

## 1. EXECUTIVE SUMMARY

This report addresses the Prior Environmental Assessment of Exploratory Wells CNSa-3 and CNSa-4 corresponding to the Cabo Nombre Field operated by Pan American Fuego SRL through its Management Unit (MU) Tierra del Fuego, to the North of Bahía San Sebastián bay. Its purpose is to comply with the environmental protection regulations in accordance with the resolutions of the Argentine Secretariat of Energy No. 105/92 and 252/93, Law No. 55/92 of the Province of Tierra del Fuego, and related rules, governing the protection, conservation, improvement and restoration of natural resources and the environment in the provincial sphere.

The overall criteria applied in this project is not to scatter the impacts but rather concentrate them in the smallest and most manageable areas. Therefore, one single location will be used for the assembly of the two exploratory wells. In this case it is an existing 100 x 190 meter location, which represents a significant reduction of the area to be affected. Thus, the disturbances already caused by the siting of the current location are environmentally capitalized.

This is an important fact if we take into account that the site is within a protected area called the Hemispheric Reserve "Costa Atlántica de Tierra del Fuego" and that in 1995 it was included within the wetlands of international relevance at the Ramsar Convention. The biological value of this bay is its biological diversity and its capacity to concentrate several migratory shorebirds, a fact which should be considered when taking into account the environmental precautions.

From the Environmental Impact Matrix developed in Chapter 7 it is concluded that most of the interactions between the elements of the recipient environmental system and the well construction and operating activities will cause moderate impacts on geological structures, the soil, the water resources, the vegetation and the fauna. However, if the suggested recommendations are appropriately implemented, many of the negative impacts caused by the work could be mitigated or minimized.

The most significant potential impacts of the project are mentioned below:

- I Given the plain features of the relief, the project contemplates the elevation of the ground both in the location area and in the access roads, which will cause a change in the existing geological structures. These actions are mainly linked to the construction stage. Nevertheless, the associated impact is minimized taking into account that within such a small location, two exploratory wells will be drilled by expanding and adapting an already existing site for that task.
- I The site is adjacent to large area linked to a fossil marshland that may be affected by the transit of vehicles and machines outside the permitted boundaries.
- I Considering the need to ground-raise the location, the material extraction from unauthorized sites may cause the degradation of the edaphic layer of such sites that are not altered by human activity.
- I The accesses near the field render road construction unnecessary. Nevertheless, the project contemplates the modification of an access road and the construction of a contiguous one so as to prevent the movement of vehicles and machinery outside the construction work limits. The arbitrary circulation of vehicles and machinery may cause the ground compaction or degradation of the peat moss developing next to the location.

- I On a local level, although no runoff lines were observed at the site, the refill and gabion construction tasks on the Southern and Eastern sides of the location may cause a change in the natural drainage of rainwater. On the other hand, as regards the excess material derived from leveling, and trenching movements for adapting and/or opening accesses or other soil movements, if no adequate storage is planned beforehand, the regular flow of natural rainwater drainage is likely to be obstructed.
- I Although the site is located within the continental section of San Sebastian Bay, it is very close to the intertidal zone affected by the tidal regime. Nonetheless, there are no records at the site under study of extraordinary tide inflow affecting the wells and/or the facilities developed in that area.
- I As regards underground water, special attention must be given to contamination of the soil (and indirectly, water contamination) due to the different fluids used during the various work stages. Considering the design of equipotential curves indicating a regional underground flow heading towards the S-SE quadrant, the consequences from hydrocarbon spills or leakages that may percolate into the deepest soil layers, may pose a potential risk of impacting underground water resources.
- I During the access road construction and modification tasks, the construction of the location and pool, the installation of work sites and camps, the circulation of machinery and equipment operation, the landscape will be temporarily modified by trenching movements, vehicles, machinery, pipes, etc. However, within this factor, the assessment made of the associated impact is influenced by the fact that the overall aspect of the landscape has been originally altered by the existence of the Cabo Nombre Field facilities.
- I Given the small extent of the area to be affected, we can presume that the natural ecological processes of the Patagonian Prairie and the Coastal Area will not be remarkably altered. Based on these considerations, although the potential impact on vegetation is specifically high due to the fact that all the mulch is removed, estimates indicate that its weighing is low because the affected area is small.
- I The projected drillings are located very near the shore of San Sebastian Bay so that its exploitation may directly affect this environment. It is vitally important to emphasize that this area is part of the Hemispheric Reserve "Costa Atlantica de Tierra del Fuego" and that since 1995 it has been included among the wetlands of international relevance at the Ramsar Convention. This is the Southernmost Ramsar site in the world. The site is important due to its wide variety of migratory shorebirds. The highest concentration of migratory birds occurs at the North of the bay during Summer so the avifauna could be affected if works are performed during this season.
- I The movement of machinery, vehicles and personnel allocated to the work shall generate noise. This would affect to a certain extent, the behavior of the wild fauna occasionally present around the work site, depending of the characteristics of the relevant species, particularly birds and territorial species. In the case of the micro fauna, the effects are expected to be greater since the area to be affected is proportionally a larger habitat. In the case of the major fauna, the alteration can be estimated to be lower since a smaller proportion of the habitat will be modified. However, we cannot disregard the fact that these specific species use larger territories than the ones included in the construction works and affected by them.
- I The lack of a stable population or dwellings near the project translates into no impact generation on them. Nevertheless, operators working on the field operations and the rural dwellers temporarily transiting the area may see their movement provisionally



affected during the construction due to provisional road blocks, denser vehicle traffic and machinery circulation, etc.

- I As there are pasture plots coexisting with the Cabo Nombre Field facilities, the new works involve a potential impact on these activities in almost all the project tasks (access road construction and modification, location and pool construction, work sites and camps, circulation of machinery and equipment operation, waste generation). The large number of sheep in the area may be affected by the works and may also hinder the development of the activity.
- I The impact balance is deemed positive for the socio-economic activity of the area, particularly due to the generation of labor and service requirements. The effect is positive though of low import as even though this activity will generate employment, the number of workers taking part in the construction and operating stages is small.

### **Recommendations and Mitigation Measures**

The following recommendations and mitigation measures are suggested for this project:

- I During the expansion tasks of the current location, the minimum projected measures need to be observed in order to minimize any alteration of the surrounding grounds, taking into account the peat moss developing next to the location.
- I The roads to be used as a means of access to the well location need to be regularly maintained and monitored in order to avoid their wear due to the constant transit of vehicles and machinery. As regards the two access roads to the site to be adapted and built, the necessary ground raising is recommended so as to prevent any unexpected tide rise that may render them unserviceable, although there are no records of this event in the area.
- I As regards the ground raising of the location, the extraction of materials from the sides of it should be avoided at all times. It is rather recommended to perform such extraction from the nearest authorized quarry which, in this case, is the so-called Cantera CP 100, belonging to Estancia Cullen, located to the West of the project site.
- I The implementation of a system of eaves troughs is advisable to drain rainwater to suitable sites in order to avoid potential waterlogging at the location and/or avoid potential swamping that may occur within the location.
- I The restoration and conditioning of the current gabions on the Eastern and Southern sides of the location is advisable in order to avoid potential damage due to tides, although there is no record of this type of event in the area.
- I In order to prevent the entry of animals that may be affected by the operations, the full fencing of the location and projected pools is recommended. In the latter case, the installation of an adequate bird protection (e.g.: bird protection nets) is suggested if hydrocarbons are likely to be spilled into them, considering the biological value of this bay as it concentrates a large number of migratory shorebirds.
- I Given the ecological value of the area, as this is a nesting site for a wide variety of migratory shore bird species during Summer, it is recommended that works be made away from this period so as to avoid affecting the avifauna.
- I An efficient signaling is recommended in the operating location and adjacent areas, road, etc., to alert dwellers of the operations being carried out. A permanent



surveillance of the site is advisable to avoid intruders from trespassing the site without authorization.

- I As regards hazardous liquid, solid and semisolid wastes (or including some hazardous substance such as oil or hydrocarbon remains) that might be generated, they must be disposed of pursuant to the instructions of the applicable provincial legislation and the internal procedures of Pan American Fueguina. Therefore, although the tasks to be performed are of a temporary nature, it is recommended to execute them in full compliance with the procedures established for the provisional deposit of this type of waste in roofed areas protected from the weather in order to avoid any spill that may affect the soil, the water resources, the vegetation, the fauna (taking into account its proximity to the inter tidal zone) until its transportation by an authorized carrier to the storage place indicated by Pan American Fueguina, or to a special waste treatment plant authorized by the relevant authority for their safe elimination.

