Macueta.x-1001 bis

1. Project description

1.1 Company information.

Company: PAN AMERICAN ENERGY

Address: Avenida Leandro N. Alem 1180. Capital Federal. Argentina

Phone number 011-43104474

1.2 Project Name

STUDY OF PREVIOUS ENVIRONMENTAL IMPACT

Exploratory Well: Macueta.x-1001 bis

1.3 Aims and Methodology of the Study.

The aim of the present (Study of previous environmental impact) E.I.A.P[1] is to present an objective and accurate environmental characterization of the Basic status, considering the following *Physical aspects*: Climate, Geology, geomorphology, Hydrology, soil, seismic, and *biological aspects*. Flora, Fauna, Conservation of the ecosystem and *socio economic aspects:* Territorial uses, Cultural heritage, Infrastructure, Population and Economic activities as well as those concerning environmental health and safety that will enable us to make the recommendations aimed at mitigating or eliminating possible environmental risks resulting from the drilling of the exploratory well comprised in this Study.

It thus complies with the provisions regarding the characterization of the Base Status indicated in resolutions SE 105/92 y 252/93.[2]

The methodology used for this study consisted in surveying the terrain in the area of the future site and compiling the main field data, attaching photographs that document the status of the area.

The rest of the information was obtained from scientific papers, historical data provided by this Consulting company and public information from the National Services. However, the use of bibliographic material of excellent quality was privileged.

1.4 Location of the well drilling site

Well drilling area **Macueta.x-1001 bis**
Province: **Salta**
District: **Gral. José de San Martín**

[1] Study of Previous Environmental Impact
[2] National Secretariat of Energy

1.5 Accesses and roads.

The area comprised in the present report is located to the north of the province of Salta, in the District of General San Martín which limits to the northwest with the Republic of Bolivia, with the department of Rivadavia to the southeast and with the department of Orán to the southwest.

The access to the future well drilling site shall be the locality of Piquirenda taking the provincial road which connects this locality with the town of Acambuco. Following the main road towards the north, and after 19 Km, it is possible to access the well location of Macueta Norte.x-1, at which there is a road leading to Macueta Norte.x-9 well, still heading towards the north, it is possible to arrive at Macueta.x-1001 bis well.

1.6 Site Selection

For the location of Macueta.x-1001 bis well drilling area, a leveled site will be used, with two well heads, one towards the northeast and the other one in the middle section of the site. For the location of the new drilling site, it will be necessary to clear ground towards the east in order to locate the rig in this sector since due to operational reasons; there must be at least 60 m distance between each well head.

2. Impact assessment

This chapter was based on the interpretation of the Potential environmental Impacts Matrix, by Engineer Bazzi (1995)[3], and developed by Geólogos Asociados SA. with the aim of assessing the different action of the oil activitiy (Exploration and Drilling stage).

This matrix classifies the eventual impacts resulting from exploratory well drilling activities under study, on the existing *physical, biological or social and economic* resources in the area.

Given that this assessment was performed before actions were implemented, the maximum and minimum probable impacts are basically theoretical, and are provided to help identify those actions that may result dangerous in any way; or those resources which are highly exposed as a result of those actions.

The scale used to assess the impact is:

Size of the impact	Value (%)	Characteristics of the Impact
Negligible	0,0	Short term natural mitigation
Very low	0,3	Natural reduction in the long term
Low	1,0	Low cost assisted reduction
Mid sized	3,3	Middle cost assisted reduction
High	10,0	High cost assisted reduction
Very high	33,0	Very high cost assisted reduction
Chaotic	10,00	

1. **Maximum Impact (Theoretical)**, in which, the highest impact that a project similar to the one analyzed may have on the environment may be assessed. It is important to notice that in the present conditions of development of this matrix, this maximum must not be considered a tolerable maximum.

2. **Minimum Impact (Theoretical).** This matrix estimates the minimum possible environmental impact resulting from the implementation of the standards in force.

Based on the values provided, the different impacts are assessed on all the resources (Impact rate per action) and on the other hand, the level of impact of each resource resulting from a set of actions is assessed (Impact rate per resource)

The addition of all the impact rates per action establishes the maximum rate of the project. Using percentages to refer to the rates per action and per resource, we may obtain the corresponding values in percentages of the maximum and minimal impacts of the operation.

In order to facilitate interpretation, the theoretical potential maximum impact values resulting from actions implemented and from existing resources in the region have been graphed.

[3] Ing. Bazzi, YPF SA. Regional Sur.

Once all the operations have been completed, the real impact shall be assessed in order to classify each action implemented, as well as each of the resources affected, so as to be able to describe the actions of the project from the environmental point of view. This task shall generate a new matrix including the real impact and its relation with the theoretical maximum and minimum rates considered herein. This matrix will be developed during the final monitoring stage in order to obtain the EIAR (actual)

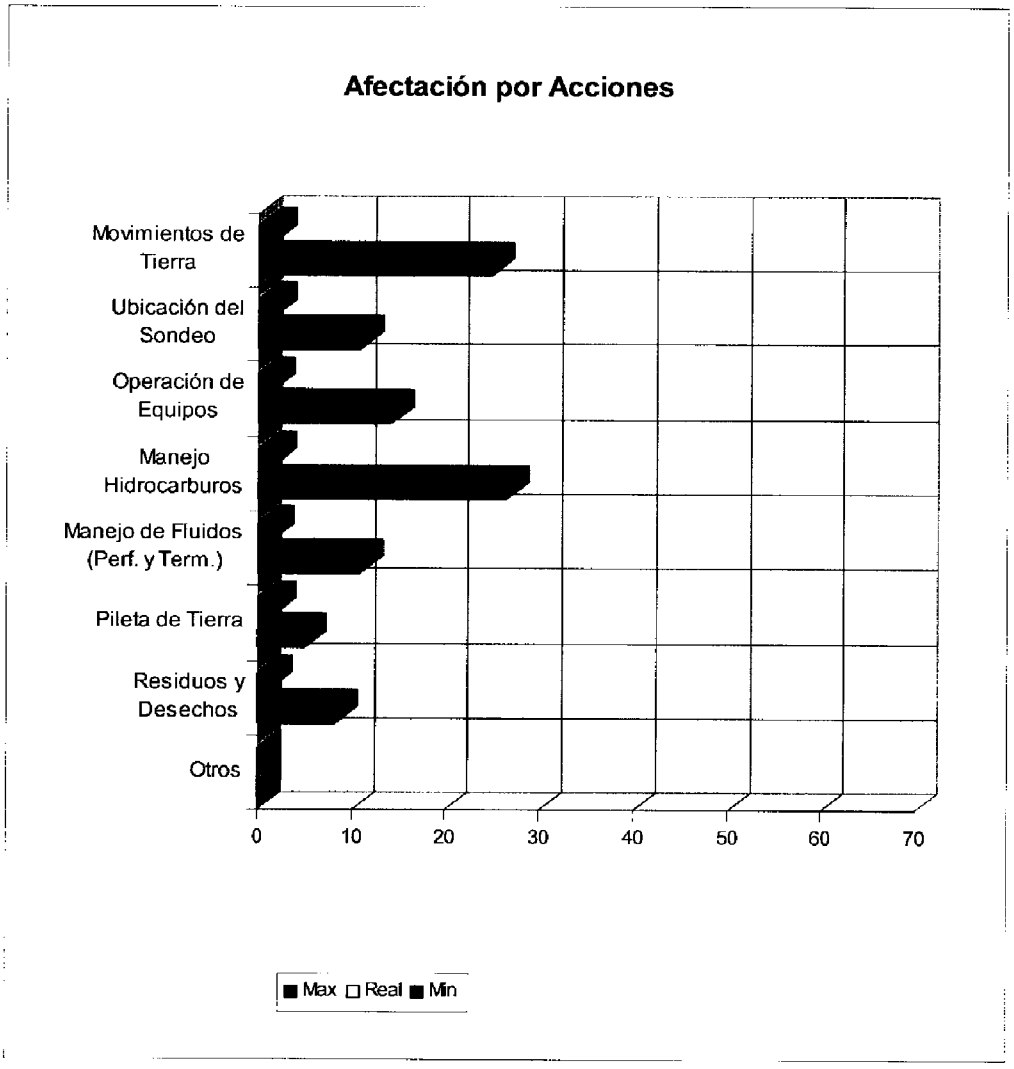
Impact caused by resources

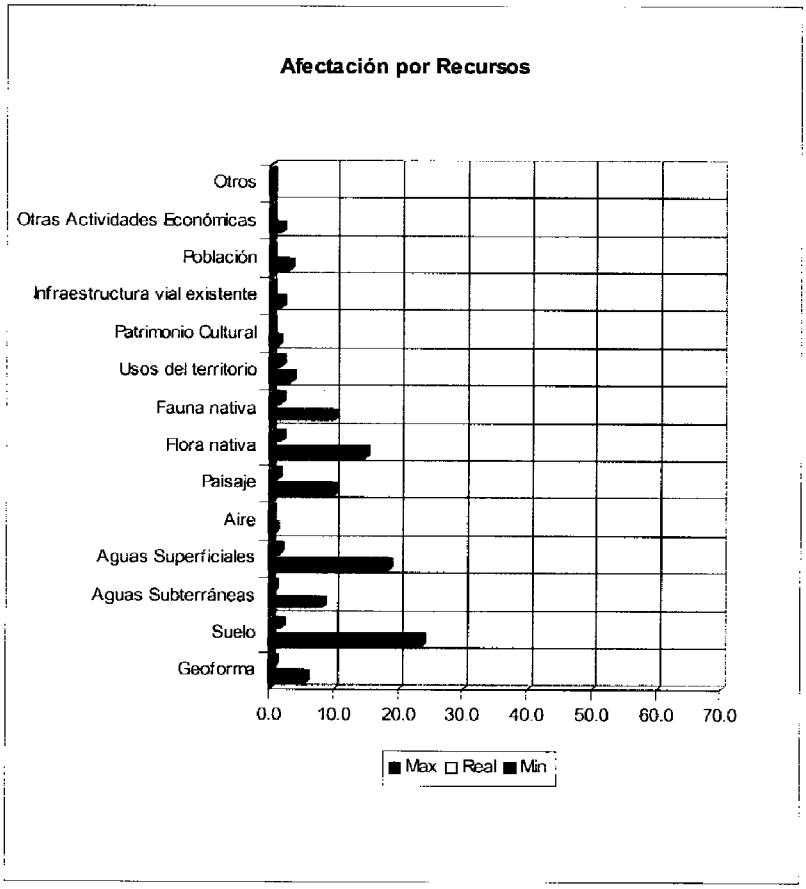
Soil		**23.6%**		
Surface waters		**18.3 %**		
Native flora		**14.6 %**		
Landscape				**9.7 %**
Native fauna		**9.7 %**		
Ground waters	**7.9 %**			
Geological structures				**5.3 %**
Uses of the territory		**3.0 %**		
Population		**2.8 %**		
Road infrastructure		**1.6 %**		
Economic Activities	**1.6 %**			
Cultural Heritage		**1.2 %**		
Air		**0.7 %**		
Others		**0.0 %**		

Impacts caused by actions

Hidrocarbon management		**26.39 %**		
Ground movements	**24.77 %**			
Equipment operation	**14.12 %**			
Management of fluids		**10.88 %**		
Location of the well drilling area				**10.88 %**
Residues and waste		**8.10 %**		
Drilling cuts pool	**4.86 %**			
Others		**0.00 %**		

The data obtained illustrate the resources which are considered most vulnerable and prone to be affected by the operation of the exploratory well as well as the actions that may pose the highest risks on the environment, from the *physical, biological and social and economic* points of view.


Afectación por Acciones
Movimientos de Tierra
Ubicación del Sondeo
Operación de Equipos
Manejo Hidrocarburos
Manejo de Fluidos (Perf. y Term.)
Pileta de Tierra
Residuos y Desechos
Otros
0
10
20
30
40
50
60
70
Max
Real
Min



2.1 Conclusions

The interpretation of the Matrix of potential environmental impacts resulting from perforation and/or completion of an exploratory well under study, allows us to determine the resources involved.

Soils

Even though for the performance of future drilling activities and existing location shall be used, additional ground shall be cleared towards the east for the installation of the rig, since due to operating reasons, there must be a distance of 60 meters between each well head. **The soil presents a high risk of erosion** due to its edaphic characteristics. This is the reason why it is considered the resource that produces the highest impact when the activities at each stage of the exploratory well are carried out without considering the environmental precautions set forth in the Chapter on Measures of mitigation. Their implementation shall facilitate the natural restoration of the soil through revegetation.

Surface waters

Given that the site is located in a sector of **temporary stream ways**, the impact of this resource would be a high risk impact, since in the event of spills, these spills could be directed towards these areas and contaminate water resources.

Native flora

Since the ecosystem of the Yungas is a system that recovers rapidly from small scale disturbances, the impact on the vegetation of the affected area can be reverted through the implementation of an adequate environmental management (refer to chapter on Measures of Mitigation). Clearing and ground leveling tasks have been assessed as well as the impact resulting from hydrocarbon and salt waters spills and from the actions affecting these resources.

The jungle of the Yungas is one of the most sensitive regions to anthropic alterations due to the high diversity of endemic species, many of which are at risk of extinction, and due to its scarce representation in the Argentine territory.

Landscape

Given the characteristics of this area, this resource is affected by the **movement of the ground, clearing of the ground, construction of accesses and others**. This situation is aggravated when landslides are produced as a result of the modification of slopes and also as a result of an inadequate disposal of residues and waste that are not correctly transported and thus generate pollution.

Native fauna

The micro fauna of the location may be highly impacted by ground movement. On the other hand, we must consider that the construction work shall not be long, thus the noise resulting from it and the anthropic presence shall not produce an irreversible and long lasting impact if the recommendations provided in Chapter V are respected.

Ground waters

The existence of this resource is proved in the area In the event of **spills** (Hydrocarbons and salt water) the area would be seriously affected and the possibilities of reverting this would be few. **The use of non polluting elements resulting from tasks of injection during the drilling of the main pipe, and its adequate cementing shall reduce this risk**.

Geological structures

The installation of the drilling equipment in an existing location, minimizes the impact resulting from ground clearing and leveling tasks. If we consider the recommendations detailed in Chapter V, the impact on the geological structure would result in a minimal risk.

Uses of the territory

This resource does not have a high impact since no present uses of it are recorded and it is not close to the location of any naturally protected area.

Population

Since this is not a densely populated area, there are practically no impacts involved. The closest urban area is Acambuco, 25 km away from the future drilling site.

The remaining resources have been weighted, using very low values which are not mentioned herein.