PINCOCK Perspectives

ISSUE NO. 98 — September 2009

CALENDAR

- ***Latin Exploration 2009 - 1st International Conference on Exploration in Latin America***
  September 29, 2009
  Panamericano Hotel
  Buenos Aires, Argentina
  Email: info@argentinamining.com

- ***Mining Indonesia 2009 - 14th International Mining and Minerals Recovery Exhibition and Conference***
  October 14 – 17, 2009
  Jakarta international Expo Kemayoran
  Jakarta, Indonesia
  Email: mwaters@oesallworld.com

- ***China Mining Congress and Expo 2009***
  October 20 – 22, 2009
  Tianjin Binhai International Convention and Exhibition Center
  Tianjin, China
  Email: conference@mining-expo.com

- ***Runge North American Professional Development Courses***

  Mining for Non Miners
  Calgary: October 26–27
  Denver: November. 10–11

  Truck and Shovel Mining Systems
  Denver: November 17–19

  Dragline Mining Systems
  Gillette: November 3–4

  Mining Economics
  Denver: November 5–6

  For additional information or to register, please contact Diane Kincaid at 403-217-4981 or dkincaid@runge.com.au

Industrial Minerals and the Concept of Reserves

The Evolving Definition of Reserves

The definition of the term "reserve" has evolved with the mining industry. Thirty years ago, reserves were the responsibility of geologists. Upgrading a resource to a reserve was a function of increased geologic confidence gained through additional sampling, drilling and mapping. Accompanying the digital age and the post-Bre-X era, was a new industry standard for the term reserve. Now, it is understood that a reserve is the result of work conducted in multiple related disciplines, not just geology. Disciplines such as mining engineering, process engineering, financial analysis, geotechnical analysis, environmental engineering and even legal analysis all play an indispensable role in defining a reserve. While the broader mining industry and their respective regulatory institutions have made this transition, the mining of industrial minerals largely has not.

To illustrate this, here are two direct quotes from two US companies lifted from their Form 10-K filings for this year.

1. "The Company estimates proven and probable reserves based on the results of drilling."

2. "[The Company] estimates its iron ore reserves using physical inspections, sampling, laboratory testing, 3-D computer models, economic pit analysis and fully-developed pit designs for its operating mines."

Quote 1, from a highly respected industrial minerals company, indicates that the issuer's concept of reserves is outdated. Conversely, quote 2, from an iron operation, recognizes the fact that reserves are a product of multiple disciplines.

Why Has Industrial Minerals Been Slow to Adopt These Changes?

In my opinion, there are three issues that funnel the efforts of an industrial minerals company away from reserve reporting and towards other more pressing endeavors.

1. Low Variability in a Deposit

Locating an epithermal silver deposit in Mexico might feel like trying to find a needle in a haystack. However, if you

slap an electronic ankle bracelet on a geologist, hand him a fifth of whiskey and drop him off outside of Saskatoon, Saskatchewan, you've got decent odds of finding him passed-out on top of a potash deposit the following morning. Often times, Industrial Mineral deposits are bulk deposits that occur in very large quantities with little geologic complexity. And so they should be. Complexity is expensive. As a result, the challenging questions for these operations are not "how much material is in the ground?" and "how do we get it out?" The kinds of questions that keep these folks up at night are:

- How do we improve quality control in the mine to improve the quality of our products?
- What new products can be developed?
- How can we expand our market without going overboard on transportation costs?
- How can we protect our market share against new alternative products?

2. Markets and Margins

"As a mining company, our principal assets are our reserves." This is a quote from a major US base metal producer in their annual report to the SEC. Conversely, reserves take a back seat to marketing in the industrial minerals industry. This discrepancy in thinking is largely a result of margins. For example, the value of one short ton of copper is around US$4,000, whereas a short ton of kaolin might run around US$130 and shipping a product across the Pacific Ocean will set you back US$50 per ton. Without even considering any other costs, it is evident that the market of the kaolin product is severely hampered by its location relative to the end-user.

Here is an interesting exercise that underscores the relative importance of marketing versus reserves. Get on the internet and navigate to the homepages of three industrial minerals companies. Looking at their write-ups about the company's vision or core business, count the number of times they use the words "Market" and "Reserve." Do the same for three base/precious metals companies and compare the results. I got seven hits on "Market" and one hit on "Reserve" when looking at industrial minerals companies. For base/precious metals companies, I got zero hits for "Market" and seven for "Reserve." If you do this exercise again, but, instead, consider consulting companies who peddle their services to either industrial minerals or metals businesses, the discrepancies are far greater.

3. Research and Development

In addition to location, the values of industrial minerals are largely derived from their physical properties. These properties range from simple (brightness, particle size and aspect ratio) to down right obscure (Brook field viscosity, thixitropy and gel strength). Often times, an important suite of physical properties for a given end use can be shared by more than one type of material. The natural competition that arises from this situation forces industrial minerals companies to spend a lot of time and effort improving product quality, developing new products and lowering production costs.

Why Reserves Still Matter

Above I have argued that, for industrial minerals companies, a great deal of technical effort and brain power is consumed by matters other than reserves and for good reason. Yet the reserves issue can not be ignored.

From a mergers and acquisitions standpoint, an operation that does not have its reserves in order should not expect to get full value when selling a property. Selling opportunities can pop up suddenly and when they do, reserves take center stage. This is not the time to first ask the question, "What are our reserves at that site, anyway?" If you find yourself digging around for old maps and cross-sections trying to answer that question, then it's probably already too late.

A savvy buyer will uncover substandard reserves reporting during his due diligence process and exploit it during price negotiations. After all, a big chunk of the assets he is buying are tied up in the reserves. Substandard reserves reporting will raise the level of uncertainty in the value of those assets. Increased uncertainty means increased risk for the buyer

and a defensible excuse to jack-up the discount rate on his financial model. Good deal as long as you are not the seller.

This is also an important issue from a regulatory stand point. Publicly traded companies are obligated to disclose their reserves to the public. These disclosures should not only be accurate, but also meet the standards of the pertinent regulatory body. Not meeting these obligations exposes a company to fines and potential law suits.

Getting Reserves in Order

To get your reserves in order, the first step is to conduct an internal review to determine where they stand today. This should be pretty straight forward for a publicly traded company that issues a reserve number in their annual report. If this task proves difficult, alarm bells should sound in your head immediately.

Once the reserve number is in hand, there should be a paper trail that supports it. Ideally, this is a single, up-to-date report covering all aspects of a reserve. A one page memo dated five years ago from somebody who has since retired is not desirable. After this documentation has been gathered, you can begin to compare it against the information required for a reserve as defined by one of several regulations or guidelines. In the United States, this would be the Securities and Exchange Commission's *Industry Guide 7* and *The SME Guide for Reporting Exploration Results, Mineral Resources and Mineral Reserves*. For Europe, the United Kingdom and Ireland, refer to *The Reporting Code*. Canadian companies will refer to CIM's *Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines*, while the Australians, who got this ball rolling in the first place, will refer to the *JORC Code*.

This comparison will allow you to get your arms around any deficiencies in your reserves. Here is a brief list of example deficiencies that are common:

- No reserves report – This document should state the reserve estimate and also describe in detail how that estimate was made. It should also be updated annually to reflect the previous year's production and exploration activity.

- No quality control program – Is the drill hole sample data from the lab any good? A quality control program is designed to answer this question with a little science and statistics. By today's standards, a quality control program is an inseparable part of any drilling campaign.

- No mine plan – What equipment will be used? What is the production rate and strip ratio? What will the mine look like at the end of the reserve life?

- No financial model – A reserve is a reserve because it will make money in the future. A financial model that describes, in easily auditable terms, the financial future of the project should demonstrate this. As industrial minerals are very sensitive to markets, a marketing study is required as a basis for reserve projections in the future.

- Unidentified "competent/qualified" persons - Who are the technical people that have produced the reserve estimate and, in so doing, staked their professional reputation on the quality of this work? If no such person exists, there is a problem.

If the internal review of reserves indicates significant deficiencies, consider bringing in an outside consultant (I hear Pincock, Allen and Holt is a good one!) to conduct a more thorough review. In addition, the consultant should provide a plan to mitigate any identified issues and offer to assist in that plan. We at Pincock, Allen and Holt are exposed to a large number of diverse mining projects every year as well as mine operators, financial institutions and potential investors. This exposure allows us to keep our fingers on the pulse of the industry with respect to standard practices including calculation and reporting of reserves. Tapping into this experience can go a long way in alleviating the problems that can arise from an old and outdated concept of the term "reserve."

This month's article was provided by Aaron McMahon, P.G., Senior Geologist
aaron.mcmahon@pincock.com

A Few Industrial Minerals and Their Uses

Ball Clay - ceramic floor and wall tile, sanitaryware, fillers, extenders/binders

Barite - petroleum industry weighting agent, functional filler in the paint, automotive and medical markets

Bauxite and Alumina - manufacturing of abrasives, cement, refractories and chemicals, water treatment, steel mills and the petroleum industry

Borates - agriculture, ceramics, glass, fiberglass, detergents, flame retardants, wood treatment

Cement - production of mortar and concrete

Common Clay - brick, cement, lightweight aggregates

Construction Aggregates (stone, sand, gravel) - combined with portland cement or liquid asphalt to make ready-mixed concrete, asphaltic concrete and other concrete products

Diatomite - snow removal, art supplies, cosmetics

Dimension Stone (granite, marble, limestone, sandstone, slate) - foundations, stonewall, headstones, countertops, roofing shingles, pool table tops, floor tiles

Feldspar and Nepheline Syenite - ceramic tiles, plumbing fixtures, fiberglass insulation, glass, filler/ extender in paint, plastics and rubber

Fire Clay - manufacture of bricks, portland cement and lightweight aggregate, refractory products

Fluorspar - hydrofluoric acid, flux, glass, enamels

Fuller's Earth - pet waste absorbents, oil and grease absorbents, pesticide carriers

Gemstones - (agates, amber, beryl, coral, garnet, jade, jasper, opal, pearl, quartz, sapphire, shell, topaz, tourmaline, turquoise) - jewelry, carvings, gem and mineral collections

Graphite - refractories, steelmaking, expanded graphite, brake linings, and foundry facings-lubricants

Ground Calcium Carbonate - concrete, landscape chips, pool plaster, paints, caulks, plastics, ceiling tiles, vinyl siding

Industrial Diamond - cutting and drilling tools, abrasives

Industrial Garnet - abrasives

Industrial Sand and Gravel - glassmaking, foundry and hydraulic fracturing, and abrasive sands

Iodine - X-ray contrast media, LCD polarizing film , chemicals, pharmaceuticals, nylon production

Kaolin - paper, fiberglass, paint rubber, brick, ceramics, fertilizers

Lime -flux, paper and paper pulp production, water treatment

Lithium - batteries, glass, lubricating greases, air conditioning

Magnesium Compounds - refractory material in furnace linings for producing iron and steel, nonferrous metals, glass, and cement

Mica -paint, makeup, drywall, electronics, insulators

Nitrogen (Ammonia) -fertilizer, plastics, explosives

Peat - soil improvement

Perlite - lightweight plasters and mortars, insulation ceiling tiles, filter aids and soil amendment

Phosphate Rock -fertilizers, animal feed supplements

Potash - fertilizers, potassium chemicals

Salt -food, highway deicing, water conditioning

Sillimanite Minerals - refractory and ceramic products

Soda Ash - glass, chemicals, soaps/ detergents

Strontium - color CRTs, pyrotechnics and signals

Sulfur - sulfuric acid, vulcanization of rubber, gunpowder, detergents

Talc and Pyrophyllite - plastics, cosmetics, flooring, health care, pharmaceuticals, sealants

Titanium -alloys: aircraft, armored vehicles, dental and body implants,

Vermiculite - potting soils, fire protection applications

Wollastonite - plastics, rubber, paint, ceramics, friction materials

Zeolites - fertilizer, insecticides, feed additives

Zirconium - ceramic glazes, electronics

Pincock, Allen & Holt is a consulting and engineering firm serving the international mineral resource industry. Your comments and suggestions are always welcome. Contact Pincock, Allen & Holt • 165 S. Union Blvd., Suite 950, Lakewood, Colorado 80228 • TEL 303.986.6950 • FAX 303.987.8907 • www.pincock.com. Pincock Perspectives is published as a free information service for friends and clients.

pincock allen & holt

Consultants for Mining and Financial Solutions