



MINERAL EXPLORATION IN IRELAND

HOW IT'S DONE

What is Mineral Exploration?

Mineral exploration is the process of searching for new mineral deposits in rocks. Geologists extract and study rock samples from an area with the potential for minerals to build a complete picture of the geology of the area.

Background

- Minerals are essential for modern society - for example, 43 different minerals may be used in a mobile phone.
- Mineral exploration is perhaps the original forensic science – minerals are difficult to find in economic quantities. Geologists try to understand the Earth processes that resulted in the formation of naturally occurring concentrations of minerals many millions of years ago.
- The likelihood of an exploration programme resulting in the discovery of a suitable concentration of minerals to warrant mining is about 1 in 5,000.
- Ireland has a good potential for the discovery of many minerals, including minerals required for the energy transition process.

Minerals Licensing

- Before any exploration activity can take place, a Prospecting Licence is needed. A Prospecting Licence is a permit, issued by the Government, which allows the holder to explore for minerals in a defined geographic area. A Prospecting Licence does not give permission to mine, only permission to explore or sample the area.
- Since the 1960s, thousands of Prospecting Licences have been issued across Ireland (north and south). Currently, approximately 30 percent of the entire island is under licence for mineral exploration.
- The exploration conducted has resulted in the discovery of several mineral deposits, including Europe's largest zinc mine at Navan, Co. Meath.
- The mineral exploration industry is very closely regulated, and all results must be reported through the Prospecting Licence system.

Mineral exploration happens in a sequence of activities, each designed to build on the previous stage. The purpose of exploration is to enable geologists to explore potential new mineral sources, discover new mineral deposits or further their knowledge about existing areas of interest that could become new mines over time.

MINERALS & MINING TERMS

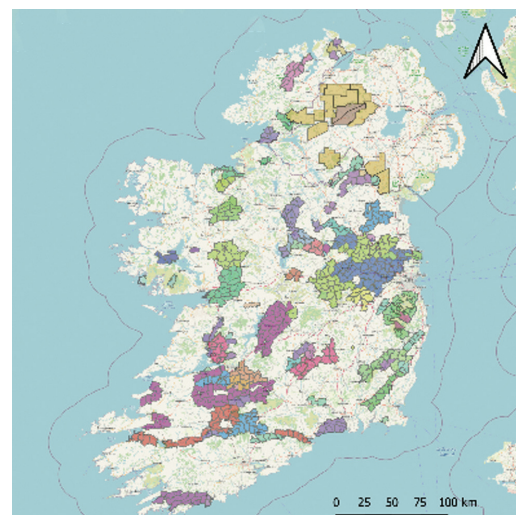
Ore - A rock from which an economically valuable mineral or metal can be extracted.

Mineral exploration - The process of searching for evidence of mineralisation hosted in the surrounding rocks

Geologist - A scientist who studies the Earth including rocks, tectonic history of the Earth, water, soil, sediments and energy materials. Geologists have different specialist areas like mining, mineral exploration, environmental protection, energy, groundwater and geotechnical engineering, palaeontology, volcanoes, metamorphism, and seismics.

Geological mapping - Collecting and recording information on the Earth's geological characteristics to produce a map of the bedrock, gain an understanding of the subsurface and develop the tectonic history of the area.

IRELAND
Prospecting Licences - February 2020



Early Stage Exploration

- Early stage exploration is the first step on the mining life cycle. This stage of exploration generally has a very low impact.
- Once a Prospecting Licence has been issued, exploration typically involves activities such as geological mapping and taking measurements of naturally occurring features such as soil, water and the physical aspects of the underlying rocks.

Later Stage Exploration

- As more is learned about the rocks underground, the exploration programme focuses on smaller areas within the Prospecting Licence.
- At this stage, exploration techniques, such as drilling, may sample rocks at different depths below the surface.
- Drilling involves taking rock samples through a small hole – usually less than 100mm in diameter. This allows the geologist to understand what types of rock are present under the surface, and if minerals are likely to occur.

Advanced Exploration

- If minerals are identified, then a more detailed drilling programme may be implemented to determine if they are present in economic quantities, i.e. if there are enough minerals present to make it commercially viable to open a mine.

Permitting a Mine

- Before a mine development can be approved by Government, detailed studies are undertaken to assess a wide range of factors including potential environmental, social and economic impacts. An important part of this process is consultation with local communities to better understand how any future mine can operate in tandem with their locality.
- Development is subject to detailed, stringent planning criteria and governed by strong regulatory controls, including Environmental Protection Agency licensing in Republic of Ireland and the Planning Process which incorporates environmental licensing in Northern Ireland, designed to protect the mine operation itself, the natural environment where it is located and the people living and working in its vicinity.
- Typically, the cycle from first discovery of a mineral deposit, through the subsequent permitting process, leading to the development of a mine may take over 10 years to complete.

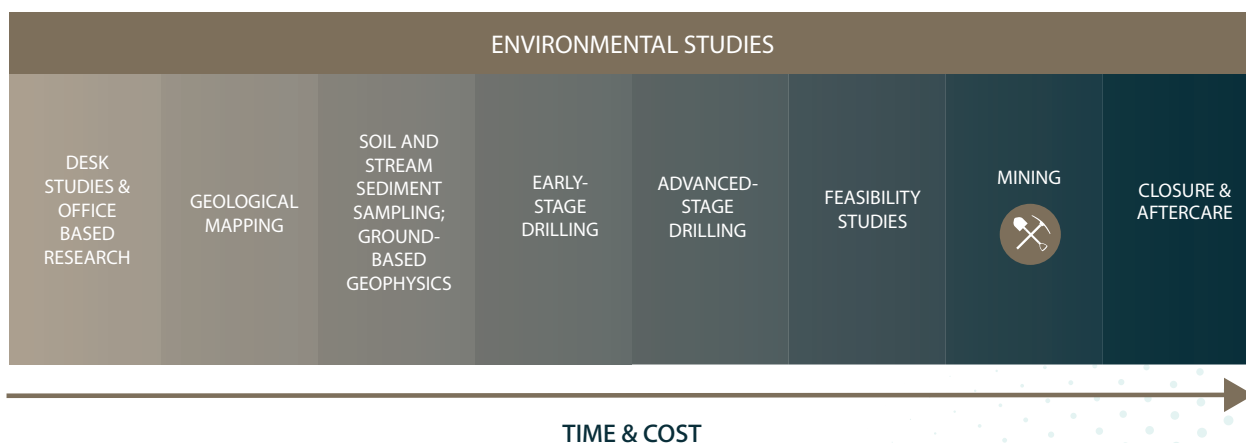


Exploration drill rig in operation



Zinc-lead ore in drill core, Tara Mines, Co. Meath

PROJECT STAGES FROM MINERAL EXPLORATION THROUGH TO MINE DEVELOPMENT



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