INTRODUCTION

In recent years, the transition from the linear ‘take-make-waste’ model to a circular economy is essential for achieving UN Sustainable Development Goals (SDGs). In this context, the mining industry plays a key role, not only by promoting cleaner extractive technologies and developing improved processes to create value from tailings and other mining waste, but also in supplying materials, such as lithium or rare earths, that are crucial for delivering a low-carbon digital economy.

The new Spanish Strategy for Circular Economy —‘Circular Spain 2030’— as well as private initiatives from the mining sector, such as the Iberian Sustainable Mining Cluster, are aligned with the SDGs.

Although mining represents a small percentage of Spain’s GDP (around 1% in 2019), metal mining, in particular, has experienced a steady increase over the last decade and may become more important in the future because of Spain’s reserves of chromium and lithium —both of them included in the EU List of Critical Raw Material. A milestone for the sector was the listing of mining in 2013 as one of the NORM involving industries requiring regulatory control in the European Safety Basics Standards Directive (Annex XV) [1]. Whereas this fact set the ground for a better protection of human health and the environment, it also raised increased social concerns towards new and ongoing mining projects and legacy mining sites.

LEGACY MINING LAKES (Pit Lakes)

The Iberian Pyrite Belt is a part of the South Zone of the Hercynian Iberian Massif in the south-western region of the Iberian Peninsula, with pyrite (FeS₂) being the main mineral associated with the volcanic sedimentary complex. Intensive mining activities over the past 150 years generated more than 30 mine pits in which underground and/or rainwater has accumulated. Weathering conditions have produced irradiation of Fe₂O₃ in water and, consequently, the pH of the pit water has become acidic (approximately pH 2), causing the dissolution of metals and radionuclides of natural origin.

ACTIVE MINING SITES

RADIOMETRICAL ASSESSMENT

Radiochemical results of liquid and solid samples from the mining sites and surroundings areas.

In spite of increased radioactivity levels, site-specific environmental management plans (including the control of air emission, leachates and the requirement to treat liquid effluents before discharge) result in a very limited radiological environmental impact (in all cases, well below the 0.3 mSv/y exemption level).

SOCIAL PERCEPTION

Extractive practices have been often associated with adverse effects on the environment. Bad industry practices in the past, major accidents, such as ruptured dams or service spillage, have negatively affected European public opinion and created a NIMBY effect.

The EU’s Horizon-2020 INFECT Project [5] identified three main factors laying out mining acceptance: i) trust in public governance over mining companies; ii) potential negative environmental impacts perceived and iii) fairness of wealth distribution within local communities. A survey conducted in 2018 in this project also revealed that 60% of the Spanish population have a positive or neutral attitude towards mining. Public support towards mining rises up to 95% in economically depressed former mining areas.

CONCLUSIONS

Although the new radiation protection regulations for mining activities, combined with a risk-based oversight, results in an adequate protection of the environment, little attention has been given to the potential adverse impacts of legacy metal mining areas.

Radioactivity levels associated to on-going and legacy mining activities is highly variable. A site-specific characterisation is needed in order to assess the scale of the problem and gain a better understanding of the associated risks and optimal control or mitigation solutions.

Social acceptance of mineral extraction activities is a key to the sustainable supply of these raw materials from European sources. The mining industry now has the responsibility to demonstrate that a responsible mining is possible by applying best environmental practices and addressing legacy contamination.

REFERENCES