

Valorisation of Pegmatite Deposits in Environmental Conditioned Areas

C. ALMEIDA¹

¹Visa -Consultores S.A., calmeida@visaconsultores.com

ABSTRACT

The valorisation of geological resources in Portugal, as is an example the pegmatite deposits, presents a strategic importance to national economy, due the high needs of these raw materials for glass and ceramic industries. The current exploitation rhythm allied to the lack of proved geological resources, turns the unexploited pegmatite deposits very attractive. Therefore the exploitation of this deposits in areas with environmental constrains becomes a reality face to the raising needs of this materials.

Keywords: valorisation, Natura 2000 Network, pegmatite, Portugal, Europe.

INTRODUCTION

Currently Portuguese ceramic mining industry faces a very concerning scenario. In one hand, the market pressure creates a growing demand of high quality ceramic raw materials, leading to an intensive exploitation of the pegmatite deposits. In the other hand, the actual exploitation rhythm of these non renewable geological resources may lead to the collapse of the available reserves and consequently to the failure of the internal supply.

PORTUGUESE MAIN OCCURRENCES OF PEGMATITE DEPOSITS

According to “Direcção Geral de Geologia e Energia” (DGGE) data base (www.dgge.pt, 2007) in 2005 there were 34 active mines, geographically distributed along the Central Iberian Zone (CIZ), in the Iberian Pegmatite Belt. The third Hercynian deformation and its related granitic intrusions control their geometrical configuration (Gomes & Nunes, 2003).

These are mainly open – pit mines and their distribution and configuration is essentially controlled by the vein/sill morphology of the pegmatite deposits.

It's important to highlight the occurrence in these ore deposits, of rare-element mineralization, namely lithium minerals. These occurrences are being studied by various researchers (Maijer 1965; Noronha & Charoy 1991; Gomes 1994; Gaspar 1997; Ramos, 1998; Charoy & Noronha 1999; Lima 2000; Antunes 2001; Puga et al., 2003; Almeida, 2003; Teixeira & Lima 2005; Lima et al. 2007, accepted) to enhance this kind of mineral resource and optimise the raw material quality for industrial application, upgrading the exploitations economical bases. The main occurrences in the Iberian Pegmatite Belt, as shown in Figure 1, are: 1- Amarante ; 2- Serra de Arga; 3- Barroso–Alvão; 4- Almendra; 5- Viseu; 6- Seixo Amarelo-Gonçalo; 7 – Segura.

GEOLOGICAL RESOURCES IN ENVIRONMENTAL CONDITIONED AREAS

The pegmatite deposits exploitation is an issue of great interest to provide a sustainable future to the ceramic raw materials market. The growing needs, allied to the increase importation of ceramic raw materials from foreign pegmatite deposits (Indian potassium feldspar; Turkish sodium feldspar, etc), creates a deficit in the Portuguese economical trade balance (Lima et al., 2003).

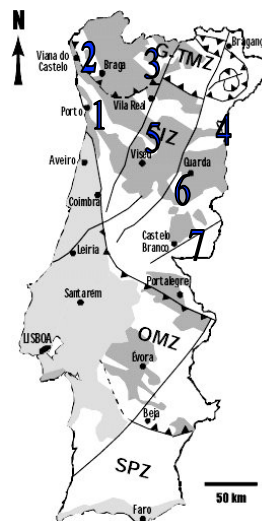


FIGURE 1. Portuguese most important pegmatite fields, located on simplified geological map with granitic rocks in dark grey, metasediments rocks in white, and sedimentary rocks in clear grey (adapted from www.ineti.pt, 2007). 1- Amarante ; 2- Serra de Arga; 3- Barroso – Alvão; 4- Almendra; 5- Viseu; 6- Seixo Amarelo-Gonçalo; 7 – Segura.

Studies carried out by several researchers groups prove that Portugal has potential to extend its geological reserves, especially lithium pegmatites.

The actual exploitation rhythm, associated to the Portuguese decrease of geological resources in the active mining concessions promotes the rising of imports. It's imperative the inventory of potential expansion areas.

The exploitation of these potential expansion areas may be conditioned by various environmental and legal restraints.

According to the Portuguese Law 180/2006, the Ecological National Reserve (REN) (MAOTDR, 2006), assures the ecosystems protection and the maintenance of the biological processes, indispensable to the balance of human activities, by creating protection areas. REN includes costal and fluvial areas, and interior areas like maximum water infiltration and steep locations.

Natura 2000 Network is the main policy on European Community to nature and biodiversity preservation, accomplished by “Birds” (Council Directive 79/409/CEE) and “Habitats” Directives (Council Directive 92/43/CEE). These two directives were transposed to internal law by the Portuguese Law 140/99, its main objective is to “contribute to ensure

biodiversity, trough conservation and reestablishment of natural habitats in a state of positive conservation of the national territory, beware the economic, social an cultural demands, as well the regional and local aspects”.

Important pegmatite deposits are also included in these areas. In fact, Natura 2000 Network covers more than 21% of Portuguese continental territory, and REN has a wider coverage, because its limits depend on municipal plans and policies.

A big percentage of these geological resources are included in environmental and land-use restricted areas, witch has consequences to the exploration and exploitation of the mineral deposits.

CONCLUSIONS

Portugal lacks exhaustive inventories of mineral resources needs, quality demands in transformation industries, future consumer's perspectives, etc. This situation, allied to the lack of knowledge on geological occurrences and land use planning restrictions, may lead to a collapse in the national ceramic industry (Bastos & Correia, 2005, www.visaconsultores.com).

Once again, the absence of geological knowledge in land-use planning, may lead to serious conflicts when very important geological resources may be lost.

In a country with economical handicaps, the loss of non renewable resources, such as the geological ones, may have serious repercussions for future generations.

The existence of important mineral deposits located in environmental conditioned areas (Figure 2), such as REN and Natura 2000 Network, conflicting and creating added difficulties to the possibility of exploitation of these geological resources may harm Portuguese interests, with short term direct repercussions in the national ceramic industry.

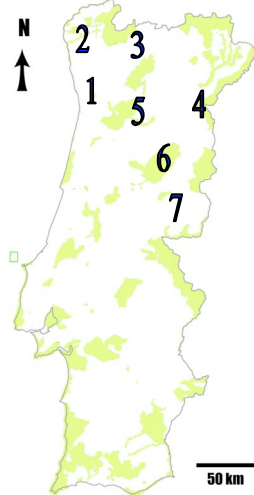


FIGURE 2. Pegmatite fields located in Environmental Conditioned Zones, the shadowed areas (adapted from www.icn.pt, 2007). 1- Amarante ; 2- Serra de Arga; 3- Barroso-Alvão; 4- Almendra; 5- Viseu; 6- Seixo Amarelo-Gonçalo; 7 – Segura.

The Portuguese government and all entities involved in the land use planning, environmental protection and economic development, with public or private interests, must find a management strategy that enables both the

preservation of natural values and the exploitation of important mineral resources.

Only this way the continuity of the Portuguese ceramic industry will be assured along with the so aimed national sustainable development, which insures quality of life to future generations.

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