National Mining Competition: Academic Case 2014

Connecting diverse minds to inspire innovation.

KPMG
cutting through complexity

NMC
NATIONAL MINING COMPETITION

Table of contents

KPMG
cutting through complexity

NMC
NATIONAL MINING COMPETITION

KPMG is proud to be the Academic Sponsor for the 3rd Annual National Mining Competition.

Our Saskatoon team spent many hours sharing their knowledge to assist with this academic case competition. We hope students leave with a better understanding of the complexities in the global mining industry.

Have fun and good luck!

Case Overview

Koppernite Resources ("Koppernite" or the "Company") is a fictional copper-producing company. Although Koppernite has three assets in two different countries, as a small producer Koppernite has been challenged by low commodity prices and limited availability of capital in recent years. Koppernite is in the process of strategic planning for the future.

As a team of consultants hired by Koppernite, your task is to analyse the Company's current operations and recommend a plan of action. Koppernite is expecting you to analyse the Company's current finances, mining and milling operations, and strategy to come up with recommendations to implement over the next five years. You will also need to consider expected market conditions and the Company's stance on corporate social responsibility.

Each of the Company's existing assets is described below, including the results of Management's initial efforts regarding possible actions that may be taken. Management is also open to leaving existing assets as is. Regardless of your recommended course of action, Management is most interested in the supporting explanations for your conclusions.

Company Background

History & Values

Koppernite Resources is a Canadian mining company headquartered in Vancouver, British Columbia, Canada. The company has operating properties in Chile, British Columbia and the Yukon, and does not have any other greenfield exploration properties. Koppernite was started in 1950 by two Geologists following their discovery of the Company's Copper deposit in Chile. The Canadian operations were discovered and developed in subsequent years by the Company.

Koppernite aims for operational excellence in all aspects of the business: financially responsible expenditures, a leader in copper mining, and effective use of company resources. Safety and the well-being of employees is the number one priority in all three locations, and Koppernite follows strict policies and regulations to ensure safeguards against injury in the workplace.

Koppernite Resources has a significant impact on its communities in terms of employment and effects on the environment and thus corporate social responsibility is always a consideration in Koppernite's decision making process. Transparency in decision making, safety, compliance with regulations and contributions to community are always factors considered in Management's decision making process. With this in mind, management of the Company expects recommendations presented will reflect and align with their current values.

Financial

Koppernite Resources is a publicly traded company on the Toronto Stock Exchange (TSX: KRQ).

Koppernite seeks to provide its shareholders with significant return on investment. The company prides itself on disciplined capital expenditures and commitment to its shareholders, and expects to provide the best possible return to shareholders.

Future Outlook

Despite recent challenges in the mining industry, the Company maintains a positive long-term outlook based on projected increases in the global demand for copper and its by-products. While the Company would like to expand its existing assets in order to keep up with the demand for copper in the next 5-10 years, it is primarily focused on enduring near term softness in commodity prices.

Current Operations

Koppernite has three operations in North and South America, each with different opportunities and challenges.

Asset 1 – Kluane Operation - Yukon

The Kluane operation in the southern Yukon is an open-pit mine with two separate pits. The asset currently produces copper with a cobalt by-product. The surface deposit contains copper in the form of chalcocite and cobalt in the form of linnaeite.

The mill accepts 5000 metric tonnes per day of ore with a concentration of 0.7% copper and 0.1% cobalt. The plant uses a bulk flotation process followed by a change in pH to separate the copper from the cobalt. The mill recovery of copper and cobalt is, on average, 85%.

Koppernite's mine engineering department at the Yukon asset has recently identified a possible expansion opportunity at the mine. After mining a significant portion of the first pit (about 80%), the company has drilled holes beyond the pit shell during brownfield exploration and determined that there is a high-grade cobalt deposit that can be accessed by a ramp from the first pit and mined using underground mining techniques. In the underground deposit, the cobalt is primarily in the form of cobaltite and copper is in the form of chalcocite.

Based on drilling to date, the Company has completed a prefeasibility study for the newly discovered underground deposit. Details on the reserves and resources are tabulated in Appendix E, and projected capital and operating costs from the prefeasibility study can be found in Appendix C. Management expects the capital costs of the project would be incurred over a two year construction period. The project would take an additional two years to ramp up to the projected level of production and operating costs.

In addition to the expansion opportunities, Koppernite's process engineers have identified opportunities to reduce mill operating costs by as much as $2 million per year for the duration of the mine's life by focusing on metallurgical optimization. To realize these savings, the Company would need to invest $15 million but the cost savings can be recognized in as little as six months.

Management is relatively certain they would need to raise capital to finance the underground expansion; however, management is less certain on whether financing would be required for the mill process improvement. A detailed financial analysis of both or either option would be required to ensure each project provides a sufficient return on investment.

Management is also looking for analysis and advice on any non-financial matters relevant to these projects that you may have considered.

Should Koppernite shift its focus from Yukon to either the British Columbia or Chile locations, a recent analysis by bankers recommended this asset could be sold in its **current state for $100 million CAD.**

Asset 2 – Roca Roja Operation – Chile

The Roca Roja operation in Chile is currently the company's lowest cost per unit operation due primarily to the lower costs associated with operating in Chile versus Canada. It produces copper with negligible by-products. The asset uses an open-pit mine design and has been operating since 1950. The deposit contains porphyry copper and inert gangue material. The mill currently accepts 18,000 metric tonnes per day of 0.5% copper. The mill recovery is about 90% and a conventional froth flotation process is used.

Due to the asset's currently low operating cost, Management recently hired a consultant to estimate capital and operating costs for a potential mine and mill expansion. The consultant's cost estimates can be found in Appendix C of this document. These costs are expected to be incurred over a two year construction period.

Furthermore, the Company's Technical Services group has identified a significant opportunity relating to the mine's tailings piles. Since the mine has been operating for a long time, the current mill recovery was not always possible due to less advanced technologies used in the past. The mine has stockpiled a significant amount of tailings containing relatively high grades of copper (shown in Appendix E).

The company's Technical Services department has proposed an expansion of the process plant that will allow the reprocessing of old tailings in addition to the new tailings. New tailings average 0.05% copper. The predicted average recovery of copper in tailings is 40%. Should the reprocessing initiative succeed, the tailings could be a significant source of Copper obtained at low cost due to the proximity of the tailings to the mill and the fact the tailings are already in a process-able state.

In summary, the Company has been considering several options for this site:

1. Leave the asset operating as it currently is.
2. Expand both the mine and the mill (which would also allow the Company to reprocess tailings).
3. Expand the mill to allow for processing of the tailings.

In addition, because the Chile asset is many years old, Management expects that technology and process improvements developed in recent years are likely applicable to the mine. Koppernite will benefit from general recommendations or ideas on how mining companies are streamlining operations to improve financial performance.

Similar to the Yukon asset, the Chile location could also be sold. The estimated selling price is $400 million CAD.

Asset 3 – Takla Operation - British Columbia

The Takla asset is in British Columbia, Canada, and produces copper with a silver by-product. The mine was completed in 2011 at significant capital cost when silver and copper prices were much higher than current prices. However, because the mine is relatively new, sustaining capital expenditure is expected to be relatively low in the near term. The gross profit for the mine is negligible which has led Management to consider whether this asset is worth operating at current prices.

The asset is an underground mine and uses the sublevel stoping mining method. The mill currently accepts over 2000 metric tonnes per day of 3% copper and 0.03% silver, along with inert gangue materials. The mill recovery is about 80% for both copper and silver, and a conventional froth flotation process is used.

While Koppernite's management has considered selling the asset within the past year, they also recognize the advantages of diversified commodities. Silver provides some protection against volatility in the broader market, which the copper price tends to follow. Furthermore, the company is concerned that the current low commodity prices will result in a low price for the asset.

Koppernite's management has also considered putting the mine into care and maintenance until commodity prices improve. While this will impact the community significantly, it will allow the company to retain the mine's reserves for periods of higher commodity prices, at which point the mine could be put back into operation and make a larger contribution to the Company's earnings. In addition, a significant amount of capital would be tied up in the non-producing asset, which results in lower returns to investors and a higher interest burden than would otherwise be necessary.

Koppernite's Management is unsure how a decision to sell or shut down the mine would impact the Company's cash flow. That said, Management has prioritized any initiative that will improve or sustain its cash flow during these uncertain times. Clearly management is uncertain how to proceed with its most expensive asset, but is aware that any decision on this matter will have a major impact on the Company.

As with the two other assets, Management would be open to any general suggestions on tactics it could investigate to make this asset more profitable, but full financial or technical analysis is not required at this time since Management is most concerned with whether or not they should keep operating the asset.

The estimated selling price of the asset is $430 million CAD.

Local Stakeholders

All three of Koppernite's assets are located in rural areas. Due to the relatively small communities, Koppernite is a significant employer in each location both through direct and indirect employment.

Corporate Social Responsibility has been implemented into decision making at all levels of the organization. Compliance with the law, decreasing environmental impact and maintaining high ethical standards are strived for and achieved on a day-to-day basis. Koppernite has also traditionally supported volunteering, donations to local charities, and promoting 'eco-friendly' activities to maintain strong relationships with their communities. Management has traditionally believed that such efforts also contribute to lower costs in the form of more productive employees, less community opposition, etc. in the long run. However, management also acknowledges that in the short term, many of these initiatives, particularly those relating to the Community, are a burden on the Company's cash flow and ultimately not required to operate the mines. Management is interested in your recommendations on whether or not it makes sense to continue community contributions given the Company's declining cash flow.

Any changes in the company's current operations will impact the surrounding inhabitants, whether positively or negatively. Koppernite expects to see a plan regarding your predicted impact on the communities given your various recommendations.

Infrastructure Requirements

Recommendations should consider infrastructure requirements given the rural locations of the assets. For example, an asset expansion would require contractors, engineering consultants, and safety inspectors on site. These individuals would all require accommodations, food, and water supplies for the duration of an expansion.

In addition, Koppernite's management has been curious about their ability to utilize alternative energy sources. Although all current electricity is obtained from existing power grids, Koppernite's management is wondering if alternative sources could provide more economical or environmentally friendly sources of energy.

Regulatory Issues

Actions such as mine expansions and reprocessing of tailings are subject to regulatory constraints. If one or more of the mine expansions are chosen, Koppernite has requested that you provide an overview of the regulatory constraints in the geographical region where the change will take place.

Environment

Processing ore with toxic metals, such as arsenic, will result in contaminated tailings and reagents that must be disposed of properly in order for the Company to maintain its operating licenses and to obtain approval for expansions. Koppernite requests that the final recommendations include a plan to deal with this waste in the event you recommend any changes or expansions to the Company's milling processes.

Management has already estimated the cost of decommissioning each mine site (in real dollars) is as follows:

- Kluane- $50 million CAD
- Roca Roja - $90 million CAD
- Takla Mine - $130 million CAD

Capital Structure

Although Koppernite is currently an operating company, capital will need to be raised in order to finance any large mine expansions. Koppernite is open to a wide variety of financing alternatives; however, the company has a high level of debt due to the relatively recent mine construction project in British Columbia and additional debt capacity may be limited. Most analysts believe Koppernite's current capital structure is at or even exceeds an optimal level of debt. Since a majority of the debt is relatively new, and was used to pay for the development of the Takla operation, cost of debt (as reflected on the income statement) generally reflects an appropriate current market rate for this company. One analyst commented that given the major impact of lower commodity prices and recent trends in the industry, he believed the cost of equity for the company would fall in the range of 30%.

The Company's advisors believe that a share issuance would be successful, although low commodity prices have suppressed the Company's share price suggesting a share issuance could be a relatively high cost of capital. It is also important to consider the dilutive impact a share issuance would have on existing shareholders, and whether the proceeds from the issuance could be used effectively enough to improve earnings per share. The Management team has heard of alternative financing methods such as metal stream financing and flow through shares but has never investigated these options.

Koppernite's management has requested that financial projections and a valuation of each proposed project be undertaken before decisions can be made. Although engineering consultants have already estimated capital costs of the various projects, your task is to put the capital costs into a useful financial evaluation of the project and add in any other items that need to be taken into account during financial evaluations.

Furthermore, commodity prices prepared by management reflect current estimates, but would be subject to fluctuation going forward. Management is open to your recommendations on where the commodity prices might be headed and is interested in how you might handle expected commodity price fluctuations in the analysis of the project options.

Closing

Management recognizes the wide scope of requests and requirements for your engagement but trusts you will identify and address the matters you consider most important in a comprehensive solution relevant to the Company as a whole. At a minimum, your solution must recommend a course of action for each of the three assets.

Remember: Although you must analyze each of the current operations individually, Management ultimately wants a recommendation relevant to the overall Company.

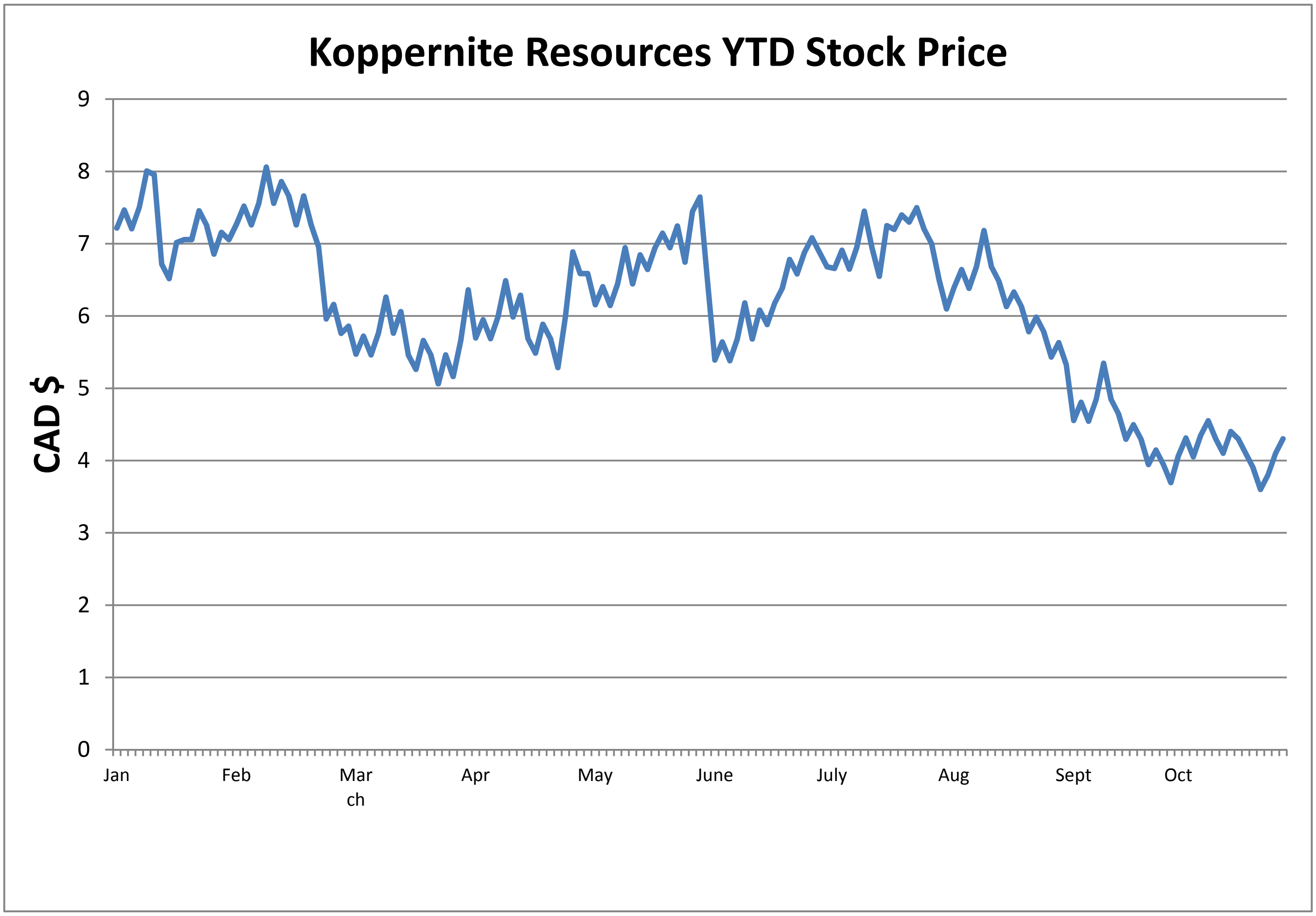
Appendix A: Financial Statements

INCOME STATEMENT	CURRENT YEAR	PRIOR YEAR
Revenue	631,931,095	750,500,000
Costs of sales:		
Mill	129,520,000	115,400,000
Mine and Tailings	114,200,000	104,500,000
Service	37,310,000	35,600,000
Camp	36,800,000	34,500,000
Technical Services	6,370,000	8,400,320
Administration	18,870,000	20,100,300
Transportation	44,920,000	44,500,000
Depreciation, depletion and reclamation	120,118,774	95,760,500
Total cost of sales	$508,108,773	$458,761,120
Gross profit	123,822,321	291,738,880
Administration expenses	40,200,000	54,020,000
Exploration	6,210,000	15,760,500
Financing costs	66,500,000	72,478,000
Income before tax	10,912,321	149,480,380
Income tax (effective rate 27%)	2,946,327	40,359,703
Net income	**7,965,994**	**109,120,677**

BALANCE SHEET	CURRENT YEAR	PRIOR YEAR
Cash	144,560,000	114,675,925
AR	52,660,925	78,188,000
Inventories	103,921,069	110,645,000
Other	34,500,000	27,560,000
Current assets	335,641,993	331,068,925
Property plant and equipment	1,765,000,000	1,856,118,774
Total assets	**2,100,641,993**	**2,187,187,699**
Accounts payable and accrued expenses	51,425,000	61,400,300
Current portion of long term debt	65,780,000	72,500,400
Current liabilities	117,205,000	133,900,700
Long term debt	950,000,000	1,035,400,000
Provision for reclamation	270,000,000	262,416,000
Total Liabilities	1,337,205,000	1,431,716,700
Common shares issued	457,080,000	457,080,000
Retained earnings	306,356,993	298,390,999
Total Liabilities and Equity	**2,100,641,993**	**2,187,187,699**

CASH FLOW	CURRENT YEAR	PRIOR YEAR
Net Income	7,965,994	109,120,677
Add DDR	120,118,774	95,760,500
Other non-cash items	7,584,000	9,870,000
Changes in working capital		
AR	25,527,075	(4,100,300)
Inventories	6,723,931	(5,100,100)
Other	(6,940,000)	1,400,500
Accounts payable and accrued expenses	(9,975,300)	1,400,200
Cash from operating activities	151,004,475	208,351,477
Capital expenditures	(29,000,000)	(74,500,300)
Cash from investing activities	(29,000,000)	(74,500,300)
Debt repayment	(92,120,400)	(94,500,000)
Dividends	-	(26,500,000)
Cash from financing activities	(92,120,400)	(121,000,000)
Net change in cash	**29,884,075**	**12,851,177**
Cash at beginning of period	114,675,925	101,824,748
Net change in cash	29,884,075	12,851,177
Cash at end of period	**144,560,000**	**114,675,925**

Appendix B: Stock Price Chart



Current shares outstanding – 42.8 million

Appendix C: Projected Operating & Capital Costs for Expansions

Note: The new expansions (Asset 1 underground, Asset 2 tailings) are incremental costs expected to be incurred over existing operating costs. Asset 2 Expansion replaces the current operating costs. All costs estimates are based on when the asset is operating at peak planned capacity.

- All dollar values given in Canadian currency.
- All dollar values given in Millions unless otherwise specified.

	Asset 1 Underground	Asset 2 Expansion	Asset 2 Tailings
Projected Operating Expenditures			
Mill	14.00	57.49	3.40
Mine and Tailings	50.00	36.96	3.40
Service	15.00	16.43	0.68
Camp	5.00	0.00	0.00
Technical Services	2.00	2.55	1.02
Administration	3.00	8.21	0.68
Transportation	10.50	24.64	0.68
Projected Sustaining Capital Expenditures			
Mine	5.00	4.00	0.50
Mill	0.50	3.00	1.00
Environmental	4.00	4.00	1.00
Total Sustaining Capex	**9.50**	**11.00**	**2.50**
Tonnes/yr milled	1,095,000	8,541,000	4,000,000
Grade			
%Cu	0.30	0.50	0.20
%Co	0.70	0.00	0.00
%Ag	0.00	0.00	0.00
Recovery	0.80	0.90	0.40
Tonnes/yr copper	2,628.00	38,434.50	3,200.00
Tonnes/yr cobalt	6,132.00	0.00	0.00
Tonnes/yr silver	0.00	0.00	0.00
Copper Price ($/tonne)	7,165.60	7,165.60	7,165.60
Cobalt Price ($/tonne)	31,528.64	31,528.64	31,528.64
Silver Price ($/tonne)	811,366.40	811,366.40	811,366.40

	Asset 1 Underground	Asset 2 Expansion	Asset 2 Tailings
Capital Expenditures			
Mill	20.00	120.00	31.00
Mine and Tailings	60.00	40.00	2.00

Appendix D: Current Operating Expenses and Revenue

- For the year 2013.
- All dollar values given in Canadian currency.
- All dollar values given in Millions unless otherwise specified.

	Asset 1	Asset 2	Asset 3	Total
Operating Expenditures				
Mill	20.08	45.99	63.45	
Mine and Tailings	23.73	29.57	60.90	
Service	9.67	13.14	14.50	
Camp	7.30	0.00	29.50	
Technical Services	1.43	2.04	2.90	
Administration	7.30	6.57	5.00	
Transportation	14.26	19.71	10.95	
Depreciation, depletion and reclamation	7.22	6.00	106.90	
Total Cost of Sales	**90.99**	**123.02**	**294.10**	**508.11**
Sustaining Capital Expenditures				
Mine	2.00	3.00	10.00	
Mill	1.50	2.00	3.00	
Environmental	2.50	3.00	2.00	
Total Sustaining Capex	**6.00**	**8.00**	**15.00**	
Mill Feed (tonnes)	1,825,000	6,570,000	800,000	
Grade				
%Cu	0.70	0.50	3.00	
%Co	0.10	0.00	0.00	
%Ag	0.00	0.00	0.03	
Recovery	0.85	0.90	0.80	
Tonnes/yr copper	10,858.75	29,565.00	19,200.00	
Tonnes/yr cobalt	1,551.25	0.00	0.00	
Tonnes/yr silver	0.00	0.00	192.00	
Copper Price ($/tonne)	7,165.60	7,165.60	7,165.60	
Cobalt Price ($/tonne)	31,528.64	31,528.64	31,528.64	
Silver Price ($/tonne)	811,366.40	811,366.40	811,366.40	
Total Revenue	**126.72**	**211.85**	**293.36**	**631.93**
Gross Profit	**35.73**	**88.83**	**(0.74)**	**123.82**

Appendix E: Reserves and Resources

For current operations:

	Asset 1 (Open Pit)	Asset 2	Asset 3
Proven (Tonnes)	10,950,000	98,550,000	12,000,000
Probable (Tonnes)	5,475,000	59,130,000	11,000,000
Average Copper Grade (%)	0.70	0.50	3.00
Average Silver Grade (%)	0.00	0.00	0.03
Average Cobalt Grade (%)	0.10	0.00	0.00

For proposed expansions:

	Asset 1 U/G	Asset 2 Tailings
Proven (Tonnes)	40,000	151,840,000
Probable (Tonnes)	2,880,000	0
Average Copper Grade (%)	0.30	0.20
Average Silver Grade (%)	0.00	0.00
Average Cobalt Grade (%)	0.70	0.00

Follow Us

kpmg.ca/mining