

### PAH NEWS PIX

- WORLD BANK RESPONSES TO EIR
- MINERS, SMELTER WORKERS STRIKING
- DOE RECEIVES CLEAN COAL PROPOSALS
- NO ROYALTY TAX FOR LAS BAMBAS

### CALENDAR

- **Argentina Mining 2004**  
August 18–20, 2004  
Emilio Civit Congress Center  
Mendoza, Argentina  
email: rojasniv@argentinamining.com
- **MiningWorld Central Asia 2004 Exhibition**  
September 16–18, 2004  
Atakent Exhibition Centre  
Almaty, Kazakhstan  
email: indira.makhmetova@iteca.kz
- **27th Annual Coal Marketing Days Conference**  
September 27–28, 2004  
Mriott City Center  
Pittsburgh, Pennsylvania  
email: patsy\_wurster@platts.com
- **MINExpo 2004**  
September 27–30, 2004  
Las Vegas Convention Center  
Las Vegas, Nevada  
email: jnaccarato@helexpo.com

## Feasibility Study Does Not Mean Feasible

There appears to be a misconception by some in the industry about what a feasibility study is and the steps required to generate one. Yes, when someone says feasibility we all know what people are talking about, but as companies try to expedite the process of bringing projects on-line these steps are being skipped. Unfortunately, skipping these steps can end up delaying the project and costing more money. In some cases it also means projects that should have been eliminated from consideration at an early phase are evaluated in too much detail costing companies time and money. This article is meant to provide a simple reminder of what a feasibility study is, the recommended steps to get to the feasibility stage, and the pitfalls of not following all the steps.

### What is a Feasibility Study?

Let us start at the very beginning with the definition of a feasibility study. A feasibility study is an engineering study based on test work and engineering analysis, which presents enough information to determine whether or not the project should be advanced to the final engineering and construction stage.

This is a “go/no-go” decision point ... thereby implying that sometimes the answer is **NO**. Unfortunately, once a project is advanced to the feasibility study stage, companies often have committed considerable capital and professional reputation and therefore assume the answer will be that the project is feasible. The possibility that the answer could be that the project is not feasible is often forgotten.

Often the term “bankable” precedes the term feasibility study. Adding this term simply means that the level of effort that has been incorporated into the study is sufficient for outside financing, provided the project is feasible. Typically “bankable” means an overall accuracy level of +/- 15 percent on the feasibility study. A “bankable” feasibility study can be compared to the level of effort a company might expend if the project is to be internally financed. For internally-financed projects, companies have their own requirements which may or may not meet an accuracy level of +/- 15 percent, and in some cases may exceed this standard.

To some in the industry, the act of commissioning a “bankable” feasibility

■ **WORLD BANK RESPONSES TO EIR**

*The main board of the World Bank Group is planning to reveal a management response to the extractive industries review (EIR). The EIR, developed three years ago, looks at whether extractive industry projects can be compatible with the World Bank's goals of sustainable development and poverty reduction. The response is expected to say that extractive industries could contribute to sustainable development but only if projects are implemented well and preserve the rights of affected people, and if the benefits they generate are well used. The International Finance Corporation (IFC), the largest multilateral source of loan and equity financing for private sector projects in development worlds, feels ensuring sustainability on financed projects is fine, but these projects also need to be profitable. Various workshops have been planned over the next few months to integrate the new initiatives proposed under EIR.*

■ **MINERS, SMELTER WORKERS STRIKING**

*This summer mining strikes are becoming a regular occurrence across North America as workers and operators are taking a hard-nosed attitude at contract talks. Strikes have occurred in Canada, Mexico, and the U.S. With high metal prices driving up company profits, miners and smelter workers are wanting their share of that profit. With a general decline in union membership and bargaining power, employers have had the upper hand in the last 20 years and expect unions to give more back.*

■ **DOE RECEIVES CLEAN COAL PROPOSALS**

*The U.S. Department of Energy has received proposals from 13 companies for new clean coal projects valued at nearly \$6 billion. Ninety-seven percent of the proposals received offered advancements for power generation based on commercial demonstrations of gasification technology and improvements to efficiency, reliability, availability, and environmental and economic performance. For each project selected, industrial sponsors must be willing to at least match the federal funding share. Repayments from commercially successful technologies will be used to underwrite future clean coal research. The proposals will support the Bush administration's Clear Skies Initiative to reduce power plant emissions.*

study with a consultant has come to mean that the project is feasible. As a result, they assume if they ask for a "bankable" feasibility study they will get a study, which shows the project is feasible. Thus, somewhere the possibility that the answer could be "it is not feasible" or currently uneconomic gets lost and is not presented to the investor, conveniently forgetting that "bankable" describes only the level of accuracy of the analysis ... not necessarily the outcome.

There is the potential for a feasibility study to show that the project would make money, thus meeting the definition of feasible so that a reserve could be declared; however, the return on investment could be low enough that the company would not want to advance the project. Essentially, in this case the project is feasible but is neither economically attractive nor financable. Banks are often more interested in cash flow during the loan repayment period not overall project economics. A project may appear economically feasible to a company but not be structured or scheduled optimally for bank financing

In order to declare a reserve on a new project, the U.S. Securities and Exchange Commission (SEC) is requiring that a feasibility study be completed for the project and that permitting be in process. Having both of these requirements in place implies that the company is going forward with the project. This has increased the importance of the feasibility study, thus increasing the pressure to skip steps in getting to the feasibility level. The likelihood of a failed bankable feasibility study

increases if preliminary steps to a feasibility study are not taken.

**Recommended Steps to Reach the Feasibility Study Stage**

A conceptual study, also referred to as a scoping study, is the first study that should be completed on a project. This is the preliminary evaluation of a project and is based on assumptions and factors. There should be a sufficient level of drilling and sampling to define a resource, simple flow sheet, and mining method. Production schedules, and cost estimates are based on limited data and test work and as a result rely more on experience and industry standards. Therefore, the accuracy of these initial studies is typically +/- 35 to 40 percent. Conceptual studies typically identify technical issues that will require additional examination or test work. Generally, the end result of the study is a description of the general features and parameters of the project and an order of magnitude estimate of capital and operating costs. A study of this level is valid to determine whether a project is worth pursuing further but the economic parameters are not sufficient for reserve definition.

Preliminary feasibility (prefeasibility) studies are the intermediate step in the project evaluation. At this stage there is sufficient drilling and process test work for basic engineering. Typically, the accuracy of these projects is in the +/- 25 percent range. The goal of these studies is to determine the mining and milling extraction methods and rates, the product recoveries, environmental and permitting issues, and

preliminary capital and operating cost estimates. As part of this process areas of concern that need further research during the feasibility stage should be identified. These areas often include geotechnical studies for mine, waste dumps, and tailings facilities design, metallurgical testing for refining estimates of product recoveries, and waste characterization studies including acid base accounting. The identification of critical issues is key, identifying them at this stage can avoid costly delays during the feasibility stage. Depending upon the level of detail in these studies, and the securities exchange that is involved, reserves can in some cases be declared at this point.

In essence, the feasibility is simply a refinement of the prefeasibility study, which evolved from the conceptual study. Key components in the feasibility study are the mine design, production schedule, a detailed process flow sheet, product recoveries, a detailed plant design, consideration of the environmental issues, detailed capital and operating costs estimates, and an economic model of the project. General industry standards are that the level of effort will result in estimates of +/- 15 percent. The final study provides the basis for the decision on whether further study is required or whether the project is worth pursuing or whether to advance the project to design and construction. At this point there should be sufficient information to declare reserves, provided the project has positive economics.

The increasingly stringent steps create a Darwinian process in project development. Few projects survive

even the conceptual study. Prefeasibility studies generally only produce positive results in say half of the cases. At the feasibility level, roughly 20% will fail, and of these most fail as a result of either overly optimistic assumptions or skipped steps. For this iterative process to be successful, conceptual and prefeasibility studies must use reasonable and rational assumptions.

**Pitfalls of Avoiding Steps**

Basically the main pitfalls resulting from not following these steps are project delays and costs, including lost opportunity costs. Experience has shown that skipping the prefeasibility study does not save time and money because issues that should have been identified early in the process are not, creating delays while these issues are analyzed and addressed, which results in increased costs. Delays are typically caused by the need for additional exploration drilling for everything from ore body definition, to geotechnical studies, to metallurgical sampling. Many times it is the need for additional sampling, including bulk samples, for metallurgical testing that delays the process. This need appears to evolve from those rose colored glasses that lead companies to the more optimistic interpretation of the results, ignoring subtle things that point to it not being so rosey. As a result of delays, the feasibility study costs increase mainly as a result of doing work over again but also just due to the fact the time for completing the project is longer. Without a prefeasibility study, the more costly and time consuming final feasibility study may focus on a less optimum mine design or process plan.

**■ NO ROYALTY TAX FOR LAS BAMBAS**

*Miners bidding for Peru's Las Bambas copper deposit will not have to pay two royalties to exploit the deposit after Congress amended a new law to exclude projects that already include such a payment. In July, Peru's government passed a bill to charge a sliding scale royalty of between 1 and 3 percent of sales on concentrates or their equivalent, depending on a company's turnover, as compensation for use of a finite resource. The bill caused some companies to pull out of the bidding for Las Bambas, which was delayed until August 31 to allow Congress to study the royalties law. The Las Bambas project stipulates a royalty of at least 2 percent. Mining companies which already pay income tax are opposed to the law and say they will be forced to pay even if they make a loss because of the failure to take into account fluctuating metal prices. Congress did not approve an amendment to the way the new sliding scale royalty is calculated which would have levied the duty in line with international metal prices, not based on sales.*

**Minerals Corner—**

**Dyscrasite  
Ag3Sb, Silver Antimonide**

*Dyscrasite is a rare mineral that is an alloy of silver and antimony, which means the atoms of silver and antimony are combined with metallic bonds instead of ionic or covalent bonds. While alloys are usually part of the elements class, dyscrasite is part of the sulfide class because antimony is really a semi-metal and not a metal like silver. Dyscrasite forms intricate and beautiful crystals and crystal aggregates. Its silver-white color is very similar to silver itself. The crystals are small and very detailed. The word dyscrasite is Greek and means "bad alloy." This mineral can be found in Wolfach and the Harz Mountains of Germany; Příbram, Czech Republic; Broken Hill, New South Wales, Australia; Pima and Santa Cruz Counties, Arizona, USA; Atacama, Chile; and Cobalt, Ontario, Canada. Dyscrasite is popular with collectors who like to collect silver bearing minerals, especially micromounted specimens.*

There are some cases where the project is not feasible because additional exploration drilling is needed to better define the ore body. Conducting a scoping or prefeasibility quickly identifies such problems and further work on the project can be suspended until the additional exploration drilling is completed thus saving time, effort, and expense.

An additional issue is that once a company states they are doing a feasibility study there is pressure to pursue the feasibility to the end, even if at an early stage there is evidence it is not worth pursuing. As a result companies spend time and money pursuing multiple options just to find a way to make the project work. In some cases this effort includes using optimistic metal prices, which may show the project to be feasible but ultimately does not work due to the restrictive approach the exchanges are using on prices or lower prices required in a bank review. For example the U.S. SEC tends to require the three-year rolling average for reserve statements more than forecast or current prices. This additional effort results in a more costly study not only because the feasibility study should be stopped

before completion but also the effort to find a way to make it work.

Perhaps the greatest pitfall is the lost opportunity costs that results from companies pursuing a project for too long. When a company goes straight to the feasibility stage, the chances to eliminate projects in the early stages are lost. As a result companies focus time and effort evaluating projects that are not worth currently pursuing which means that there are reduced resources available to pursue more worthwhile projects, thus lost opportunities.

### **Conclusions and Recommendations**

A feasibility study is a detailed study to determine the economic viability of a project. Thus sometimes the answer is **NO**, the project is not feasible. Adding "bankable" to the title does not guarantee it is feasible, but merely dictates a level of accuracy.

Take the time to do a conceptual study and a prefeasibility study so that a project can be stopped in the early stages or key issues can be

identified so additional work including sampling can be done. In some cases, companies have skipped the preliminary studies and gone straight to the feasibility study stage because they could get financing for a feasibility study but not the other studies. For these instances, there should be project milestones, which effectively are the completion of these preliminary studies as part of the overall feasibility study.

Skipping steps can delay projects and increase costs. These cost are not only the actual monetary cost but also the opportunity cost of not allocating resources to more worthwhile projects.

For more details on recommended content and standards for each of the studies discussed in this Newsletter, please read the September 2002 Pincock Perspectives available on the PAH website at [www.pincock.com](http://www.pincock.com). Also watch for additional information on changes in industry reporting and the impact on project evaluation in upcoming Pincock Perspectives.

This month's article was provided by Susan R. Poos, P.E., Senior Mining Engineer [susan.poos@pincock.com](mailto:susan.poos@pincock.com)



## **PINCOCK ALLEN & HOLT**

*Delivering smarter solutions*