

**Annex 6**  
**WATER SERVICES REGULATION AUTHORITY**

**1.- Description of the Project**

**ANSWER TO COMMENT 3**

The natural course of the waterway will not be altered while the temporary digression works are under operation. When the normal conditions of the natural waterway are reinstated, there will be an increase in the turbidity that will last for some hours, but that will not exceed half of a working day.

In conclusion, it is estimated that the change in the load of sediments due to construction works will not be significant or far from the normal conditions of the runoff of the highland rivers.

Additionally, Annex 17 of Addenda 1, shows the analysis of the requirements for the water biota, as well as the hydrologic and hydraulic characterization of the rivers and streams located in the area of the project.

On the other hand, Annex 2 of the EIA includes the Gantt chart that describes the activities of the PHAM, which provides details of the activities per month and per stage.

**ANSWER TO COMMENT 6**

Regarding the possible encumbrance of El Morado glacier, please refer to the answer to question 3, section 6 of this Addendum.

Nevertheless, what is pointed out in the answers to questions 4, 5, and 6 of Addenda 1 is reaffirmed, in the sense that the technical knowledge, the research and the geological recognitions of surface carried out, along with the technology provided for the construction works, allow to claim and conclude that "there won't be any impacts on the glacier and its dynamics."

The execution of systematic recognition soundings in front of the excavation face, is a common practice in the construction of deep tunnels, in order to anticipate the geotechnical conditions that will be faced, and to prepare, in an efficient and timely manner, the supporting actions that must be carried out.

It is reiterated that the tunnels are excavated in the rock mass, in which, there naturally aren't any aquifers. If there are any (hung aquifers) these are not related to the surface.

However, it is reaffirmed that, given possible leakages to the inside of the tunnel, due to the existence of rock fractures that are connected to the surface or base of the glacier (an improbable situation given the depth of the tunnel and the proven fact, in Annex 45 of the EIA, that at over 300 m of depth, the notches are sealed by the pressure exerted by the rock

mass), that section will be made waterproof, reestablishing the original conditions, so as to allow for the hydric flow in the rocky mass not to be interrupted.

### **ANSWER TO COMMENT 10**

As per the comment made, and notwithstanding the commitments and obligations stated in the Environmental Impact Study and its Addenda 1 related to these issues, we must point out that this is based on an error: that there must be a "new right" provided, concerning the change in the restitution point that has been requested according to preexisting rights.

In fact, the owner of the project is the owner of the rights for the exploitation of waters, protected by the constitutional guarantee established in Article 19, N° 24, in the final paragraph of the Political Constitution, regarding which there has only been one amendment requested as per the means of execution, namely, the change in the restitution point. Since that is not a concern in the request for a new right – as it was said, it exists and it is incorporated in its estate - the same treatment cannot be applied to that request, as the one given to the requests for completely new exploitation rights, and from it, there are several legal consequences that arise.

Particularly, regarding the environmental flow, the Water Code, only considers its imposition because of the constitution of water exploitation rights after the date of effectiveness of the reform to Law 20,017 of the Water Code of 2005. In effect, paragraph 1, of article 129 bis 1 of the Water Code states the following: ***When establishing the water exploitation rights, the National Waters Authority will look after the preservation of nature and the protection of the environment, and to do so, it will establish a minimum environmental flow, which will only affect the new rights established, and for which it will also have to consider the natural relevant conditions for each surface source***

In fact, the Water Code allows for the imposition of an environmental flow, in the extent that the following circumstances are met: (i) That it is a constitutive resolution of a water exploitation right; (ii) that the flow's aim is to preserve nature and to protect the environment and no other aims, such as recreational, related to sports or the availability for other rights; and (iii) for the right to be "new", that is to say, established after June 16, 2005, date of the publication of Law 20,017 in the Official Gazette. That is ratified in the legislative history for approval of Law 20,017.

In particular, as per the change of location for the exercise of water exploitation rights, being from its point of collection or restitution (in the case of non-consumptive rights), Article 163 of the Water Code, that regulates the procedure for the mentioned change of location, does not contain any regulations on environmental flows nor does it refer to article 129 bis 1 previously transcribed. In this case, the National Waters Authority must only verify that the already constituted rights in favor of third parties are not affected, and if there is water availability. If the aforementioned requirements are fulfilled, the National Waters Authority must proceed with the authorization for the change of location.

Finally, we reiterate that under any circumstances, the request for change of location of the exercise of a right for water exploitation, such as the restitution point, can be considered to represent the request for constituting a new water exploitation right. The prior since the constitution request states the mere expectation to acquire a water exploitation right, while the location change request from the collection or restitution point has to do with the exercise of an exploitation right that has already been constituted and incorporated in the property of a person.

The prior, agrees with what is stated by the Comptroller General of the Republic (Dictum 25,027 of 2002), in the sense that the change of location of a restitution point cannot be considered as the constitution of a new right.

### **ANSWER TO COMMENT 11**

The collection works of the PHAM will be equipped with measurement devices that will allow to record, on a permanent basis, the water level of the wall where the outlet holes of the environmental flow are located.

The eventual clogging that could affect these holes, will be translated into a normal water level increase recorded by the aforementioned devices. In that case, and as part of routinary maintenance, the material causing that clogging will be removed.

### **ANSWER TO COMMENT 21**

The water quality of the flows during the operation of the PHAM was analyzed in detail in Annex 17 of Addenda 1. Please refer to the answer to question 11, section 7, Addenda 2.

The information gathered in Annex 16, Addenda 1, and that describes in detail the “Effect of the Rejection of the Load of Alfalfal II and Las Lajas Power Plants,” in the Yeso and Colorado rivers are the result of the studies carried out for representative scenarios of the system with the power plants of the project in operation.

In the case of Yeso River, its average flow with the project under operation will be of 4 m<sup>3</sup>/s, which corresponds to the most representative scenario of the river, considering the flow passing through the water intake, plus the intermediate water shed. It is worth repeating what is pointed out in the studies presented; the El Yeso reservoir can discharge up to 80 m<sup>3</sup>/s in a situation of water increase, being this a much larger flow that would run off through El Yeso River, at a load rejection of the power plants (27 m<sup>3</sup>/s).

At Colorado River, the scenario for the normal flow increases during the summer has been modeled according to the situation of the project, and which corresponds to an unfavorable scenario.

On the other hand, the results of the previously mentioned modeling, state that the increase in the height of the waters due to a load rejection in the power plants is slow enough so as to not create any risk situations for people (please refer to answer 12, section 7 of this Addenda).

Moreover, in answer 16 of Addenda 1, the technical actions, and emergency and/or mitigation plans considered for the project during the construction and operation phase are described.

### **ANSWER TO COMMENT 23**

Please refer to answer 1 of section 6 and to the answer to question 6 of section 5 of this Addenda.

### **ANSWER TO COMMENT 24**

In answer 27 of Addenda 1, the necessary information that allows reaffirming that the works of the PHAM will not interfere with the operation of El Yeso reservoir is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

### **ANSWER TO COMMENT 27**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

### **ANSWER TO COMMENT 28**

Please refer to the answer to comment 33 of this section.

### **ANSWER TO COMMENT 29**

The measurement of the flows coming from El Yeso River that PHAM will use, will be carried out with a level sensor located in the Parshall drain pipe.

The information for the water levels that the sensor provides, will allow determining, after knowing the discharge curve of the drain pipe, the flow of passing water.

In the case of the surplus reservoir, the same principle described before is applied. The information will be continuously recorded and will be available for supervisory entities.

### **ANSWER TO COMMENT 33**

As per the statement regarding the increase in temperature due to the flow decrease, it must be said that such statement does not have any technical basis, since in a project situation there will always be continuity on the water flow in all the flows.

Similarly, a modification to the runoff regime does not produce any adverse alterations to the concentration of water sediments.

Regarding the effect in the quality of the waters conducted through tunnels, it is important to point out that as it happens in the area of San José de Maipo, where currently the power plants of Alfalfal, Maitenes, Queltehues and El Volcán are under operation, and that consider the transportation of water through tunnels and channels to be then returned to the flows of rivers Colorado and Maipo do not have any influences in their quality. In particular, the geology of the area where the tunnels run in Alfalfal (27 Km of hydraulic piping, without lining), is of the same characteristics of those of the PHAM's tunnels.

Finally, and regarding the potential for sanitary services and the availability of water for purification being affected, Ord. 1165 dated on December 5, 2008, of the Superintendence of Sanitary Services, which states that the collected waters for the treatment and production of drinking water in the watershed, will not be affected by the development of this project in any of its stages confirms this (later, in answer 27 of Addenda 1).

Regarding the mentioned physical and chemical analysis, this is included in answer 8, section 6, Addenda 2.

For the case of the situation of the waterholes in Maipo River, please refer to Annex 25 of the EIA.

Regarding the drinking water supply for the locality of Maitenes, the PHAM will improve the current supply conditions, which has been agreed with the community, both in the construction and in the operation phase of the Project.

#### **ANSWER TO COMMENT 34**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

Also, the PHAM will exert the water rights of its owner, respecting the legally constituted water rights of third parties.

#### **ANSWER TO COMMENT 40**

The owner reaffirms its full respect for the exercise of the rights of third parties which are legally constituted as provided by Law.

#### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

#### **ANSWER TO COMMENT 4.1**

The requested information is described extensively in answers 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

#### **ANSWER TO COMMENT 4.3**

In answer 27 of Addenda 1, the necessary information that allows reaffirming the fact that the works of the PHAM will not interfere in the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

The previous is a determining factor for the operation and feasibility of the project, as it has been established by the service in charge of assuring and protecting the availability and quality of drinking water, the Superintendence of Sanitary Services, in Ord. 1165 dated on December 5, 2008, which is in conformity with the PHAM.

#### **ANSWER TO COMMENT 4.4**

It is reiterated that once in operation, the PHAM will not modify the hydraulic regime of the watershed, due to the fact that it is comprised only by run of river power plants that do not regulate flows.

According to what is described in Chapter 3, Annex 16, Addenda 1, neither the startup of the PHAM nor the sudden stoppages of the power plant will interrupt the continuous flow. This because Las Lajas tunnel has exit gateways that allow to control the discharge flow in order to preserve its continuity through the use of the volume of that tunnel.

That Annex presented the modeling of the intake and load rejection cases of Alfalfa II and Las Lajas power plants individually and in the case of a black out, proving that the control elements considered in the design allow to guarantee that there won't be any interruptions in the continuous flow and that there will not be any consequences for the users downstream.

The filling process for the tunneling system is detailed in Chapter 4, Annex 17 of the EIA. In that document it is stated that Gener considers obtaining, through rental or purchase, the necessary consumption rights for filling of the tunneling system, for which it only requires 300,000 m<sup>3</sup>.

#### **ANSWER TO COMMENT 4.5**

As it was described in answer 4.5 of Addenda 1, the PHAM will not affect the agricultural valley since the return of waters takes place upstream from the irrigation collections. Alfalfa II and Las Lajas power plants are run of river power plants and therefore, they do not regulate waters and do not create any effects in the Hydrologic Regimen of the watershed. Similarly, it is stated that the works of the project will not interfere with the operation of El Yeso reservoir, nor they will affect the safety, or the availability of the hydric resource, for the production of drinking water for Santiago.

It is important to consider that climate changes are directly related to the emissions of CO<sub>2</sub> and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO<sub>2</sub> emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately 1,000,000 tons the emissions of CO<sub>2</sub> per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

Hindering or delaying this project is, ultimately, to accelerate climate change even more.

#### **ANSWER TO COMMENT 4.10**

The compensation measures for emissions will reduce the current emissions of the area caused by the traffic of trucks. For more details, please refer to Annex 4 and 5 of the EIA, and to Annex 9 of Addenda 1.

#### **ANSWER TO COMMENT 4.11**

The analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

Please refer to answers 11 and 23, section 1, Addenda 2 for more information.

## **5.- Base Line**

### **ANSWER TO COMMENT 5.1**

The assessment of the landscape flow was presented in Annex 17, Addenda 1, and was carried out considering the minimum conditions as it is recognized in the comment. In consequence, by not having any restrictions in this condition, the continuity of larger flows as the monthly mid flows is assured.

It is worth mentioning that the Environmental Impact Study provides a predictive analysis based on the knowledge and the current state of the art pertaining the issues addressed, the simulation models and the experience of similar projects.

That is why, and in order to reduce any kind of uncertainty that a predictive analysis may imply, the online monitoring and recording of the flows in different areas of the rivers whose waters PHAM will use have been agreed.

In furtherance, please refer to answer 23. Section 1, Addenda 2.

### **ANSWER TO COMMENT 5.2**

The information requested can be found in Chapter 5, section 5.5 of the EIA "Human environments" in Annexes 35 and 36 of the EIA, further, the assessment of the effects that the operation of the PHAM will have in the landscape, recreation, water flora and fauna, etc., is described in Annex 17, Addenda 1.

Through official note 651, dated on December 1, 2008, the relevant service (National Tourism Service - SERNATUR), did not provide any comments on Addenda 1. The comments carried out by that service in a complementary official note has been answered in question 11, section 7 of this Addenda.

### **ANSWER TO COMMENT 7**

The requested can be found in answer 8, section 1, Addenda 2.

### **ANSWER TO COMMENT 14**

The requested information can be found in Annex 17, Addenda 1 and can be complemented with answer 11, sections 1 and 7 of section 7, Addenda 2.

### **ANSWER TO COMMENT 21**

Please refer to previous answer 4.11

## **ANSWER TO COMMENT 24**

The study of environmental flows presented in Annex 17, Addenda 1, set the environmental requirements of Yeso River. In the mentioned study it is proven that the specified environmental flows fulfill those requirements in their full extent.

### **ANSWER TO COMMENT 24 ii)**

What is stated in section 3.3.2 and Annex 10 of the EIA is reaffirmed, this is that in the tranche of the Colorado river downstream from the works of the PHAM there are not any touristic or recreational facilities or infrastructure associated to informal seasonal activities in its flow, and that are susceptible of being affected by the PHAM, except for the use for irrigation that has been addressed in question 40, Addenda 1.

As per the development works mentioned, Institute Río Colorado on its website does not mention any recreational activities directly related to the use of the banks or waters of the Colorado river, and the Río Colorado Sanctuary was not approved for environmental processing, and finally, the housing-touristic property, Sociedad Parque El Quillayal, was built from the construction of Alfalfa power plant (1896-1991) which significantly improved the road infrastructure of that area.

As per the hydrology of the river flows, where the works of the PHAM take place, please refer to Annex 13, Addenda 1.

Please refer to Annex 17, Addenda 1 for more information on the assessment of the hydric requirements of both the biota and the anthropic uses, and landscape aspects in the rivers and streams.

### **ANSWER TO COMMENT vi)**

The procedures for changing the location of the restitution point of a water exploitation right for non-consumption use, according to the Standards and Procedures Manual for the Management of Hydric Resources of the National Waters Authority of 2008, in a procedure through which, the authorization of such service to move the location for exercising water rights (existing), that is to say, the change in the point of return of waters. Therefore, the request of a new right is not required.

### **ANSWER TO COMMENT xi)**

The analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. In it, it has been established that the Area of Environmental Importance in the Colorado river in fact corresponds to the entire river.

As per the hydrology of the river flows, where the works of the PHAM take place, please refer to Annex 13, Addenda 1.

Also, the PHAM will exert the water rights of its owner, fully respecting the water rights of third parties and legally constituted parties.

### **ANSWER TO COMMENT xii)**

Regarding the project Santuario Río Colorado, this was consulted in different sources of information, being registered in the Electronic Environmental Impact Assessment System as a project not accepted for processing, entered in the system on 6/7/2007, and therefore it would not have the Qualifying Environmental Resolution.

In furtherance, the staff of the Municipality of San José de Maipo was consulted, and they indicated that the project in question would not be registered as a valid touristic activity of the commune and that they do not have more information in that respect.

As per Institute Río Colorado, this is a non-profit institution that promotes environmental culture along with outdoor activities and scoutism. It provides camping and recreational services, including cabins rental, especially for scouts associations, offering activities such as hiking, trekking and mountain climbing.

Its facilities are located in the area of El Manzano, and they are not affected by the construction works and operation of the project.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 5**

The owner reaffirms that it owns the water rights required by the PHAM. This means that during their processing, the eventual third party rights constituted previously through the corresponding hydrological budgets were averted. That is why under any circumstances the PHAM will affect the rights of third parties.

Also refer to answer 12, section 7 of this Addenda.

#### **ANSWER TO COMMENT 6**

The owner reiterates that the PHAM will not interfere with the touristic activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development. The Land Register Cadastre of tourist and mountain attractions are described in Annexes 35 and 36 of the EIA. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

In turn, the analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

### **ANSWER TO COMMENT 7**

The analysis of environmental flows, and their relationship with the landscape, vegetation, and fauna, is described extensively in Annex 10 of the EIA and is complemented with the information requirements requested by the State Administration Bodies with Environmental Competency, in charge of the assessment of the PHAM, in Annex 17, Addenda 1.

### **ANSWER TO COMMENT 8**

It is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource.

For more information, please refer to answer 8, section 6, Addenda 1 and this Addenda.

### **ANSWER TO COMMENT 9**

The impact on tourism has been extensively analyzed in the EIA. For this reason there was as full cadaster on the tourist and mountain attractions carried out in Annexes 35 and 36 of the EIA. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

Alternatively, in Annex 17, Addenda 1, the situation that water tourist attractions will undergo with the operation of the PHAM is analyzed. In this sense, the Owner reiterates that the PHAM will not interfere with the tourist activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development.

As per the request of the question regarding the inclusion of an opinion poll of the direct users of the rivers considered in the PHAM, The National Tourism Office, body that formally requested that information in its ORD. 392 dated July 9, 2008 has not provided any comments, with which it is understood that the polling methods for users implicit in the process of citizen participation (PAC) in which the PHAM has participated and that also incorporates the different players involved in exercising recreational activities associated to rivers, is suitable for obtaining the opinion of the direct users of the rivers<sup>1</sup>.

In fact, for the case of the PHAM, the PAC process (both on a voluntary or anticipated basis) has been very extensive (approximately 50 assemblies and meetings among other activities), thus allowing to gather important information on the local perception of uncertainties, concerns, and the objectivity of the environmental assessment of the Project. In these PAC activities there have been public services, residents of the area and the community in general, along with local tour operators, workers involved in tourism, restaurants and recreation.

### **ANSWER TO COMMENT 10**

It is important to point out that the estimations provided in the research of the Department of Civil Engineering of U de Chile, were based on a series of monthly mid-flows. It is only for

---

<sup>1</sup> ORD 671, dated December 11, 2008 and that answers the comments provided for Addenda 1 of the EIA, does not provide any further comments in regards to answer 9, section 6, Addenda 1.

these types of averages that the extractions of flows of the PHAM can have some relevance regarding the flows that pass through the river, and thus, on the sediment rating associated to it. In this sense, the analysis carried out allowed to provide a pessimistic scenario regarding the effect that the PHAM could present on the sedimentologic component. That explains the reason why the monthly flows represent an average condition, as a practical approximation approach to a hydrological reality, that in any case, is better represented by the series of daily flows and the passing times of the river, for which the flows of the PHAM represent a less significant fraction compared to the monthly average flows.

On the other hand, it is important to point out that as it is stated in the report of U de Chile, the entrainment from the bed of the river represents around 70% of the total sediment rating that such flow carries, and the remaining percentage is the suspended sediment rating. That amount was obtained as a reference in the area of Maipo in El Manzano, a point that was used to represent the sediment rating that would be exported towards the downstream areas of the project. That is to say, that mostly the effect of the PHAM is felt at the level of the bed sediment rating, but only in the proportion of the flows of the mentioned project, compared to the passing flows of the river.

In the given context, it is important to emphasize on the fact that the study of U de Chile that included an analysis with the series of monthly average flows, limited the characterization of actual variations of the flow (the approximation should be better on a daily basis and at given times), thus getting to the conclusion that although it is consistent with that approach, it provides more importance to the impact of the PHAM in terms of the volumes of carried material. This, since the sediment ratings are related non-linearly to the liquid flows ( $G_s$  is related to approximately with  $Q^{1.5}$ ). For this reason, if the sediment ratings of the river were calculated based on the daily average liquid flows, the effects on the sedimentary regime of the collected flows and discharge of the PHAM can be considered to be less relevant.

In furtherance, it is worth considering that the sediment volumes that determine the characteristic sedimentary regime and the relevant river processes of a natural river course are mostly carried through the passing of floods, a condition in which the fraction of the flows associated to the PHAM represents a lower proportion and is surely irrelevant regarding the passing flows during flood events.

As per the floods it can be said that, as an example, that the monthly average flow range assessed for Maipo in Las Variants, is between 40 and 600 m<sup>3</sup>/s, for the period between 1952 and 2002, with an annual average flow of 112 m<sup>3</sup>/s for the period. For the same period, the annual series of floods shows a variation range between 150 y 1,100 m<sup>3</sup>/s (with return periods estimated in 1 and between 25 and 50 years, respectively.) That is to say, the hydrologic regime is characterized by a broad range of larger flows which is not represented in the series of monthly average flows. That is why, if the movement of quantified sediments as a sediment rating is associated to monthly average flows, this will be significantly lower than the actual values characteristic of the river (associated to instant liquid flows, at certain times and on a daily basis), and as it has been mentioned the sediment rating increases according to a factor that multiplies the liquid flow to the power of 1.5 or similar. In the context of those liquid flows that are more representative of the hydrologic reality of the river, it is obvious that the fraction associated to the operation flows of the PHAM would be less relevant, and less significant even if the sediment ratings are considered.

If the daily flows were incorporated as part of the analysis, for example, the uncertainty regarding the effect of the PHAM on the sedimentologic behavior of the river could be reduced. That is to say, when representing the flows of the PHAM a less important fraction of this hydrologic series, and therefore on the extent of the movement of global sediments of the river, the insignificant effect of the works of the PHAM on the sedimentologic behavior would be better characterized.

Given the aforementioned and addressing the concern expressed by the authorities, the Owner has considered convenient to develop the specific studies that allow for the DOH, to have the additional technical elements to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river. As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works). With the described procedure, the Owner's intent is for that revising institution to become involved in the process of definition of the studies requirements, and later, in the review process itself, so that once the study is concluded, there is a full agreement on its outcomes, conclusions and recommendations.

Based on the outcomes and the conclusions from the mentioned study, there will be a proposal for a Monitoring Plan of the river's hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complete the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen o eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment. The aim with that is to avoid any negative effects that the project could have on the behavior of the river.

#### **ANSWER TO COMMENT 14**

In order to properly address the mentioned concerns, the Owner proposes to carry out specific studies that allow for the DOH of the MOP, to have the technical elements needed to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river, and with this proving what was presented in the predictive studies carried out as part of the environmental assessment.

As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works).

Specifically, the current situation of the river will be described, both in relation to the sedimentary regime of Maipo river and the Colorado and Yeso river affluents, and Colina, La Engorda, Las Placas and Morado streams, and the existing conditions of the infrastructure that could be affected by the PHAM.

Based on the outcomes and the conclusions of the mentioned study, there will be a proposal for a Monitoring Plan of the river hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complement the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen o eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment.

### **ANSWER TO COMMENT 18**

The requested can be found in Annexes 4 and 5 of the EIA, similarly, the traffic analysis for the construction stage can be found in Annex 9, Addenda 1. With the previously mentioned information, it can be affirmed that the glaciers will not be affected by the dust emissions from the PHAM, since its mitigation actions, avoid the suspension and re-suspension of dust, thus largely decreasing the current emissions.

As per the concern with Climate Change, the PHAM does not involve environmental activities, impacts or risks that may have an incidence on this phenomenon. Similarly, given the characteristics of the PHAM (run of river power plants without reservoirs), an environmental impact related to changes to local weather conditions is not foreseen either.

It is important to consider that climate changes are directly related to the emissions of CO<sub>2</sub> and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO<sub>2</sub> emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately 1,000,000 tons the emissions of CO<sub>2</sub> per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

Hindering or delaying this project is, ultimately, to accelerate climate change even more.

For a better understanding, the PHAM does not consider to produce vast deforested areas or without herbaceous or shrubby vegetation, being this an eminently underground project, and considering the fact that it agrees with the reforestation and revegetation of a greater area than the actual affected area (including disposal areas, camps, etc.).

On the other hand, as it was stated, the PHAM does not involve greenhouse gas generation as a result of its operation, considering also for the case of emissions during the construction phase, a comprehensive dust emissions program, which also involves the reduction of the current emissions in the area.

The hydrologic studies of the PHAM are based on historical statistics with more than 50 years of records, while the environmental studies have considered the information currently available for the best prediction and weighing possible for environmental impacts. Nonetheless, the environmental management measures that the PHAM involves use an adaptive approach, and therefore, they will adjust to the information available and the outcomes obtained during the environmental follow-up.

**ANSWER TO COMMENT 33 a, b, c, d, and e**

Please refer to the answer to comment 14 above

**ANSWER TO COMMENT 35.**

Please refer to the answers of questions 1. 33, 4.4 and 6.33 above.

**Section 9.- Follow-up Plan for the Relevant Environmental Variables that give rise to the EIA**

**ANSWER TO COMMENT 9**

Please refer to Annex 5 of this Addenda.

**DEPARTMENT OF HYDRAULIC WORKS (DIRECCIÓN DE OBRAS HIDRÁULICAS)**

**1.- Description of the Project**

**ANSWER TO COMMENT 23**

As per the Influence Area set by the project and related to the sediment transport regime, it is reaffirmed that this is extended through Maipo river to the water intake of Canal Sirena.

Although the PHAM will decrease the sediment entrainment capacity to the previously mentioned point, this will not affect the current situation related to the erosion-sedimentation balance, since sediment transport in this part of the basin is controlled by the availability of sediments, that is to say, the amount of transportable sediments is lower than the entrainment capacity of the watercourses still with a project.

Notwithstanding the aforementioned, the Owner has committed to carry out a study agreed with the corresponding Authority (please see Annex 5 of this Addenda.)

As per the identification of the beach resorts and other touristic activities emplaced in the area of influence of the project, Annexes 35 and 36 of the EIA provided a full cadaster of the tourist and mountain attractions present in the area. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

Finally, in Annex 17, Addenda 1, the situation that water tourist attractions will undergo with the operation of the PHAM is analyzed. In this sense, the Owner reiterates that the PHAM will not interfere with the tourist activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development.

For more information, please refer to answer 1 of section 6 and to the answer to question 6 of section 5 of this Addenda.

#### **ANSWER TO COMMENT 24**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm that the works of the PHAM will not interfere with the operation of El Yeso reservoir is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

#### **ANSWER TO COMMENT 26**

The verification of the compliance of DS 90, is considered in the Follow-up Plan. The competent authority (Secretaría Regional Ministerial de Salud - Regional Ministerial Health Department) did not make any comments in this respect.

Concerning the location of the discharges, this is indicated in Annex 15 of the EIA, and in answer 26, section 1, Addenda 1.

Moreover, in answer 8, section 6, Addenda 2 includes the details of the physical-chemical quality that the flows will have once the PHAM is in operation.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 6**

The owner reiterates that the PHAM will not interfere with the touristic activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development. The Land Register Cadastre of tourist and mountain attractions are described in Annexes 35 and 36 of the EIA. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

In turn, the analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

## **ANSWER TO COMMENT 10**

It is important to point out that the estimations provided in the research of the Department of Civil Engineering of U de Chile, were based on a series of monthly mid-flows. It is only for these types of averages that the extractions of flows of the PHAM can have some relevance regarding the flows that pass through the river, and thus, on the sediment rating associated to it. In this sense, the analysis carried out allowed to provide a pessimistic scenario regarding the effect that the PHAM could present on the sedimentologic component. That explains the reason why the monthly flows represent an average condition, as a practical approximation approach to a hydrological reality, that in any case, is better represented by the series of daily flows and the passing times of the river, for which the flows of the PHAM represent a less significant fraction compared to the monthly average flows.

On the other hand, it is important to point out that as it is stated in the report of U de Chile, the entrainment from the bed of the river represents around 70% of the total sediment rating that such flow carries, and the remaining percentage is the suspended sediment rating. That amount was obtained as a reference in the area of Maipo in El Manzano, a point that was used to represent the sediment rating that would be exported towards the downstream areas of the project. That is to say, that mostly the effect of the PHAM is felt at the level of the bed sediment rating, but only in the proportion of the flows of the mentioned project, compared to the passing flows of the river.

In the given context, it is important to emphasize on the fact that the study of U de Chile that included an analysis with the series of monthly average flows, limited the characterization of actual variations of the flow (the approximation should be better on a daily basis and at given times), thus getting to the conclusion that although it is consistent with that approach, it provides more importance to the impact of the PHAM in terms of the volumes of carried material. This, since the sediment ratings are related non-linearly to the liquid flows ( $G_s$  is related to approximately with  $Q^{1.5}$ ). For this reason, if the sediment ratings of the river were calculated based on the daily average liquid flows, the effects on the sedimentary regime of the collected flows and discharge of the PHAM can be considered to be less relevant.

In furtherance, it is worth considering that the sediment volumes that determine the characteristic sedimentary regime and the relevant river processes of a natural river course are mostly carried through the passing of floods, a condition in which the fraction of the flows associated to the PHAM represents a lower proportion and is surely irrelevant regarding the passing flows during flood events.

As per the floods it can be said that, as an example, that the monthly average flow range assessed for Maipo in Las Vertientes, is between 40 and 600 m<sup>3</sup>/s, for the period between 1952 and 2002, with an annual average flow of 112 m<sup>3</sup>/s for the period. For the same period, the annual series of floods shows a variation range between 150 y 1,100 m<sup>3</sup>/s (with return periods estimated in 1 and between 25 and 50 years, respectively.) That is to say, the hydrologic regime is characterized by a broad range of larger flows which is not represented in the series of monthly average flows. That is why, if the movement of quantified sediments as a sediment rating is associated to monthly average flows, this will be significantly lower than the actual values characteristic of the river (associated to instant liquid flows, at certain times and on a daily basis), and as it has been mentioned the sediment rating increases according to a factor that multiplies the liquid flow to the power of 1.5 or similar. In the context of those liquid flows that are more representative of the hydrologic reality of the river, it is obvious that the fraction associated to the operation flows of the PHAM would be less relevant, and less significant even if the sediment ratings are considered. .

If the daily flows were incorporated as part of the analysis, for example, the uncertainty regarding the effect of the PHAM on the sedimentologic behavior of the river could be reduced. That is to say, when representing the flows of the PHAM a less important fraction of this hydrologic series, and therefore on the extent of the movement of global sediments of the river, the insignificant effect of the works of the PHAM on the sedimentologic behavior would be better characterized.

Given the aforementioned and addressing the concern expressed by the authorities, the Owner has considered convenient to develop the specific studies that allow for the DOH, to have the additional technical elements to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river. As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works). With the described procedure, the Owner's intent is for that revising institution to become involved in the process of definition of the studies requirements, and later, in the review process itself, so that once the study is concluded, there is a full agreement on its outcomes, conclusions and recommendations.

Based on the outcomes and the conclusions from the mentioned study, there will be a proposal for a Monitoring Plan of the river's hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complete the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen or eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment. The aim with that is to avoid any negative effects that the project could have on the behavior of the river.

#### **ANSWER TO COMMENT 14**

In order to properly address the mentioned concerns, the Owner proposes to carry out specific studies that allow for the DOH of the MOP, to have the technical elements needed to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river, and with this proving what was presented in the predictive studies carried out as part of the environmental assessment.

As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works).

Specifically, the current situation of the river will be described, both in relation to the sedimentary regime of Maipo river and the Colorado and Yeso river affluents, and Colina, La Engorda, Las Placas and Morado streams, and the existing conditions of the infrastructure that could be affected by the PHAM.

Based on the outcomes and the conclusions of the mentioned study, there will be a proposal for a Monitoring Plan of the river hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complement the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen o eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment.

#### **ANSWER TO COMMENT 33 a, b, c, d, and e**

Please refer to the answer to comment 14 of the DGA section.

### **9.- Follow-up Plan for the Relevant Environmental Variables that mother the EIA**

#### **ANSWER TO COMMENT 9**

Please refer to the answer to comment 14 of the DGA section.

## **AGRICULTURE AND LIVESTOCK SERVICE**

### **1.- Description of the Project**

#### **ANSWER TO COMMENT 3**

The natural course of the waterway will not be altered while the temporary digression works are under operation. When the normal conditions of the natural waterway are reinstated, there will be an increase in the turbidity that will last for some hours, but that will not exceed half of a working day.

In conclusion, it is estimated that the change in the load of sediments due to construction works will not be significant or far from the normal conditions of the runoff of the highland rivers.

Additionally, Annex 17 of Addenda 1, shows the analysis of the requirements for the water biota, as well as the hydrologic and hydraulic characterization of the rivers and streams located in the area of the project.

On the other hand, Annex 2 of the EIA includes the Gantt Chart that describes the activities of the PHAM, which provides details of the activities per month and per stage.

## **ANSWER TO COMMENT 21**

The water quality of the flows during the operation of the PHAM was analyzed in detail in Annex 17 of Addenda 1.

Please refer to the answer to question 11, section 7, Addenda 2.

Kayaking and/or rafting activities have not been identified in Yeso and Colorado rivers.

The information gathered in Annex 16, Addenda 1 describe in detail the “Load rejection effect of Alfalfa II and Las Lajas Power Plants,” in Yeso, Colorado and Maipo rivers. Moreover, in answer 16 of Addenda 1, the technical actions, and emergency and/or mitigation plans considered for the project during the construction and operation phase are described.

## **ANSWER TO COMMENT 28**

Please refer to the answer to comment 33 of the DGA section.

### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

#### **ANSWER TO COMMENT 4.1**

The requested information is described extensively in answer 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

#### **ANSWER TO COMMENT 4.2. i)**

A significant negative impact is not considered on the habitat of mountain birds, in terms of the following: the project is eminently underground and the area to be intervened will be recovered in more than 50% (temporary works), therefore, reestablishing the conditions of the bird's habitat. Also, the PHAM considers carrying out bird population studies associated to flows, which intend to verify that the species being studied, will not in fact be significantly altered by the Project. Finally, it is important to stress on the fact that the areas with a greater presence of birds in the location of the PHAM, have been set as restricted areas for works and Contractors.

#### **ANSWER TO COMMENT 4.2. ii y iii)**

**i) ii) iii).**- In all of the areas that the project will intervene, the environmental component has been fully assessed, thus meaning fauna, flora, landscape, etc. For this, the Owner developed Management Plans for each one of the environmental components of interest, where the prevention, mitigation, management, protection, safeguard actions etc., along with the abandonment, recovery and restoration of the areas to be intervened are described. It is worth noticing that 50% of the intervened areas are recovered to their natural condition.

It is recommended to review the Management Plans described in the Annexes of the EIA and Addenda 1 and 2.

#### **ANSWER TO COMMENT 4.4**

It is reiterated that once in operation, the PHAM will not modify the hydraulic regime of the watershed, due to the fact that it is comprised only by run of river power plants that do not regulate flows.

According to what is described in Chapter 3, Annex 16, Addenda 1, neither the startup of the PHAM nor the sudden stoppages of the power plant will interrupt the continuous flow. This because Las Lajas tunnel has exit gateways that allow to control the discharge flow in order to preserve its continuity through the use of the volume of that tunnel.

That Annex presented the modeling of the intake and load rejection cases of Alfalfal II and Las Lajas power plants individually and in the case of a black out, proving that the control elements considered in the design allow to guarantee that there won't be any interruptions in the continuous flow and that there will not be any consequences for the users downstream.

The filling process for the tunneling system is detailed in Chapter 4, Annex 17 of the EIA. In that document it is stated that Gener considers to obtain, through rental or purchase, the necessary consumption rights for filling of the tunneling system, for which it only requires 300,000 m<sup>3</sup>.

#### **ANSWER TO COMMENT 4.5**

The PHAM does not involve any activities, impacts or environmental risks that may have a significant incidence on global warming as described in the Comment. Similarly, given the characteristics of the PHAM (run of river power plants without reservoirs), an environmental impact related to changes to local weather conditions is not foreseen either.

For a better understanding, the PHAM does not consider to produce vast deforested areas or leave areas without herbaceous or shrubby vegetation, being this an eminently underground project, and considering the fact that it agrees with the reforestation and revegetation of a greater area than the actual affected area (including disposal areas, camps, etc.).

Similarly, the PHAM does not involve the generation of greenhouse gases as a result of its operation, also considering for the case of the emissions during the construction phase, a comprehensive compensation program for dust emissions.

The hydrologic studies of the PHAM are based on historical statistics with more than 50 years of records, while the environmental studies have considered the information currently available for the best prediction and weighing possible for environmental impacts. Nonetheless, the environmental management measures that the PHAM involves use an adaptive approach, and therefore, they will adjust to the information available and the outcomes obtained during the environmental follow-up.

It is important to consider that climate changes are directly related to the emissions of CO<sub>2</sub> and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO<sub>2</sub> emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately

1,000,000 tons the emissions of CO<sub>2</sub> per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

As it was described in answer 4.5 of Addenda 1, the PHAM will not affect the agricultural valley since the return of waters takes place upstream from the irrigation collections. Alfalfal II and Las Lajas power plants are run of river power plants and therefore, they do not regulate waters and do not create any effects in the Hydrologic Regimen of the watershed. Similarly, it is stated that the works of the project will not interfere with the operation of El Yeso reservoir, nor they will affect the safety, or the availability of the hydric resource, for the production of drinking water for Santiago.

#### **ANSWER TO COMMENT 4.7**

The execution of the “Forestry” and “Vegetation restoration” Management Plans are conditioned by the approval of the RCA and to the beginning of the works, and therefore its startup will take place once the corresponding permits are approved. In turn, the work methodologies described in the management plans have been established based on previous experiences with favorable results, however, those methodologies will be conditioned to their adjustment or modification during their development with the aim of achieving the best result. Moreover, the Vegetation Restoration plan (Annex 29 of the EIA), will start once every work is finished, and the Reforestation Plan (Annex 7 of the EIA) will start once the corresponding permits are approved and not after 2 years as it is mentioned in the comment.

The priority is for the species to be used in the reforestation and revegetation plans to come from the nursery that the Owner will implement. However, depending on the construction programs, and on the arrangements set by the corresponding Authorities (CONAF and SAG), some specimens coming from already established nurseries could eventually be partially used , with the purpose of meeting the deadlines for implementing the measure.

#### **ANSWER TO COMMENT 4.8**

All of the information relative to wet prairie La Engorda is presented in Annex 6, Addenda 1. That information is complemented with the information presented in answer 19 - section 1, answer 3 - section 5, answer 10 - sections 6 and 3, and section 5 of Addenda 2.

#### **ANSWER TO COMMENT 4.9**

As per Natural Monument El Morado, please refer to answer 3 - section 2 and answer 3 - section 4; of this Addenda and

Regarding the application of PAS 78, please check answer 5, section 5 of this Addenda.

Pertaining the effect on the high-Andean scrubland and the repositioning actions of the affected areas that the PHAM considers, they have been broadly described in the EIA and in Addenda 1. For details, please refer to Annex 6, Addenda 1.

#### **ANSWER TO COMMENT 4.10**

The requested can be found in Annexes 4 and 5 of the EIA, similarly, the traffic analysis for the construction stage can be found in Annex 9, Addenda 1. With the previously mentioned information, it can be affirmed that the glaciers will not be affected by the dust emissions from the PHAM, since its mitigation actions, avoid the suspension and re-suspension of dust, thus largely decreasing the current emissions by truck traffic.

#### **ANSWER TO COMMENT 4.11**

The requested information, was addressed extensively in Annex 17, Addenda 1, and complemented with answers 18 and 23 of section 1, and answer 7, section 7, Addenda 2.

The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

Please refer to answers 11 and 23, section 1, Addenda 2 for more information.

#### **5.- Base Line**

##### **ANSWER TO COMMENT 5.2**

The information requested can be found in Chapter 5, section 5.5 of the “Human environments” EIA, and in Annexes 35 and 36 of the EIA, further, the assessment of the effects that the operation of the PHAM will have in the landscape, recreation, water flora and fauna, etc., is described in Annex 17, Addenda 1.

Through official note 651, dated on December 1, 2008, the relevant service (National Tourism Service - SERNATUR), did not provide any comments on Addenda 1. The comments carried out by that service in a complementary official note has been answered in question 11, section 7 of this Addenda.

##### **ANSWER TO COMMENT V)**

As it was mentioned in the answer, the information was presented in section 5.4.2 of the EIA, and it included all of the areas of physical intervention of the PHAM.

#### **ANSWER TO COMMENT 14**

The requested information can be found in Annex 17, Addenda 1 and can be complemented with answer 11, sections 1 and 7 of section 7, Addenda 2.

**ANSWER TO COMMENT 21-** The requested information was developed extensively in Annex 17, Addenda 1 and complemented with answers 11 and 23 of section 1, answer 8, section 6 and 7 of section 7, Addenda 2.

Please refer to previous answer 4.11

#### **ANSWER TO COMMENT 24**

The study of environmental flows presented in Annex 17, Addenda 1, set the environmental requirements of Yeso river. In the mentioned study it is proven that the specified environmental flows fulfill those requirements in their full extent.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 6**

The owner reiterates that the PHAM will not interfere with the touristic activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development. The Land Register Cadastre of tourist and mountain attractions are described in Annexes 35 and 36 of the EIA. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

In turn, the analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

#### **ANSWER TO COMMENT 7**

Please refer to the answer to question 6, section 6 of this document.

#### **ANSWER TO COMMENT 8**

It is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource. For more information, please refer to answer 8, section 6, Addenda 1 and Addenda 2.

It is reiterated that the PHAM is an eminently underground project and that also considers reforestation and revegetating the intervened areas above surface, not foreseeing the generation of dry areas as it is stated in the question. In the case of reduced flows, the bank areas will be partially planted with species used to flow variations, and therefore, the appearance of dry strips is not foreseen. All of the above applies to the case of the area of Alto Volcán, as well as the valleys of rivers Colorado and Maipo.

As it was stated in answer 4.1, section 4, Addenda 1, the reduction of flows will imply a decrease in the ability of dilution of the intervened rivers and streams, especially in the season of lower flows (fall-winter), because that effect will be equivalent to the reduction of the runoff. This effect could be more evident immediately downstream of the projected collections, however, the contribution of the intermediate watershed assures an eventual recovery of the flow's dilution capacity in the tranche involved downstream.

Although the entire reduction of the flows influences the dilution ability of the flows given future discharges or mixes, it is considered that this effect will not be relevant due to the following:

- In general, the tranches of the rivers and streams where the collections of the Project are projected, are located in the high or mid-mountain (between 1,000 and 2,500 m.a.s.l), are unpopulated and that do not receive in general, liquid waste discharges, either legal or clandestine. That is to say, the tranches of surface flows where an environmental flow will be kept are not subject to discharges that compromise their physical-chemical quality, presenting in general, a good quality of water (see section 5.3.5.2 of the EIA), with which a reduction of the runoff will not have a significant incidence in its physical-chemical quality, nor it will imply any risks for the limnologic system.
- The area where the flow decrease will be more noticeable will be the area of Alto Volcán that remains covered by snow during most of the fall-winter season. The 4 streams of the Alto Volcán area (3 of them converge in El Morado stream) will vary their flow in a similar way, and therefore, there are not any mixing conditions expected that would significantly modify the composition of the El Morado stream, or of the El Volcán river to where finally the waters coming from the 4 mentioned streams converge. In this area there are not any legal or clandestine liquid waste discharges.
- Downstream from the Las Lajas areas there will be a restitution of the waters of the PHAM, the dilution capacity of Maipo river will be completely restored, which however, changes again downstream of the separate intake of Aguas Andinas S.A.

From the point of view of aquatic life, a significant impact due to a decrease in the dilution ability is not foreseen. In these mountain systems, the organisms are adapted to a notable seasonal variations of flow and composition of waters (section 6.4.1.4 of the EIA). It is inferred that they are also adapted to the regulation of the flow that different players exert in the rivers of the area. The previous will be verified through the Limnologic Monitoring Program that the PHAM considers. Similarly, in case the monitoring records an unforeseen effect, the compensation actions described in Annex 17 of this Addenda will be implemented.

From the anthropic point of view, in the future, any new activity that implies discharges to flows, will have to comply with the regulations for such discharges in surface flows having as a base situation the flows in situation with the PHAM.

As per the modification of the load of sediments, during the operation phase of the PHAM, there will not be any variations in the turbidity of the rivers, that could alter the ability of the drinking water treatment systems, as it was explained in answer 28, section 1, Addenda 1. The discharge of the Project in the area of Las Lajas will provide desanded waters, therefore, these will not, under any circumstances, worsen the turbidity naturally found in the river. In the construction phase, the intervention of the flows due to construction works will not create a significant increase in the load of sediments of rivers and streams, as it was explained in answer 3, chapter 1, Addenda 1.

Thus, it is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource.

### **ANSWER TO COMMENT 18**

The requested can be found in Annexes 4 and 5 of the EIA, similarly, the traffic analysis for the construction stage can be found in Annex 9, Addenda 1. With the previously mentioned information, it can be affirmed that the glaciers will not be affected by the dust emissions from the PHAM, since its mitigation actions, avoid the suspension and re-suspension of dust, thus largely decreasing the current emissions. Also, please refer to question 4.5 of this document.

### **ANSWER TO COMMENT 29**

The agreement of the Owner to carry out a population study (section 6.4.1.6 of the EIA) that provides quantitative information on the possible impacts of the Project on the species is reiterated, thus allowing for the consideration of proper compensation or rectification actions to mitigate or compensate the impact, such as restoring some areas next to the flows with the purpose of increasing the population, or others to be set with the corresponding sectorial Authority. The proposed population study, can also be a useful tool for developing quantitative information for making decisions in future projects that affect similar habitats.

The population study will be presented before the Authority with the purpose of informing both the outcomes as well as the proposal and adjustment of the relevant environmental management actions. With that, the assumed strategy considers a consensus with the Environmental Authority regarding the additional necessary actions in case the outcomes of the study reveal adverse effects on the species. As a general criteria, given the eventual detection of an adverse effect on the populations of the alluded species, the additional measures will be centered in improving and restoring the quality of the habitat (ecological restoration).

### **ANSWER TO COMMENT 31**

Moreover, the Vegetation Restoration plan (Annex 29 of the EIA), will start once every work is finished, and the Reforestation Plan (Annex 7 of the EIA) will start once the corresponding permits are approved and not after 2 years. Moreover, the Rescue and Relocation Plan (Annex 4, Addenda 1) considers the rescue and relocation of all species of individuals located in the surface works area, prior to the beginning of the works. In case of finding Gruñidor de El Volcán, this will be considered in the Rescue Plan and the most proper rescue and relocation methodology will be applied. In case of interfering with any Cururo colonies, the Disturbance and/or Spontaneous Migration methodology will be applied, so that the same species is relocated; according to prior experiences, this is the most proper methodology.

Again, Annex 4, Addenda 1 describes in detail the methodology, length, campaigns, and etc. of the rescue and relocation of species. It is worth mentioning that ALL the areas to intervene; that is to say that in all areas where surface works will be carried out, the fauna rescue action will be applied.

Finally, the execution of trainings for contractors is reiterated. These will be taught by a Fauna Specialist. Such trainings will be registered, indicating their participants and the professional in charge of them.

### **7.- Mitigation, Repair and/or Compensation Actions Plan**

#### **ANSWER TO COMMENT 7**

Please refer to Annex 6, Addenda 1 and answer 10, section 6, Addenda 2.

#### **ANSWER TO COMMENT 8**

Moreover, the Vegetation Restoration plan (Annex 29 of the EIA), will start once every work is finished, and the Reforestation Plan (Annex 7 of the EIA) will start once the corresponding permits are approved and not after 2 years. Moreover, the Rescue and Relocation Plan (Annex 4, Addenda 1) considers the rescue and relocation of all species of individuals located in the surface works area.

Moreover, the Forestry Management Plan will be in charge of Professionals with a vast experience, and therefore, all the measures and methodologies to be developed in the planting will be applied with the aim of achieving an optimal result.

#### **ANSWER TO COMMENT 9**

The protection measures described in the Forestry Management Plan are considered, but in case of needing an additional measure, these will be assessed at that moment, with the purpose of assessing the best option to finally apply them.

### **ANSWER TO COMMENT 10**

The location of “disposal and plant recovery areas” (awning), will be determined on site, prior to the execution of the works. In the micro-routing process, the flora specialist will determine the best site for the awning, considering the best place for the disposal of the extracted specimens with probabilities for recovery.

### **ANSWER TO COMMENT 20**

The location of “disposal and plant recovery areas” (awning), will be determined on site, prior to the execution of the works. In the micro-routing process, the flora specialist will determine the best site for the awning, considering the best place for the disposal of the extracted specimens with probabilities for recovery.

## **SUPERINTENDENCE OF SANITARY SERVICES**

### **1.- Project Description**

#### **ANSWER TO COMMENT 24**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm that the works of the PHAM will not interfere with the operation of El Yeso reservoir is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

#### **ANSWER TO COMMENT 27**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

#### **ANSWER TO COMMENT 28**

Please refer to the answer to comment 33 of the DGA section.

#### **ANSWER TO COMMENT 29**

The measurement of the flows coming from El Yeso river that PHAM will use, will be carried out with a level sensor located in the Parshall drain pipe.

The information for the water levels that the sensor provides, will allow to determine, after knowing the discharge curve of the drain pipe, the flow of passing water.

In the case of the surplus reservoir, the same principle described before is applied.

The information will be continuously recorded and will be available for supervisory entities.

### **ANSWER TO COMMENT 33**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

Regarding the mentioned physical and chemical analysis, this is included in answer 8, section 6, Addenda 2.

### **ANSWER TO COMMENT 34**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

Also, the PHAM will exert the water rights of its owner, respecting the legally constituted water rights of third parties.

### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need of conducting an EIA.**

#### **ANSWER TO COMMENT 4.1**

The requested information is described extensively in answer 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

## **6.- Forecast and Assessment of Impacts and Risk Situations**

### **ANSWER TO COMMENT 8**

It is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource. For more information, please refer to answer 8, section 6, Addenda 1 and Addenda 2.

It is reiterated that the PHAM is an eminently underground project and that also considers reforesting and revegetating the intervened areas above surface, not foreseeing the generation of dry areas as it is stated in the question. In the case of reduced flows, the bank areas will be partially planted with species used to flow variations, and therefore, the appearance of dry strips is not foreseen. All of the above applies to the case of the area of Alto Volcán, as well as the valleys of rivers Colorado and Maipo.

As it was stated in answer 4.1, section 4, Addenda 1, the reduction of flows will imply a decrease in the ability of dilution of the intervened rivers and streams, especially in the season of lower flows (fall-winter), because that effect will be equivalent to the reduction of the runoff. This effect could be more evident immediately downstream of the projected collections, however, the contribution of the intermediate watershed assures an eventual recovery of the flow's dilution capacity in the tranche involved downstream.

Although the entire reduction of the flows influences the dilution ability of the flows given future discharges or mixes, it is considered that this effect will not be relevant due to the following:

- In general, the tranches of the rivers and streams where the collections of the Project are projected, are located in the high or mid-mountain (between 1,000 and 2,500 m.a.s.l.), are unpopulated and that do not receive in general, liquid waste discharges, either legal or clandestine. That is to say, the tranches of surface flows where an environmental flow will be kept are not subject to discharges that compromise their physical-chemical quality, presenting in general, a good quality of water (see section 5.3.5.2 of the EIA), with which a reduction of the runoff will not have a significant incidence in its physical-chemical quality, nor it will imply any risks for the limnologic system.
- The area where the flow decrease will be more noticeable will be the area of Alto Volcán that remains covered by snow during most of the fall-winter season. The 4 streams of the Alto Volcán area (3 of them converge in El Morado stream) will vary their flow in a similar way, and therefore, there are not any mixing conditions expected that would significantly modify the composition of the El Morado stream, or of the El Volcán river to where finally the waters coming from the 4 mentioned streams converge. In this area there are not any legal or clandestine liquid waste discharges.

- $\frac{3}{4}$  Downstream from the Las Lajas area where the restitution of the waters of the PHAM will take place, the dilution capacity of Maipo river will be completely restored, which however, changes again downstream of the independent intake of Aguas Andinas S.A.

From the point of view of aquatic life, a significant impact due to a decrease in the dilution ability is not foreseen. In these mountain systems, the organisms are adapted to a notable seasonal variations of flow and composition of waters (section 6.4.1.4 of the EIA). It is inferred that they are also adapted to the regulation of the flow that different players exert in the rivers of the area. The previous will be verified through the Limnologic Monitoring Program that the PHAM considers. Similarly, in case the monitoring records an unforeseen effect, the compensation actions described in Annex 17 of this Addenda will be implemented.

From the anthropic point of view, in the future, any new activity that implies discharges to flows, will have to comply with the regulations for such discharges in surface flows having as a base situation the flows in situation with the PHAM.

As per the modification of the load of sediments, during the operation phase of the PHAM, there will not be any variations in the turbidity of the rivers, that could alter the ability of the drinking water treatment systems, as it was explained in answer 28, section 1, Addenda 1. The discharge of the Project in the area of Las Lajas will provide desanded waters, therefore, these will not, under any circumstances, worsen the turbidity naturally found in the river. In the construction phase, the intervention of the flows due to construction works will not create a significant increase in the load of sediments of rivers and streams, as it was explained in answer 3, chapter 1, Addenda 1.

Thus, it is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource.

### **ANSWER TO COMMENT 10**

It is important to point out that the estimations provided in the research of the Department of Civil Engineering of U de Chile, were based on a series of monthly mid-flows. It is only for these types of averages that the extractions of flows of the PHAM can have some relevance regarding the flows that pass through the river, and thus, on the sediment rating associated to it. In this sense, the analysis carried out allowed to provide a pessimistic scenario regarding the effect that the PHAM could present on the sedimentologic component. That explains the reason why the monthly flows represent an average condition, as a practical approximation approach to a hydrological reality, that in any case, is better represented by the series of daily flows and the passing times of the river, for which the flows of the PHAM represent a less significant fraction compared to the monthly average flows.

On the other hand, it is important to point out that as it is stated in the report of U de Chile, the entrainment from the bed of the river represents around 70% of the total sediment rating that such flow carries, and the remaining percentage is the suspended sediment rating. That amount was obtained as a reference in the area of Maipo in El Manzano, a point that was used to represent the sediment rating that would be exported towards the downstream areas of the project. That is to say, that mostly the effect of the PHAM is felt at the level of the bed sediment rating, but only in the proportion of the flows of the mentioned project, compared to the passing flows of the river.

In the given context, it is important to emphasize on the fact that the study of U de Chile that included an analysis with the series of monthly average flows, limited the characterization of actual variations of the flow (the approximation should be better on a daily basis and at given times), thus getting to the conclusion that although it is consistent with that approach, it provides more importance to the impact of the PHAM in terms of the volumes of carried material. This, since the sediment ratings are related non-linearly to the liquid flows ( $G_s$  is related to approximately with  $Q^{1.5}$ ). For this reason, if the sediment ratings of the river were calculated based on the daily average liquid flows, the effects on the sedimentary regime of the collected flows and discharge of the PHAM can be considered to be less relevant.

In furtherance, it is worth considering that the sediment volumes that determine the characteristic sedimentary regime and the relevant river processes of a natural river course are mostly carried through the passing of floods, a condition in which the fraction of the flows associated to the PHAM represents a lower proportion and is surely irrelevant regarding the passing flows during flood events.

As per the floods it can be said that, as an example, that the monthly average flow range assessed for Maipo in Las Vertientes, is between 40 and 600 m<sup>3</sup>/s, for the period between 1952 and 2002, with an annual average flow of 112 m<sup>3</sup>/s for the period. For the same period, the annual series of floods shows a variation range between 150 y 1,100 m<sup>3</sup>/s (with return periods estimated in 1 and between 25 and 50 years, respectively.) That is to say, the hydrologic regime is characterized by a broad range of larger flows which is not represented in the series of monthly average flows. That is why, if the movement of quantified sediments as a sediment rating is associated to monthly average flows, this will be significantly lower than the actual values characteristic of the river (associated to instant liquid flows, at certain times and on a daily basis), and as it has been mentioned the sediment rating increases according to a factor that multiplies the liquid flow to the power of 1.5 or similar. In the context of those liquid flows that are more representative of the hydrologic reality of the river, it is obvious that the fraction associated to the operation flows of the PHAM would be less relevant, and less significant even if the sediment ratings are considered. .

If the daily flows were incorporated as part of the analysis, for example, the uncertainty regarding the effect of the PHAM on the sedimentologic behavior of the river could be reduced. That is to say, when representing the flows of the PHAM a less important fraction of this hydrologic series, and therefore on the extent of the movement of global sediments of the river, the insignificant effect of the works of the PHAM on the sedimentologic behavior would be better characterized.

Given the aforementioned and addressing the concern expressed by the authorities, the Owner has considered convenient to develop the specific studies that allow for the DOH, to have the additional technical elements to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river. As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works). With the described procedure, the Owner's intent is for that revising institution to become involved in the process of definition of the studies requirements, and later, in the review process itself, so that once the study is concluded, there is a full agreement on its outcomes, conclusions and recommendations.

Based on the outcomes and the conclusions from the mentioned study, there will be a proposal for a Monitoring Plan of the river's hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complete the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen or eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment. The aim with that is to avoid any negative effects that the project could have on the behavior of the river.

#### **ANSWER TO COMMENT 14**

In order to properly address the mentioned concerns, the Owner proposes to carry out specific studies that allow for the DOH of the MOP, to have the technical elements needed to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river, and with this proving what was presented in the predictive studies carried out as part of the environmental assessment.

As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works).

Specifically, the current situation of the river will be described, both in relation to the sedimentary regime of Maipo river and the Colorado and Yeso river affluents, and Colina, La Engorda, Las Placas and Morado streams, and the existing conditions of the infrastructure that could be affected by the PHAM.

Based on the outcomes and the conclusions of the mentioned study, there will be a proposal for a Monitoring Plan of the river hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complement the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen or eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment.

## **9.- Follow-up Plan for the Relevant Environmental Variables that mother the EIA**

### **ANSWER TO COMMENT 9**

Please refer to the answer to comment 14 of the DGA section.

## **REGIONAL SECRETARIAT OF THE MINISTRY OF AGRICULTURE**

### **1.- Description of the Project**

#### **ANSWER TO COMMENT 40**

The owner reaffirms its respect for the exercise of the rights of third parties which are legally constituted as provided by Law.

#### **ANSWER TO COMMENT 21**

The water quality of the flows during the operation of the PHAM was analyzed in detail in Annex 17 of Addenda 1.

Answer 11, section 7, Addenda 2, reassesses the emergency discharge issues, fully assuring that there will not be any dangers and/or adverse effects.

Kayaking and/or rafting activities have not been identified in Yeso and Colorado rivers.

The information gathered in Annex 16, Addenda 1 describe in detail the “Load rejection effect of Alfalfal II and Las Lajas Power Plants,” in Yeso, Colorado and Maipo rivers. Moreover, in answer 16 of Addenda 1, the technical actions, and emergency and/or mitigation plans considered for the project during the construction and operation phase are described.

#### **ANSWER TO COMMENT 28**

Please refer to the answer to comment 33 of the DGA section.

#### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

##### **ANSWER TO COMMENT 4.1**

The requested information is described extensively in answer 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

##### **ANSWER TO COMMENT 4.4**

It is reiterated that once in operation, the PHAM will not modify the hydraulic regime of the watershed, due to the fact that it is comprised only by run of river power plants that do not regulate flows.

According to what is described in Chapter 3, Annex 16, Addenda 1, neither the startup of the PHAM nor the sudden stoppages of the power plant will interrupt the continuous flow. This because Las Lajas tunnel has exit gateways that allow to control the discharge flow in order to preserve its continuity through the use of the volume of that tunnel.

That Annex presented the modeling of the intake and load rejection cases of Alfalfal II and Las Lajas power plants individually and in the case of a black out, proving that the control elements considered in the design allow to guarantee that there won't be any interruptions in the continuous flow and that there will not be any consequences for the users downstream.

The filling process for the tunneling system is detailed in Chapter 4, Annex 17 of the EIA. In that document it is stated that Gener considers obtaining, through rental or purchase, the necessary consumption rights for filling of the tunneling system, for which it only requires 300,000 m3.

#### **ANSWER TO COMMENT 4.5**

The PHAM does not involve any activities, impacts or environmental risks that may have a significant incidence on global warming as described in the Comment. Similarly, given the characteristics of the PHAM (run of river power plants without reservoirs), an environmental impact related to changes to local weather conditions is not foreseen either.

It is important to consider that climate changes are directly related to the emissions of CO<sub>2</sub> and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO<sub>2</sub> emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately 1,000,000 tons the emissions of CO<sub>2</sub> per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

For a better understanding, the PHAM does not consider to produce vast deforested areas or leave areas without herbaceous or shrubby vegetation, being this an eminently underground project, and considering the fact that it agrees with the reforestation and revegetation of a greater area than the actual affected area (including disposal areas, camps, etc.).

Similarly, the PHAM does not involve the generation of greenhouses gases as a result of its operation, also considering for the case of the emissions during the construction phase, a comprehensive compensation program for dust emissions.

The hydrologic studies of the PHAM are based on historical statistics with more than 50 years of records, while the environmental studies have considered the information currently available for the best prediction and weighing possible for environmental impacts. Nonetheless, the environmental management measures that the PHAM involves use an adaptive approach, and therefore, they will adjust to the information available and the outcomes obtained during the environmental follow-up.

As it was described in answer 4.5 of Addenda 1, the PHAM will not affect the agricultural valley since the return of waters takes place upstream from the irrigation collections. Alfalfal II and Las Lajas power plants are run of river power plants and therefore, they do not regulate waters and do not create any effects in the Hydrologic Regimen of the watershed. Similarly, it is stated that the works of the project will not interfere with the operation of El Yeso reservoir, nor they will affect the safety, or the availability of the hydric resource, for the production of drinking water for Santiago.

#### **ANSWER TO COMMENT 4.11**

The requested information was addressed extensively in Annex 17, Addenda 1, and complemented with answers 18 and 23 of section 1, and answer 7, section 7, Addenda 2.

The analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

Please refer to answers 11 and 23, section 1, Addenda 2 for more information.

#### **ANSWER TO COMMENT 4.12**

The specific summer grazing areas of La Engorda that will be intervened with the temporary works will be restored through the replacement of the extracted soils, along with a set of actions described in detail in Chapter 6 of the EIA. The permanently affected surface, constitutes a much smaller part of the summer grazing area, and does not represent a significant impact or puts the existing ecosystem into risk.

It is reiterated that the PHAM will not affect the aquifers of the area, and that the vegetation of the wet prairies in the summer grazing areas depend on the surface water flows that drain the organic soil, and that mainly come from melt waters, in a scattered and anastomosed way.

As per the restoration of the Andean scrubland, it is stated that the Revegetation Plan considers the use of vegetable species that currently exist.

The technical information that supports the forecast of the environmental impacts has been described in chapter 6 of the EIA, and has also been reinforced in different statements within Addenda 1 (Annex 6). The verification of such forecasts as the efficiency of the proposed actions will be proven through the environmental follow-up agreed by the Owner.

To add to the previously mentioned, there is more information provided in answer 19 - section 1, answer 3 - section 5, and answer 10 - section 6 and 3 section 5 of Addenda 2.

For more details please check the information of Annex 6, Addenda 1 and answer 19, sections 1 & 10, section 6, Addenda 2.

#### **6.- Forecast and Assessment of Impacts and Risk Situations**

##### **ANSWER TO COMMENT 13**

Please refer to answers 4, 5 and 6, Addenda 1 and answers 2 and 3 section 2, answer 5 section 5 and 4 section 6, Addenda 2.

## **ANSWER TO COMMENT 14**

In order to properly address the mentioned concerns, the Owner proposes to carry out specific studies that allow for the DOH of the MOP, to have the technical elements needed to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river, and with this proving what was presented in the predictive studies carried out as part of the environmental assessment.

As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works).

Specifically, the current situation of the river will be described, both in relation to the sedimentary regime of Maipo river and the Colorado and Yeso rivers affluents, and Colina, La Engorda, Las Placas and Morado streams, and the existing conditions of the infrastructure that could be affected by the PHAM.

Based on the outcomes and the conclusions of the mentioned study, there will be a proposal for a Monitoring Plan of the river hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complement the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen or eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment.

### **33 d).-**

Please refer to the answer to comment 14 of the DGA section.

## **ANSWER TO COMMENT 35**

Please refer to the answers of questions 1. 33, 4.4 and 6.33 above.

## **NATIONAL FORESTRY SERVICE**

### **1.- Description of the Project**

#### **ANSWER TO COMMENT 6**

Regarding the possible encumbrance of El Morado glacier, please refer to the answer to question 3, section 6 of this Addenda.

Nevertheless, what is pointed out in questions 4, 5, and 6 of Addenda 1 is reiterated, in the sense that the technical knowledge, the research and the geological recognitions of surface carried out, along with the technology provided for the construction works, allows to claim and conclude that “there won't be any impacts on the glacier and its dynamics.”

The execution of systematic recognition soundings in front of the excavation face, is a common practice in the construction of deep tunnels, in order to anticipate the geotechnical conditions that will be faced, and to prepare, in an efficient and timely manner, the supporting actions that must be carried out.

It is reiterated, that given possible leakages to the inside of the tunnel, that section will be made waterproof, reestablishing the original conditions, so that the hydric flow in the rock mass is not interrupted.

#### **ANSWER TO COMMENT 21**

The water quality of the flows during the operation of the PHAM was analyzed in detail in Annex 17 of Addenda 1.

Please refer to the answer to question 11, section 7, Addenda 2.

Kayaking and/or rafting activities have not been identified in Yeso and Colorado rivers.

The information gathered in Annex 16, Addenda 1 describes in detail the “Load rejection effect of Alfalfa II and Las Lajas Power Plants,” in Yeso, Colorado and Maipo rivers. Moreover, in answer 16 of Addenda 1, the technical actions, and emergency and/or mitigation plans considered for the project during the construction and operation phase are described.

#### **ANSWER TO COMMENT 28**

According to the reading of the 3 first paragraphs of the question, the concern addresses the impact of the quality of waters due to the decrease in the flow of the streams and its resulting impact on the dilution capacity. Answer 8, sections 6, Addenda 2, provides an analysis of such impact.

Regarding the effect in the quality of the waters conducted through tunnels, it is important to point out that as it happens in the area of San José de Maipo, where currently the power plants of Alfalfal, Maitenes, Queltehues and El Volcán are under operation, and that consider the transportation of water through tunnels and channels to be then returned to the flows of rivers Colorado and Maipo do not have any influences in their quality. In particular, the geology of the area where the tunnels run in Alfalfal (27 Km of hydraulic piping, without lining), is of the same characteristics of those of the PHAM's tunnels.

Finally, and regarding the potential for sanitary services and the availability of water for purification being affected, Ord. 1165 dated on December 5, 2008, of the Superintendencia of Sanitary Services, which states that the collected waters for the treatment and production of drinking water in the watershed, will not be affected by the development of this project in any of its stages confirms this (later, in answer 27 of Addenda 1).

Moreover, and regarding the potential of sanitary services and the availability of water for purification being affected, Ord. 1165 dated on December 5, 2008, of the Superintendencia of Sanitary Services, which states that the collected waters for the treatment and production of drinking water in the watershed, will not be affected by the development of this project in any of its stages confirms this (later, in answer 27 of Addenda 1). The previous is a determining factor subject to the operation and feasibility of the project, as it has been established, the mentioned service in charge of assuring the availability and quality of drinking water in the Metropolitan Region.

### **3.- Compliance Plan for the Environmental Legislation Applicable - Sectorial Environmental Permits.**

#### **ANSWER TO COMMENT 6.1**

Annex 7 of the EIA, describes the Forestry Management Plan, which indicates the reforestation areas (approved by CONAF on a site visit), and the specimens to be reforested which were agreed with CONAF.

### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

#### **ANSWER TO COMMENT 4.2 i)**

A significant negative impact is not considered on the habitat of mountain birds, in terms of the following: the project is eminently underground and the area to be intervened will be recovered in more than 50% (temporary works), therefore, reestablishing the conditions of the bird's habitat. Also, the PHAM considers carrying out bird population studies associated to flows that intend to verify that the species being studied, will not in fact be significantly altered by the Project. Finally, it is important to stress on the fact that the areas with a greater presence of birds in the location of the PHAM, have been set as restricted areas for works and Contractors.

**ANSWER TO COMMENT ii) and iii)**

i) ii) iii).- In all of the areas that the project will intervene, the environmental component has been fully assessed, thus meaning fauna, flora, landscape, etc. For this, the Owner developed Management Plans for each one of the environmental components of interest, where the prevention, mitigation, management, protection, safeguard actions etc., along with the abandonment, recovery and restoration of the areas to be intervened are described. It is worth noticing that 50% of the intervened areas are recovered to their natural condition.

It is recommended to review the Management Plans described in the Annexes of the EIA and Addenda 1 and 2.

In all of the areas that the project will intervene, the environmental component has been completely assessed, thus meaning fauna, flora, landscape, etc. For it the Owner developed Management Plans for each one of the environmental components of interest, where the prevention, mitigation, management, protection, safeguard actions etc., along with the abandonment, recovery and restoration of the areas to be intervened. It is worth noticing that 50% of the intervened areas are recovered to their natural condition.

**ANSWER TO COMMENT 4.5**

The PHAM does not involve any activities, impacts or environmental risks that may have a significant incidence on global warming as described in the Comment. Similarly, given the characteristics of the PHAM (run of river power plants without reservoirs), an environmental impact related to changes to local weather conditions is not foreseen either.

It is important to consider that climate changes are directly related to the emissions of CO2 and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO2 emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately 1,000,000 tons the emissions of CO2 per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

For a better understanding, the PHAM does not consider to produce vast deforested areas or leave areas without herbaceous or shrubby vegetation, being this an eminently underground project, and considering the fact that it agrees with the reforestation and revegetation of a greater area than the actual affected area (including disposal areas, camps, etc.).

Similarly, the PHAM does not involve the generation of greenhouses gases as a result of its operation, also considering for the case of the emissions during the construction phase, a comprehensive compensation program for dust emissions.

Finally, the hydrologic studies of the PHAM are based on historical statistics with more than 50 years of records, while the environmental studies have considered the information currently available for the best prediction and weighing possible for environmental impacts. Nonetheless, the environmental management measures that the PHAM involves use an adaptive approach, and therefore, they will adjust to the information available and the outcomes obtained during the environmental follow-up.

As it was described in answer 4.5 of Addenda 1, the PHAM will not affect the agricultural valley since the return of waters takes place upstream from the irrigation collections. Alfalfal II and Las Lajas power plants are run of river power plants and therefore, they do not regulate waters and do not create any effects in the Hydrologic Regimen of the watershed. Similarly, it is stated that the works of the project will not interfere with the operation of El Yeso reservoir, nor they will affect the safety, or the availability of the hydric resource, for the production of drinking water for Santiago.

#### **ANSWER TO COMMENT 4.7**

The execution of the “Forestry” and “Vegetation restoration” Management Plans are conditioned by the approval of the RCA and to the beginning of the works, and therefore its startup will take place once the corresponding permits are approved. Further, the work methodologies described in the management plans have been set based on previous experiences with excellent results, however, such methodologies will be subject to change in their operation in order to obtain the best possible result. Moreover, the Vegetation Restoration plan (Annex 29 of the EIA), will start once every work is finished, and the Reforestation Plan (Annex 7 of the EIA) will start once the corresponding permits are approved and not after 2 years as it is mentioned in the comment.

#### **ANSWER TO COMMENT 4.8**

The specific summer grazing areas of La Engorda that will be intervened with the temporary works, will be restored through the replacement of the extracted soils, along with a set of actions described in detail in Chapter 6 of the EIA. The permanently affected surface, constitutes a much smaller part of the summer grazing area, and does not represent a significant impact or puts the existing ecosystem into risk.

It is reiterated that the PHAM will not affect the aquifers of the area, and that the vegetation of the wet prairies in the summer grazing areas depend on the surface water flows that drain the organic soil, and that mainly come from melt waters, in a scattered and anastomosed way.

As per the restoration of the Andean scrubland, it is stated that the Revegetation Plan considers the use of vegetable species that currently exist.

The technical information that supports the forecast of the environmental impacts has been described in chapter 6 of the EIA, and has also been reinforced in different statements within Addenda 1 (Annex 6). The verification of such forecasts as the efficiency of the proposed actions will be proven through the environmental follow-up agreed by the Owner.

To add to the previously mentioned, there is more information provided in answer 19 - section 1, answer 3 - section 5, and answer 10 - section 6 and 3 section 5 of Addenda 2.

#### **ANSWER TO COMMENT 4.9**

As per Natural Monument El Morado, please refer to answer 3 - section 2 and answer 3 - section 4; of this Addenda and

Regarding the application of PAS 78, please check answer 5, section 5 of this Addenda.

Pertaining the effect on the high-Andean scrubland and the repositioning actions of the affected areas that the PHAM considers, they have been broadly described in the EIA and in Addenda 1. For details, please refer to Annex 6, Addenda 1.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 18**

The requested can be found in Annexes 4 and 5 of the EIA, similarly, the traffic analysis for the construction stage can be found in Annex 9, Addenda 1. With the previously mentioned information, it can be affirmed that the glaciers will not be affected by the dust emissions from the PHAM, since its mitigation actions, avoid the suspension and re-suspension of dust, thus largely decreasing the current emissions.

As per the concern with Climate Change, the PHAM does not involve environmental activities, impacts or risks that may have an incidence on this phenomenon. Similarly, given the characteristics of the PHAM (run of river power plants without reservoirs), an environmental impact related to changes to local weather conditions is not foreseen either.

For a better understanding, the PHAM does not consider to produce vast deforested areas or leave areas without herbaceous or shrubby vegetation, being this an eminently underground project, and considering the fact that it agrees with the reforestation and revegetation of a greater area than the actual affected area (including disposal areas, camps, etc.).

Similarly, the PHAM does not involve the generation of greenhouses gases as a result of its operation, also considering for the case of the emissions during the construction phase, a comprehensive compensation program for dust emissions.

Finally, the hydrologic studies of the PHAM are based on historical statistics with more than 50 years of records, while the environmental studies have considered the information currently available for the best prediction and weighing possible for environmental impacts. Nonetheless, the environmental management measures that the PHAM involves use an adaptive approach, and therefore, they will adjust to the information available and the outcomes obtained during the environmental follow-up.

## **7.- Mitigation, Repair and/or Compensation Actions Plan**

### **ANSWER TO COMMENT 9**

The protection measures described in the Forestry Management Plan are considered, but in case of needing an additional measure, these will be assessed at that moment, with the purpose of assessing the best option to finally apply them.

### **ANSWER TO COMMENT 10**

The location of “disposal and plant recovery areas” (awning), will be determined on site, prior to the execution of the works. In the micro-routing process, the flora specialist will determine the best site for the awning, considering the best place for the disposal of the extracted specimens with probabilities for recovery.

### **ANSWER TO COMMENT 20**

As it was stated in section 3, Annex 6, Addenda 1, up to date there is not an exact location of the areas for “disposal of soil and plants,” however, the areas without vegetation or with a lower coverage of vegetation next to the road, and without the presence of seasonal wet prairies will be privileged. The sites will be set as part of the construction programs. It is reiterated that the area to be intervened will be prospected as part of the micro-routing works agreed by the Owner.

## **NATIONAL TOURISM OFFICE**

### **1.- Project Description**

#### **ANSWER TO COMMENT 21**

The water quality of the flows during the operation of the PHAM was analyzed in detail in Annex 17 of Addenda 1.

Please refer to the answer to question 11, section 7, Addenda 2.

Kayaking and/or rafting activities have not been identified in Yeso and Colorado rivers.

The information gathered in Annex 16, Addenda 1 describe in detail the “Load rejection effect of Alfalfa II and Las Lajas Power Plants,” in Yeso, Colorado and Maipo rivers. Moreover, in answer 16 of Addenda 1, the technical actions, and emergency and/or mitigation plans considered for the project during the construction and operation phase are described.

**4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need of conducting an EIA.**

**ANSWER TO COMMENT 4.1**

The requested information is described extensively in answer 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

**ANSWER TO COMMENT 4.4**

It is reiterated that once in operation, the PHAM will not modify the hydraulic regime of the watershed, due to the fact that it is comprised only by run of river power plants that do not regulate flows.

According to what is described in Chapter 3, Annex 16, Addenda 1, neither the startup of the PHAM nor the sudden stoppages of the power plant will interrupt the continuous flow. This because Las Lajas tunnel has exit gateways that allow to control the discharge flow in order to preserve its continuity through the use of the volume of that tunnel.

That Annex presented the modeling of the intake and load rejection cases of Alfalfal II and Las Lajas power plants individually and in the case of a black out, proving that the control elements considered in the design allow to guarantee that there won't be any interruptions in the continuous flow and that there will not be any consequences for the users downstream.

The filling process for the tunneling system is detailed in Chapter 4, Annex 17 of the EIA. In that document it is stated that Gener considers to obtain, through rental or purchase, the necessary consumption rights for filling of the tunneling system, for which it only requires 300,000 m<sup>3</sup>.

**ANSWER TO COMMENT 4.5**

It is important to consider that climate changes are directly related to the emissions of CO<sub>2</sub> and other greenhouse gases. The Alto Maipo hydroelectric project is in fact a renewable, clean, and free of CO<sub>2</sub> emissions project, whose construction and operation will contribute directly to reduce the use of fossil fuels in our energy matrix. According to the studies carried out by the company operating Alto Maipo project, it will allow to reduce in approximately 1,000,000 tons the emissions of CO<sub>2</sub> per year in our country, which would evidently help to reduce the effects of climate change. This is why the PHAM has considered the implementation under the clean development mechanism established in article 12 of the Kyoto protocol.

As it was described in answer 4.5 of Addenda 1, the PHAM will not affect the agricultural valley since the return of waters takes place upstream from the irrigation collections. Alfalfal II and Las Lajas power plants are run of river power plants and therefore, they do not regulate waters and do not create any effects in the Hydrologic Regimen of the watershed. Similarly, it is stated that the works of the project will not interfere with the operation of El Yeso reservoir, nor they will affect the safety, or the availability of the hydric resource, for the production of drinking water for Santiago.

#### **ANSWER TO COMMENT 4.10**

The compensation measures for emissions will reduce the current emissions of the area caused by the traffic of trucks. For more details, please refer to Annex 4 and 5 of the EIA, and to Annex 9 of Addenda 1.

#### **ANSWER TO COMMENT 4.11**

The analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

Please refer to answers 11 and 23, section 1, Addenda 2 for more information.

### **Section 5.- Base Line**

#### **ANSWER TO COMMENT 5.1**

The assessment of the landscape flow was presented in Annex 17, Addenda 1, and was carried out considering the minimum conditions as it is recognized in the comment. In consequence, by not having any restrictions in this condition, the continuity of larger flows as the monthly mid flows is assured.

It is worth mentioning that the Environmental Impact Study provides a predictive analysis based on the knowledge and the current state of the art pertaining the issues addressed, the simulation models and the experience of similar projects.

That is why, and in order to reduce any kind of uncertainty that a predictive analysis may imply, the online monitoring and recording of the flows in different areas of the rivers whose waters PHAM will use have been agreed.

In furtherance, please refer to answer 23. section 1, Addenda 2.

## **ANSWER TO COMMENT 5.2**

The information requested can be found in Chapter 5, section 5.5 of the “Human environments” EIA, and in Annexes 35 and 36 of the EIA, further, the assessment of the effects that the operation of the PHAM will have in the landscape, recreation, water flora and fauna, etc., is described in Annex 17, Addenda 1.

Through official note 651, dated on December 1, 2008, the relevant service (National Tourism Service - SERNATUR), did not provide any comments on Addenda 1. The comments carried out by that service in a complementary official note has been answered in question 11, section 7 of this Addenda.

## **ANSWER TO COMMENT 21**

Please refer to previous answer 4.11

## **ANSWER TO COMMENT 24 II)**

The study of environmental flows presented in Annex 17, Addenda 1, set the environmental requirements of Yeso river. In the mentioned study it is proven that the specified environmental flows fulfill those requirements in their full extent.

What is stated in section 3.3.2 and Annex 10 of the EIA is reaffirmed, this is that in the tranche of the Colorado river downstream from the works of the PHAM there are not any touristic or recreational facilities or infrastructure associated to informal seasonal activities in its flow, and that are susceptible of being affected by the PHAM, except for the use for irrigation that has been addressed in question 40, Addenda 1.

As per the development works mentioned, Institute Río Colorado on its website does not mention any recreational activities directly related to the use of the banks or waters of the Colorado river, and the Río Colorado Sanctuary was not approved for environmental processing, and finally, the housing-touristic property, Sociedad Parque El Quillayal, was built from the construction of Alfalfal power plant (1896-1991) which significantly improved the road infrastructure of that area.

As per the hydrology of the river flows, where the works of the PHAM take place, please refer to Annex 13, Addenda 1.

Please refer to Annex 17, Addenda 1 for more information on the assessment of the hydric requirements of both the biota and the anthropic uses, and landscape aspects in the rivers and streams.

## **ANSWER TO COMMENT XI)**

The analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. In it, it has been established that the Area of Environmental Importance in the Colorado river in fact corresponds to the entire river.

As per the hydrology of the river flows, where the works of the PHAM take place, please refer to Annex 13, Addenda 1.

Also, the PHAM will exert the water rights of its owner, fully respecting the water rights of third parties and legally constituted parties.

## **6.- Forecast and Assessment of Impacts and Risk Situations**

### **ANSWER TO COMMENT 5**

The owner reaffirms that it owns the water rights required by the PHAM. This means that during their processing, the eventual third party rights constituted previously through the corresponding hydrological budgets were averted. That is why under any circumstances the PHAM will affect the rights of third parties.

Also refer to answer 12, section 7 of this Addenda.

### **ANSWER TO COMMENT 6**

The owner reiterates that the PHAM will not interfere with the touristic activities that currently take place in Cajón del Maipo (sections 6.4.1.9 and 6.4.2.9 of the EIA), in any of its stages of development. The Land Register Cadastre of tourist and mountain attractions are described in Annexes 35 and 36 of the EIA. Further, it is complemented with the Base Line of Human Environments described in chapter 5, section 5.5 of the EIA.

In turn, the analysis of the environmental flows has been extensively addressed in Annex 17, Addenda 1. The methodology presented in such study considers the environmental requirements both of the biota and the anthropic uses and landscape aspects for the calculations of the environmental flows.

### **ANSWER TO COMMENT 7**

Please refer to the answer to question 6, section 6 of this document.

### **ANSWER TO COMMENT 8**

It is reiterated that the PHAM is an eminently underground project and that also considers reforesting and revegetating the intervened areas above surface, not foreseeing the generation of dry areas as it is stated in the question. In the case of reduced flows, the bank areas will be partially planted with species used to flow variations, and therefore, the appearance of dry strips is not foreseen. All of the above applies to the case of the area of Alto Volcán, as well as the valleys of rivers Colorado and Maipo.

As it was stated in answer 4.1, section 4, Addenda 1, the reduction of flows will imply a decrease in the ability of dilution of the intervened rivers and streams, especially in the season of lower flows (fall-winter), because that effect will be equivalent to the reduction of the runoff. This effect could be more evident immediately downstream of the projected collections, however, the contribution of the intermediate watershed assures an eventual recovery of the flow's dilution capacity in the tranche involved downstream.

Although the entire reduction of the flows influences the dilution ability of the flows given future discharges or mixes, it is considered that this effect will not be relevant due to the following:

- In general, the tranches of the rivers and streams where the collections of the Project are projected, are located in the high or mid-mountain (between 1,000 and 2,500 m.a.s.l.), are unpopulated and that do not receive in general, liquid waste discharges, either legal or clandestine. That is to say, the tranches of surface flows where an environmental flow will be kept are not subject to discharges that compromise their physical-chemical quality, presenting in general, a good quality of water (see section 5.3.5.2 of the EIA), with which a reduction of the runoff will not have a significant incidence in its physical-chemical quality, nor it will imply any risks for the limnologic system.
- The area where the flow decrease will be more noticeable will be the area of Alto Volcán that remains covered by snow during most of the fall-winter season. The 4 streams of the Alto Volcán area (3 of them converge in El Morado stream) will vary their flow in a similar way, and therefore, there are not any mixing conditions expected that would significantly modify the composition of the El Morado stream, or of the El Volcán river to where finally the waters coming from the 4 mentioned streams converge. In this area there are not any legal or clandestine liquid waste discharges.
- Downstream from the Las Lajas areas there will be a restitution of the waters of the PHAM, the dilution capacity of Maipo river will be completely restored, which however, changes again downstream of the separate intake of Aguas Andinas S.A.

From the point of view of aquatic life, a significant impact due to a decrease in the dilution ability is not foreseen. In these mountain systems, the organisms are adapted to a notable seasonal variations of flow and composition of waters (section 6.4.1.4 of the EIA). It is inferred that they are also adapted to the regulation of the flow that different players exert in the rivers of the area. The previous will be verified through the Limnologic Monitoring Program that the PHAM considers. Similarly, in case the monitoring records an unforeseen effect, the compensation actions described in Annex 17 of this Addenda will be implemented.

From the anthropic point of view, in the future, any new activity that implies discharges to flows, will have to comply with the regulations for such discharges in surface flows having as a base situation the flows in situation with the PHAM.

As per the modification of the load of sediments, during the operation phase of the PHAM, there will not be any variations in the turbidity of the rivers, that could alter the ability of the drinking water treatment systems, as it was explained in answer 28, section 1, Addenda 1. The discharge of the Project in the area of Las Lajas will provide desanded waters, therefore, these will not, under any circumstances, worsen the turbidity naturally found in the river. In the construction phase, the intervention of the flows due to construction works will not create a significant increase in the load of sediments of rivers and streams, as it was explained in answer 3, chapter 1, Addenda 1.

Thus, it is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource.

### **ANSWER TO COMMENT 9**

According to official note N° 3365 that addresses Addenda 1, the National Tourism Service does not present any comments to the PHAM on the survey methodology.

As per the water flows and impacts on activities for uses of rivers as described on Annex 10 on the Environmental Flow, proposed in the EIA, included in Addenda1 and presented again in this report of Addenda .

## **REGIONAL SECRETARIAT OF THE MINISTRY OF HEALTH**

### **1.- Description of the Project**

#### **ANSWER TO COMMENT 24.-**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm that the works of the PHAM will not interfere with the operation of El Yeso reservoir is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

#### **ANSWER TO COMMENT 27**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of PHAM will not create any interferences to the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

Please refer to Ord. N 1165 of the Superintendence of Sanitary Services for more information.

#### **ANSWER TO COMMENT 28**

Please refer to the answer to comment 33 of the DGA section.

### **ANSWER TO COMMENT 29**

The measurement of the flows coming from El Yeso river that PHAM will use, will be carried out with a level sensor located in the Parshall drain pipe.

The information for the water levels that the sensor provides, will allow to determine, after knowing the discharge curve of the drain pipe, the flow of passing water. In the case of the surplus reservoir, the same principle described before is applied.

The information will be continuously recorded and will be available for supervisory entities.

### **ANSWER TO COMMENT 33**

Please refer to the answer to comment 33 of the DGA section.

### **ANSWER TO COMMENT 34**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of the PHAM will not interfere in the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

The previous is a determining factor for the operation and feasibility of the project, as it has been established by the service in charge of assuring and protecting the availability and quality of drinking water, the Superintendence of Sanitary Services, in Ord. 1165 dated on December 5, 2008, which is in conformity with the PHAM.

Finally, it is reiterated that the PHAM will exert the water rights that are provided by the National Waters Authority, according to the availability of hydric resource, with full respect of the water rights legally constituted in property of third parties, including, Aguas Andinas.

### **ANSWER TO COMMENT 35**

The amount of explosives are described in Answer 35, in the section Project Description of Addenda 1.

It is stated that there will not be any explosives used in the area that crosses under the El Morado National Monument (see answer 20, in the section Project Description, Addenda 2.)

Regarding the extent or the amounts of explosives to be used, these are regulated per areas by Article 77 of the Complementary Regulation of Law 17,798, About Weapon Control, which the PHAM will follow.

Regarding the actions for road transportation, additional to those described in answer 35, of the Project Description section of Addenda 1 of the EIA, in answer 57 of the same section of Addenda 1.

### **3.- Compliance Plan for the Environmental Legislation Applicable Sectorial Environmental Permits.**

#### **ANSWER TO COMMENT 1.3**

All of the information regarding the management and storage of sludge, has been extensively addressed in Chapters 2 & 3 (Sectorial Environmental Permit 91) of the EIA. Additionally, there was more information provided in Addenda 1 of the EIA, specifically in section 3, item 1.

All of this information was analyzed by the Regional Secretariat of the Ministry of Health, to determine the granting of the Sectorial Environmental Permit 91, which in fact refers to sludge management. In this sense, and as stated in official note N° 8038 of the Regional Secretariat of the Ministry of Health, there are not any comments on such management, with which it is understood that the PHAM complies with all safety and feasibility conditions for sludge management.

### **Section 4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need of conducting an EIA**

#### **ANSWER TO COMMENT 4.1**

The requested information is described extensively in answer 4.1, pages 110 and 111 of Addenda 1, and in answer 8, section 6 of Addenda 2.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 8**

It is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource. For more information, please refer to answer 8, section 6, Addenda 1 and Addenda 2.

It is reiterated that the PHAM is an eminently underground project and that also considers reforesting and revegetating the intervened areas above surface, not foreseeing the generation of dry areas as it is stated in the question. In the case of reduced flows, the bank areas will be partially planted with species used to flow variations, and therefore, the appearance of dry strips is not foreseen. All of the above applies to the case of the area of Alto Volcán, as well as the valleys of rivers Colorado and Maipo.

As it was stated in answer 4.1, section 4, Addenda 1, the reduction of flows will imply a decrease in the ability of dilution of the intervened rivers and streams, especially in the season of lower flows (fall-winter), because that effect will be equivalent to the reduction of the runoff. This effect could be more evident immediately downstream of the projected collections, however, the contribution of the intermediate watershed assures an eventual recovery of the flow's dilution capacity in the tranche involved downstream.

Although the entire reduction of the flows influences the dilution ability of the flows given future discharges or mixes, it is considered that this effect will not be relevant due to the following:

- In general, the tranches of the rivers and streams where the collections of the Project are projected, are located in the high or mid-mountain (between 1,000 and 2,500 m.a.s.l.), are unpopulated and that do not receive in general, liquid waste discharges, either legal or clandestine. That is to say, the tranches of surface flows where an environmental flow will be kept are not subject to discharges that compromise their physical-chemical quality, presenting in general, a good quality of water (see section 5.3.5.2 of the EIA), with which a reduction of the runoff will not have a significant incidence in its physical-chemical quality, nor it will imply any risks for the limnologic system.
- The area where the flow decrease will be more noticeable will be the area of Alto Volcán that remains covered by snow during most of the fall-winter season. The 4 streams of the Alto Volcán area (3 of them converge in El Morado stream) will vary their flow in a similar way, and therefore, there are not any mixing conditions expected that would significantly modify the composition of the El Morado stream, or of the El Volcán river to where finally the waters coming from the 4 mentioned streams converge. In this area there are not any legal or clandestine liquid waste discharges.
- Downstream from the Las Lajas areas there will be a restitution of the waters of the PHAM, the dilution capacity of Maipo river will be completely restored, which however, changes again downstream of the separate intake of Aguas Andinas S.A.

From the point of view of aquatic life, a significant impact due to a decrease in the dilution ability is not foreseen. In these mountain systems, the organisms are adapted to a notable seasonal variations of flow and composition of waters (section 6.4.1.4 of the EIA). It is inferred that they are also adapted to the regulation of the flow that different players exert in the rivers of the area. The previous will be verified through the Limnologic Monitoring Program that the PHAM considers. Similarly, in case the monitoring records an unforeseen effect, the compensation actions described in Annex 17 of this Addenda will be implemented.

From the anthropic point of view, in the future, any new activity that implies discharges to flows, will have to comply with the regulations for such discharges in surface flows having as a base situation the flows in situation with the PHAM.

As per the modification of the load of sediments, during the operation phase of the PHAM, there will not be any variations in the turbidity of the rivers, that could alter the ability of the drinking water treatment systems, as it was explained in answer 28, section 1, Addenda 1. The discharge of the Project in the area of Las Lajas will provide desanded waters, therefore, these will not, under any circumstances, worsen the turbidity naturally found in the river. In the construction phase, the intervention of the flows due to construction works will not create a significant increase in the load of sediments of rivers and streams, as it was explained in answer 3, chapter 1, Addenda 1.

Thus, it is reiterated that the operation of the PHAM will not affect, under any circumstances, the quality of the hydric resource.

#### **ANSWER TO COMMENT 14**

In order to properly address the mentioned concerns, the Owner proposes to carry out specific studies that allow for the DOH of the MOP, to have the technical elements needed to confirm that the extent of the impacts of the works of the project will not be significant on the sedimentologic component of the river, and with this proving what was presented in the predictive studies carried out as part of the environmental assessment.

As part of the works prior to the execution of the study, the technical interaction with the DOH has been considered, so as to have prior agreements relative to the definition of the specific scope and objectives of the study to be developed.

Annex 5 includes the Reference Terms that describe the methodological scope and aspects that are proposed to apply for the execution of the required studies, which are agreed with the DOH of MOP (Ministry of Public Works).

Specifically, the current situation of the river will be described, both in relation to the sedimentary regime of Maipo river and the Colorado and Yeso river affluents, and Colina, La Engorda, Las Placas and Morado streams, and the existing conditions of the infrastructure that could be affected by the PHAM.

Based on the outcomes and the conclusions of the mentioned study, there will be a proposal for a Monitoring Plan of the river hydraulic-mechanic and sedimentologic component, including the eventual mitigation actions and follow-ups needed to complement the proposals originally included in the EIA.

For that, the identification of the eventual negative effects associated to the operation of the intake and discharge works on its environment will be considered, as well as the characterization of their extent, set from the simulation of the river's hydraulic-mechanical and sedimentologic behavior of the flows, thus assessing the need for implementing works or mitigation actions to lessen or eliminate the adverse effects that could be detected, such as the local degrading or local undermining processes, erosion on banks or others.

Based on the characterization of the expected effects, there will be a monitoring plan proposed that will allow to monitor the intake and discharge works during its operation phase, so that such plan can allow to confirm the results of the study or eventually introduce, if applicable, corrective actions to eliminate any unwanted effects on the environment.

## **7.- Mitigation, Repair and/or Compensation Actions Plan**

### **ANSWER TO COMMENT 17**

It is reiterated that the PHAM will not affect the rights of legally constituted third parties in the flows (chapter 3, annex 16, Addenda 1). Of that, the Owner states that the precautions assumed by the Project so as not to affect the continuity or the quality of waters are extensive for the Volcán river.

## **9.- Follow-up Plan for the Relevant Environmental Variables that mother the EIA**

### **ANSWER TO COMMENT 9**

Please refer to the answer to comment 14 of the DGA section.

## **REGIONAL SECRETARIAT OF THE MINISTRY OF NATIONAL ASSETS**

### **1.- Description of the Project**

#### **ANSWER TO COMMENT 4**

The requested information can be found in answers 20 and 21, sections 1 and 4 of section 6, Addenda 2.

#### **ANSWER TO COMMENT 6**

Regarding the possible encumbrance of El Morado glacier, please refer to the answer to question 3, section 6 of this Addenda.

Nevertheless, what is pointed out in questions 4, 5, and 6 of Addenda 1 is reiterated, in the sense that the technical knowledge, the research and the geological recognitions of surface carried out, along with the technology provided for the construction works, allows to claim and conclude that “there won't be any impacts on the glacier and its dynamics.”

The execution of systematic recognition soundings in front of the excavation face, is a common practice in the construction of deep tunnels, in order to anticipate the geotechnical conditions that will be faced, and to prepare, in an efficient and timely manner, the supporting actions that must be carried out.

It is reiterated, that given possible leakages to the inside of the tunnel, that section will be made waterproof, reestablishing the original conditions, so that the hydric flow in the rock mass is not interrupted.

#### **ANSWER TO COMMENT 4.9**

As per Natural Monument El Morado, please refer to answer 3 - section 2 and answer 3 - section 4; of this Addenda and

Regarding the application of PAS 78, please check answer 5, section 5 of this Addenda.

Pertaining the effect on the high-Andean scrubland and the repositioning actions of the affected areas that the PHAM considers, they have been broadly described in the EIA and in Addenda 1. For details, please refer to Annex 6, Addenda 1.

#### **4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

##### **ANSWER TO COMMENT 4.13**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field.

##### **ANSWER TO COMMENT 4.15**

It is reiterated, that given possible leakages to the inside of the tunnel, that section will be made waterproof, reestablishing the original conditions, so that the hydric flow in the rock mass is not interrupted. Such information, is complemented with answers 5 of section 6 and answer 15 of section 7, Addenda 2.

#### **5.- Base Line**

##### **ANSWER TO COMMENT 5.15**

As it is indicated in Answer 2, section 6, Addenda 2 of the EIA, carrying out soundings in the area of the El Morado Natural Monument is not considered. The intention is to carry out drillings in the tunnel area towards the mine face. These drillings will not, in any case, be extended to the surface level. The purpose of this activity is checking the constructive parameters (state of the rock, permeability, etc.), and its execution will not have any effects on the renewable natural resources.

Please refer to the answer to question 5, section 5, Addenda 2

##### **ANSWER TO COMMENT xii**

Regarding the project Santuario Río Colorado, this was consulted in different sources of information, being registered in the Electronic Environmental Impact Assessment System as a project not accepted for processing, entered in the system on 6/7/2007, and therefore it would not have the Qualifying Environmental Resolution.

In furtherance, the staff of the Municipality of San José de Maipo was consulted, and they indicated that the project in question would not be registered as a valid touristic activity of the commune and that they do not have more information in that respect.

As per Institute Río Colorado, this is a non-profit institution that promotes environmental culture along with outdoor activities and scoutism. It provides camping and recreational services, including cabins rental, especially for scouts associations, offering activities such as hiking, trekking and mountain climbing.

Its facilities are located in the area of El Manzano, and they are not affected by the construction works and operation of the project.

Regarding the effect of the activities being carried out in the banks of Río Colorado, these are (please complete with the comments from Bernardo).

As per the mentioned developments, Institute Río Colorado on its web page does not mention any recreational activities directly related to the use of the banks or the waters of Colorado river, and the Río Colorado Sanctuary was not approved for environmental processing.

In summary, the PHAM will not affect the activities of Institute Río Colorado nor the mentioned project.

## **6.- Forecast and Assessment of Impacts and Risk Situations**

### **ANSWER TO COMMENT 23**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field. In any event, the mentioned location does not present any archeological interest areas.

## **7.- Mitigation, Repair and/or Compensation Actions Plan**

### **ANSWER TO COMMENT 23**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field. In any event, the mentioned location does not present any archeological interest areas.

## **9.- Follow-up Plan for the Relevant Environmental Variables that mother the EIA**

### **ANSWER TO COMMENTS 12**

The permanent presence of an archeologist, who will supervise the earthworks, including, road improvement works is reiterated.

**REGIONAL SECRETARIAT OF THE MINISTRY OF NATIONAL MONUMENTS**

**1.- Description of the Project**

**ANSWER TO COMMENT 4**

The requested information can be found in answers 20 and 21, sections 1 and 4 of section 6, Addenda 2.

**ANSWER TO COMMENT 6**

Regarding the possible encumbrance of El Morado glacier, please refer to the answer to question 3, section 6 of this Addenda.

Nevertheless, what is pointed out in questions 4, 5, and 6 of Addenda 1 is reiterated, in the sense that the technical knowledge, the research and the geological recognitions of surface carried out, along with the technology provided for the construction works, allows to claim and conclude that “there won't be any impacts on the glacier and its dynamics.”

The execution of systematic recognition soundings in front of the excavation face, is a common practice in the construction of deep tunnels, in order to anticipate the geotechnical conditions that will be faced, and to prepare, in an efficient and timely manner, the supporting actions that must be carried out.

It is reiterated, that given possible leakages to the inside of the tunnel, that section will be made waterproof, reestablishing the original conditions, so that the hydric flow in the rock mass is not interrupted.

**ANSWER TO COMMENT 4.9**

As per Natural Monument El Morado, please refer to answer 3 - section 2 and answer 3 - section 4; of this Addenda and

Regarding the application of PAS 78, please check answer 5, section 5 of this Addenda.

Pertaining the effect on the high-Andean scrubland and the repositioning actions of the affected areas that the PHAM considers, they have been broadly described in the EIA and in Addenda 1. For details, please refer to Annex 6, Addenda 1.

**4.- Effects, Characteristics or Circumstances in Article 11 of the Law that arise the need for conducting an EIA.**

**ANSWER TO COMMENT 4.13**

The requested information is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which complements the information presented in Addenda 1. The conclusion with this report is that there are not any paleontological resources that may be affected by the project's works in the area of the project.

For more information on the study's methodology, please refer to Answer 3, Addenda 2 of the EIA.

#### **ANSWER TO COMMENT 4.13**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field.

#### **ANSWER TO COMMENT 4.15**

It is reiterated, that given possible leakages to the inside of the tunnel, that section will be made waterproof, reestablishing the original conditions, so that the hydric flow in the rock mass is not interrupted. Such information, is complemented with answers 5 of section 6 and answer 15 of section 7, Addenda 2.

Please refer to answer 5, section 5, Addenda 2.

### **5.- Base Line**

#### **ANSWER TO COMMENT 5.15**

As it is indicated in Answer 2, section 6, Addenda 2 of the EIA, carrying out soundings in the area of the El Morado Natural Monument is not considered. The intention is to carry out drillings in the tunnel area towards the mine face. These drillings will not, in any case, be extended to the surface level. The purpose of this activity is checking the constructive parameters (state of the rock, permeability, etc.), and its execution will not have any effects on the renewable natural resources.

Please refer to the answer to question 5, section 5, Addenda 2.

### **6.- Forecast and Assessment of Impacts and Risk Situations**

#### **ANSWER TO COMMENT 23**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field. In any event, the mentioned location does not present any archeological interest areas.

### **7.- Mitigation, Repair and/or Compensation Actions Plan**

#### **ANSWER TO COMMENT 23**

The requested information, is found in Annex 4, Addenda 2 “Geologic Heritage Report of the Alto Volcán area,” which is a complement to the one presented in Addenda 1, since it includes the inspection and results on the field. In any event, the mentioned location does not present any archeological interest areas.

## **9.- Follow-up Plan for the Relevant Environmental Variables that mother the EIA**

### **ANSWER TO COMMENTS 12-13-14.**

The permanent presence of an archeologist, who will supervise the earthworks, including, road improvement works is reiterated.

## **REGIONAL SECRETARIAT OF THE MINISTRY OF HOUSING**

### **ANSWER TO COMMENTS 1**

1. Aclaremos que este proyecto no puede ser considerado una central de pasada, ya que pretenden trasladar y trasvasiar aguas de una cuenca a otra a través de un mega túnel de 70 kilómetros y alrededor de 5 a 6 metros de anchura, descrito por el titular como un laboreo minero, por su gran movimiento de tierra y que se convierte finalmente, en un gran embalse tubular, trasgrediendo la condición y derechos de aguas de terceros, destruyendo asimismo el ecosistema, la biodiversidad y normal desarrollo natural, que existe hoy, en toda la zona del Río Maipo en el Cajón del Maipo.

### **ANSWER TO COMMENT 2**

In answer 27 of Addenda 1, the necessary information that allows to reaffirm the fact that the works of the PHAM will not interfere in the operation of El Yeso reservoir, nor they will affect the safety or the availability of hydric resources for producing drinking water for Santiago is attached.

The previous is a determining factor for the operation and feasibility of the project, as it has been established by the service in charge of assuring and protecting the availability and quality of drinking water, the Superintendencia of Sanitary Services, in Ord. 1165 dated on December 5, 2008, which is in conformity with the PHAM.

Finally, it is reiterated that the PHAM will exert the water rights that are provided by the National Waters Authority, according to the availability of hydric resource, with full respect of the water rights legally constituted in property of third parties, including, Aguas Andinas.

## **ANSWERS TO COMMENTS 3, 4, 5 & 6**

The analysis regarding the location of the PHAM and its relationship with the land use planning set forth in the Urban Metropolitan Town Plan, is detailed in section 3.1.5 of Chapter 3 of the EIA, where it is proven that the Project is compatible with the uses set forth by the mentioned planning instrument. In effect, this statement is ratified by the Ministry of Housing and Urbanism, an entity with Environmental Competency that decides on these matters, in its ORD. 2461 and ORD 2465 dated June 16 and July 4, 2008 respectively, and where it is concluded that according to the sectorial regulations of the project (use of infrastructure) it will be understood as always admitted, and that there are not any impediments of territorial planning for its location as well as it refers to special conditions of the town plans.