Mineral Development Process

Mine Development Process

Stage	1 Geoscientific surveys	2 Exploration	3 Deposit appraisal	4 Construction and commissioning	5 Extraction	6 Restoration
Objectives	Identify mineral potential on Québec's territory	**Basic exploration:** discovery and identification of mineral occurrence and confirmation of mineral content and continuity **Advanced exploration:** completion of an initial inventory of the mineral deposit and assessment of its preliminary economic potential	Appraisal of the deposit and definition of mining project parameters	Mine construction Commissioning and testing of mine facilities	Ore extraction and processing Marketing of the product extracted	Closure, securing and restoration of the site Post-restoration monitoring
Methods	Data acquisition: surveys, sampling, research and synthesis of collected data	Review and synthesis of all available information Prospecting, mapping, surveying, stripping and drilling Sampling at the surface, in trenches and in drill holes Resource estimation Mineralogical and metallurgical testing at the lab scale Techno-economic analysis of exploration data	Delimitation of the deposit: drilling Selection of the processing method: bulk sampling, mineralogical and metallurgical testing at the pilot scale Engineering design and cost estimate, market studies Analysis of technical, economic, environmental, social, political and financial risk	Project management and quality management Commissioning plan and worker training	Production management to improve quality, yield and employee safety on an ongoing basis	Management of site closure and restoration to a satisfactory state
Target outcome at the end of the stage	Publication of geological information and identification of zones conducive to mineral exploration	Preliminary economic assessment of the deposit Decision to develop the deposit	Feasibility study and decision to bring the ore body into production Organization of financing	Achievement of commercial operating conditions	Return on investment and earnings Full extraction of the ore body	Restored mining site meeting Québec's mine site rehabilitation requirements
Mineral resource	Mineral potential →	Mineral resources →	Mineral reserves →			

Promoter's good practice

As early as possible in the process, inform and consult citizens, municipalities and the Indigenous communities concerned about the progress of the work and project to ensure better integration with the host community and improve the project's social acceptability.

Implement responsible practices considering social, environmental, economic and governance issues.

Promoter's legal obligations

Obtain the necessary permits and authorizations for every activity that has an impact on the environment or territory

Conduct the provincial and federal environmental assessment process, as the case may be.

Outline of obligations to comply with:

- Acquire claims and notify the landowner and the municipality
- Obtain approval of rehabilitation and restoration plan and deposit financial guarantee
- Obtain the mining lease
- Create a monitoring committee
- Conduct the environmental follow-ups
- Carry out mine site restoration and rehabilitation work

The State's obligation

The Government must meet its constitutional obligations with respect to consultation with the Indigenous communities and, if necessary, accommodation.

8 octobre 2020 – Direction générale du développement de l'industrie minière

Québec

Glossary

Bulk sampling: Extraction of mineral substances to determine the ore's characteristics. An authorization is required for a quantity greater than 50 metric tonnes under section 69 of the Mining Act.

Claim: Immovable real right that allows the holder to have the exclusive right to explore the land (public or private) in search of mineral substances. The claim is the only mining exploration title that may be issued for prospecting mineral substances in the domain of the State.

Commercial operating conditions: Mine whose production has reached 60% of the capacity set out in the technical studies.

Commissioning: Period during which each of the installed equipment is started and tested to ensure that it performs the functions intended by the manufacturer. This period is after construction and before honing.

Deposit: Concentration in the same location of a mineral containing one or several metals or metallic substances which could be potentially mined. A deposit is described in the following technical reports: mineral resource estimate, preliminary economic assessment and prefeasibility study.

Drilling: Boring of a small diameter hole using a mechanical tool called a drill. Allows collecting samples of soil, rock and groundwater, or placing explosives during mining operations.

Feasibility study[1]: Technical and economic study that aims to identify all aspects of a project in detail, including risks, to demonstrate that the operation is cost-effective. The confidence level of this study is higher than that of a pre-feasibility study. A promoter or a financial institution can reasonably rely on the study's results to make a final decision on whether to continue or fund the project.

Financial guarantee: Guarantee that a mining company must file with the Québec government, which covers all the estimated cost of the rehabilitation and restoration work for the entire mining site as is set out in the rehabilitation and restoration plan and approved by the MERN.

Geoscientific survey: Cartographic representation of information. The information may be geochemical (sediment or rock chemical composition) or geophysical (description of the site's geological structure based on indirect measurements of some of the subsoil's physical properties [gravity, magnetism, seismicity]).

Lab scale testing: tests carried out on a few kilograms of ore sample using equipment that is non-representative of what is used in the industry.

Mineral occurrence: Surface or near-surface traces that suggest a particular mineral substance is present in the surrounding area and ideally in greater quantities.

Mineralogical testing: tests using physical (mechanical) processes to separate the valuable minerals from others in an ore (ore processing).

Mineral potential: Potential to develop mineral substances extraction projects in a given area considering its geological context.

Mineral reserve[1]: Economically mineable part of a measured or indicated mineral resource, as demonstrated by at least one pre-feasibility study. Mineral reserves include diluting materials and allowances for losses, which may occur when the material is mined. They can be probable or proven according to the increasing order of geological confidence.

Mineral resource[1]: The concentration of a mineral substance, including metals, that shows such a grade that there are reasonable prospects for eventual economic extraction. Mineral resources can be inferred, indicated or measured according to the increasing order of geological confidence.

Mining lease: Lease entitling the holder to exploit mineral substances other than surface mineral substances.

Mining site: Area encompassing all infrastructures related to mining operations (mine, processing plant, power supply, waste yard, service buildings, etc.).

Metallurgical testing: tests using chemical processes to produce high purity, marketable metals, alloys, metallic compounds or industrial minerals.

Ore Body: Deposit which demonstrated a potential to be economically mined.

Ore: Rock that contains one or many metals or mineral substances in a percentage sufficient to justify extraction.

Pilot scale testing: tests carried out on a few tons of ore sample using equipment that is representative of what is used in the industry

Pre-feasibility study [1]: Technical and economic study that aims to identify all aspects of a project to define its probabilities of success and determine whether all mineral resources, or some of them, may be classified as mineral reserves. The confidence level for this study is higher than that of a preliminary economic assessment but lower than that of a feasibility study.

Preliminary economic assessment[2]: Study, other than a pre-feasibility or feasibility study, that includes an economic analysis of the potential viability of mineral resources. Also called technoeconomic study. It can be based on measured mineral resources, either indicated or presumed, or a combination of these resources.

Rehabilitation and restoration plan for the mining site: Document to be submitted for approval by a mining company that describes all planned rehabilitation and restoration work at the cessation of mining activities. Other than the nature of the work, this plan must also include a detailed assessment of the anticipated costs of carrying out the work. The plan must foresee the restoration of all areas affected during the mining operations and must be approved before the mining lease is granted.

Resource estimation: Exercise to estimate the quantity and the grade, density, shape and physical characteristics of the deposit according to established standards and good practices.

Start-up: Initial period during which a mining site's activities are started, adjusted and optimized to reach 60% of the nominal production capacity. This period occurs after commissioning and lasts until commercial operating conditions.

Stripping: Excavation of the soil covering the bedrock.

Trench: Shallow excavation made using a manual or mechanical shovel to collect soil or rock samples.

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[1] Term defined in the "CIM Definition Standards on Mineral Resources and Reserves – Definitions and guidance" adopted by the council of the Canadian Institute of Mining, Metallurgy and Petroleum.

[2] Term defined in NI 43-101 respecting standards of disclosure for mineral projects.