

2008 AMEC National Mining Congress

Levels Of Feasibility Studies For The Exploration Market

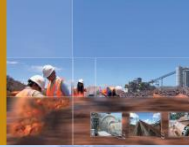


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Mineral Engineering Technical Services Pty Ltd

- 20 Years In Mineral Processing
- Global & Local Experience
- Consulting
- Studies
- Detailed Design
- Due Diligence, Ni, U, Pb-zn, Au, Cu, Fe, Al,
- Laboratory Testwork

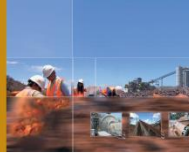


- Feasibility Studies Are Vital Part From Resource Discovery To Viable And Profitable Operation
- Feasibility Studies Are Carried Out At Different Stages Of Project Development
- The Study Levels Are Scoping Or Concept/Pre Feasibility Study/ Feasibility Study /Definitive Feasibility Study
- Each Level Must Address All Aspects Of The Project, Include A Risk Analysis
- Used As Basis For Investment Decision- Bankable Feasibility Study
- The Cost Estimates For Each Level Must Be Carried Out At The Appropriate Level Of Detail:
 - +/-25-35% Scoping Study
 - +/-20-25% Pre Feasibility Study
 - +/-10% Final Feasibility Study



- Introduce Feasibility Studies & Their Importance To A Project
- Demonstrate 'Uses And Abuses' Of Feasibility Studies
- Establish Feasibility Study Fundamentals
 - Project Phases & Criteria
 - Venture Analysis, Idea Phase
 - Scoping Study, Pre-feasibility, Feasibility
 - Financial Analysis
 - Mineral Resources And Reserves
 - Ownership & Business
- The Presentation Will Present A Framework For The Conduct Of Feasibility Studies And Provide Guidance To Minimum Standards And Best Practice.



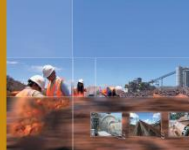


Comparison of Estimates

COMPARISON OF ESTIMATES

ESTIMATE	scoping/ conceptual	preliminary/ prefeasibility	feasibility/ funding	definitive detailed
accuracy	30-35%	20-25%	10-15%	5-10%
contingency	20-25%	15-20%	10-15%	5-10%
relative cost of study	1	4	10	14
% engineering complete	0-2%	2-5%	8-15%	35-45%
cost as % of plant cost	0.01%	0.02-1%	0.25-2.5%	2-6%
SITE VISIT				
project team	possibly	recommended	essential	essential
GEOLOGY/MINING				
resources/reserves status	indicated	probable	proven/probable	proven/probable
resources/reserves analysis	limited data	cross sections	detailed block model	detailed block model
geology	preliminary	preliminary	probable	probable
geotech	preliminary/assumed	preliminary	detailed/essential	detailed/essential
mine plan	preliminary/sketch only	preliminary/short & long term	firm detailed/ preproduction short & long term	final/preproduction short & long term
mine schedule	assumed	approximated	calculated	firm
	assumed on annual basis	calculated on annual basis	detailed on annual basis	optimised on annual basis
mine equipment	assumed	in house data	optimised	quoted specifically
mine services	assumed	sketch design	full outlines without plans	firm basis detailed specification with plans
PROCESSING FACILITY				
plant product & capacity	assumed	approximate	optimised fixed	optimised fixed
process selection	assumed	preliminary	optimised	approved
testwork	preliminary	preliminary	finalised	finalised
design basis	none	preliminary	final	fixed
process flowsheets	assumed/diagram	preliminary/diagram	optimised/detailed	complete
mass balances	assumed	preliminary	optimised	complete
process equipment	none	draft list	completed list/ sizing	sizing refined
specifications	none	none	major equipment only	mostly completed
layout	sketch	preliminary	optimised	fixed
GA drawings	none	limited	full outlines	fixed
detailed drawings	none	none	limited	mostly completed
- civil structural drawings	none	typical	sized	semi-complete
- architectural drawings	none	exterior elevation	sized	semi-complete
- piping/HVAC drawings	none	p & id	sized	semi-complete

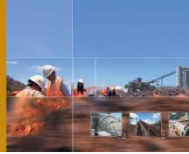




Comparison of Estimates

INFRASTRUCTURE				
geographical maps	usually unknown	approximate	exact	exact
topographical maps	not available	rough	rough/defined	detailed 1:10000, 2000, 500: 1 or 2 m contour complete
geology/soil/ foundation reports	not available	outline/draft	draft	
hydrological criteria	assumed	preliminary	essential	essential
existing services	assumed	investigated	known	fixed
design basis	none	preliminary	final	fixed
equipment selection	assumed	preliminary	optimised	fixed
geographic location	assumed	preliminary	fixed	fixed
layout	sketch	preliminary	optimised	fixed
GA drawings	none	limited	full outlines	fixed
specifications	none	none	major equipment only	completed
- civil structural drawings	none	typical	sized	complete
- architectural drawings	none	outline/draft	preliminary	complete
- piping/HVAC drawings	none	p & id	sized	complete
- electrical drawings	none	minimum	preliminary	complete
- mechanical drawings	none	minimum	preliminary	complete
ENVIRONMENTAL				
field data collection	none	preliminary	complete	complete
impact assessment	none	approximate	nearing completion	complete
EIS report	none	none	nearing completion	complete
impact management plan	none	none	commenced	complete
CAPITAL COST ESTIMATING METHODOLOGY				
prepared by	project engineer	estimator	estimator	estimator
equipment quotes	none, factorised, historical	major, single letter quote	multi quotes	fixed prices, vendor proposals
civil/structural	historical/ sketch only	take off sketch	partial take offs, MTO & quotes	partial take offs, tender prices
architectural work	historical	take off major items	partial take offs	partial take offs
mechanical piping	historical % of key equipment	mix MTO & %'s	MTO & hours	partial take offs, tender prices
electrical/ instruments	historical, \$ per kW	take off major items, \$ per kW	partial take offs & hours	partial take offs, detailed estimates
indirect costs	% per total	% of total	calculated	calculated
schedule	assumed	bar chart	CP network	detailed CP network
labour rates	not evaluated	current rate schedule	current rate schedule	current rate schedule
labour productivity	not evaluated	assumed productivity	evaluated	evaluated
construction equipment usage	not evaluated	% of labour	% of labour/ crew method	% of labour/ crew method
material pricing	not evaluated	historical	telephone quotes	some letter quotes
subcontractors' OH&P	not evaluated	historical	telephone quotes	written quotes
engineering & management	% of construction cost	% of construction cost	broad estimate	broad estimate
escalation	often excluded	% year to midpoint	% year to midpoint	detailed evaluation
contingency	single %	broad evaluation	broad evaluation	detailed evaluation





Comparison of Estimates

OPERATING COST ESTIMATING METHODOLOGY				
manning requirements	assumed/factorised	preliminary/ inhouse information	detailed estimated/ calculated schedule	optimised schedule/ known
labour cost rates	assumed	calculated	calculated	actual
labour burden	assumed	calculated	calculated	actual
consumables	factorised	factorised, verbal quote in house & suppliers information	verbal, letter quote calculated	letter quote calculated
maintenance	factorised	factorised	estimated	estimated
spares	factorised	factorised	factorised verbal quotes	some quotes
fuel costs	assumed	verbal quote	written quote	firm quote
power costs	assumed	estimated	estimated	actual
PERMITTING, IMPLEMENTATION & PLANNING				
water rights	preliminary	detailed	final	final
mining/ exploration licence	exploration	exploration	mining	mining
construction work plan	none	not required	desirable	desirable
construction contract config	none	not required	desirable	draft
construction schedule	none	not required	outline	draft
project programmes	bar chart	bar chart, CP indicative	CP network	CP network



Fundamentals Of Feasibility Studies

Project Phases & Criteria



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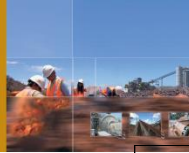
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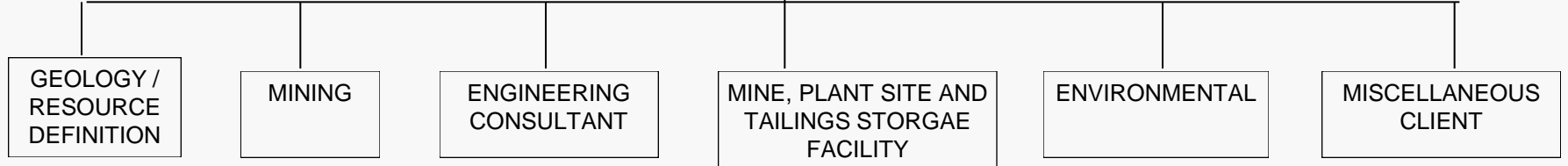
Basis For Successful Projects





CLIENT
STUDY MANAGEMENT

STUDY MANAGEMENT
CONSULTANT



- Drilling Programme
- Geology
- Block Model / Resource update
- Resource Statements

- Pit Design
- Mine Scheduling
- Costings
- Mine Infrastructure
- Reserve update
- Reserve statements

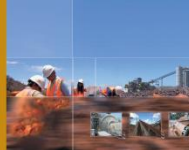
- Metallurgical Testwork and Supervision
- Metallurgy Review
- Comminution Circuit Modelling
- Process Design
- Engineering Design
- Drafting
- Off Site Housing
- Power Supply
- Estimating
- Implementation / Scheduling
- Financial Model
- Document Compilation and Issue
- Study Management

- Geotechnical
- Hydrogeology
- Hydrology/Water Management
- Embankment Design
- Tailings Discharge
- Decant Return
- River Diversion

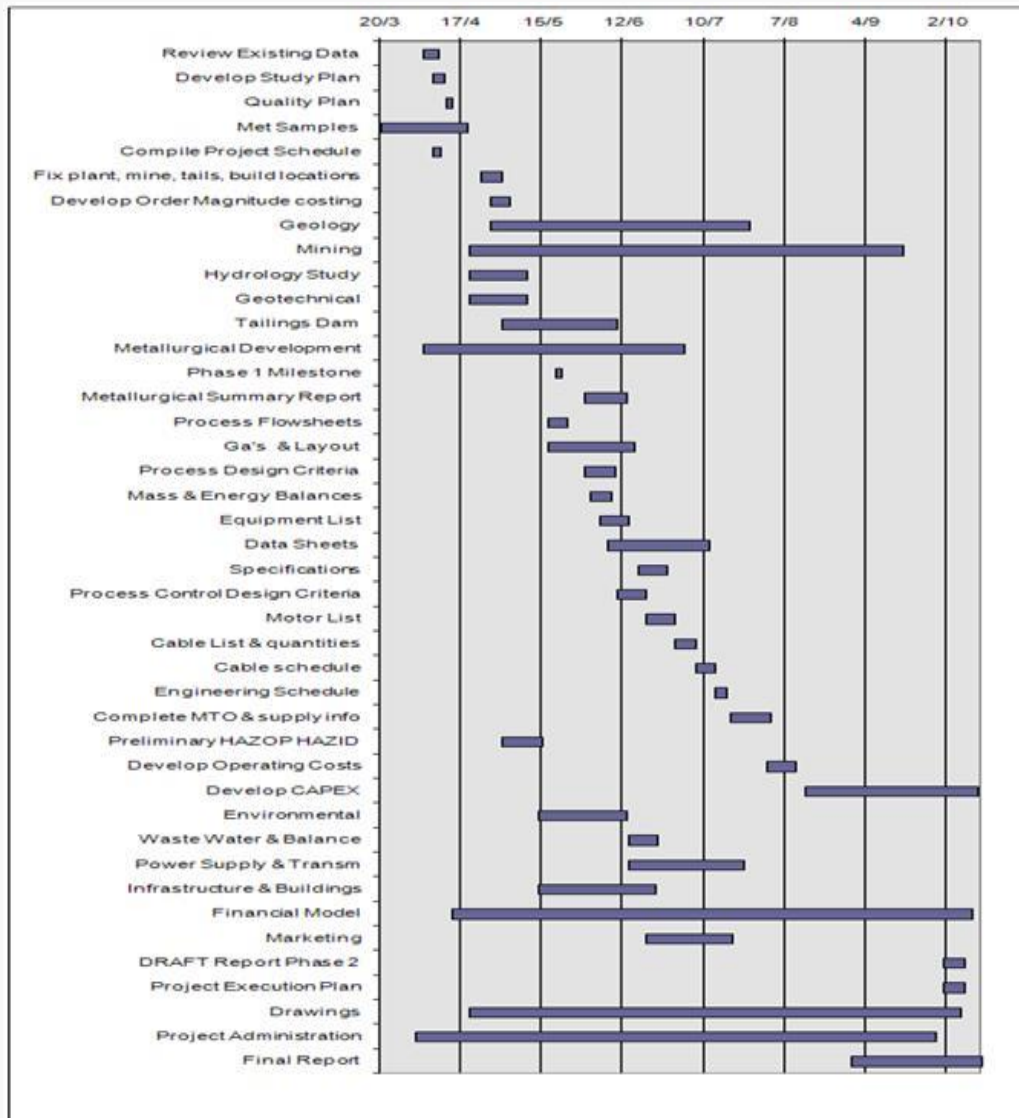
- Draft EIS
- Final EIS
- EIS Submission
- Closure Plan

- Exploration
- Property Purchase
- Surveys
- Community Relations
- Audits
- Permits / approvals
- Training
- Sample Procurement
- Environmental Parameters via SGS
- Reserve drilling, sampling and assay
- Sterilisation drilling sampling and assay
- Geotechnical drilling
- Metallurgical sample drilling





Study Schedule



ID	Task Name	Start Date	End Date	Duration (d)
100	Review Existing Data	04/04/06	09/04/06	5
200	Develop Study Plan	07/04/06	11/04/06	4
300	Quality Plan	12/04/06	14/04/06	2
400	Met Samples	20/03/06	19/04/06	30
500	Compile Project Schedule	07/04/06	10/04/06	3
600	Fix plant, mine, tails, build locations	24/04/06	01/05/06	7
700	Develop Order Magnitude costing	27/04/06	04/05/06	7
800	Geology	27/04/06	26/07/06	90
900	Mining	20/04/06	17/09/06	150
1000	Hydrology Study	20/04/06	10/05/06	20
1100	Geotechnical	20/04/06	10/05/06	20
1200	Tailings Dam	01/05/06	10/06/06	40
1300	Metallurgical Development	04/04/06	03/07/06	90
1400	Phase 1 Milestone	20/05/06	22/05/06	2
1500	Metallurgical Summary Report	30/05/06	13/06/06	14
1600	Process Flowsheets	17/05/06	24/05/06	7
1700	Ga's & Layout	17/05/06	16/06/06	30
1800	Process Design Criteria	30/05/06	09/06/06	10
1900	Mass & Energy Balances	01/06/06	08/06/06	7
2000	Equipment List	04/06/06	14/06/06	10
2100	Data Sheets	07/06/06	12/07/06	35
2200	Specifications	17/06/06	27/06/06	10
2300	Process Control Design Criteria	10/06/06	20/06/06	10
2400	Motor List	20/06/06	30/06/06	10
2500	Cable List & quantities	30/06/06	07/07/06	7
2600	Cable schedule	07/07/06	14/07/06	7
2700	Engineering Schedule	14/07/06	18/07/06	4
2800	Complete MTO & supply info	19/07/06	02/08/06	14
2900	Preliminary HAZOP HAZID	01/05/06	15/05/06	14
3000	Develop Operating Costs	01/08/06	11/08/06	10
3100	Develop CAPEX	14/08/06	13/10/06	60
3200	Environmental	14/05/06	13/06/06	30
3300	Waste Water & Balance	14/06/06	24/06/06	10
3400	Power Supply & Transm	14/06/06	24/07/06	40
3500	Infrastructure & Buildings	14/05/06	23/06/06	40
3600	Financial Model	14/04/06	11/10/06	180
3700	Marketing	20/06/06	20/07/06	30
3800	DRAFT Report Phase 2	01/10/06	08/10/06	7
3900	Project Execution Plan	01/10/06	08/10/06	7
4000	Drawings	20/04/06	07/10/06	170
4100	Project Administration	01/04/06	28/09/06	180
4200	Final Report	30/08/06	14/10/06	45

Study Budget

- Resources/Reserve Drilling
- Geology
- Geotech
- Hydrology
- Mining Studies
- Metallurgical Testwork
- Metallurgical Studies
- Infrastructure
- Environmental Studies
- Marketing Studies
- Financial Modelling
- Owners Cost
- Site Visits
- Contingency



A Critical Aspect Of Any Scoping Study Is To Derive The **Key Performance Indicators (Kpi's)** For The Enterprise.

Examples of Typical Kpi's are:

Capital Cost Per Annual Pound Or Tonne Of Production

Operating Cost Per Annual Pound Of Production.

These And Other Kpi's Should Be **Benchmarked To Other Projects**, Including Appropriate Existing Project Owners Projects.



1. Executive Summary
 - 1.1 Overview Of Project
 - 1.2 Main Project Features
 - 1.3 Financial Analysis
2. Introduction
 - 2.1 Terms Of Reference
 - 2.2 Objectives And Scope Of Work
 - 2.3 Details Of Consultants Participating In Bankable Feasibility Study
3. Background To The Project
 - 3.1 Project Description
 - 3.2 Project Location, Physiography And Climate
 - 3.3 Details Of Owner
 - 3.4 The Mine's Future
 - 3.5 Brief Description Of The Project
 - 3.6 Structure Of The BFS



4. General Summary
 - 4.1 Aim Of Study
 - 4.2 Company Information
 - 4.3 Legal Information
 - 4.4 Geology
 - 4.5 Mining
 - 4.6 Processing
 - 4.7 Infrastructure
 - 4.8 Environmental Issues
 - 4.9 Capital Costs
 - 4.10 Operating Costs
 - 4.11 Schedule
 - 4.12 Financial Modelling
 - 4.13 Conclusion And Recommendations
5. General Project Issues
 - 5.1 Project Sponsor
 - 5.1.1 Description Of Sponsor
 - 5.1.2 Forms Of Association Of Sponsor
 - 5.1.3 Previous Experience
 - 5.1.4 Historical And Current Financial Performance
 - 5.2 Project History And Status
 - 5.2.1 Project History
 - 5.2.2 Exploration Agreements And Licenses
 - 5.2.3 Concession Agreements
 - 5.2.4 Engineering Contracts
 - 5.2.5 Management Arrangements
 - 5.2.6 Joint Venture Agreements
 - 5.2.7 Status Of Permits, Licenses Etc.
 - 5.3 Legal Position
 - 5.4 Scope Of The Study
 - 5.5 Description Of The Project
 - 5.6 *Available Data (Could Be Given In Appendix)*



- 6. Geology And Resources Estimation
 - 6.1 Introduction
 - 6.2 Exploration History
 - 6.3 Regional Geological Setting
 - 6.4 Deposit Geology
 - 6.4.1 Summary
 - 6.4.2 Description
 - 6.4.3 Estimates And Methodology
 - 6.4.4 Data Sufficiency
 - 6.4.5 Statistical/Geostatistical Analysis Of Assay Data
 - 6.4.6 Resource
 - 6.5 Potential For Further Resources
 - 6.6 Comments
- 7. Ore Reserves
 - 7.1 Introduction
 - 7.2 Mineable Reserves
 - 7.2.1 Introduction
 - 7.2.2 Modelling Methodology
 - 7.2.3 Ore Reserve Estimate
 - 7.2.4 Potential For Additional Reserves



- 8. Mining Method And Mine Design
 - 8.1 Introduction
 - 8.2 Geotechnics
 - 8.2.1 Geotechnical Data Base
 - 8.2.2 Mining Rock Mass Conditions
 - 8.2.3 Slope Angles
 - 8.3 Proposed Mining Method
 - 8.4 Mining Sequence
 - 8.5 Mine Production Schedule
 - 8.6 Waste Production
 - 8.7 Mine Equipment
 - 8.8 Mine Service Facilities
 - 8.9 Mine Development Plan
 - 8.10 Mine Capital Cost Estimate
 - 8.11 Mine Operating Cost Estimate
- 9. Processing
 - 9.1 Introduction
 - 9.2 Petrography And Mineralogy
 - 9.3 Testwork



10. PROCESS PLANT DESIGN, ENGINEERING AND COSTING

10.1 Design Criteria

10.2 Site Selection

10.3 Process Description

10.3.1 Process options

10.3.2 Process design criteria

10.3.3 Process description and process control philosophy

10.3.4 Mass balances and flowsheets

10.3.5 Plant layout

10.4 Equipment List

10.5 Replacement Schedules

10.6 Ancillary Facilities

10.7 Security

10.8 Consumables

10.9 Maintenance Schedules and Facilities

10.10 Ancillary Equipment and Processes

10.11 Recommendations for Further Work

10.12 Process Plant Capital Cost Estimate

10.13 Process Plant Operating Cost Estimate



11. INFRASTRUCTURE

- 11.1 General
- 11.2 Existing Infrastructure
- 11.3 Site Development
- 11.4 Buildings
- 11.5 Electrical Supply
- 11.6 Telecommunications
- 11.7 Water Supply
- 11.8 Township
- 11.9 Fuel Supply
- 11.10 Refuse and Sewage Disposal
- 11.11 Temporary Construction Camp
- 11.12 Ancillary Facilities
- 11.13 Procurement, Transportation and Warehousing
- 11.14 Security
- 11.15 Fire Protection Services
- 11.16 Medical Services
- 11.17 Mobile Equipment
- 11.18 Permanent Housing
- 11.19 Infrastructure Capital Cost Estimate
- 11.20 Infrastructure Operating Cost Estimate





Suggested Table Of Contents

- 12. TRANSPORTATION
 - 12.1 Air
 - 12.2 Road
 - 12.3 Rail
 - 12.4 Sea
- 13. ENVIRONMENTAL ISSUES
 - 13.1 General
 - 13.2 Project Components and Alternatives where available
 - 13.3 Regulatory Requirements and Standards
 - 13.4 Status of Environmental Impact Study
 - 13.5 Baseline Conditions
 - 13.6 Health and Safety
 - 13.7 Water Management and Effluent Treatment
 - 13.8 Potential Impacts and Mitigation
 - 13.8.1 Atmospheric
 - 13.8.2 Terrestrial
 - 13.8.3 Aquatic
 - 13.8.4 Agricultural
 - 13.8.5 Sociocultural and socioeconomic issues
 - 13.9 Contingency Planning
 - 13.10 Environmental Monitoring and Surveillance Programmes
 - 13.11 Mine Closure and Reclamation Plan
 - 13.11.1 Aims
 - 13.11.2 Mine closure
 - 13.11.3 Post-closure monitoring
 - 13.12 Environmental Cost Estimates
 - 13.12.1 Environmental capital cost estimate
 - 13.12.2 Environmental operating cost estimate
 - 13.13 Public Information and Consultation
 - 13.14 Conclusions



- 14. WATER SUPPLY AND MANAGEMENT
 - 14.1 Introduction
 - 14.2 Hydrology
 - 14.3 Hydrogeology
 - 14.4 Mine Water
 - 14.5 Process Plant Water Requirements
 - 14.6 Infrastructure Requirements
 - 14.7 Water Quality
 - 14.8 Water Sources
- 15. WASTE DISPOSAL
 - 15.1 General
 - 15.2 Mine Waste Disposal
 - 15.3 Tailings Disposal
 - 15.4 Effluent Disposal
 - 15.5 Capital Cost Estimates for Waste Disposal
 - 15.6 Operating Cost Estimates for Waste Disposal
- 16. HUMAN RESOURCES
 - 16.1 Project Organisation
 - 16.2 Human Resources Sourcing
 - 16.3 Human Resources Requirements
 - 16.3.1 Mining
 - 16.3.2 Processing
 - 16.3.3 Infrastructure
 - 16.3.4 General and administration
 - 16.4 Training
 - 16.4.1 Identification of skills requiring training
 - 16.4.2 Training plan and schedule
 - 16.5 Health and Safety



- 17. Capital Costs
 - 17.1 Capital Cost Estimate
 - 17.2 Preproduction Capital Costs
 - 17.3 Mining Capital Costs
 - 17.4 Process Plant Capital Costs
 - 17.5 Other Capital Costs
- 18. Operating Costs
 - 18.1 Overall Operating Costs
 - 18.2 Mine Costs
 - 18.3 Administration And Infrastructure Costs
 - 18.4 Processing Costs
 - 18.5 Manpower Costs
 - 18.6 Preproduction Operating Costs
- 19. Project Schedule
 - 19.1 Introduction
 - 19.2 Overall Schedule
 - 19.3 Construction Schedule
 - 19.4 Production Schedule
 - 19.5 Financial Schedule
 - 19.6 Construction Contracts



- 20. Project Implementation
 - 20.1 Introduction
 - 20.2 Project Control Plan And Objectives
 - 20.3 Project Organisation
 - 20.4 Construction Packages
 - 20.5 Engineering, Procurement And Construction Management Contract
 - 20.5.1 Engineering
 - 20.5.2 Procurement
 - 20.5.3 Construction Management
 - 20.6 Construction Infrastructure
 - 20.6.1 Accommodation
 - 20.6.2 Power
 - 20.6.3 Water
 - 20.6.4 Transportation
 - 20.7 Manpower
 - 20.7.1 Requirements
 - 20.7.2 Source
 - 20.7.3 Working Agreements
 - 20.7.4 Safety And Training



- 21. FINANCIAL ANALYSIS
 - 22.1 Introduction
 - 22.2 Project Economics
 - 22.3 Summary of Results
 - 22.4 Sensitivity Analysis
 - 22.4.1 Framework
 - 22.4.2 Sensitivity
 - 22.5 Basis for Economic Evaluation
 - 22.5.1 Analysis Period
 - 22.5.2 Revenue
 - 22.5.3 Operating Costs
 - 22.5.4 Government Fees and Charges
 - 22.5.5 Production and Operating Surplus
 - 22.5.6 Capital Costs
 - 22.5.7 Value Added Tax
 - 22.5.8 Escalation
 - 22.5.9 Funding
 - 22.5.10 Cash Flow and
 - 22.5.11 Net Present Value
 - 22.5.12 Internal Rate of Return
 - 22.5.13 Payback Period
 - 22.5.14 Production Statistics
- 22. CONCLUSIONS AND RECOMMENDATIONS
 - 23.1 Conclusions
 - 23.2 Recommendations
 - 23.3 Future Work



Suggested Table Of Contents

Appendices

1. List Of References
2. Location, General Area Topographical And GA Maps
3. Legal Information
4. Company Information
5. Surface Sampling
6. Reverse Circulation And Diamond Drilling Data
7. Geological Modelling And Statistical Analysis
8. Density
9. Geotechnics
10. Tables Of Geological Resource
11. Cross Sections Of Geological Resource
12. Pit Profiles
13. Mine Schedule
14. Mine Equipment
15. Mine Equipment Calculations
16. Mine Capital Cost Table
17. Mine Operating Costs
18. Metallurgical Testwork
19. Process Criteria
20. Process Equipment List
21. Process Flowsheet
22. Plant GA
23. Plant Sections And Plans
24. Electrical Single Line Diagram
25. Process Equipment Capital Cost Table
26. Process Operating Cost
27. Water Supply And Hydrology
28. Metal Production And Cost Schedule
29. Base Economic Model
30. Environmental Information
31. List Of Infrastructure
32. Construction Schedule



Fundamentals Of Feasibility Studies

Scoping Study / Concept Phase



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Fundamentals Of Feasibility Studies

Pre-feasibility Study



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Fundamentals Of Feasibility Studies

Feasibility Study / Basic Engineering



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Fundamentals Of Feasibility Studies

Financial Analysis



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XYZ NICKEL PTY LTD

FINANCIAL STATEMENTS PROFIT AND LOSS & CASHFLOW SUMMARY LIFE OF MINE

(A\$'000)	Actual Jul-02	Actual Aug-02	Actual Sep-02	Actual Oct-02	Actual Nov-02	Actual Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	
Sales Revenue																					
Operations: <i>Nickel</i>	0	17,562	13,436	11,367	14,286	14,959	2,630	11,848	11,780	10,725	9,570	1,063	10,633	10,633	10,633	9,570	10,633	10,633	1,063	10,633	
<i>Cobalt</i>	0	198	84	86	132	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Sales Revenue	0	17,761	13,520	11,453	14,418	15,053	2,630	11,848	11,780	10,725	9,570	1,063	10,633	10,633	10,633	9,570	10,633	10,633	1,063	10,633	
Total direct mining expenses (inc. WIP)	0	(3,849)	(4,268)	(5,544)	(5,842)	(3,917)	315	(3,636)	(3,620)	(3,663)	(3,610)	503	(3,622)	(3,670)	(3,625)	(3,615)	(3,646)	(3,636)	560	(3,202)	
Profit on sale of mine assets																					
Other mine income	0	4	5	2	58	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Treatment & transport costs	0	(6,444)	(5,258)	(4,551)	(5,709)	(5,706)	(137)	(4,087)	(4,141)	(4,110)	(3,611)	(481)	(3,955)	(3,956)	(3,956)	(3,612)	(3,957)	(3,957)	(480)	(3,901)	
Restoration expense	0	(120)	(90)	(70)	(70)	(70)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Royalties	0	(651)	(503)	(627)	(587)	(564)	(416)	(397)	(397)	(397)	(397)	0	(397)	(397)	(397)	(397)	(397)	(397)	0	(398)	
Mine depreciation/amortisation	0	(1,674)	(790)	205	(629)	(748)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(561)	(594)	(594)	
Mine profit/(loss)	0	5,027	2,616	968	1,639	4,060	1,831	3,168	3,061	1,996	1,392	524	2,099	2,051	2,095	1,386	2,073	2,083	549	2,539	
Acquisition costs <i>new projects</i>	(52)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Exploration costs <i>~</i>	0	0	0	(22)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>site</i>	0	(410)	(72)	(319)	(332)	(158)	(223)	(105)	(81)	(84)	(101)	(105)	(77)	(41)	0	0	0	0	0	0	
Sub-total	(52)	(410)	(72)	(341)	(332)	(158)	(223)	(105)	(81)	(84)	(101)	(105)	(77)	(41)	0	0	0	0	0	0	
Amortisation - mining rights	0	(1,872)	(1,546)	230	(1,088)	(1,030)	0	(832)	(832)	(832)	(832)	0	(832)	(832)	(832)	(832)	(832)	(832)	0	(832)	
Black Swan Disseminate	0	0	0	0	0	0	(42)	(42)	(42)	0	0	0	0	0	0	0	0	0	0	0	
Honeymoon Well/Project Generation	0	0	0	0	(8)	(13)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	
Corporate/marketing costs	(26)	4	(86)	(11)	(55)	(51)	(80)	(80)	(80)	(80)	(80)	(80)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	
Other income/expenses	(61)	60	(542)	(99)	(345)	(330)	(50)	(150)	(425)	(150)	0	0	0	0	0	0	0	0	0	0	
EBIHT	(139)	2,809	371	747	(189)	2,478	1,337	1,861	1,502	750	279	239	1,041	1,029	1,113	404	1,091	1,101	399	1,558	
Interest income				2	2	1	33	32	8	16	26	41	44	29	39	40	50	56	41	54	
Interest - nickel acquisition	0	(129)	0	52	0	0	(105)	(105)	(515)	(42)	(42)	(496)	(42)	(42)	(42)	(42)	(42)	(75)	(42)	(42)	
<i>- borrowings</i>	0	0	(50)	(85)	(43)	(33)	(32)	(32)	(32)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	0	0	
Derivative instruments <i>Realised - nickel</i>	0	0	0	0	(584)	424	(2,300)	41	132	196	0	137	91	116	239	0	234	233	202	175	
<i>- - FX</i>		(241)		(64)	(3)	56															
Profit/(loss) before abnormal items and tax and unrealised derivatives	(139)	2,439	320	652	(817)	2,926	(1,066)	1,797	1,095	897	240	(102)	1,111	1,108	1,327	379	1,310	1,292	600	1,744	
Abnormal -																					
Profit/(loss) before tax and before unrealised derivatives	(139)	2,439	320	652	(817)	2,926	(1,066)	1,797	1,095	897	240	(102)	1,111	1,108	1,327	379	1,310	1,292	600	1,744	



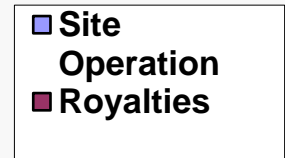
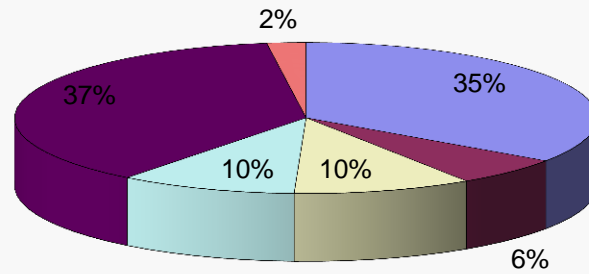
Financial Modeling Guidelines

- Capital Expenditures
- Demolition / Closure Costs
- Costs And Prices
- Financial Leverage
- Operating Costs
- Residual Values
- Revenue Forecasting
- Stand Alone Basis
- Taxes
- Time Horizon



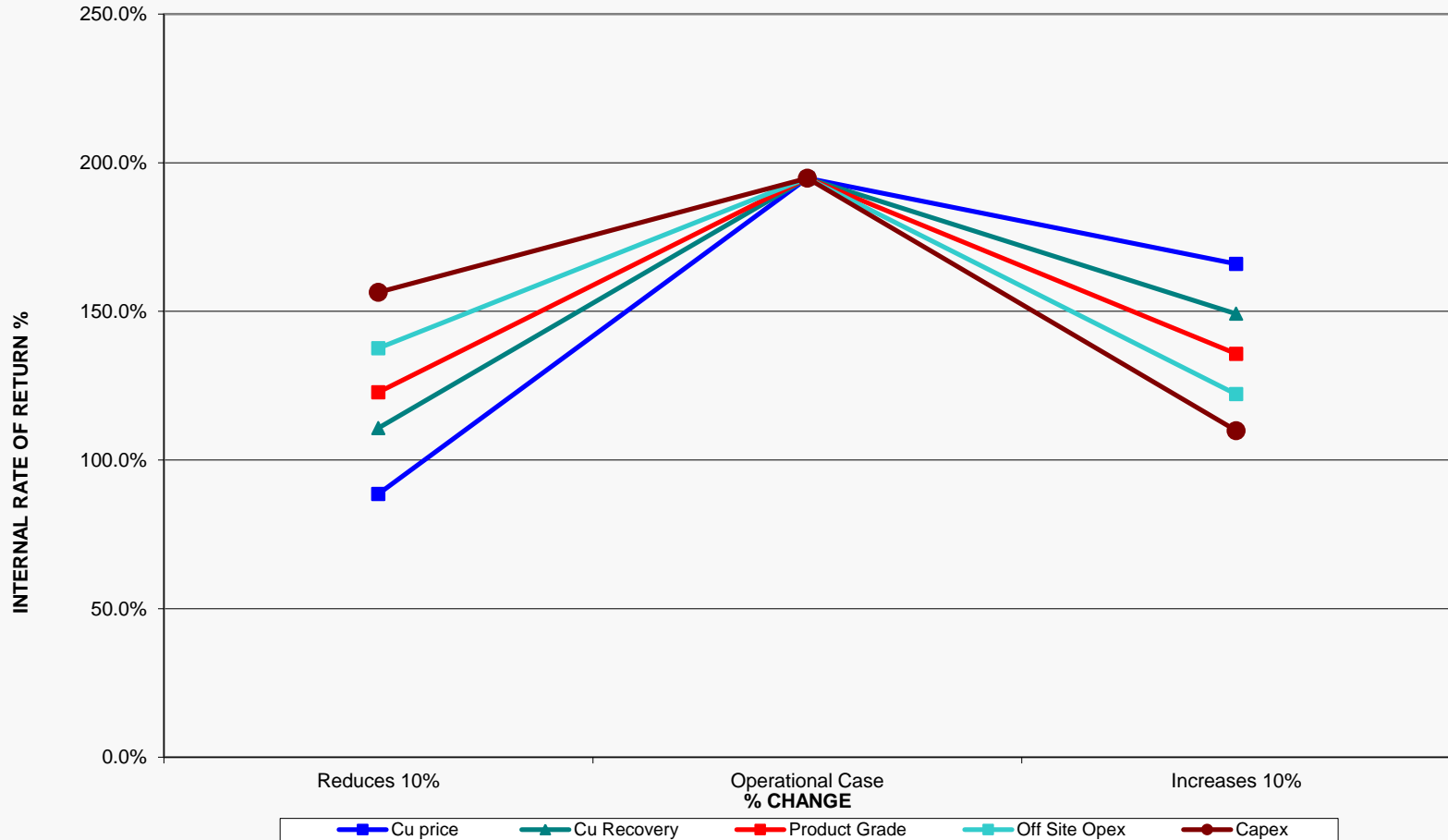


Unit Costs of Production %



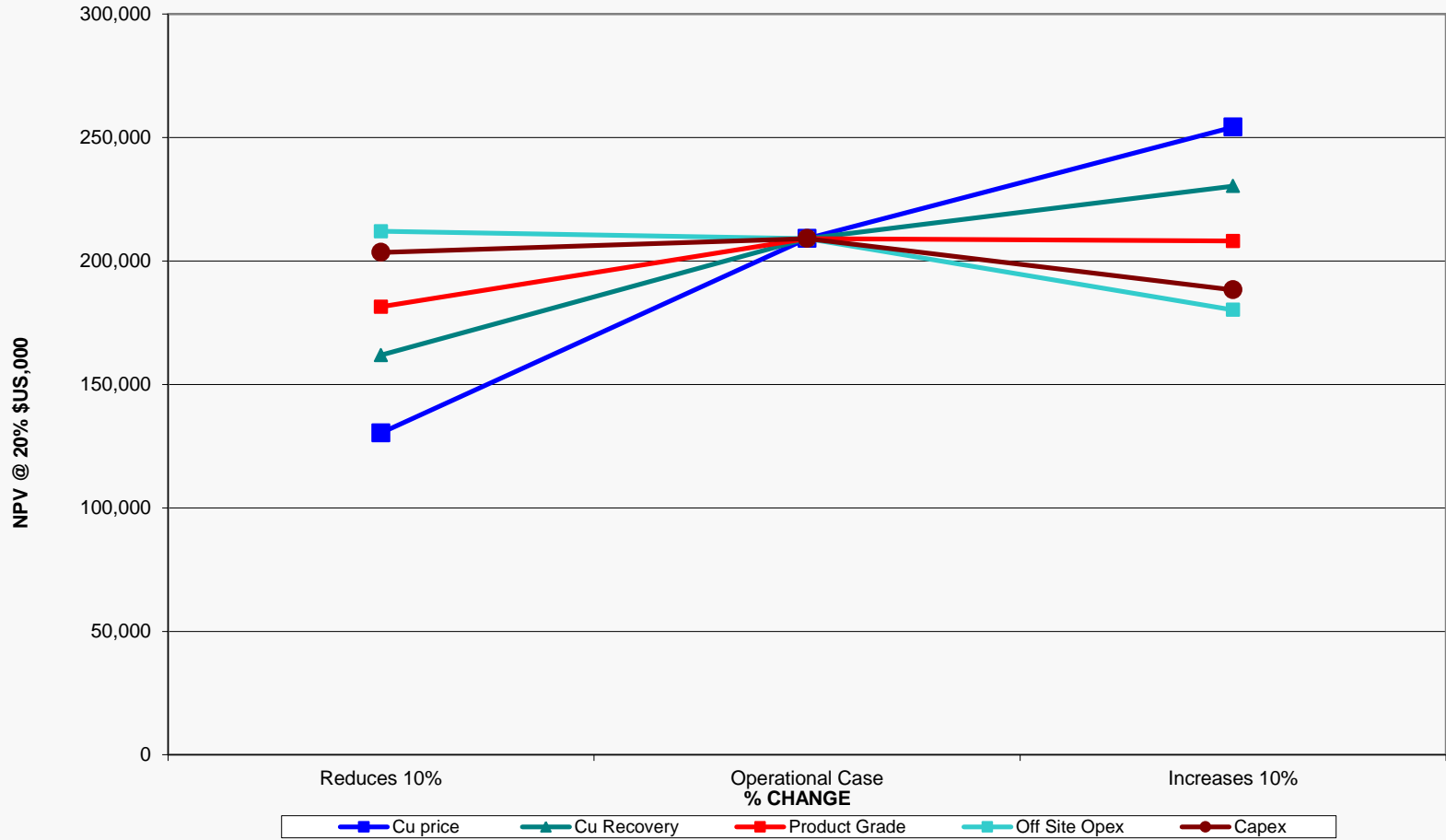


**XYZ COPPER PROJECT SENSITIVITY ANALYSIS
INTERNAL RATE OF RETURN**





**XYZ COPPER PROJECT SENSITIVITY ANALYSIS
NET PRESENT VALUE**



Fundamentals Of Feasibility Studies

Project Execution Plan



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Project Execution Typically Spans The Following Activities:

- Setting up the Project Implementation Phase
- Pre-project Commitment Mobilization activities
- Project funding
- Project permitting and licensing activities
- Board approvals to implement the project
- Engineering, procurement, construction, commissioning and ramp-up
- Handover to the Operator



Planning For Project Execution

- Detailed Engineering
- Project Management
- Procurement
- Construction
- Commissioning
- Handover To The Operator



Fundamentals Of Feasibility Studies

Risk Analysis



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Risk Table

			Consequence		
Likelihood	Catastrophic	Major	Moderate	Minor	Insignificant
Certain	High	High	High	Significant	Significant
Likely	High	High	High	Significant	Moderate
Moderate	High	High	Significant	Moderate	Low
Unlikely	High	Significant	Moderate	Low	Low
Rare	Significant	Significant	Moderate	Low	Low

Geology
 Mining
 Metallurgy
 Political
 Economic
 Community
 Human Resources

Market
 Legal
 Environmental
 Commercial
 Country
 Construction
 Climatic/Seismic



Fundamentals Of Feasibility Studies

Sustainability



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- Oh&s
- Community Relations & Development
- Emergency Response Procedures
- Environmental Plan
- Crisis Management
- Continuous Improvement



Fundamentals Of Feasibility Studies

Project Management & 10 Common Failures



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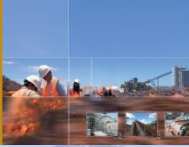
Common Mistakes

- Assuming project leadership is the same as team leadership
- Identifying good technical persons and giving them the job
- Focusing on methodology rather than team dynamics
- Getting lost in the “doing”, not facilitating and co-ordinating
- Pretending to think you have all the answers
- Underestimating value of group decision making
- Relying on reporting structure to solve problems
- Thinking squeaky wheels go away if ignored
- Thinking a procedures manual and training constitute release management
- Thinking deployment is not a problem



- Don't miss the steps- i.e. start with Feasibility Study-stage gate approach is best
- A Financial Model driven study with everything maxed out is probably not realistic or achievable
- The CAPEX is the last figure to come out of the study and the one that causes most grief
- The Scope changes are ok for concept or Pre Feasibility Studies but very costly for Feasibility Studies
- Successful Feasibility Study does not guarantee a successful project- shortage of good management





THANK YOU

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