Financial Analysis:
Mary River Iron Ore Mine

Reply to Baffinland Jan 26 Review of OpenOil model

OpenOil

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Contents

History of Correspondence

On January 8th, 2021, OpenOil sent a financial analysis of the Mary River Mine to executives at Baffinland Iron Mining Corporation ("Baffinland"). The analysis examines Baffinland's profitability under various operational scenarios at the mine, and also levels of benefits going to Inuit rightsholders. It maintains that, contrary to statements by Baffinland executives, railway expansion to Milne Inlet is not necessary to reach a minimum level of profitability as defined by norms which prevail in the global mining industry.

OpenOil invited Baffinland to comment on the findings, which are based largely on data published by Baffinland itself, and took the unusual step of sending the underlying financial model, to allow company managers to examine it point by point.

Baffinland did not reply directly, but sent a review of the analysis to the Nunavut Impact Review Board (NIRB) on January 26, 2021. The review asserted that the model contained optimistic assumptions which had a material impact on the conclusions of the report.

OpenOil have reviewed these comments. Many points provide additional information, and have been integrated. ***We note that incorporating Baffinland's suggestions on methods to estimate price, price differentials and the impact of corporate finance strengthens the conclusion that a continued trucking operation, or the approved route to Steensby, is commercially viable.***

Other comments seemed less grounded in industry norms and practise, or in other ways to misunderstand the nature of the research undertaken. We have replied to these below.

It is for the principal stakeholders – the company, regional and federal Canadian government, and above all Inuit rightsholders – to determine which development option is most suitable. Our contribution is purely from the position of technical commercial analysis, based on the understanding that Baffinland's argument for the necessity of a railway to Milne Inlet is based on a commercial rationale.

We note that the company, while offering many critiques of the OpenOil model, which is principally based on data points from Baffinland itself, has not offered its own numbers for potential profit in the mine under different development paths. We invite Baffinland to continue to engage with our report and model or, even better, to issue settled estimates of their own for rates of return and minimum breakeven price under each development path, including the benefit levels for Inuit rightsholders agreed in the Inuit Certainty Agreement. Failing that we note that there can be no independent view of whether a rail route to Milne Inlet is necessary in commercial terms.

Price Scenarios

The most material comments made in the Baffinland review concerned use of price scenarios. Specifically, the review pointed out that forecasts by the World Bank have had high variance with actual market pricing[1], and referred to a recent guidance note issued by the Canadian Institute of Mining[2] (the CIM) in response to a request by the Canadian Securities Administrator. The CIM note helpfully lays out seven potential valuation methods, which were bullet pointed by Baffinland.

The updated OpenOil report and model incorporates two such methods suggested by CIM, based on CIM's description of the appropriateness of circumstance: a long-term historical average (using a baseline of the past 10 years), and a three year moving average. We note that each of these methods has potential drawbacks as well as advantages: according to CIM long-term historical averages remove volatility, but could miss changes in underlying demand structure. This is significant as the iron ore market has witnessed such a change in market conditions in the last decade, with the rise of demand in China largely unrelated to the global business cycle, and also the financialisation of iron ore.

The three-year moving average removes volatility but, according to the CIM "has the disadvantage of understating Mineral Resources and Mineral Reserves in a rising market, and overstating Mineral Resources and Mineral Reserves in a falling market." In view of the recent boom in iron ore, this is therefore a relatively conservative approach.[3]

The table below shows breakeven prices required on benchmark iron ore prices needed to achieve various investor rates of return under a continued trucking operation:

TABLE 1: BREAKEVEN PRICES & RATES OF RETURN UNDER TRUCKING OPERATION				
Discount rate	*7%*	*8%*	*10%*	*12.5%*
Constant (original in OpenOil model)	$59	$61	$67	$77
Long-term historical average	16.29% at $98 (10 year adjusted average)			
Three-year Moving Average-led	$51	$52	$57	$69
World Bank-based forecast-led	14.60%			

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[1] Baffinland's review appears to misunderstand the use of the World Bank scenario in the OpenOil report: it is one of two pricing scenarios offered in the model, in conformity with the common professional practice of offering more than one forward looking scenario, precisely no single long-term forecast is authoritative. But it does not constitute a baseline scenario and its results were not referenced in the report.
[2] https://mrmr.cim.org/media/1140/2020_cim_guidance_on_commodity_pricing.pdf
[3] Of the other methods suggested in the CIM paper OpenOil is not in a position to base a methodology on Contract Prices or Consensus Prices (although we note that Baffinland might be); current spot price is unsuitable because the market is at a multi-year boom which cannot be expected to continue; a Specialist Consultant Report method does not seem appropriate as it is intended for commodities which do not have benchmarks and thick price data; and Margin over Cash Cost of Production is unavailable owing to discrepancies and incompleteness of cost information made available by Baffinland.

TABLE 2: RATES OF RETURN UNDER HISTORICAL PRICE AVERAGE OPTIONS				
Historical Average Period	5 years	10 years	15 years	20 years
Investor Rate of Return (IRR)	14.54%	16.29%	17.33%	14.32%

Table 2 shows how investor rates of return change depending on the period chosen. CIM recommendation is for a minimum of five years, with no maximum. The model uses 10 years as a baseline because this both most closely matches the Mary River Mine's history as an investible project, and also coincides with the rise of Chinese demand and financialisation of iron ore as a commodity, two structural changes which are increasingly dominant today.

Under all price scenarios investor rates of return are higher with a rail expansion, either to Milne Inlet or as approved to Steensby. These rates are available in the model but have not been included here as these results are not contested.

Industry Norms of Profitability

Baffinland's review included the assertion: "the author cannot and should not represent what is considered acceptable to the investment community for this Project", apparently to our reference to metrics to gauge a minimum acceptable rate of return. This perspective is hard to reconcile with stated best practise as exercised in the global mining industry, or at policy making level by fiscal authorities, or indeed with Baffinland's own statements to investors.

Investors typically analyse the mining industry in terms of whether returns in a particular project are likely to exceed the Weighted Average Cost of Capital (WACC). The WACC is a metric built on the proportion of company equity, and also external debt, it takes on to develop and run a particular project. Since the internal "cost of equity" includes minimum necessary returns to shareholders or other investors, the WACC is often used as the basis for a discount rate, which in a project model is used to reduce future revenue flows to a present day value, expressed variously as the Internal Rate of Return (IRR), or a particular value for the Net Present Value (NPV).

Such metrics have become widespread precisely because they offer direct comparison between projects of different sizes, periods of time, and even industry sectors.

Although the discount rate specific to a project is often held internally by companies, there are widely recognised norms. For example, a professor at the Stern Business School of New York University maintains an authoritative table of discount rates by industry sector[4]. The 86 mining companies surveyed have an average cost of capital of 4.77%. Various discount rates used in other mines, and by other miners are as follows:

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[4] people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm

TABLE 3: DISCOUNT RATES TO ANALYSE MINING INVESTMENTS		
Company / Project	**Context of Use**	**Discount Rate**
Rio Tinto, Australia	Pilbara	6.9%
Australian government, Economic Assessment of Mineral Resources	Woomera	7%
Blackiron	Shymanivske, Ukraine	10%
Zanaga Iron	Congo	10%
Vale	(generic, used to assess impairments)	6.3%

At a policy level, the International Monetary Fund's Fiscal Affairs Department, which advises over 100 governments around the world, issues a modeling tool known as the Fiscal Analysis of Resource Industries (FARI). FARI's default discount rate on mining projects is 12.5%.

So there are a wide range of discount rates used: between 4-5% on the low end and 12.5% on the high end. Where in the range a project lies largely depends on perception of risk by investors. It is no coincidence that the higher discount rates are in jurisdictions which have infrastructural or political stability challenges.

The precise discount rate to apply in any given project is therefore open to interpretation, and needs to take a wide variety of factors into account. But it is worth noting that Baffinland themselves used three different discount rates in their 2018 Preliminary Offering bond document: 7%, 8% and 10%[5]. Thus, the rate the OpenOil model introduces as a default value equals the _highest_ of the values used by Baffinland internally – the highest minimum return on investment.

Mary River Mine Differential Premium

The Review correctly states that the OpenOil model used 21% as a standard differential of the iron ore produced from the Mary River Mine: "this may have been relevant during 2018 when iron ore prices were low but as iron ore prices have gone up those premiums have

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[5] https://nunatsiaq.com/stories/article/conservationists-allege-baffinland-withheld-vital-information-from-regulators/ p94/112

decreased and as of the end of 2020 are below 10%." Elsewhere in the Baffinland Review, the company displayed a graph containing historical differentials since 2015. This yields an average differential (premium) of 17.85%. Accordingly, we have updated the model to use this as a constant differential against the benchmark, to insulate against underlying volatility.[6]

The Review also suggested that the premium to be obtained by MRM production will decrease over time due to a changing ratio of pellets to finer iron ore:

> *"For Baffinland, despite the high-grade and low amount of deleterious elements, one of the more difficult product qualities to achieve has been product size for our lump product. This has resulted in a change in our lump to fines ratio dropping from over 72% in 2016 steadily to just over 20% in 2020. This changing product mix towards fines material which carries a significantly lower VIU premium compared to a lump product results in lower revenue."*

It is difficult to know how to reconcile this with Baffinland's 2018 statement, when it had already been operating the mine for several years, to its potential investors in the bond circular that it expected a ratio of 75% pellets to 25% fines over the life of the project:

> *We produce two products: coarse ore and fine ore. Coarse ore is sold under a brand name of Direct Shipping Pellet ("DSP") and fine ore is marketed as Super Sinter Fines ("SUSF"). Our products are among the highestgrade iron ore products available worldwide. Our products are also low in deleterious elements, including silica and alumina, and command significant premiums in the iron ore market. Based upon our life of mine operating plans, we expect to mine 75% coarse ore and 25 % fine ore. We expect year over year variations from this ratio as we mine different areas of the deposit.*

We assume the earlier statement is correct, and the later statement refers to one of the short-term variations explained to investors. We therefore leave the ratio unchanged, and do not further adjust the premium obtained for Mary River iron ore beyond adjusting to the historical average for the differential provided in the Baffinland Review.

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[6] The Baffinland argument that the lower differential at the end of 2020 is related to the higher underlying price seems belied by the data they themselves present, since lower differentials are also recorded at lower benchmark values in 2015-15. However if the principle is regarded as sound over the long term, then it also serves as a floor to realised prices for the Mary River Mine, since a higher differential at lower benchmark prices will provide insulation from revenue loss in a bear market.

Corporate Finance

The Review states: "BIMC considers it unreasonable that financing costs would not be included as part of a financial analysis. It is common practice for project financing, equipment leasing, debt financing, etc... to be used in the construction of a mining project. In fact, it would be highly uncommon for it not to be. The cost of debt is a real cost to any company and would be a component of any development of the Mary River Project regardless of owner."

It should be noted that *factoring corporate finance into investor rates of return will under most circumstances increase the estimate of rates of return to company shareholders.* Companies borrow because interest rates on the loan are lower than the internal cost of capital. For example, in the mining industry as a whole, sector ratios show that the WACC is a blend of the average cost of project finance of 4.09% and the higher rate of 5.20% cost of internal capital.

As laid out in the OpenOil report, Baffinland has taken on various tranches of debt which appear to be on the high end of project finance rates. We are not able to explain the difference between Baffinland's loans of 8% or 12% against an industry average of just over 4%. Nevertheless if interest rates are below projected rates of return, as they are under all of the model's four pricing scenarios, returns to Baffinland shareholders will be higher than the stated post-tax rates of return to the commercial operation. If borrowing decreases shareholder return, management competence has to be questioned.

Without more data on the specific loans Baffinland has contracted we cannot produce a narrow estimate of how much shareholder returns will rise. A ballpark estimate would be between 1% and 3% to rates of return expected by investors under any particular scenario.

This is perhaps an area which could bear further research and discussion.

Itemised Response to Other Comments