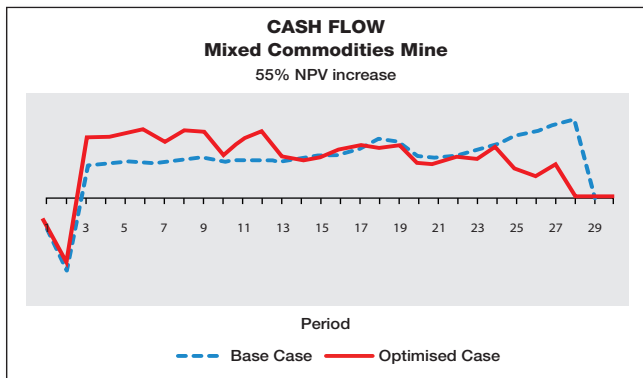
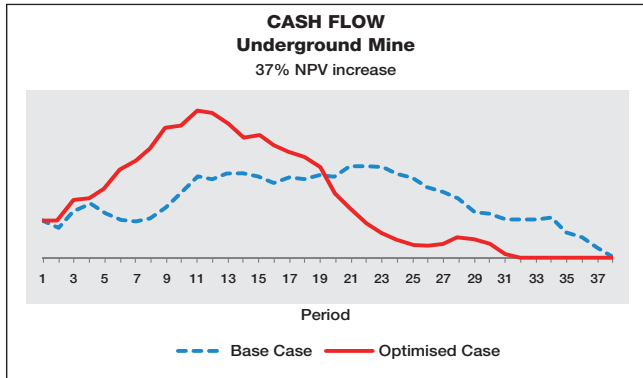
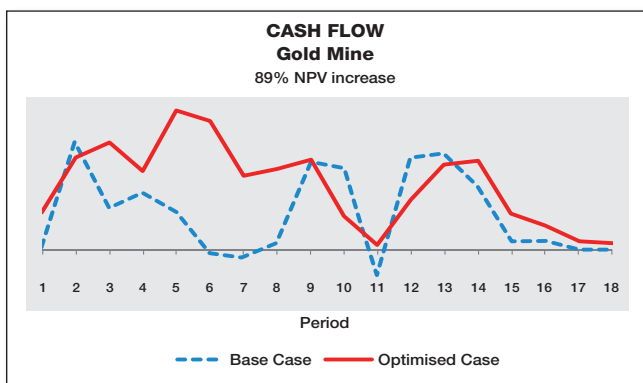
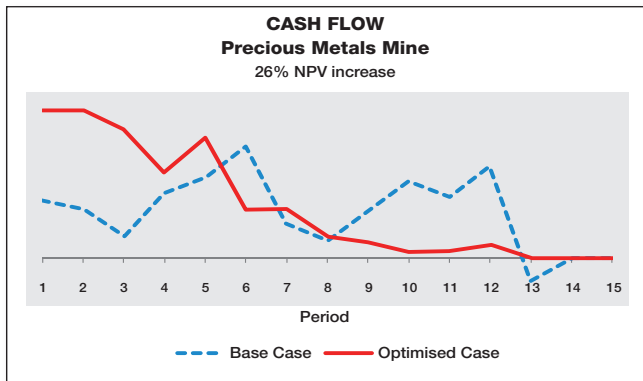


MONEY MINING

Value Extraction on a Vast Scale



Examples of recent results of Enterprise Optimisation studies (above)

Our unique approach to Enterprise Optimisation helps mining companies make a step change in their economic performance, by developing long term plans with significantly better cash flow profiles, increasing their Net Present Value by 5% to 35%, or considerably more.

Higher early cash flows, usually measured in hundreds of millions of dollars, allow mining companies to:

- Increase exploration expenditure
- Invest in profitable expansion projects
- Undertake acquisitions or defend against take-overs
- Enhance environmental and social programs
- Survive market, technical, political and environmental threats and events
- Increase returns and reduce risk for their debt and equity investors, making it easier to raise finance for capital programs

Resulting plans usually have higher production levels:

- Increasing employment
- Increasing government royalties and taxes
- Increasing returns to shareholders

... a win-win for all stakeholders.

With strong cash flows, mining company boards have the power and independence to pursue their ambitions, grow their businesses, and exploit a wider range of options.

In today's volatile world, mining company management needs every possible edge to compete for capital, staff, and other resources.

Enterprise Optimisation can make the difference between whether a new project gets approved or not, or whether an existing operation flourishes or fails.



WHITTLE CONSULTING
BUSINESS OPTIMISATION FOR
THE MINING INDUSTRY

www.whittleconsulting.com.au

ENTERPRISE OPTIMISATION

Many mining businesses are partially optimised. Enterprise Optimisation goes beyond what can be achieved using conventional methods and available software.

Enterprise Optimisation involves a combination of:

Philosophy

“It’s a Money Mine!”

Mining and mineral processing businesses are highly technical, and staffed by lots of technical people. However, the focus on tonnes, pounds, ounces, truck hours, material movement etc can distract us from the fact that this is a commercial enterprise. We are not here to make copper/gold/nickel etc, we are here to make money. Mines don’t fail because they don’t make metal, they fail because they don’t make money. Generating cash is the fundamental objective of a mining operation, without it you will not have the opportunity to exist, expand, or pursue other social and political objectives. If you are not making money then you should not be messing up the environment, asking employees to risk their safety and the livelihoods of their families, and asking investors to trust you with their capital.

“Money has a time value – we want the money now!”

A million dollars is worth more today than in several years time. The timing of cash spent and generated is critical to the evaluation of a mining business, and the assessment of its value. That is why we use Net Present Value (NPV) as a basic measure of value. It is a simple arithmetic tool that reflects the time value of money (opportunity cost and risk). NPV is not perfect, in particular how it accounts for risk and uncertainty (a deep subject which can be incorporated with more sophisticated techniques), but it is a great starting point.

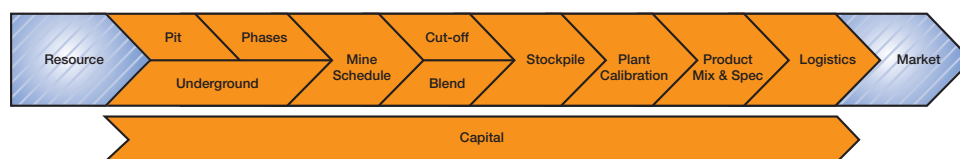
“It is the bottlenecks that stop us getting all the money now!”

If there were no bottlenecks/constraints, then we could mine and process the ore body in one year to get all the cash immediately and the NPV would be fantastic. It is not just the amount of cash in the ore body that is important, it is the rate at which the cash can be realised that counts, and that is determined by the bottlenecks. The bottlenecks are what make a mining operation 10, 20 or 30 years. We need to understand and manage the economic bottlenecks to maximise the value of the business.

Methodology

We combine a comprehensive and unique combination of advanced business modelling and optimisation techniques, including Lerchs-Grossman*, Ken Lane* Cut-off Grade, Activity Based Costing, and Theory of Constraints, through a process that involves Cross Functional Communication, and a heavy dose of lateral thinking. For example, detailed recognition of the cost, throughput and recovery characteristics of material (Geo-metallurgy) can and should have a material impact on the mine design and operating production plan. Recognition of the bottlenecks in the system affects all parts of the plan and will lead to changes in operating strategies at different stages of the life-of-operation.

Enterprise Optimisation involves the combination of 10 distinct mechanisms, which are ultimately performed simultaneously to produce life of mine business plans with Net Present Value increased by of 5%-35% or considerably more, even when conventional optimisation techniques and software have already been applied (including Gemcom Whittle). This value is derived from overcoming organisation silo-based barriers, dynamically harmonising the flexibility in all parts of the business value chain.

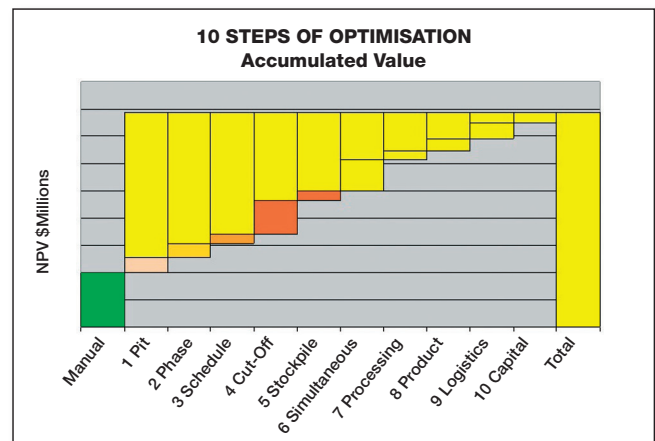


The result is a business plan with significantly better cash flow profile.

How do we do it?

Money Mining means running your mining and mineral processing business to maximise economic value. This may mean overcoming typical organisational silo-based objectives like maximising reserves, minimising costs, maximising recovery, maximising equipment utilisation, having steady production, minimising capital expenditure and maximising mine life – all of which can be demonstrated to reduce the value of the business in many circumstances.

Whittle Consulting’s approach called Enterprise Optimisation is a comprehensive integrated study which identifies where the value-increasing opportunities exist. Enterprise Optimisation can be your first step by “finding the money”, hidden from mining company management by the complexity of the operation, long standing industry paradigms and typical organisational barriers.



Lerchs, H & Grossman, I F, 1965. Optimum Design of Open Pit Mines. CIM Bulletin, Canadian Institute of Mining & Metallurgy, Vol 58, January.
 Lane, K F, 1998, 1997. The Economic Definition of Ore: Cut-off Grades in Theory & Practice. Mining Journal Books, London.
 Goldratt, E. & Cox, J. (1992). The Goal: A process of ongoing improvement.

MONEY MINING – TWO DAY COURSE

Mining & Mineral Processing Optimisation

SHORT COURSE This course will change forever the way you look at your mining business! Gain the latest insights in business planning.	Who should attend? This course is designed for decision makers including:	Previous attendees' comments:
<ul style="list-style-type: none"> Releasing value through better planning decisions – better asset management Exploring the latest developments in optimisation for the mining industry Simultaneously optimising the whole value chain: mining, mineral processing, logistics, production and capital Planning and optimisation with geological uncertainty and volatile metal markets Operational and cost modelling techniques for optimisation "Bust the myths" that organisations pursue which limit their economic performance Implementing an effective planning process 	<ul style="list-style-type: none"> Senior executives Directors Department, divisional or project managers Professionals who are currently, or will be, involved in the technical aspects of optimisation analysis (geologists, mining engineers, process engineers & metallurgists, logistics managers, marketing managers, finance & HR managers) Institutional investors in mining funds Financial analysts Project financiers 	<p><i>"Enlightening & challenging."</i></p> <p><i>"Well organised, relevant and challenging existing paradigms."</i></p> <p><i>"Eye opening & empowering concepts."</i></p> <p><i>"Certainly opened my mind to new and different approaches to business optimisation."</i></p> <p><i>"Every serious mining professional should attend this course. No feasibility study should be done without these principles."</i></p> <p><i>"This is the future of mining."</i></p> <p><i>"I have been putting what I learnt at the course into practice and as a result we have added a significant amount to the NPV in our recent business plan."</i></p>

Please visit the Events & Seminars page of our website for dates on upcoming courses currently being held in Australia, North America, South America, Africa & United Kingdom – <http://www.whittleconsulting.com.au/events.html> or email seminar@whittleconsulting.com.au

OUR CLIENTS

Clients	Project name	Location	Mine type
AFRICA			
AngloGold Ashanti Limited	Iduapriem	Ghana	Gold
African Rainbow Minerals Limited	African Rainbow	South Africa	Manganese, Iron
Mimosa Platinum	Mimosa	Zimbabwe	3PGE+Au, Nickel, Copper
Anglo Platinum Limited	Mogalakwena	South Africa	3PGE+Au, Nickel, Copper
AngloGold Ashanti Limited	Navachab	Namibia	Gold
Paladin	Paladin Langer Heinrich	Namibia	Uranium Oxide
Gold Fields Limited	Tarkwa	Ghana	Gold
Kinross	Kinross Tasiast	Mauritania	Gold
Semafo Inc.	Semafo	Burkina Faso	Gold
Gem	Letseng	Lesotho	Diamonds
Anglo American Kumba	Sishen & Kolomela	South Africa	Iron Ore
Jonah Capital	Buchanan	Liberia	Iron Ore
AUSTRALASIA			
Mundaro Resources	Mundaro	China	Gold
PT Adaro	PT Adaro	Indonesia	Coal
Chalco	Aurukun	Australia	Alumina
Catalpa Resources Limited	Catalpa	Australia	Gold
Golden Cross Resources	Golden Cross	Australia	Gold, Copper
Goro Nickel/ Vale	Goro Nickel	New Caledonia	Nickel
Gold Fields Limited	St Ives	Australia	Gold
Lihir Gold Limited	Lihir	Papua New Guinea	Gold, Sulphur
Minara Resources Ltd	Minara	Australia	Nickel, Cobalt
Arafura Resources	Nolans	Australia	Rare earths
Panoramic Resources Limited	Panoramic	Australia	Nickel
PanAust Limited	PanAust	Laos PDR	Copper, Gold, Silver
PT Inco	PT Inco	Indonesia	Nickel
Société Le Nickel	SLN	New Caledonia	Nickel
Xstrata	Xstrata (Mount Isa)	Australia	Copper, Lead, Zinc
NORTH AMERICA			
Rio Tinto	US Borax	California	Borate
Vale	Sudbury	Canada	Copper, Nickel, Cobalt, Platinum, Palladium, Gold, Rhodium, Iridium, Silver, Ruthenium
SOUTH AMERICA			
Barrick	Cerro Casale	Chile	Gold, Silver, Copper
Gold Fields Limited	Cerro Corona	Peru	Gold
Gold Fields Limited	Goldfields Chucapaca	Peru	Gold, Silver, Copper
Kinross	Kinross Project U	Chile	Gold, Copper

Enterprise Optimisation PRESENTATION by appointment

Contact your closest Whittle Consulting regional office to arrange a 1-2 hour presentation.

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