

*To Roger Taylor*

*T.B.S. → Red Chris  
Feb 10/00*

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**MINERALS NORTH CONFERENCE**

**Red Chris Project**

**May 14, 1999**

**D. J. Barker, P. Eng.**

## **INTRODUCTION**

When Paul Wojdak first asked me to do this talk, I wondered how I could squeeze the Red Chris story into 20 minutes. The development of the project since the 1970s is a long and complicated story to arrive at what we believe is a small, expandable, low risk copper project, which can be developed at lower commodity prices than we have today.

First, let me show you some slides that indicate the property location and setting.

### **History and Background**

1. Project is owned by American Bullion Minerals Ltd. with a minority interest by Teck.
2. Some 75 holes drilled in the 1970s targeting approximately 40 million tonnes grading better than 0.75% copper.

3. A further 170 holes drilled in 1994 and 1995 outlining:
  - i. Close to a billion tonne potential grading 0.29% copper and 0.26 g/tonne gold.
  - ii. 550 million tonnes of open pit reserves grading 0.32% copper and 0.25 g/tonne gold.
4. Prefeasibility study in 1996 was completed by FDW defining a mine based on a production rate of 90,000 tpd, costing \$550 x 10<sup>6</sup> and which gave marginal economics at \$400.00 gold and \$1.00 copper. In this study the project had a mine life of about 17 years and utilized traditional open pit mining practices using the largest shovels and trucks available.
5. In the later part of 1997 it was decided to capitalize on the topographic advantage with the orebody being accessed from the valley floor and the ore and waste drawn through ore passes. A scoping study, done at the end of 1997, indicated positive economics based on an \$0.80 copper and \$330.00 gold. A new prefeasibility study was begun in early 1998 using \$0.75 copper and \$275.00 gold. The ore tonnage rate was chosen at 30,000 tpd and a total tonnage of 75,000 tpd was to be drawn through a series of ore passes and conveyed to a mill and waste dump facility in the valley floor.

The prefeasibility study indicated marginal economics (i.e. 10 - 15% ROR) and represented a capital cost of about \$250 x 10<sup>6</sup> to accomplish the mining of 200 x 10<sup>6</sup> tonnes of ore grading 0.44% copper and 0.33 g/tonne gold.

This study was a step in the right direction. It capitalized on the best opportunities provided by the topographical advantage, it zeroed in on the highest grade ore available, and throughout the majority of the year, chosen commodity prices treated us well. However given that the prefeasibility study was somewhat innovative in style and direction, it was clear after completion, that many improvements could be made to the mining style, ore pass locations and the underground network.

6. In the last quarter of 1998 after doing a constructive review of the prefeasibility study and seeing copper prices fall to \$0.65/lb., it was decided to take a salvage type approach to the project. Commodity prices were chosen at \$260.00 gold and \$0.60 copper (Canadian dollar = \$0.675 U.S.).

The following criteria formulated future work:

- i. The highest grade possible had to be attained on a consistent basis.

- ii. The nature of the highest grade ore zone would determine the production rate and not economy of scale.
- iii. The capital cost of the mine will have to be a minimum (i.e. bootstrapped, similar to Mount Polley).

### Current Project Planned Direction

1. A manual set of reserves of the East Zone based on structural continuity, consistency of high grade and reasonable ore outlines indicated a high grade zone of 18 x 10<sup>6</sup> tonnes grading 0.86% copper and 0.8 g/tonne gold. The zone is 465 meters in vertical depth and about 130 meters in diameter. Although originally defined within proven and probable reserves, this reserve is now referred to as drill indicated. The grade is based on the numeric average of 118 composited bench intersections and 650 raw assay data points.

The zone is continuous and the ore outlines are not dendritic in nature. High grade zones are avoided if they do not conform to the vertical continuity and low grade is included if it conforms to vertical continuity.

2. A first pass mine plan indicated that 10,000 tpd was the maximum rate that the high grade zone could be extracted. A further review indicated that the 10,000 tpd rate should be reduced to about 7500 tpd. Assuming that commodity prices are \$0.60 copper and \$260.00 gold, the recovered value of the ore is about \$23.00/tonne. On site operating costs are about \$7.50/tonne and downstream costs are \$8.00/tonne which allows for \$7.50 to be dedicated to debt. On this basis the payback period is three to four years.
  
3. The top  $7 \times 10^6$  tonne grades 0.87% copper and 0.67 g/tonne gold and exists at a stripping ratio of 3.7:1. This material could probably be mined traditionally and hauled about 2.7 km. downhill to a mill located at the lower (1,200 meter) elevation. In this way the long term plan for drawing the resource down through ore passes is accommodated for, and at the same time a low cost method of traditionally mining high grade and accepting a long ore haul, makes the project easier in the earlier years.
  
4. In order to extract the highest grade possible by traditional open pit mining techniques would require a production rate of no more than 5,000 tpd. By avoiding the underground work and using a mining contractor, the capital cost would be about  $\$50 \times 10^6$ . The 10,000 tpd case would be just over  $\$100 \times 10^6$ .

The conclusion is that by initially attacking only the high grade and based on \$260.00 gold and \$0.60 copper, a bootstrapped style mine can be constructed for \$50 - 100 x 10<sup>6</sup> assuming a production rate of 5,000 - 10,000 tpd.

5. The three most important aspects of this project are grade, grade and grade. Without the high grade core of the East Zone, the project is marginal at today's commodity prices.

However after grade, the second most important aspect of the project is the rate of development of average grade and low grade ore as a function of releasing the high grade. A very large proportion of the "waste" within the stripping ratio is in fact ore. The rate of development of this ore tonnage and its corresponding grade, coupled with the debt replacement schedule will define the strategy to expand the mine in a systematic planned manner.

## Conclusions

1. At the commodity prices chosen, a project in the 5,000 - 10,000 tpd is plausible today.
2. By starting small and expanding on a prudent basis, the ideal final mine size is probably about 20,000 - 25,000 tpd. The mine life of such an operation could be between 30 - 50 years.
3. Downstream costs (on 0.86% copper) are about \$8.00/tonne of ore. This cost is underpinned in \$80.00 U.S. smelting cost/tonne concentrate, \$0.08 U.S./lb. refining and \$44.00 U.S. freight costs. The downstream costs are higher than the on property costs because of the high grade and downstream costs represent 34% of the recovered value. This represents a very good argument for the use of hydrometallurgical facility at the property.
4. In order to be competitive internationally this project must avoid, as much as is reasonable, all operating and capital costs that are underpinned in U. S. dollars. It is superior economically to use the best available technology to do mining work and ore and waste handling systems using Canadian expertise.



And so how does this project affect those interested delegates in this room? There is probably some disappointments. There might not be 100,000 tonnes of concentrate going through the port of Stewart. However there might be 28,000 tonnes of cathode copper for export through the port. Or better still perhaps, there is only 15,000 tonnes for export and the remainder supports a secondary copper industry in B. C.

There is not a large project which supports vast construction jobs. But there is a very small project that is solid economically on the basis of prudent prices and can be expanded over 10 - 15 years. With the possible introduction of the hydrometallurgical process, there could be many more jobs at the mine site at a much higher technical level.

We believe that this approach best serves our shareholders, the local residents of Iskut and vicinity, all northern communities, suppliers and governments at all levels. Most important, it serves best the investors in the machinery and infrastructure at the mine site.

Thank you.

Don Barker, P. Eng.

May 14, 1999

**EXECUTIVE SUMMARY**  
**RED CHRIS PROJECT**

This executive summary is intended to supplement and summarize the important features within the February 1999 Red Chris Report. The report was originally intended to document mining improvements and an ore reserve analysis within the Red Chris ore zone. However, as the report was being written, many improvements to the mining style were recognized as a function of the ore body geometrics and the grade distribution. As a result, the best approach to mining the ore zone was not determined until the end of the report writing process, and consequently, the actual recommendations could be confusing. The following summarizes my thoughts with respect to the Red Chris opportunity based on recent ore reserve work and engineering thinking.

- I. The Red Chris ore zone can be defined in many forms from a one billion tonne resource grading 0.29% copper and 0.26 g/tonne gold, to a 550 million tonne open pit reserve grading 0.32% copper and 0.25 g/tonne gold, or a 120 million tonne reserve grading 0.62% copper and 0.5 g/tonne gold, based on a 0.40% copper cutoff. Recently, the East zone has been further evaluated and on the basis of analyzing the zone in terms of a high grade core, regardless of cutoff grade, and ensuring that an overall structural integrity of the zone was maintained, a drill indicated reserve of  $18 \times 10^6$  tonnes grading 0.86% copper and

0.8 g/tonne gold was measured. It is clear that the Main zone also has a high grade core, although not as high as the East zone.

Preliminary evaluations have indicated that positive economics can be attained on the exploitation of ~~this~~ <sup>the East</sup> zone based on \$260.00 gold and \$0.60 copper.

It is clear that the mining and development solution around Red Chris should be focussed, at least initially, around the highest grade possible and production rates that can be attained on the basis of high grade development.

- II As a function of exploiting the highest grade possible from either the ore pass concept or traditional open pit mining, large quantities of above average grade ore and low grade will be developed in the mining sequence. This material will have very important positive economic implications for the project in terms of expansion strategies, campaign mining possibilities and development strategies.

The rate, annual tonnages and grades of this material have yet to be measured but will eventually play an important role in the longer term development of the project.

- III The mining possibilities for the project are numerous and varied and this is a main advantage of the project. In my judgement the ore pass concept in mining the 18 x 10<sup>6</sup> tonnes grading 0.86% copper and 0.80 g/tonne gold as part of a long term plan is correct. The ideal

milling rate would be about 7,500 tpd, and the capital costs for such a mine would be about \$80 x 10<sup>6</sup>. However, initially, it could be prudent to begin the mine at a production rate of about 5,000 tpd, locate the mill at the 1200 elevation for the long term plan, avoid all underground work and accept a 3 - 3.5 kilometer down hill ore haul. The initial cost would be about \$50 x 10<sup>6</sup> with the use of a mining contractor.

If this strategy were to be utilized, approximately 7 x 10<sup>6</sup> tonnes of ore could be processed grading 0.87% copper and 0.67 g/tonne gold. This ore is at a stripping ratio of about 3.7:1 and would last for about four years. At the end of four years the capital debt would be retired and either the underground work would be done to continue the mine in the East zone or the lower ratio material taken from the Main zone. There could be a further 5 - 6 years of high grade ore at sufficiently low ratio to justify hauling it to the mill. Unfortunately, the grade is substantially lower than the East zone (ie., ±0.60 - 0.65% copper and ±0.4 g/tonne gold). However, with the debt retired after four years, a reasonable life of mine of 10 - 12 years could be realized based on contract mining, 5,000 tpd, and traditional open mining.

However, the main objective would be to use the traditional mining technique only long enough to gain control of the capital debt, finance underground work to both the East zone and Main zone, and expand systematically as a function of debt replacement, and as average grade ore becomes available as a result of releasing high grade ore.

It is clear that many options exist, most of which are controlled by grade and stripping ratio. Ore reserve work, traditional planning (ie., open pit) and the long term open pit ore pass work should be done concurrently to determine the proper blend of grade realization and expansion strategy.

- IV A re-emphasis must be-made on the geological and metallurgical aspects of the high grade within both the Main and East zones. This emphasis should be on re-logging the core within the high grade zones, re-sampling and quartering the core on the basis of the intensity of mineralization, analysis of the structure within the ore zone, analysis of the relationship between gold, copper and pyrite mineralization, and, assessment of clay content.

Very preliminary pit design work to measure stripping ratios, prioritization of mining sequences, and measurements of average grade ore should be done to set a mining and milling strategy.

- VI All of the economic conclusions and recommendations are based on revenues assuming \$260.00/oz gold and \$0.60/lb copper. Based on these prices, a low capital cost project (ie.,  $\pm \$50 \times 10^6$ ) can be constructed and a strategy employed to expand the mine to +20,000 tpd depending on future circumstances. The key is the first  $18 \times 10^6$  tonnes grading 0.86% copper and 0.8 g/tonne gold. However, this is a very large resource and in fact approaches the size of Valley Copper. Consequently, it is very important to have an expansion strategy in conjunction with the high grading plan.

The character of this ore zone, and the ability to utilize the better grade ore to reduce risk and systematically expand is similar to Bethlehem Copper and their strategy in the 1960's.

The Red Chris ore zone is potentially a company builder.

D.J. Barker, P.Eng.  
March 4, 1999

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January 31, 2000

To: Dr. Raul Hasid 713-988-9639

From: Don Barker

Subject: Red Chris Project - American Balliol Minerals

Mr. Ronald Austin called me on Jan 28, 2000 to inquire about my knowledge of mineral projects. He had obtained my name from the American Balliol head office in Vancouver. After numerous discussions on Jan 28 and 29<sup>th</sup> I faxed him the attached documents and he suggested that I fax them to yourself. The attached documents are as follows

1. Executive Summary - March 9, 1999

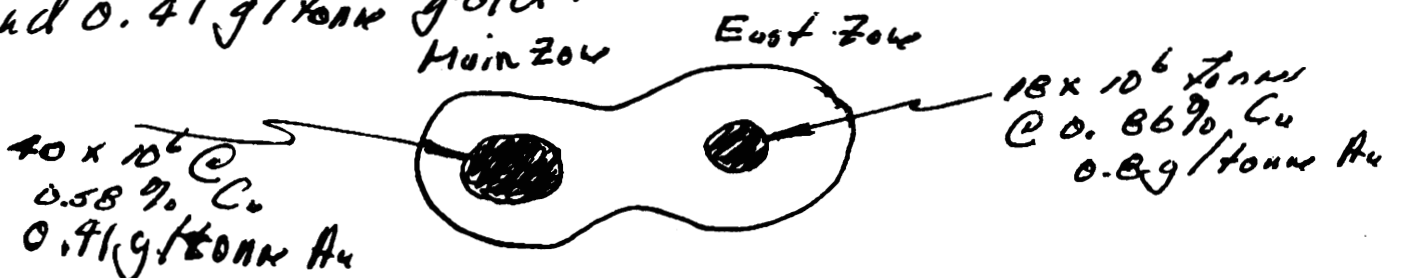
This summary is based on a report I wrote in Feb 1999. It clarifies the thoughts between the 5,000 tpd case and the 10,000 tpd case.

2. Minerals North Conference May 17, 1999.

This is a paper given in Stewart to a general audience.

Both papers stick to the same theme.

The Main Zone tonnage has since been calculated to be  $39.4 \times 10^6$  tonnes grading 0.58% copper and 0.41 g/tonne gold is



I am presently doing a modified feasibility, utilizing <sup>2/3</sup> \$0.60 U.S. copper price and U.S. \$260.00/oz gold price and a 0.675 Canadian dollar. The strategy is as follows:

1. Open up the East Zone at 8000 tpd & capture only the high grade for 3-4 yrs. - capital cost  $\approx 90 \times 10^6$  Canadian.
2. In year 4 the debt will be retired & then utilizing the average ore generated by releasing the high grade ore of the East Zone plus a start to mining the Main Zone, the mill would be expanded to 16,000 tpd in year 4.
3. In year 7 or 8, after the mill had paid the expansion debt off, utilizing the remainder of the high grade East Zone and the Main Zone, the mill would be expanded to  $\pm 24,000$  tpd.

It is anticipated that by utilizing the high grade properly to finance an orderly expansion program that a long life mill can be built for an initial outside capital of less than  $100 \times 10^6$  Canadian and prices at \$0.60 copper and \$260.00 gold. This could be improved by possibly i) deep leaching of low grade (see Gibraltar) ii) use of a hydrometallurgical facility i.e. CESH or Intec. etc



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The climate at the location area is cold in the winter and moderate in the other seasons. It is not in a high snowfall or rain fall area. The property is 10 km east of highway 37 at Iskut B.C. (140 km south of the Yukon border). It is presently planned to take the concentrates out from Stewart B.C. A rail right of way crosses within 10 km of the property.

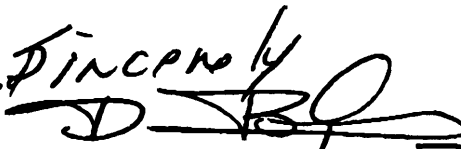
I am consultant to American Bullion. I believe that because of the grade distribution there is an opportunity to develop a fog like mine at low risk in capital and utilizing very low copper and gold prices. This project is potentially a company builder.

You now have some very general documents that outline the opportunity. If you are interested my only recommendation is to do very thorough due diligence to define the opportunity. Please contact me at either

604-684-1704 }  
 or 604-801-6780 }  
 (America Bullion)

if you have further questions.

C.C. Ronald Austin  
 229-3057 phone  
 229-3110 fax.

P.S. The attached documents are 14 pages  
 Sincerely  
  
 D.J. Becker P.Eng.



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Feb 8, 2000

To: Tom Schroeter

From: Don Bonker

Subject: Red Chris - American Ballion

The attached is some of the material (on type of material) I have been trying to attract investors with. Within a week or so I will give you a first pass at a one page highlights on Red Chris

Regards