

MINING INSIGHTS

# 10 things you should know about Strategic Mine Planning for Open Pits

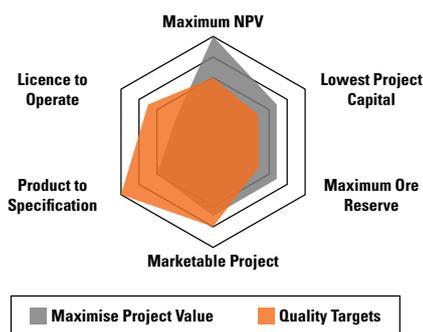


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“ A smart and robust strategic plan is vital for the success of a business. The aim is to harness the deposit variability and develop dynamic planning policies to add value. ”

Figure 1: Objectives Trade-off



## Foreword

A Strategic Mine Plan is the first stage of mine planning that sets the economic and technical direction for your project. The correct strategy is vital for the economic, social and environmental success of your project. You may be currently operating with a sub-optimal plan, so take this opportunity to create value and optimise your assets by reviewing your strategic plan.

### 01 | Objectives must be clearly understood and communicated

Objectives are provided to planning engineers from corporate/management teams. Each objective (e.g. maximising NPV) requires a separate strategic plan and a differing set of policies. Objectives are generally achievable only by compromising other objectives (Figure 1). Input from all departments is necessary to develop and implement a practical and dynamic strategic plan.

### 02 | Selecting the appropriate pit size can significantly improve project value

A little known fact is that a Revenue Factor 1.0 pit shell is never the optimal pit and can often increase project risks. A different pit shell will often provide a higher NPV and reduce project risk.

### 03 | Practical cutback sequencing is key to deferring waste stripping

Designing practical cutbacks that can be mined separately allows waste mining to be deferred, which can significantly add to the project’s NPV and decrease start-up capital. Deferral of waste stripping is limited primarily by practical sink rates.

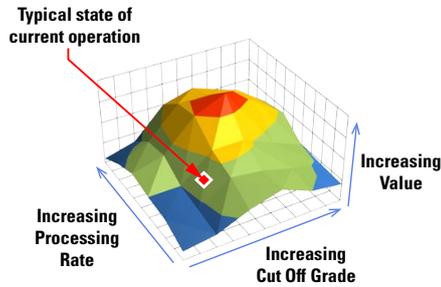
### 04 | Steady state mining schedules with fixed cut-offs are not optimal

Mineral deposits have variable material characteristics (grade, hardness, density etc.). A variable mining rate enables higher value material to be targeted early and to defer waste mining where practical. The aim is to harness the deposit variability and develop dynamic planning policies to add value.

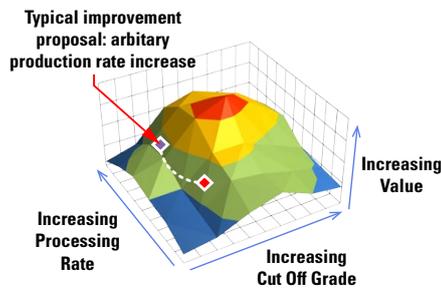
**Figure 2: Options Analysis**

*Cut-off Grades and Optimising the Strategic Mine Plan, Brian Hall, 2014.  
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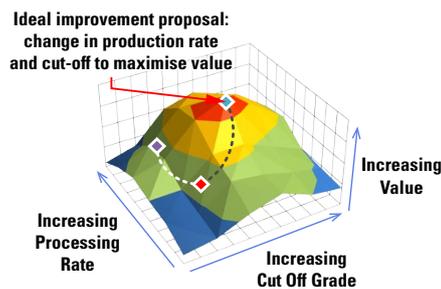
**Current Operational Scenario**



**Assessment of Single Scenario**



**Assessment of Multiple Scenarios**



**05 | How to calculate important cut-off grades**

**Marginal Cut-Off (MCOG)** (where marginal cost is processing unit cost per tonne ore).

$$\frac{\text{marginal cost}}{(\text{product price} - \text{selling cost}) \times \text{metal recovery} \times \text{metal payability}}$$

**Operating Cut-Off (OCOG)** (where total cost is mining + processing unit cost per tonne ore).

$$\frac{\text{total cost}}{(\text{product price} - \text{selling cost}) \times \text{metal recovery} \times \text{metal payability}}$$

These two cut-off points can be used to define processing pathways.

	Grade < MCOG	MCOG ≥ Grade < OCOG	Grade ≥ OCOG
Pathway	Waste	Low Grade	High Grade

**06 | Plant throughput and metal recovery trade-off should be assessed**

The relationship between metal recovery and plant throughput should be examined to identify whether a small sacrifice in metal recovery could increase plant throughput, improve metal production and cash flow.

**07 | Density and processing characteristics are as important as grade**

The quantity of recovered metal is equally weighted by density, processing recovery and grade. Geological sampling and estimating the variability in density and processing recovery/throughput enables the next level of project optimisation.

**08 | Assess multiple options to identify the correct strategies**

A robust options analysis will help you to identify the optimal strategy for a number of possible scenarios (Figure 2). Assessing a single option will not determine the optimal mine plan.

**09 | Modern software enables fast options assessment**

Advanced optimisation software can now be used to assess multiple strategic plans in days.

**10 | Garbage in = Garbage out**

Understanding the accuracy of your assumptions that underpin your mine plan is vital to developing a proper strategic plan. When actual operating data is unavailable, a first principles approach is the most robust and defensible technique for equipment, labour and cost estimation.

## Contacts

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