LEGISLATION FOR ENVIRONMENTAL PROTECTION IN THE CASE OF GEOTHERMIC DRILLINGS IN MEXICO

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ABSTRACT

In order to prevent and/or to mitigate, the potential environmental impacts produced by Geothermal drilling and development, Mexican legislation specifically establishes particular measures. Such official recommendations includes the protection of soil, plants and fauna in the environment. Special attention is provided for the endemic or endangered species, the Natural Protected Areas and tourist, historical or archeclogical zones. Specific measures are established in order to avoid any possibility of chemical contamination. In this study we analyze in a broad scope, the legislation concerning the activities associated to geothermal drillings in México.

KEY WORDS: Environmental Protection, Geothermal Drilling, Mexican Legislation.

INTRODUCTION

As a national strategy for México, it is very important to search and assess potential geothermal resources in order to reduce our dependence of fossil fuels (Gutiérrez-Negrín, 1991). At Baja California Sur this search is even more important, because their geographic isolation and their lack of surface hydropower resources. At Baja California Sur there are only two diesel thermoelectric plants with a total production of 184 Megawats. Baja California Sur is the only State of the mexican republic with no connection with the national net of electricity distribution (CFE, 1990).

At the Baja California Sur State, there exists the propitious geologic, geophysics and geochemistry conditions for the existence of a profitable commercial geothermal resource, specifically at Las Tres Virgenes geothermal field (CFE, 1989). In order to verify such profitability of the geothermal resource, it was necessary to proceed to perform an exploratory drilling.

Prior to proceeding with drilling activities at Las Tres Virgenges, and according with the mexican legislation it was necessary to develop an Environmental Study, (Diario Oficial de la Federación, 1988). This work analize in a broad scope the specific rules established in the mexican legislation for such kind of exploratory activities (Diario Oficial de la Federación, 1989).

MATERIAL *AND* METHODS

Our environmental study was developed from 1991 to 1993. Through intense and extensive field and bibliographic studies we established the principal characteristics of the natural and socioeconomic environment surrounding the Project (Ortega et al., 1991).

On the other hand, we established with accuracy all the characteristics of every one of the project activities, programed during each phases: during the preparation of the terrain, during the construction and during the operation (Ortega et al., 1991). For each phase of the Project activities we analized the work program, the main implied activities, the affected area, the utilized machinery and materials; kind and quantity of personal and energy sources used; nature and quantity of generated residues and the programed emergency and security measures (Ortega et al., 1991).

RESULTS *AND* DISCUSSION

Theoretically, the expected main potential environmental impacts for this project could be grouped in two aspects: physical and chemical (Ortega et al., 1991). Expected physical impacts could be associated with roads, construction of dams and platforms drill pads. These activities could produce vegetation destruction and alteration of natural drainages, wich could increase soil erosion (Ortega et al., 1991).

On the other hand, chemical impacts could be produced by the condensation of the discharged vapor and produced fluids. This fluids contains a total 3,500 ppm of dissolved solids, which includes 128 ppm of Boron, 16 ppm of Arsenic, 1,200 ppm of Chloride and non condensable gases, mainly Hydrogen sulfite (Ortega et al., 1991).

We consider, as the main contribution of this manuscript, to proceed to analyze the main official recomendations (Diario Oficial, 1989), in order to show how in México environmental protection is a priority. Such official recommendations are the following:

1.- Geothermoelectric plants must be preferabelly located outside of natural protected Areas.

2.- Geothermoelectric plants must be located outside of zones with endemic or endangered species.

3.- Geothermoelectric projects must be located outside of archaelogic, historic and even zones with tourist potential.

4.- Exploratory wells must be planned in order to preclude great soil movements and instability of the terrain which could promote landslides and future erosion problems.

5.- For the construction of the access roads, it is mandatory for the roads to be as narrow and short as possible. Also, it is necessary to use for leveling purposes the materials produced during the drill pads and the same road construction.

6.- The area of the Exploratory drilling platforms must be as small as possible. Also, it must have an mud pits, enough to contain any residual produced by the perforation.

7.- All mud pits must be located at stable terrain, must be large enough to contain all produced residuals and must be impermeable.

8.- During the well evaluation tests, it is mandatory to use adequate equipments in order to condense all the steam produced.

9.- During the well evaluation tests, it.is mandatory to re-inject to the same well all the water produced by the steam separation equipment.

10.- After the exploratory activities, a restoration and a monitoring program must be established at the area.

CONCLUSIONS

From our analysis of the key environmental factors surrounding the project; by our weighing the proposed project activities and by the results of our environmental impact assessment we can conclude that: all and every one of the activities of the project follow the adequate and official measures programed to preclude, minimize or mitigate such impacts (Ortega et al., 1991). The project program includes all the equipments, systems, actions and measures necessaries to follow the official recommendations of the mexican legislation (Diario Oficial, 1989).

Thus, our only emphatic recommendation (Ortega et al., 1991), in the case of the Las Tres Virgenes Geothermal Project, was the establishment of a verification program for to certify the implementation of these official recommendation.

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