

GEOTECHNICAL STUDY OF THE LAND AFFECTED BY THE POWER PLANTS

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ABSTRACT: With the development of civilization, with all its advantages and disadvantages, the concept of developing the strategy and economic policies should be based on a simple principle and confirmed: Prevention is always better than cure and more economical.

KEY WORDS: geotechnical studies, power plants, pollution, surface, extracted, degradation, foundation, landscape.

1. INTRODUCTION

Because of its specific, the entire activity of mining pit produces multiple and varied adverse effects on the environment, as exemplified by:

- modifications of the relief, manifested by landscape degradation and displacement of households and the industrial areas of operation;

- occupation of large areas of land for mining activity, stockpiles, storage of minerals, industrial plants, roadways, etc., surfaces which are thus totally unusable for other purposes for a long time, affecting local communities (creating land use conflicts, displacement, destruction of recreation areas etc.);

- land degradation, by vertical and horizontal surface displacement, sliding dumps and tailings dams, therefore causing serious accidents;

The pollution of flowing surface water and groundwater;

- hydrodynamic imbalance of groundwater;
- negative influences on the atmosphere, flora and fauna;

- Chemical pollution of the soil, which may affect its fertile properties for many years.

Noise, vibration and radiation spread into the environment, having a strong adverse action.

Today in Gorj County lignite mining activity takes place on the surface quarries: Tismana I, Tismana II, Rovinari, East Gârla, Pinoasa, Rosia Jiu, Northern Peşteana, Lupoiaia, Roşiuţa I, Northern Jilt and Southern Jilt.

In Gorj county, close to the quarries mentioned above there are two major consumers of the extracted lignite, namely Rovinari and Turceni power stations. Rovinari power plant at a production level of electricity approx. 8,6TWh / year, consumption of lignite, the average calorific value 1800kcal / kg (7,6GJ / kg) should be approx. 9.7 million tons, which can be obtained from quarries Pinoasa, Tismana I Tismana II and Rosia Jiu (with aggregate reserves of approx. 500 million tons) for a period of 50 years.

If the production level of electricity in Rovinari Power Station is approximately 8,6TWh / year, then the consumption of lignite, having an average calorific value of 1800kcal / kg (7,6GJ / kg) should be of

approx. 9.7 million tons, which can be obtained from the quarries of Pinoasa, Tismana I, Tismana II and Rosia Jiu (with aggregate reserves of approx. 500 million tons) for a period of 50 years.

For Turceni thermal power plant, considering the same levels of production of electricity, respectively 8,6TWh / year, the quarries from Northern Jilt and Southern Jilt with aggregated reserves of approx. 270 million tons, can provide coverage for more than 30 years.

The exploitation of the quarries in Gorj county generates aquifer system degradation intercepted by their location. The aquifer formations of the roof and the lignite layers create difficulties in their operation, the danger of inundation of the work and mining fronts, the slipping and crumbling steps and slopes in the quarries.

To remedy these shortcomings it is necessary to dewater the acvifere formations. Dewatering work performed in Rovinari quarries mining basin, for example, led to eviction of approx. 90 million m³ of water / year, derived from dewatering wells and pumping stations existing in the open-pit mining.

The influence of the dewatering works carried out on the aquifer system, can also be seen on the adjacent quarries. The exploitation of lignite deposits, safely throughout the quarries in the floodplain basin of Rovinari, caused the lowering of piezometric level of groundwater by 50-100 m, and thus forming a large basin landform, which has extended far beyond the quarries.

As a result of this, all wells downstream floodplain careers Rovinari mining basin had dried up completely within a few years. The phenomenon had significant negative repercussions on the activities of forestry and pastoral farming in the whole downstream quarries area. Intensive dewatering operations and the evacuation of groundwater can lead to subsidence phenomena and even sudden ruptures and collapses of the marl clay layers and of the aquifers.

The settlement caused by dewatering and consolidating layers of fine-grained

aquifers, produced in the Rovinari power plant, located in the center of the mining basin Rovinari, did not exceed 10-15 cm, which didn't have significant negative consequences on the industrial facility. The inconvenience caused by the subsidence phenomena can be avoided if industrial activity is preceded by hydrogeological studies carried out very carefully at regional level. Then, according to the results, appropriate measures should be taken in order to plan the activities.

Significant in this regard are the provisions of the current legislation in Romania (Environmental Law, Mining Law, etc.) which require the mines to study the hydrogeological consequences of the opening quarries, as well as the need to replenish the aquifer systems, both within and beyond the quarries. These laws also provide that if the entrepreneur does not have accurate enough accurate data to address this problem, then the operating permit will not be granted.

The stabilization process can be applied successfully to fine-grained soils such as clay lands, but it may also have favorable results in the case of sandy soils, which contain a significant percentage of fine particles (clay minerals). By using the term improvement of the foundation soil it means an increase, with a greater or lesser extent of its engineering properties thereof, while the term stabilization automatically involves the increasing of the geotechnical properties of the earth (an increase of the tensile shear strength and the reduction of permeability and compressibility) so it can support the engineering works.

Geotechnical study is required by law, the norm governing this being NP 074/2007 regarding the documentation for geotechnical construction.

There have been concerns about the geotechnical studies of the areas affected by CHPs in Gorj when they agreed on the need to respond to inexorable issues concerning the deterioration of the natural environment and the prevention of worsening the ecological imbalances and ensuring ecological balance.

2. CONCLUSION

Geotechnical study will include information about the soil strata, its weight and pressure supported by the terrain, what is the recommended drilling depth and at what level is the groundwater, the type of the terrain etc. Geotechnical study makes it possible to meet the requirement of strength and stability throughout the entire work. A geotechnical study is to determine the characteristics of geomechanical earth samples taken from the ground.

The steps that will follow during the geotechnical study are: to identify the location, to choose the methods of prospecting the terrain, to take samples of soil in order to analyze them in a geotechnical laboratory certified for determining the physico-mechanical parameters, the interpretation of data and the preparation for the proper study.

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