CAPITAL INVESTMENT SYSTEMS
MAKING THE RIGHT INVESTMENT DECISIONS

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INTRODUCTION

Investment decisions to develop or acquire new capital assets should be made on complete information evaluated via a feasibility process. By necessity the information is never final, hence due to this uncertainty, no investment decision is without risk.

What is at issue is that the systematic evaluation processes used, and the definition standards to be achieved, should ensure the evaluations are complete and to a known quality.

During the 90's and even more recently, the media have reported on a number of large projects and acquisitions that could only be described as technical and economic disasters. These well publicised investments destroyed shareholder value and resulted in challenges to Boards and Management of many resource companies.

Capital Investment Systems incorporating defined processes and standards have now evolved to meet these challenges.

This paper sets out the experiences of Neil Cusworth, Managing Director of Enthalpy, relating to the Best Practices now being used or developed to make Capital Investment decisions.

CONTEXT

The costs and efforts needed to define any new capital asset development or acquisition utilise the resources available from shareholders' investments. If the intended development or acquisition proceeds, then the investigation costs add to the costs of the new development or acquisition. Alternatively, if the intended development or acquisition does not proceed, then the shareholders' funds are lost or reduced in value.

Yet to grow or sustain a business, investments must be made. The challenge then is to decide how much of shareholders' funds should be put at risk, prior to the investment decision, in seeking to define the investment. The alternative is to take higher risks during the delivery of the development project or purchase of the existing business or asset.

Over the past fifteen years too many examples of investment decisions which did not deliver the promised values have been witnessed in the resource and industrial sectors. Two fundamental aspects underlie such unfavourable outcomes:

(a) The investment decisions were made on flawed or inadequate evaluations; or
(b) The new project developments or acquisitions were not delivered to the evaluations made; or
(c) Both (a) and (b) occurred.

Failures in successfully delivering new projects or acquiring assets or businesses are the subject of continual developing skills, with this paper focusing on the first of these issues.

THE CAPITAL INVESTMENT PROCESS

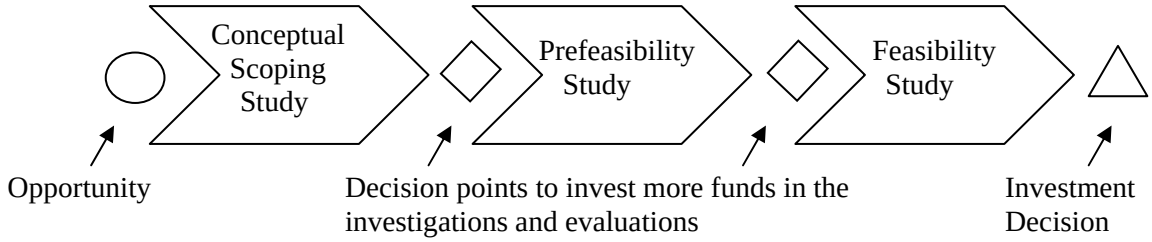
For any shareholder to agree to put funds at risk, an evaluation of the costs and risk reward must be made so that an informed decision can be made. The evaluation then becomes the determinant as to the level of risks and the accuracy of the forecast of outcomes.

The logic is clear. More shareholder funds spent evaluating an investment will normally result in a greater level of accuracy. The questions then become how much to invest, and how to go about the process, to get a defined quality of decision making information.

Phased Approach

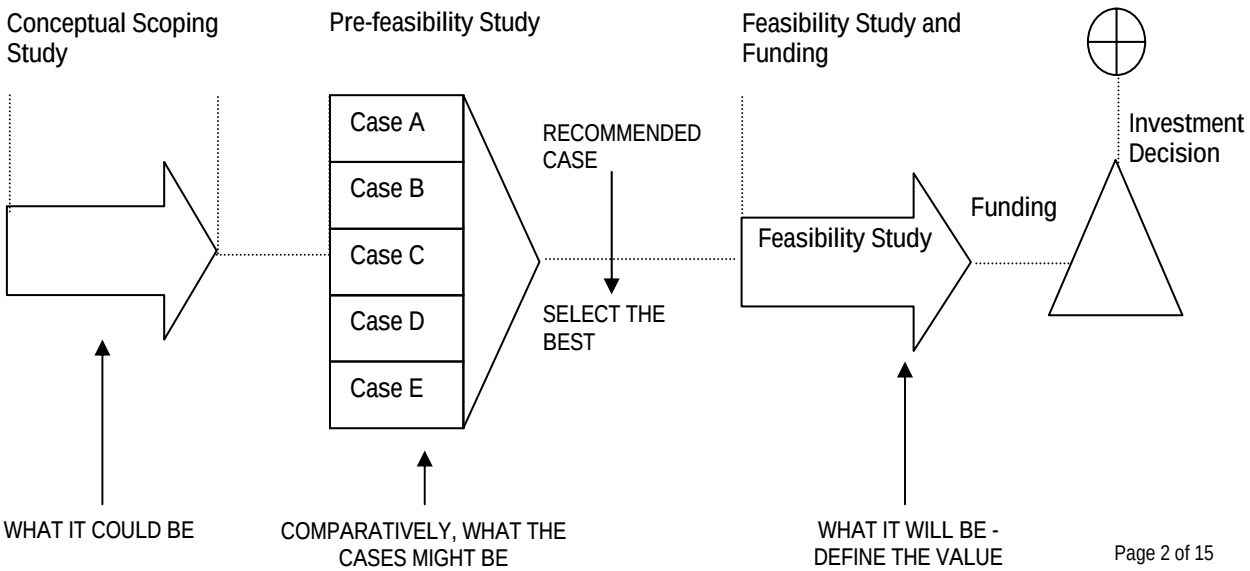
Experience has shown Best Practice to be to adopt a phased, step-by-step approach to the evaluation of potential investments so as to control the amount of shareholders' funds put at risk during the investigations. This ensures that, should any potential investment not show signs of viability, the investments can be terminated at minimum loss.

The resource sector typically uses phases of:



Each phase has different objectives as well as degree of effort needed to achieve the quality of definition of the investment parameters.

The representation of Best Practice for these objectives is:



Later in this paper, the objectives of each phase will be described in more detail, as Principles of Best Practice.

Integrated Evaluation of Capital Investment Opportunities

Over the 90's the industry learnt that evaluations of new Capital projects and acquisitions had to be reset from 'technically orientated' to 'whole of business' considerations.

Now, feasibility processes must include and consider issues of safety, health, community, sustainability, risk and management as much as production, products and economics.

This has in turn forced a change in the approach to feasibility evaluation if the full balance of business investment criteria is to be considered.

Standards of Evaluations

Since the 1960's, various standards existed which gave guidelines as to the standards of definition needed for evaluations in each phase of the process of capital investment.

Many of these standards were developed by the major Engineering Contractors to define what type and quality of Engineering Deliverables were needed to achieve capital cost accuracy levels. These guidelines still exist and are in use by Owners and Engineers.

By the early 90's, these standards proved to be inadequate to address Owner and Investor standards in areas other than Capital Costs. The Australasian Institute of Mining and Metallurgy responded in 1993 with a Cost Estimating Handbook for the Mining Industry which proposed quality and content definition for resource feasibility studies. This began the process of including Standards for evaluation including environment, operating costs, implementation, marketing, etc.

Since then, more development has been needed so that standards of evaluation are available to cover business factors now impacting the integrated evaluation process.

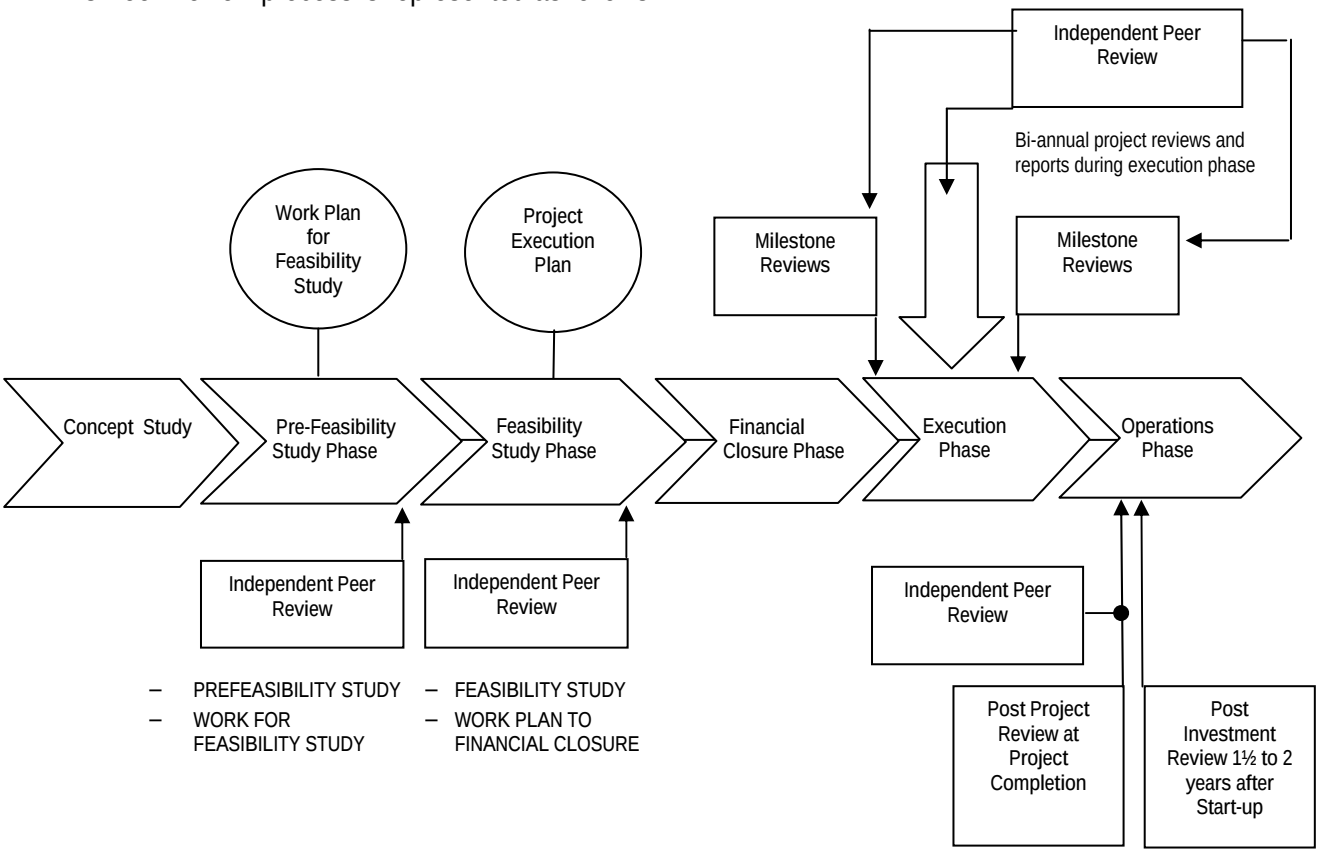
These Standards are described further below.

Quality Assurance

The Capital Investment Process is driven towards the representatives of shareholders or stakeholders, such as Lenders, making informed decisions to commit funds to new business ventures. Yet most Boards either do not have the technical skills or resources to ensure that investment recommendations necessarily cover all aspects and that evaluations have reached acceptable and defined standards.

The result is that a process of Independent Peer Review has been developed to create the contestable advice needed for Boards and for Lenders.

This Peer Review process is represented as follows:



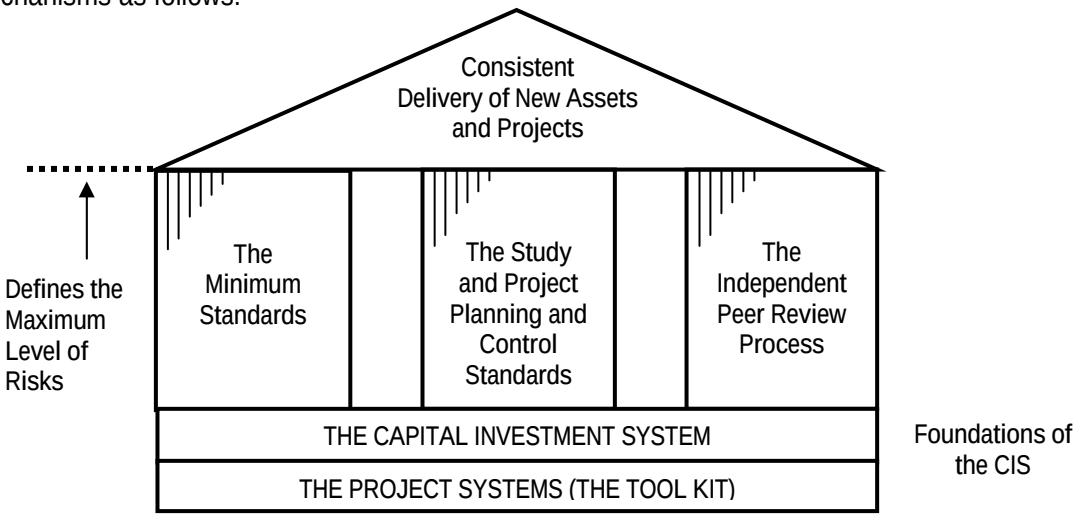
Planning and Control

The ability to reliably deliver the evaluations of opportunities for investment decision, and then to be capable of achieving the planned outcomes via project implementation or business acquisition, is dependent on planning and control.

Only through planning and control techniques can forecasts become reality. Therefore a minimum standard of planning and control must be exercised through the feasibility study evaluation process.

Structure of the Capital Investment Process

The structure of the Capital Investment Process is dependent on three primary management mechanisms as follows:



If any one of these structures proves to be inadequately defined or poorly implemented, then the Capital Investment Process can be put at risk (making inappropriately based investment decisions likely).

Major companies in the resource sector all use to varying extents these three management processes. However many do not define the Minimum Standards to be achieved for the quality of evaluations and studies, rather they adopt guidelines or lower level check lists of content.

This is a major failure as effectively the shareholders do not define the quality to be achieved and needed for their investment decisions. In such cases Management, in effect, is delegating a critical corporate governance standard to project or operating level.

Enthalpy has created a structure which captures all these aspects in one system. (Refer Appendix A)

PRINCIPLES OF CAPITAL INVESTMENT

Over the last 15 years of internal development, reviews, or observations of Capital Investment Systems ("CIS") in use with major resource companies, certain fundamental principles have been identified, as follows:

Principle 1	CIS Policy comes from the Board and the President / CEO. It is a statement of the shareholders' representatives to management.
Principle 2	The Policy should authorise Standards, Processes and Procedures. Only the shareholders' representative can change the standards.
Principle 3	The CIS Policy in relation to other Policies must be stated and integrated with all the business policy streams of the business.
Principle 4	Investment Decisions should only made based on recommendations complying with the CIS. If not complying, the Board should reject.
Principle 5	The processes of developing a new Capital Asset and acquiring an existing Asset or Business are the same. Acquisitions need the same rigour, only done faster.
Principle 6	The CIS must ensure that alternatives are considered. The value-add comes from this phase, no other.
Principle 7	A phased approach should be used in a controlled, step-by-step process, ensuring known levels of investment funding is at risk.
Principle 8	Consistent Reporting and Comparisons of Opportunities is needed, with ability to compare opportunities within a portfolio of possible investments.
Principle 9	Risks must be identified, defined and mitigation steps planned. Risk management must be used proactively to get the balanced risk to reward during the evaluation process.

Principle 10	All major investment decisions, outcomes and forward plans are subject to Independent Peer Reviews. Boards cannot be expected to get into detail, and need independent eyes and ears of their own.
Principle 11	The role of Project Teams must be clearly stated, well planned and adequately resourced to deliver the planned outcomes.
Principle 12	Assessment Effort and Quality Levels must be appropriate. Inadequate levels of definition at study phase is one of the major causes of project failure.
Principle 13	The Portfolio Management System must be part of the overall CIS process.
Principle 14	The CIS requires Benchmarking to be practiced. An extra or new approach is required to beat history – with knowledge of the past the first step in demonstration.
Principle 15	The CIS requires Post Project and Post Investment Reviews, as only from Lessons Learnt can improvements be made.
Principle 16	Work Plans and Project Execution Plans ensure planning is made a key to project success.
Principle 17	Ownership of the CIS must come from the shareholders, not just management.
Principle 18	Capturing Best Practices is the only way to learn the good aspects, and to improve the deltas.
Principle 19	Continuous Improvement is a must for an organised process to get positive benefits.
Principle 20	Accessibility and Transparency means lessons and improvements are available to everyone and able to be challenged.

MINIMUM STANDARDS

Minimum Standards refer generically to the content, quality and accuracy that must be achieved at each phase in the investment evaluation process. Rather than guidelines or check lists, Minimum Standards set criteria which have to be exceeded if the degree of confidence in risk allocation and assessment is to reach the requirements of the shareholders.

Content

Minimum Standards should define the content to be covered in any evaluation of an investment opportunity. It should not be optional whether a Feasibility Study evaluates, or not, issues that must be considered mandatory criteria by shareholders. Regardless of the size, type or complexity of any project or acquisition, each business driver needs to be investigated and the forecast outcomes defined. Therefore, Minimum Standards should be declared which set the contents of Feasibility Study reports, similar to the following.

The summary level Table of Contents of a typical resource project Feasibility Study Report is:

1. Summary & Recommendations
2. Development Approach
3. Risk
4. Safety
5. Environment
6. Geology & Mineral Resource
7. Mining & Ore Reserves
8. Mineral Processing
9. Waste Management
10. Infrastructure
11. Human Resources
12. Information Technology
13. Project Execution
14. Operations
15. External Relations
16. Capital Costs
17. Operating Costs
18. Marketing
19. Ownership & Legals
20. Commercial
21. Financial Analysis
22. Funding
23. Status of Studies
24. Work Plan – Future

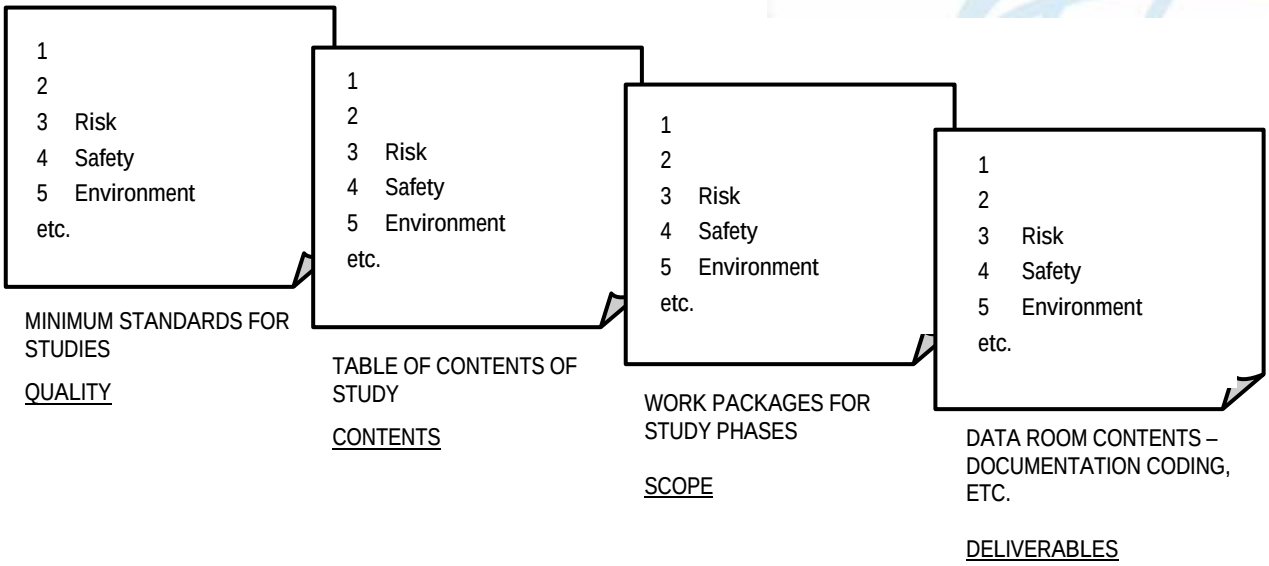
This content has evolved from the technical, project orientated version of the early 90's into a Business based evaluation structure.

Hurdle issues such as Risk, Safety and Environment have been brought forward so as to give the emphasis now needed for demonstration of the sustainability of a business. A focus has been added on human resources, external relations, ownership and legals, which previously were dealt with outside the evaluation process.

Importantly, Studies should now integrate and report on the plans for the next step in development by presenting matters such as Status and Work Plans for the future.

Another advancement made has been the development of a common order of contents between the Minimum Standards, the contents of Study Reports, Work Packages for control purposes and then the Deliverables produced.

This order (refer below) helps create a consistent pattern across every phase of multiple studies.



Quality

The quality of definition to be achieved at each phase is driven off the objectives needed for decision making. For each phase the Minimum Standards are proposed to be:

Conceptual – Scoping Studies - shall be structured to identify:

- The potential of the new or expanded business
- The general features of the project
- The order of magnitude of costs of the project (both capital and operating)
- Technical issues needing to be further investigated or testwork conducted
- The costs and time to undertake further development work before a prefeasibility study can be commenced.

Prefeasibility Studies - shall be structured to:

- Assess the likely technical and economic viability of the project
- Consider different mining, process, location and project configurations to determine and recommend the preferred optimum for final study
- Consider different capacities for the project to determine and recommend the preferred optimum for final study
- Outline the features of the project
- Determine the nature and extent of further geological, mining, metallurgical, environmental and marketing work needed to be completed prior to, or during, the final feasibility study
- Determine the costs and time to complete this work, and to develop the project following completion of a feasibility study
- Determine if there may be any fatal flaws in the potential project.

Feasibility Studies - shall be structured to:

- Demonstrate the technical and economic viability of the project
- Provide the basis for making an investment decision
- Clearly recommend one mining, processing, location and project configuration, all in the most optimum form possible
- Be capable of being audited by third parties
- Prevent the need to be materially varied after project commitment
- Have sufficient trackability and data so as to act as the Control Baseline for the project
- Set the basis of implementation and timing for both the Business establishment and the Project Execution Phases.

For each area of a Feasibility Study the Minimum Standard to be achieved during each phase needs to be defined.

Two 'part examples' of the Minimum Standards for Project Execution for both a Conceptual – Scoping Study and Feasibility Study (part only) are presented.

(a) Conceptual – Scoping Study

NO.	ISSUE	STANDARD
13.1	Scope	The physical scope of the project must be stated along with the resultant trials and output assumptions.
13.2	Work Breakdown Structure (WBS)	A preliminary WBS for the project shall be prepared and utilised to produce a structure for the project costs to Level 2 as a minimum.
13.3	Contracting Strategy	Broadly identify the various contracting strategies that could be utilised to deliver the project and which select or nominate to support the basis of factorised estimates for indirect costs.
13.4	Project Organisation	The Project Organisation for implementation of the project shall be broadly addressed including the general type of structure, and joint venture arrangements etc. which might be employed.
13.5	Project Health, Safety and Security	Identify key or special health, safety and security issues that will require management during the Execution phase of the project.
13.6	Planning and Scheduling	The preparation of a Level 2 schedule showing all the major activities during the subsequent studies and commitment to implementation and start-up of the project. Structured generally in accordance with the Work Breakdown Structure. Critical path identified by judgement only.
13.7	Engineering	An approach to Engineering, including the requirements for specialist input, the application of new technologies and the engineering resources required for the subsequent Study and Execution phases should be noted.
13.8	Procurement and Contracts	Key items of equipment with long lead times or critical technology issues should be identified including potential manufacturers and suppliers. Major contracts that need to be let in the implementation phase shall be identified in outline only.

NO.	ISSUE	STANDARD
13.9	Construction	The broad approach to construction, industrial relations, labour resources, logistics and specific construction issues should be presented.

(b) Feasibility Study (part only)

NO.	ASPECT	STATEMENT REQUIRED
13.1	Mission Statement	A clear and simple statement of the project and business objectives.
13.2	Scope	The physical scope of the project must be defined and referred to a control baseline. Change control procedures to be utilized shall be identified for scope, cost and time.
13.3	Criteria	Key performance indicators (KPI's), control quantities, product specification and quality standards to be achieved, shall be defined.
13.4	Work Breakdown Structure (WBS)	A WBS for the project shall be declared and utilized to produce an integrated control and reporting standard for the proposed project costs and the Project Schedule.
13.5	Approach	The Project Execution approach and the Project procedures to be used shall be defined in the approach outlined in the Feasibility Study.
13.6	Contracting Strategies	The contracting strategies for the project shall be developed and presented in the Feasibility Study, with the approach and responsibility for implementation outlined.
13.7	Risk Management	The risk management programs, approach and resources to be implemented within the Project Execution phase should be presented.
13.8	Project Organisation	The Project Organisation for implementation of the project shall be addressed including the type of structure, joint venture arrangements, and the changes that occur between the set-up, mobilization, implementation and commissioning phases.
13.9	Project Occupational Health, Safety and Security	A Project Occupational Health, Safety and Security Plan shall be outlined. Objectives shall be set with reference on how they will be achieved, the resources and systems needed, reporting and control techniques.

Accuracy

The accuracy of Capital and Operating Cost estimates is a subject not yet to the stage of an absolute. The definition of accuracy remains an imprecise art form, but is now advancing.

What a Best Practice Capital Investment System must have is a definition of the Minimum Standards to be met, which then targets the work needed to be done to derive a reasonable level of confidence in the accuracy of cost estimates.

What has been learnt in recent years is that any investment decision depends on Operating Cost Estimates as much as Capital Costs. Therefore, work has been done to advance the accuracy assessments in this area.

Appendix B provides the Accuracy Guidelines developed by the author in pursuit of this endeavour.

IMPLEMENTING A CAPITAL INVESTMENT SYSTEM

Lessons from the development of Capital Investment System processes and then the application within some major resource groups, indicates that the endorsement by executives of a company of a complete CIS is critical to its eventual success. The process must be top-down driven from the Board and Executives.

The depth of experience and training in project management skills will have an influence on the level of success in the investment development phases. Not all project personnel are equipped to evaluate investment opportunities.

Every Company needs to challenge its current investment processes, systems and skill levels if it is to be developing projects to lowest cost and avoiding disasters of the past. How the Capital Investment System is organised within the corporate structure will be critical to the success or otherwise.

CONCLUSIONS

The Capital Investment System and Processes used by a Company are critical to the competitive edge of any business. Every year, the demands for greater effectiveness from shareholder funds will increase as this is a natural evolution found in business.

For this to happen lessons must be learnt continually and improvements made, as recent lessons show the importance and benefits of having in place well defined processes, structures and minimum standards.

Why have a Capital Investment System?

A defined Capital Investment System will increase shareholder confidence when making investment decisions, while yielding a reduction in project disasters (never assume the system will totally eliminate).

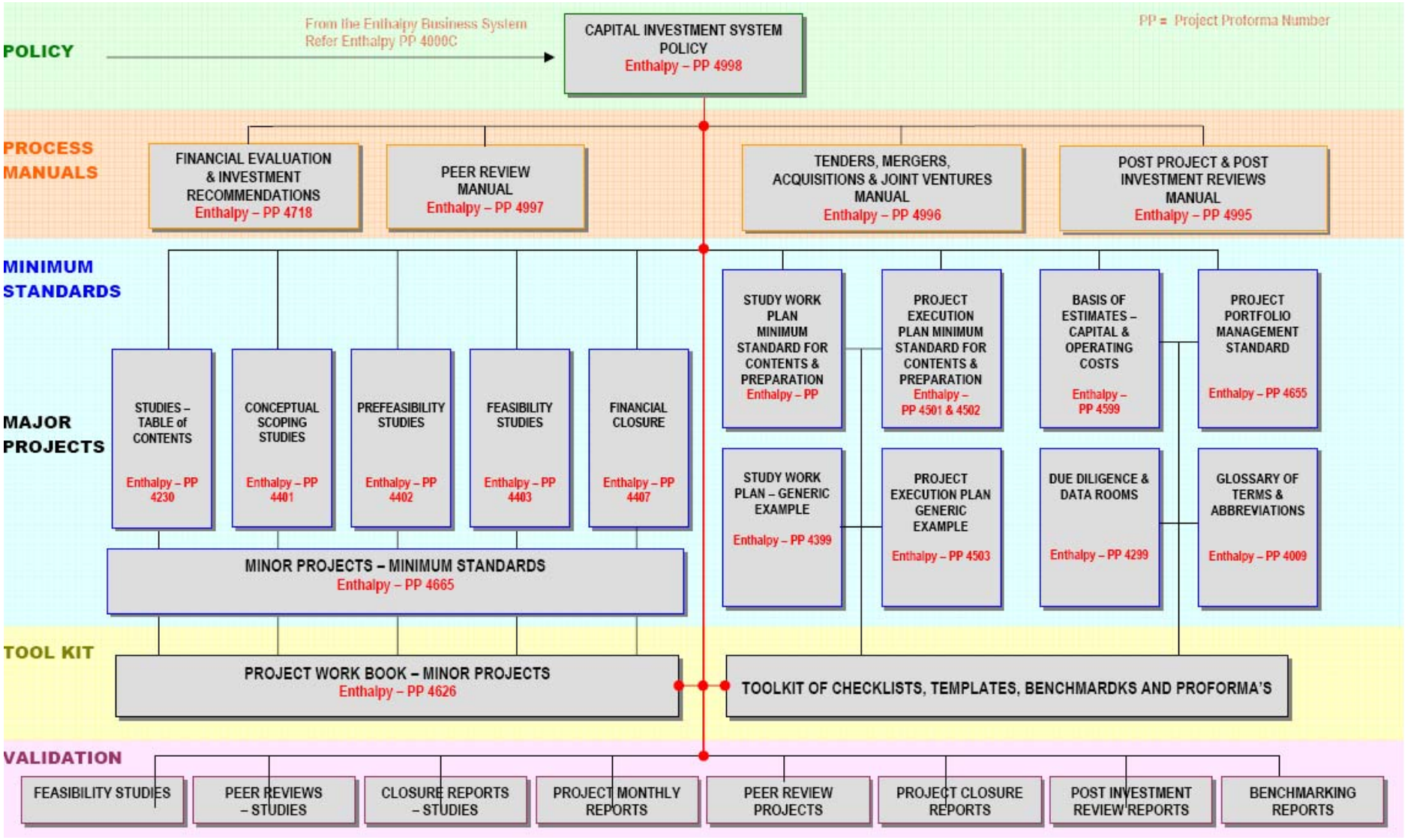
The processes and structures will lead to improvements in the cost effective use of development funds, and give consistent management and more disciplined decisions.

Finally:

- One bad project can destroy the investment benefits of ten good projects.
- A Capital Investment System has such a low cost to establish and it is insignificant relative to the reduction in risks.
- A good process and structure will see better use of shareholder funds at risk in the development cycle.
- In the end, to stay competitive, and to ensure the correct investment decisions are made, every investment must be made to Best Practice.

APPENDIX A *

Enthalpy has created a structure which captures all these aspects in one system, as follows:



* As revised May 2006

APPENDIX B - Accuracy Guidelines

A - CAPITAL COST ESTIMATES

Estimate class	Scoping - Conceptual Study - Phase 1	Pre-feasibility Study - Phase 2	Feasibility Study – Phase 3 and Investment Decision	Execution Phase 4 – Definitive Estimate
CAPITAL COST ESTIMATES BASIS:				
A1 - Mining Costs:				
Resources/Reserves Status	Indicated	Probable	Proven/Probable	Proven/Probable
Resource/Reserve Analysis	Limited Data	Cross Sections	Detailed Block Model	Detailed Block Model
Geology	Preliminary	Preliminary	Detailed	Detailed
Geotechnical	Preliminary	Preliminary	Detailed	Detailed
Mine Plan	Sketch Only	Preliminary	Firm detailed - General optimised	Final for Year 1 and Firm thereafter
Mine Schedule	Assumed	Approximated	Calculated – Detail	Final for Year 1 and Firm thereafter
Mine Equipment	Assumed	In house data	Optimised	Quoted Specifically
Mine Services	Assumed	Sketch design	Full Outlines	Firm basis
A2 - Capital Cost Estimating Methodology:				
Direct Costs:				
Equipment Quotes – Supply	None – factorised	Single check price	Multiple quotes	Fixed Prices
Civil/Structural – Material Supply	Sketched only	Take-off sketch	MTO & Quotes – Benchmarked	Tender Prices
Mechanical/piping – and Construction	% of key equipment	Mix of MTO's and factors	MTO's & Hours – to actual	Tender Prices
Electrical/Instruments	$ per kw	$ per kw	MTO's & Hours – data	Detailed Estimates or Tender Prices
Information Systems / Control Systems	% of total budget	% of total budget	Mix of calculated and multiple quotes	Firm and Tender Prices
Labour Rates	Not Applicable – included in factorisation	Current best information	Current quotes	Actual
Labour Productivity		Assumed	Evaluated	Evaluated
Construction Equipment		$ / Hr	$ / Hr	Quotes
Indirect Costs:				
EPCM and other Services and Temporary Facilities	% per total	% of total	Calculated	Calculated
Owners Costs:				
Management Services, Commissioning, Preproduction, Contingency and Provisions	% per total	Calculated – Preliminary	Calculated – Detailed	Calculated and firm quotes
Contingency Amount	Typically 20 to 25 %	Typically 15 to 20%	Typically 10 to 15%	Typically 5 to 10%

CAPITAL COST ESTIMATES - CONTINUED

Estimate Class A3 - ESTIMATE CLASS	Scoping - Conceptual Phase 1	Pre-Feasibility Study – Phase 2	Feasibility Phase 3 & at Investment Decision Point	Project Execution Phase 4- Project Control or Definitive Estimate
Level of Definition (expressed as a percentage of complete engineering and project definition using appropriate indicators ie % of EPCM, % of Engineer)	1% to 2% of full project definition	10% to 15% of full project definition	10% to 25% of full project definition	40% to 60% of Full Project Definition
Typical Accuracy Range	± 30 to ± 35%	± 20 to ± 25%	± 10 to ± 15%	± 5 to ± 10%
Quotations / Tenders - Supporting the Estimates	None - Benchmark Data	Equipment Quotes and benchmark material supply and construction rates.	Multiple firm equipment quotes. Multiple material supply and construction quotes and rates checked.	Equipment on order, tendered or firm quotes available. Tenders for Material Supply and Construction costs. Some contracts awarded.
A4 - General Project Data needed to support the Estimate Class:				
Project Scope Description	General	Preliminary	Defined	Defined
Soils and Hydrology Report	Assumed	Preliminary	Defined	Defined
Integrated Project Plan (Mine & Plant)	General	Approximate	Specific	Specific
Contracting Strategy - Implementation	Assumed	Outline	Defined and Optimised	Defined and Detailed
Project Master Schedule - Implementation	Outline	Preliminary Bar chart	Detailed and Resourced Critical Path	Actual to Date, Detailed and Resourced To Go Critical Path.
Project Master Schedule - Commissioning and Ramp-up	Assessed	Outlined	Detailed Critical Path	Detailed and Resourced Critical Path
Work Breakdown Structure	Outline	Preliminary	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined
Foreign Exchange Strategy	None	Preliminary	Defined	Defined
Contingency	Assessed / Factorised	Calculated	Detailed Calculation and Analysis	Detailed Calculation on the To Go
Accuracy	Assessed by Judgement	Evaluated	Detailed Analysis - Monte Carlo	Detailed Analysis - Monte Carlo
Basis of Estimate and Methodology Statement	Outline	Preliminary	Complete	Complete
A5 - Engineering Deliverables:				
Block Flow Diagrams	Started / Preliminary	Preliminary / Complete	Complete	Complete
Process Flow Diagrams	Possibly Started	Started / Preliminary	Preliminary / Complete	Complete
P&ID's	None	Started	Preliminary / Complete	Complete
Heat & Material Balances	None Likely	Started	Preliminary / Complete	Complete
Design Criteria	Outline	Preliminary	Preliminary / Complete	Complete
Overall Site Plan	Sketch (Possible)	Started	Preliminary / Complete	Complete
Plot Plans	None	Started / Preliminary	Preliminary / Complete	Complete
Process/Mechanical Equipment List	Started / Preliminary	Started / Preliminary	Preliminary / Complete	Complete
Electrical Equipment List	None	Started / Preliminary	Preliminary / Complete	Complete
Specifications and Datasheets	None	Started	Preliminary / Complete	Complete
GA Drawings by Facility/Area	None	None	Preliminary / Complete	Complete
Mechanical / Piping Discipline Drawings	None	Started	Preliminary / Complete	Preliminary / Complete
Civil / Structural Discipline Drawings	None	Started	Preliminary / Complete	Preliminary / Complete
Electrical Single Line Diagrams	None	Started / Preliminary	Preliminary / Complete	Complete
Electrical Discipline Drawings	None	Started	Started	Preliminary / Complete
Instrumentation & Control Discipline Drawings	None	None	Started	Preliminary / Complete
Information Systems	None	Started / Preliminary	Preliminary / Complete	Complete
Information Systems Plan, as per PEP	None	Started	Preliminary / Complete	Complete
Spare Parts Listings	None	Started	Started / Preliminary	Complete
Environmental	Assessed only	Preliminary Study	EIS underway & may be nearing completion	EIS Complete
Cash Flow	None needed	Preliminary- annual	Detailed – Quarterly and Monthly	Updated monthly

B - OPERATING COSTS

OPERATING COST ESTIMATES				
Estimate Class	**Scoping – Conceptual Study Phase 1**	**Prefeasibility Study Phase 2**	**Feasibility Study Phase 3 and Investment Decision**	**Execution Phase 4 - Definitive Estimate**
B1 - Operating Cost Estimate Methodology:				
Basis of Estimate and Methodology Statement	Outline	Preliminary	Complete	Complete
Staffing Levels	Factorised	Preliminary	Detailed Estimate	Known
Cost Rates	Factorised	Calculated	Known basis	Known
Consumables	Factorised	Factorised	Estimated	Estimated - Detailed
Maintenance	Factorised	Factorised	Estimated	Estimated - Detailed
Spares	Factorised	Factorised	Estimated	Some quotes
B2 - Operating Costs:				
Labour Rates	Assumed average	Separate categories	Detailed Review	Detailed Review and updated to Actuals
Labour Burden	Assumed average	Calculated	Calculated	Calculated and updated to Actuals
Power & Water Costs	Data bank	Preliminary Calculations	Detailed Calculations	Detailed Calculations and updated to Actuals
Fuel Costs	Data bank	Budget Quotes	Firm written quotes	Firm written quotes and updated to Actuals
Expendable Supplies & Reagents	Data bank	Budget Quotes	Firm written quotes	Firm written quotes and updated to Actuals
Transport and Logistics	factored % of total estimate	Preliminary Calculations	Quotes and Calculations	Detailed Calculations and Quotes
B3 -Post Commissioning:				
Working Capital	factored % of total estimate	Preliminary Calculations	Detailed Calculations	Detailed Calculations
Sustaining / Replacement Capital / Improvement Capital	Factorised %	Factorised %	Detailed Calculations	Detailed Calculations and updated to Actuals
Business Systems (core and support systems, e-commerce, business management, office, etc)	factored % of total estimate	Preliminary Calculations	Detailed Review	Detailed Review and updated to Actuals
Training	factored % of total estimate	Preliminary Calculations	Detailed Review	Detailed Review and updated to Actuals
Ramp Up	factored % of total estimate	Preliminary Calculations	Detailed Review	Detailed Review and updated to Actuals
Insurances	factored % of total estimate	Budget Quotes	Firm written quotes	Firm written quotes and updated to Actuals
Escalation	factored % of total estimate	Preliminary Calculations	Detailed Review	Detailed Review and updated to Actuals
Foreign Currency Provisions	factored % of total estimate	Preliminary Calculations	Detailed Review	Detailed Review and updated to Actuals
Accuracy	±15 to 20%	±10 to 15%	±5% to ±10% (more to ±5%)	±5% or better

General Notes: Although this Cost Estimate Guideline defines the classes of Estimates, the classes should not be considered absolute levels to be complied with in all categories of costs to achieve a certain class.
Similarly, a particular class of estimate for Capital Costs may be met, but for demonstrable reasons the Operating Cost Estimates may achieve a different class of estimate.
The lowest class of estimate achieved for any area should decide the overall class achieved.
Should one or more individual categories of costs not achieve the stated levels, but other categories exceed the stated level, then the overall class in that area may be achieved.
The quality of definitions and accuracy of the estimates shall be the determinates of the Class of Estimate achieved by the end of a defined Phase of activities.

Terms Used:
None = work on development of deliverable has not begun, or is only conceptual in nature.
Started = work on deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion, may be sufficient to indicate, but not define the scope.
Preliminary = work on deliverable is advanced. Interim, cross functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals. Sufficient to define scope and major sizes and locations to allow MTO's to be prepared.
Complete = deliverable has been reviewed and approved. Sufficient to define scope and quantities to allow trackable MTO's to be prepared and quotations obtained.
Assumed = based on non-demonstrable experience.
Approximate = sketch or similar based on assumed or assessed data.
Outlined = primary features or dimensions shown.
Calculated = Utilising inputs, derive sizes or features on a trackable basis.
Defined = outline able to be aligned to a specific engineering or other deliverable.
Assessed = based on judgement of benchmarks.
Factorised = proportioned from previous cost data.