The Role of the Independent Engineer in Project Finance

Accessing Capital in Mining Today: Managing Through the Cycle


February 20, 2017
About RPA

• Advice to the mining industry for 30 years
• The specialty firm of choice for resource and reserve work
• All stages:
  • exploration and resource evaluation
  • scoping, prefeasibility and feasibility studies
  • financing, permitting, construction, operation, closure and rehabilitation.
• Clients are financial institutions, governments, major mining companies, exploration and development firms, law firms, individual investors, and private equity ventures
• Offices in Canada, United States and United Kingdom
• Head office in Toronto
• 100% employee owned
Outline

- Definitions
- Mine Finance Options
- Role of Independent Engineer in Project Finance
- Scope of Work
- Mining Project Risks & Mitigations
- Completion Tests
- Common Mistakes
Definitions

- Independent Engineer (IE) - Independent third-party engineers and geologists that provides technical assistance to the lenders.
- Independence – A test to show that the IE is not conflicted. An IE should not be reviewing its own work.
Mining Project Financing Options

• New mining projects are typically funded through capital financing
  • Retain cash on hand
  • Larger companies have more options

• Common types of capital financing include bank debt, private investors debt or equity, equity financing or business bonds.

• Our focus today is primarily on debt financing

• **Equity Financing** helps companies maintain a strong balance sheet by avoiding debt.
  • Equity financing is often required even with debt financing.
  • Typical ratios for loan financings are 50-70% debt to equity.
Mining Project Financing Options

- **Business Bonds** may be issued by companies to raise capital.

- **Bank Loans** are usually the most popular form of capital financing.

- **Private/Equity Investors** or venture capitalist may be used to fund capital projects,
  - Some private investors require an ownership stake, board positions, offtake agreements or managerial influence.
IE’s Involvement in Mining Project Financing

- Private Equity Investors – IE does due diligence reviews for the private equity investors to support their investment/debt in a project. Some, private equity investors also negotiate an off-take agreement.

- Bank Debt – IE provides due diligence reviews for bank loans and investments.
Project Financing and IE’s Role

• In broad terms, the IE provides consulting due diligence services to the lenders of mining projects and it is usually performed in three phases:
  • Phase I: Initial project review and technical due diligence prior to financial closing.
  • Phase II: Construction and performance test monitoring. Completion Testing.
  • Phase III: Operations monitoring during commercial operation and after financial closing, typically for the life-of-loan.

• Not all projects get past Phase 1
Scope and Reporting

- Phase 1 – Due Diligence Report
- Phase 2 – Construction Monitoring reports after each site visit
- Phase 2 – Operational Monitoring reports after each site visit prior to Completion
- Phase 2 – Completion Test report after completion testing period
- Phase 3 – Continued Operational Monitoring Reports after each site visit and review of annual budgets and production performance.
## Project Finance - Risks

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Risk</td>
<td>Overrun funding by parent. Make provisions and run sensitivities for schedule delays.</td>
</tr>
<tr>
<td>Completion Risk</td>
<td>Contractual guarantees from manufacturer, selecting vendors of repute, completion and/or performance tests.</td>
</tr>
<tr>
<td>Price Risk</td>
<td>Hedging</td>
</tr>
<tr>
<td>Resource Risk</td>
<td>Keeping adequate cushion in assessment, “reserve tail”</td>
</tr>
<tr>
<td>Operating Risk</td>
<td>Production tests, sensitivities, insurance.</td>
</tr>
<tr>
<td>Environmental Risk</td>
<td>Bonding and insurance</td>
</tr>
<tr>
<td>Technology Risk</td>
<td>Expert evaluation (IE) and retention accounts. Reserve accounts to insure proper funding</td>
</tr>
</tbody>
</table>
## Project Finance – Risks

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| Political and Sovereign Risk | • Externalizing the project company by forming it abroad or using external law or jurisdiction  
|                           | • External accounts for proceeds                                           |
|                           | • Political risk insurance (Expensive)                                      |
|                           | • Export Credit Guarantees                                                  |
|                           | • Contractual sharing of political risk between lenders and external project sponsors |
|                           | • Government or regulatory undertaking to cover policies on taxes, royalties, prices, monopolies, etc. |
|                           | • External guarantees or quasi guarantees (IFC)                              |
| Interest Rate Risk        | Swaps and Hedging                                                          |
| Insolvency Risk           | Credit Strength of Sponsor, Competence of management, good corporate governance |
| Currency Risk             | Hedging                                                                    |
Completion Testing

• A series of tests to validate the performance assumption in the cash flow model
• These tests include:
  • Physical Facilities and Critical Spares – Were the facilities built as described in the initial capital estimate and cash flow?
  • Production - Nominally there is a test for 90% of production over a 90-day period and a second test for 100% of production over a 30-day period.
    • Includes test of mine tonnage, grade, and reconciliation with the geologic model.
    • Includes test of process plant (and concentrate) tonnage, grade, and recovery..
    • May include test of the mineral reserves – a “reserve tail” test. Usually lenders like to see at least 35% of the mineral reserves remain after the loan is repaid.
  • Cost or Efficiency – test includes all mine site costs and either costs or consumables (fewer problems with potential escalation); may be expressed as C1 or AISC values.
  • Marketing – Tests the borrowers product to make sure it is saleable and acceptable to the purchasers. Usually requires shipping and invoice.
What are Common Mistakes

- Schedule Delay
- Ramp-Up Delay
- Capital Costs Overrun
- Mine Grade
- Productivity
- Metallurgy
- Level of Study
Schedule Delay

- The primary purpose of the schedule developed by the EPCM firm is to provide a target for project completion.
- The Master Schedule typically excludes any contingency.
From: Terry McNulty
Mining Engineering  Oct 1998
Capital Cost Overruns

- Of five operations in production, project total cost escalation of 11% to 186% with annual rises at long lead time projects typically in the 20-40% bracket (Brook Hunt 2008).
- Of seven mines in construction, total cost escalation from 52-157% with annual rises again typically in the 20-40% bracket. (Brook Hunt 2008)
- In a study of Feasibility Study performance since 1980 of 60 Western Hemisphere projects the average overrun was 22%. (Gypton 2002)
- Bullock suggests average overrun is 26% (Mining Engineering April 2011)
- No difference between internal and external
- No difference between majors and juniors
- No difference in location
Mine Grade

- Geology – does the block model reflect reality?
- Database integrity – QA/QC
- SG or Density
- Cut-off grades and price assumptions
- Capping
- Dilution
- Grade smearing
- Reconciliation
Productivity

- Number of workplaces = flexibility
- Lay out entire mine at the start, including all development
- Schedule in detail – monthly, quarterly, annually, life of mine
- Sinking Rate
  - Underground – 50 metres vertical per year
  - Open pit – 8 to 12 benches per year
- Benchmarking
Metallurgy

• Enough testwork to establish metal recoveries throughout the orebody
  • Bench scale
  • Locked cycle tests
  • Grinding tests
  • Pilot Plant
  • Leach tests
  • Column tests
  • Test heap

• Concentrate quality and impurities
  • Metal content too low
  • Sulfur content too low
  • Penalties for Pb, Zn, As, Sb, F, Cl, Hg, Bi, Cd, Se, etc.
Level of Study

- Levels of studies will have general range of accuracy.
- We get to accuracy through more and more engineering design and the use of detailed, current quotations for the estimate.
- The problem for many exploration and developing companies is that there is a cost to gaining estimate accuracy and a cost estimate has a shelf life.
- Unless there is a scope change, project cost estimates rarely get lower with more detail.
- Problems with projects advancing based on good results from Scoping Study.
- No feasibility study.
- Advance purchasing of equipment before study is complete.
Permitting

- Project advances before permitting complete.
- Permitting conditions affect project layout.
- Inability to mine certain areas.
- Higher closure costs
Summary

• Objective:
  • Provide background on project financing options
  • Describe role of IE and scope of work
  • Describe project risks and mitigations
  • Show where some mining projects make mistakes

• Outcome
  • Understanding mining risks and mitigations
  • Knowing when to engage an IE
  • Avoid losing money
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