement of talks previous to work included in OSHA §1910.269 Paragraph (c) and to comply with the best practices of the industry.

ii) Definitions

Barrier: term used to describe the measures taken to protect the workers in front of risks at the work place. The barriers are grouped in three categories: Control Barriers, safety Barriers and support Barriers.

Totally qualified electrician worker: a "qualified electrician worker" has been trained and has demonstrated skills recognizing electric risks identified in this standard and counts with the participation in a recognized program of professional learning for electrician workers.

Work safety analysis: a work assessment to identify and document the inherent hazards of the workplace and risks related to labor activities associated to work. The safety analysis contemplates before the start of the activities and is discussed with all AES Gener S.A. workers and contractors involved in the work.

Previous safety talk: a discussion between all the workers involved in a work, including a description of the task to be performed, tasks assignment for individual workers, work procedures to be used, hazards associated to the task, hazard control for identified hazard and emergency plans. The previous safety talks are known as safety discussions, meetings pervious to work, practical information meetings.

Recognized learning program: regulated training system combining in field training with formal training outside the field. The apprentice must pass the written tests and prove competences for each group of skills before the regulating agency and/or employer certifies him/her officially.

Basic skills training: a skill learnt systematically (learning) and which is fundamental for everyday tasks.

iii) Guideline principles and fundamental standards

1. Keeping a safety work plan documented for each construction or maintenance work of the aerial lines.
2. All the tasks of the safety works plan not covered by the training in basic skills training of a recognized learning program, by safety standards or by a specific written work procedure must count with a Job Safety Analysis (JSA) prepared before starting to work.
3. The risk management principles must be integrated to all the JSA, in which, for each potentially fatal danger:
 - a. Must be at least one control Barrier, that is to say:
 - i. Eliminating the risk, for example: blocking and signs;
 - ii. Minimizing the energy to safe levels, for example: ventilation of confined spaces;
 - iii. Physical Barriers, for instance: rotating shafts protections, rubber covers; and
 - b. It is necessary to use multiple barriers to provide a secondary protection in case of failure of the primary barrier.
4. A previous talk should be done before starting the jobs and each time the work conditions or the setup of the team change. The previous safety talk must cover the job safety analysis for the task to be performed.

4.2.2 Procedure for works with tension

i) Objective

A standard to specify the requirements for works with tension is established. The standard must be used in the determination of the minimum requirements for works over the lines and equipment with tension using rubber gloves, tools for works with tension and/or techniques for work potential.

ii) Scope

This safety standard is applied to jobs over the tension conductors, when they are disassembled, moved, cut, connected and/or when solid connections are done or are withdrawn directly from the tension lines through the use of rubber gloves, tools for tension works and/or techniques for potential works.

iii) Definitions

Tension works: it is defined as tension work as the job when a conductor of more than 750 volts is disassembled, moved, cut, connected or where solid connections are connected or withdrawn.

Second point of contact: is where the current would leave the body of a person if this would make contact with a live circuit. There should not be current flux (electrical burns) if contact with a live circuit is done and the person is not in contact with any other part of his/her body with another object that might have a different potential.

Works near the tension lines: Work near or close to devices or lines with tension. The installation of poles, placing of a transformer, stringing of conductors, manoeuvres, and operation over clamps and replacement of fuses are some examples of jobs near the tension circuits. This standard does not consider those works as "works with tension"

iv) Principles guideline and fundamental standards

1. An assessment to determine whether to complete the job with an isolated circuit and earth it, is the preferable option, should be always carried out. The decision of insulating and earth the electrical circuit /equipment or to do the job using techniques for works with tension must be based on the risk, and complexity of the job.

2. The worker should not get close to the circuit less than the minimum safety distance unless he/she is insulated, the circuit/equipment is insulated or the circuit/equipment is earthed.

3. The work with tension is not an exception to the minimum safety distances. Examples of maintenance of adequate distance are:

a. Guarantee enough distance to the insulated sections of the tools for works with tension;
And

b. The distance of a worker to an earthed object or to another phase, when working with rubber gloves or with techniques of potential work.

v) Programme elements of works with tension

1. Requirements previous to work:

a. Determine if there is a written procedure for the job to be performed. If there is none, a Job Safety Analysis(JSA) must be prepared;

b. Prepare a safety plan for the job

2. When is thought to perform a work with tension near the suspension type insulators, already installed, the condition of them should be checked looking for breaks (except from suspension insulator of distribution installed over the non-conductive materials, not earthed, e.g.: wood crosspiece).

3. Inspection previous to work and maintenance for works with tension. Aspects to be considered:

a. Work with rubber gloves

- b. Tools for works with tension.
- c. Electric Potential work.

4.2.3 Vegetation management

i) Objective

Safety standards are established to reduce the risks involved in the sprout of trees and vegetation management.

Guidelines of safety job are established in it when sprouting of trees near the tension circuit is done. Pruning of trees near the electric circuit is a high risk job and must be kept for trained tree planters in the clearance of the lines. The qualified tree planters are thought to perform basic sprouting of trees and rescue shrubs near the tension circuits where there are electric risks; they should keep distances of safety. Unless employees have received a training equivalent to a certified tree planter, they should be able to recognize when a sprouting of trees is out of their skills and equipment.

ii) Principles and fundamental guidelines

All dangerous trees must be avoided.

Whoever climbs a tree must be protected against falls through a climbing system as the anchorage point system.

Works in a tree can only be done once the worker is connected.

Equipment, tools and ropes used near the circuits with tension must receive electrical tests, inspections and should be kept clean.

Only qualified Tree Planters for Line Clearance or the Apprentices of the Qualified Tree Planter for the Clearance of Lines, under direct supervision of a Qualified Tree Planter for the Clearance of Lines, will be able to work where there are electric risks.

iii) Procedures

The written procedure must clearly and specifically align the scope, purpose, accountability, authorization, rules and techniques to be applied for.

1. Sprouting of trees: according to:

a. Directional pruning (Shigo's method) is a standard of the industry for pruning near electric lines. Only branches growing towards the electric lines are pruned; without intervening in those growing under it or towards another direction.

b. Cuts with saws must use the three step pruning method.

c. Branches should not be cut leaving stumps. If a branch needs to be cut, this should be done towards a side long enough so the branch keeps a minimum of 1/3 diameter from the one removed.

2. Tree works near electric circuits.

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3. Electric risks and controls.
 4. Specific procedures for works in electric risk environment.
 5. Tree pruning from a pruning crane.
 6. Tree climbing.
 7. Climbing risks and controls.
 8. Rescue procedures: tree planting.
 9. Use and cares of pruning tools.