

## Will it be worth it?

If knowledge is the key to success in business, nowhere is this quite so evident than in the mining industry. The greater the knowledge, the greater the confidence in long-term viability.

Long before a mine can be established and start to generate revenues, its owners, investors, and bankers will be looking for an answer to one simple question – will it be worth it?

These stakeholders need to assemble as much information as possible in order to establish the viability of a prospective mining venture, with a view to reducing the economic risks as much as possible.

To do this, they enlist the assistance of professional evaluators, usually a firm of consultant engineers that specializes in carrying out feasibility studies as a means of providing an independent assessment of the project's potential. These feasibility studies, also simply called pre-studies, are used to determine whether the mineral resource can be mined economically, but it doesn't end there. The findings are simply estimations that must be verified, which can take years in some cases before a final decision can be made on whether to proceed or not.

Over the years there have been many different types of feasibility studies employed for this purpose and just as many names – Conceptual, Resource Calculation, Preliminary, and so forth – mostly reflecting the reason for which they were commissioned. These days, the most common system for establishing the viability of a prospective underground mining venture has three simple steps:

- Order of Magnitude (also known as scoping)
- Preliminary Feasibility
- Definitive Feasibility

As shown in Figure 1, all mine development is a closely regulated process consisting of a series of clearly defined stages. Approvals and permits are required from government authorities for each stage, and the results must be evaluated and approved before the next stage can proceed. As a rule, the whole process, from initial prospecting to production startup, stretches over a seven-year period, but can extend even further depending on results.

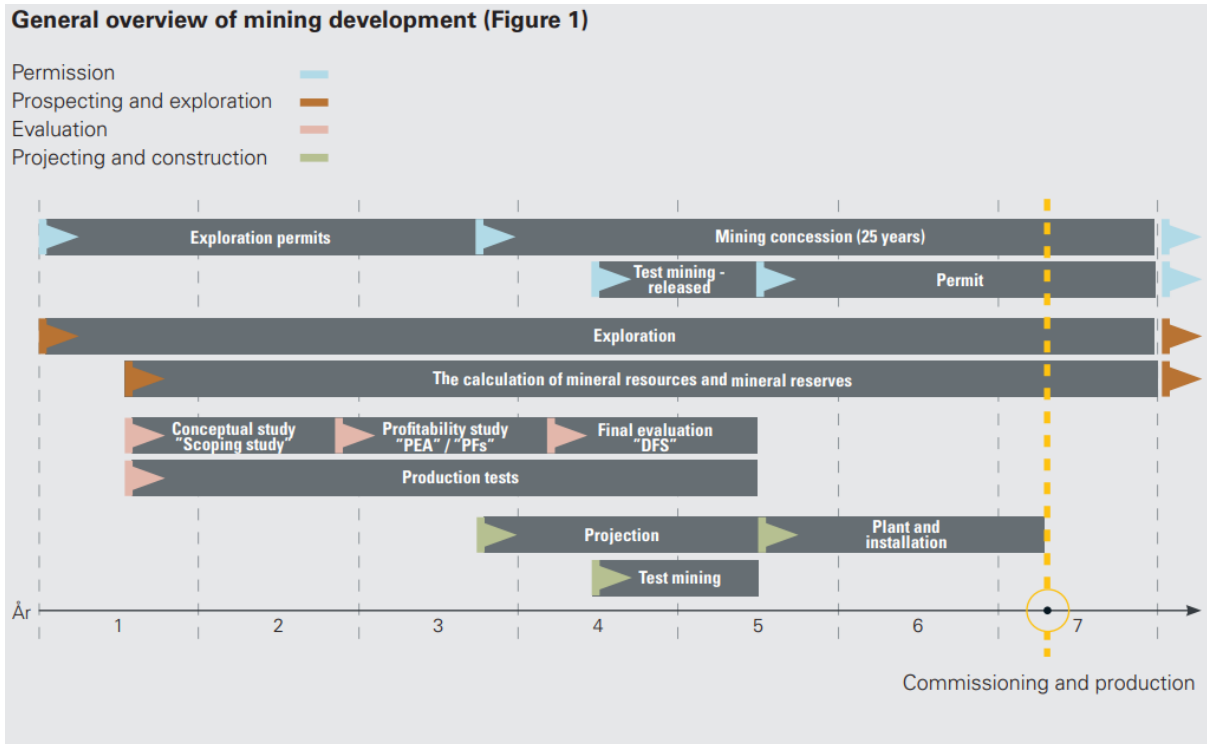


Figure 1: Establishing a mine is a closely regulated process and consists of clearly defined stages.

## Order of Magnitude

Order of Magnitude studies, or scoping, provide an initial financial appraisal of an indicated mineral resource. This is used to guide the exploration and definition of the mineral deposit and the critical aspects of the project configuration. They involve a preliminary mine plan and are the basis for determining whether to proceed with an exploration program and detailed engineering work. Order of Magnitude studies factor in known costs from existing projects that have been completed elsewhere and are generally considered to be accurate to within 40–50%.

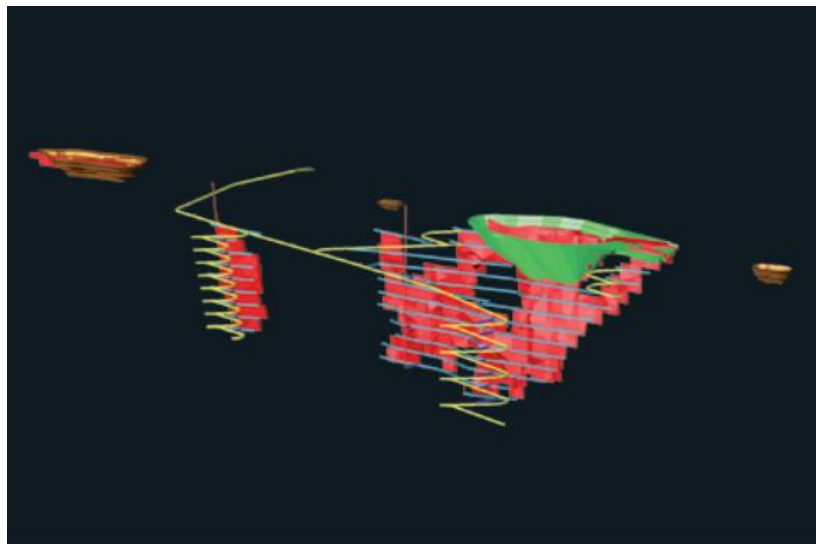


Figure 2: The mining method and mine layout must be evaluated in the planning stage using computerized models.

## Preliminary Feasibility

Preliminary Feasibility studies or “prefeasibility studies” are more detailed than Order of Magnitude studies. They are used, to determine whether to proceed with step three – a detailed feasibility study – and are also used as a “reality check” to identify areas within the study that require more attention. Preliminary Feasibility studies factor in all known unit costs and estimate gross quantities once preliminary engineering and mine design has been completed. This step is normally carried out by a small group of multi-disciplined technical individuals and is considered accurate within 20–30%.



*Geological surveys typically involve limited core drilling and sampling from the surface.*

## Definitive Feasibility

Step three, the Definitive Feasibility study, determines definitively whether to proceed with the project. It forms the basis for capital appropriation and provides the budget figures for the project. Detailed feasibility studies require a significant amount of formal engineering work and are considered accurate to within 10–15%. They are also said to cost  $\frac{1}{2}$  –  $1\frac{1}{2}$  % of the total estimated project cost. With advancements in modern calculation technology, pre-studies are now more reliable than ever, but research shows that a large percentage still fails to reflect reality. There are many reasons for this, not least that circumstances often change between study and implementation and that both the calculated capital investments and operating costs turn out to be higher than expected.

This may also be attributed to inadequate resources and that it often takes longer to ramp up than expected. In any event, the result is lower sales revenues than expected and the projected commercial result is not achieved. A rule of thumb is that all pre-study work should be benchmarked as far as possible and that all assumptions be reviewed by a team of specialists with no personal interest in the outcome.



*Once a definitive feasibility study has been approved, further exploration drilling enables the type and extent of mineralization to be defined.*