Feasibility Consulting & Successful Study Completion

Philippines Mineral Exploration Association
Manila ~ 04 July 2011

Hugh Thompson | Principal Mining Consultant | Brisbane

The views and opinions expressed in this presentation do not necessarily state or reflect those of GHD.

All material © 2011 GHD.
Today

=> Feasibility – What is this beast?
=> Pathway(s) to a successful feasibility study
    => Consultant selection
=> Alignment scopes, deliverables rewards with corporate goals
    => Which Contract type?
=> Innovation in a consulting environment

“We can easily represent things as we wish them to be” - Aesop
Feasibility Studies – What is this beast?
- What has changed?

- Mining – what is different about us as an industry?
- What is a “Mining” Feasibility Study?
- Why do we do these – as an industry?
- How do we do these studies…..
  – Scoping / Pre-Feasibility / Feasibility study
  – FEL 1 / FEL 2 / FEL 3…..
  – Toll gates
  – The numbering approach
- Rise of Private Equity and China……what is “bankable” ?
Definitive Feasibility Study - Outcomes

Required:

- Demonstrate technical and economic viability of the proposed project;
- Develop only one project configuration and investment case;
- Optimise the project for best use of the mineral, capital and human resources;
- Risk matrix / mitigation strategies to reduce the likelihood of significant changes;
- Develop an implementation plan => Baseline for operations phase;
- Facilitate the procurement of funds to develop in a timely manner; and
- Provide a comprehensive report with clear recommendation
Feasibility Studies – What types and when?
Scoping and Detailed Feasibility Study – by discipline
## Feasibility Study – Nature of the Disciplines
- How to get people

<table>
<thead>
<tr>
<th>Package</th>
<th>Comment – Consultant based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Local knowledge ~ legislation important. Corporate style transferable, but not bulk of work. High profile / sensitive for investors….Definition??</td>
</tr>
<tr>
<td>Geology</td>
<td>Commodity based; transferable. Local skills available / required. Source of Fatal Flaw / QAQC problems. Audit??</td>
</tr>
<tr>
<td>Mining</td>
<td>Method base; transferable. Senior skills in demand</td>
</tr>
<tr>
<td>Processing</td>
<td>Commodity based. Senior level transferable, lower level needs to be local content. (very relevant for Au, Cu, Ni)</td>
</tr>
<tr>
<td>Site Infrastructure</td>
<td>Volume based. High $ component of total work. Thus need high local content.</td>
</tr>
<tr>
<td>Transport / Logistics :: Off-Site infrastructure</td>
<td>as above, but more legislation and community issues ??</td>
</tr>
<tr>
<td>Project Management / Delivery</td>
<td>Transferable - comms &amp; culture skills important</td>
</tr>
<tr>
<td>Corporate</td>
<td>Some top-down (eg. Risk), a lot local (eg. Community). Corporate culture…</td>
</tr>
</tbody>
</table>
Pathway - successful feasibility study

- Traditional Process
  Scope => EOI => RFT => Short List => Negotiation => Award

- Success – is what?
  ✓ Delivered “on-time” & “on-budget”…….for a DFS or a PFS?
  ✓ Understanding the value in this opportunity?
  ✓ Hallmarks of “success” - What does success look like?

- Acceptance
  ✓ What the deposit is
  ✓ Success measure
  ✓ Battery limits
  ✓ Business Case

- 360° reviews at @ 10% of budget spend
  ✓ What have we learnt?
  ✓ What's missing?
  ✓ What needs to change?
  ✓ Communication plan

- Risk / Role assignment
- Reporting of interim findings
Consultant Selection

- Client corporate requirement
- Consultant corporate requirement
- Scope conformance
- Paid Scopes
- Experience Profile
- Ability to Manage.....Project Management + more......
- Personnel Management
- Client team
- Value Map of project

- What are you paying for? What do you want to pay for?
  
  ie. what would you want from a contractor versus a consultant

- One size fits......One stop shop....???
Feasibility Study – Risks to “On Time On Budget” completion

- Lack of Panorama / Vision
- Delay in progressing through phases;
- Insufficient coordination across disciplines;
- Inability to challenge / validate outcomes like outsider;
- Poor study planning resulting in funding shortages;
- Insufficient scope. Only one option taken forward;
- Failure to on-going review current study due to
  - broad economic changes or,
  - options results (running in parallel);
- Insufficient involvement / identification of stakeholders.
**Alignment** – Scopes, Deliverables, Rewards & Corporate goals

- Consultant Risks
  - Data
  - Interpretation
  - Skills
  - Scope creep

- Rewarding consultants - How
  - Payment – on-time
  - Volume incentives
  - Understanding the contract

- Team Wins / Team Rewards
- Innovation

“**there is nothing so disastrous as a rational investment policy in an irrational world**”
  - John Maynard Keynes
Contract Type

- What behaviour do “we” want?
- How are “we” measuring success?
- How much do we want to invest up-front?
- Deliverables well defined?
- Method certain?
- Who is taking what risk?
- Lump Sum
- Milestones
- Audit
Today

=> Feasibility – What?
=> Pathway to success
=> Selection
=> Alignment
=> Type?

Hugh Thompson :: hugh.thompson@ghd.com
Feasibility Studies – the Null hypothesis

- Feasibility Study ≠ Feasible Project

- A PFS is not…
  - Basis for legal obligations to long term service providers
  - An audit

- A DFS is not…
  - Environment for options studies
  - A Due Diligence
Innovation in consulting environment

Hear lots about this……

1. Innovation relates to renewal or improvement.
2. Novelty is a consequence of that improvement.
3. For Improvement to happen => People must change the way they make decisions.

So…..
Is it compatible with the existing contract?
How does this “New thing” get valued?
Intellectual Property…..
<table>
<thead>
<tr>
<th>Package</th>
<th>Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Development proposal and environmental management plan; Draft EIS submitted;</td>
</tr>
<tr>
<td></td>
<td>Project potential impacts known; and Complete environmental monitoring plan</td>
</tr>
<tr>
<td>Geology</td>
<td>Detailed mineralogy / lithology study; All sampling programs complete including density; and 3D resource model audited.</td>
</tr>
<tr>
<td>Mining</td>
<td>Mining method and plan finalised; Detailed designs complete; and Annual schedules complete =&gt; physical &amp; resource requirements</td>
</tr>
<tr>
<td>Processing</td>
<td>Detailed 5-15% engineering complete; Major P&amp;ID; All design one-line diagrams; and</td>
</tr>
<tr>
<td></td>
<td>Detailed Layouts complete.</td>
</tr>
<tr>
<td>Site Infrastructure</td>
<td>All support facilities identified, sized and costed; Communications licensing and standards known; and Power requirements and unit costs derived.</td>
</tr>
<tr>
<td>Off-Site Physical</td>
<td>All roads, rail, ports detailed Route to market</td>
</tr>
<tr>
<td>Project Delivery Study</td>
<td>Development schedule; Client and contractor liaison Capex / Opex Costing Detailed project master schedule complete;</td>
</tr>
<tr>
<td>Management</td>
<td>Uncertainty model</td>
</tr>
<tr>
<td>Corporate</td>
<td>Stakeholder Engagement Marketing and Logistic study Risk Assessment, OH&amp;S systems</td>
</tr>
<tr>
<td></td>
<td>Project financing and evaluation</td>
</tr>
</tbody>
</table>