

*Tom Schwartz*

**DRC RESOURCES CORPORATION**

886020

**EXCERPTS FROM:**

**SCOPING STUDY  
ON THE AFTON MINES PROJECT  
KAMLOOPS, B.C.**

**February, 2001**

**PREPARED BY:**

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**J01-001**

## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction**

The Afton Mine Project of DRC Resources Corporation ("DRC") is located 6 miles west of Kamloops, BC, on the site of the previous Afton Mine operation of Teck Corporation ("Teck"). Since acquiring the property in late-1999, DRC has drilled 9,320 m (30,575 ft.) in 21 NQ diamond core holes, seeking to delineate an underground-mineable resource, beneath and adjacent to the existing open pit. A resource estimate by DRC Consulting Geologist J.J. McDougall resulted in an Indicated Mineral Resource of 22.7 million tonnes (25.0 million tons) grading 2.0% copper, 0.045 oz/ton (1.54 gpt) gold, 0.20 oz/ton (6.8 gpt) silver and 0.004 oz/ton (0.14 gpt) palladium, for an approximate copper equivalent grade of 3.00 percent copper. This resource does not include material contained in about 62m (200 feet) of strike length of the mineralized zone drilled off by Teck in 1973. The resource as delineated by DRC is relatively unique, in that it contains economically recoverable quantities of copper, gold, silver and palladium.

In January of 2001, Behre Dolbear & Company Ltd. (Behre Dolbear) was commissioned by DRC to perform a scoping study to examine the project merits at the current point in time. The study includes a review of geology, evaluation of possible mining methods, recommendation of a metallurgical processing method, development of mine, mill, and infrastructure capital costs, determination of operating costs, a review of environmental status and a financial analysis. All of the Behre Dolbear work has been based on the drilling results obtained by DRC and the definition of the in-situ resource as described by J.J. McDougall, P.Eng. in his report titled "2000 Diamond Drill Exploration Report on the Afton Mine Property", (the "McDougall Report") dated January 24, 2001. Behre Dolbear has accepted the DRC drilling and the McDougall Report as being representative of the project at this point in time. Additional exploration drilling to confirm the size and geotechnical aspects of the mineralized body is required along with expanded metallurgical testing of samples representative of the entire resource.

The scoping study has determined that the project has favorable economic possibilities with low production costs, moderate capital requirements and relatively low environmental concerns. Relevant project statistics are presented in Table 1.1, below.

<b>Table 1.1 Afton Mine Project Statistics</b>			
<b>Ore Reserve</b>	25,000,000 tons	2.0% Copper 0.045 opt Gold 0.20 opt Silver 0.004 opt Palladium	
<b>Mine</b>	Mining Method Production Rate	Block Caving 4,500 tons/day	
<b>Mill</b>	Re-furbished Design Capacity Availability (%) Average Daily Throughput Operating Days per Year Recoveries	5,000 tons/day 90 4,500 tons/day 365 Copper 87% Gold 90% Silver 75% Palladium 74%	
<b>Financial</b>	Recovered Metal Quantity and Commodity Price Used	Commodity	Metal Production (Life of Mine) Price
		Copper	870,000,000 lbs \$US 0.85/lb
		Gold	990,000 oz \$US 280/oz
		Silver	3,750,000 oz \$US 5.00/oz
		Palladium	74,000 oz \$US 1,000/oz
	Operating Cost (excludes freight, smelting, refining)	Mine	C\$8.00 -C\$9.14
		Mill	C\$5.50
		Administration	C\$1.06
		Home Office & Contingency	C\$1.72
		Total (per ton milled)	C\$16.28-C\$17.42
	Initial Capital Investment*	C\$91,156,000	
	Life of Mine Sustaining Capital)*	C\$41,477,000	
	Life of Mine (after-tax) Cash Flow	C\$366,279,000	
	Net Present Value (10% Disc. Rate)	C\$117,815,000	
	Internal Rate of Return	32.3%	

\* Includes 30% Contingency

## **1.2 Geology**

The Afton mineral zones are located within the 35 km long Iron Mask Batholith, at the northwest end of the 18 km long Iron Mask Pluton, composed of diorites and gabbros of Upper Triassic age (230–208 Ma). The pluton was emplaced in Upper Triassic strata of the Nicola Group composed of andesitic and basaltic flows, breccias, tuffs, mudstones, argillites, and limestones<sup>1</sup>. After sporadic exploration by numerous mining companies dating from the early 1900s, an economic deposit was delineated at Afton in the early 1970s, culminating in the development of an open pit mine, which was brought into production in 1978. The assumption at that time was that the deposit was a supergene-enriched porphyry type copper deposit, in which surface water percolating down through the rock had oxidized and enriched low grade copper minerals near surface.

Open pit mining operations ceased in 1987, when at a depth of 275 m (900 ft.), supergene native copper, chalcocite and chalcopyrite ores could no longer be economically mined by open-pit methods. Subsequent drilling below the pit bottom indicated higher copper and precious metals grades at depth, which is inconsistent with most porphyry copper deposits, which decrease in grade with depth. Mineralogical and petrographic examination of the deeper mineralization suggests that the Afton deposit might be analogous to a magmatic copper-nickel deposit.

Recognizing the potential for a high-grade resource amenable to underground bulk mining, DRC acquired the Afton Mine claims in 1999 and have been drilling since that time to locate and define a high grade primary hypogene copper-gold deposit.

## **1.3 Mining**

DRC's Year 2000 Diamond Drill Program has established the presence of a substantial primary (hypogene) copper zone adjacent to and below the [southwest

segment of the] existing open pit. The mineral zone is a 035° striking tabular body that is in excess of 365m (1200 ft) in strike length, averages 76m (250 ft) in width, and extends to a depth of at least 303m (1000 ft) below the old Afton pit bottom, with no indication of narrowing along strike or down dip, although some narrowing up dip is indicated. The Indicated Mineral Resource, based on data from 18 of the 21 NQ diamond core holes drilled, is 22.7 million tonnes (25.0 million tons) averaging 2.00 % copper or 3.00% copper equivalent. This mineral resource was estimated with approximately 25% of the total drill core representing the continuous mineral zone and 99% core recovery within the zone<sup>2</sup>. The dip of the inferred tabular body varies from 70° to sub-vertical<sup>3</sup>. For the purposes of conceptual mine design, a uniform dip of 80° has been assumed.

The Block Caving mining method was selected, in the light of information available from diamond drilling, as the method offering the lowest potential operating costs. An ore production rate of 4,500 tons per day (4,090 tonnes per day) was found to be the largest that could be supported technically by the tabular body as currently defined. No attempt was made to optimize the scale of operation.

In order to bring the mine into production at the earliest practical date, proposed development has been split into two phases, with the initial infrastructure laid out to start mining the upper 152m (500 feet) of the tabular body two years after Project initiation. A second lift will be developed to start mining from the bottom of the currently defined resource in the eighth year of production. In line with current preferred practice, mine layout, productivity and costs are based on a trackless operation.

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<sup>1</sup> Carr, J.M. and Reed, A J., 1976, "Afton: A Supergene Copper Deposit": *Porphyry Deposits of the Canadian Cordillera*, v. 15 p. 376-387.

<sup>2</sup> McDougall, J.J., 2001, "Diamond Drill Exploration 2000 Report on the Afton Mine Property"

<sup>3</sup> *Idem*: Figure 6.

## **1.4 Processing**

The assumptions used to forecast the possible metallurgical performance for the DRC ores are taken from testing performed by Process Research Associates Ltd. ("PRA") of Vancouver, BC during December 2000 and January 2001. This testing indicated copper recoveries of 87% and gold recoveries of 90 percent. Copper concentrate grades in excess of 40 percent were achieved. The ore also contains significant values of palladium at a level of 0.14 g/t (0.004 opt). Palladium recovery has been estimated at 74 percent for the scoping study. Silver recovery was estimated from past performance and the available metallurgical tests.

It is assumed that copper concentrate will be shipped by truck and rail to Vancouver for trans-shipment to an offshore smelter. The final concentrates are expected to contain up to 4,000 ppm (0.40 percent) arsenic. The arsenic content of the concentrate may trigger a penalty for the amount over 0.3 percent and has been calculated at C\$3.00 per DMT per 0.1 percent over 0.3 percent up to the level of 0.40 percent in the copper concentrates used in this scoping study.

For the purposes of this study, it is assumed that the ore will be treated in the existing Afton concentrator, which along with shops and laboratories remains from the former Teck operations on the site. Design production rate for the study is 5,000 tons (4,545 tonnes) per day, which at 90% availability is consistent with the mine output of 4,500 tons per day. The concentrating operations will require new capital expenditures for underground primary crushing, conveying, stockpiling, flotation, filtration and tailings pumping/distribution. In addition, the SAG mill circuit will have the SAG mill oversize crusher re-installed and most major process pumps will have to be replaced.

## **1.5 Environment**

Environmental concerns to be addressed by DRC at the Afton project include the mining lease, the reclamation permit and permits associated with water and air issues.

The mining claims are under option by DRC, however the Afton Operating Corporation (Teck's operating subsidiary at Afton) is currently maintaining the reclamation permit/bond, certain water permits and the waste management permit. A water license for the 3,960,000 gpd mill water requirement has been relinquished and will require re-negotiation. Acid mine drainage is not a problem at Afton due to the fact that carbonate-rich rocks are found throughout the mine and tailings areas.

Behre Dolbear did not find any significant environmental issues that would impact DRC's plan to re-start operations.

## **1.6 Capital Costs**

### **1.6.1 Summary**

The capital cost estimate includes capital spending for new and re-furbished equipment and facilities and an allowance for the purchase of the existing Teck assets on site. Included in the Teck assets are the Office Building, Assay Laboratory, Mill Building & Infrastructure, Grinding Lines, Maintenance Shops, Ambulance, Process Water System (Kamloops Lake) and miscellaneous equipment currently in use for reclamation activities on site. No discussions are on record of negotiations with Teck for the acquisition of the existing site facilities. The current figure is an allowance recommended by Behre Dolbear.

No capital is allotted for the purchase of the adjoining lands controlled by Sugar Loaf Ranches (Teck Owned).

Initial Capital costs for purchase of the Teck assets and for project development and construction are estimated at C\$5,000,000 and C\$56,620,000 respectively. The estimates do not include contingency.

Sustaining capital (after production commences) totals C\$36,628,000.

Working capital, estimated at two months operating costs, and warehouse inventories plus initial fills have been estimated at C\$4,700,000 and C\$5,000,000 respectively.

Contingency at 30 percent would total C\$32,384,000 on the total capital investment (initial plus sustaining).

### **1.6.2 Mining Capital**

Mining Capital has been estimated for a 4,500 stpd operation utilizing the Block Caving method.

An underground mine at Afton would be a new venture, with no previous facilities to build on. The Block Caving mining method selected is known for its low operating costs, under narrowly specific conditions, but it also tends to require a high level of pre-production capital expenditure. In this case, a mine development program is proposed that minimizes up-front capital costs and initiates revenue-earning production as quickly as possible. Much of this work is non-recurring and does not warrant DRC's acquisition of the personnel and equipment to do it. Canada is well provided with skilled contracting companies able to perform shaft sinking, underground development and construction, so costs have been estimated on the basis of using contractors for these activities.

Pre-production capital costs would include acquisition of fixed plant, mobile equipment for ore production, and EPCM costs. Some 60% of the pre-production capital expenditure would be on contractors. Ongoing, or sustaining capital expenditure is required for routine replacement of certain fixed plant and mobile equipment. The first lift, exploits the 150m (500 ft) high upper half of the mineralized body to accelerate early returns on investment. Major capital expenditure will be incurred during Years 5 – 7, to prepare for mining the 150m (500ft) high lower half of the mineralized body.



The pre-production cost to access the deposit and prepare it for mining is estimated at C\$34,000,000. A 30 percent contingency allowance would add C\$10,200,000 to this estimate.

### **1.6.3 Processing & Infrastructure Capital**

The capital requirements for the concentrator and infrastructure are mainly related to replacing those articles of equipment, which have been sold as salvage from the milling, concentrate handling, tailings disposal and process water operations. Other significant capital costs include those associated with refurbishing the three grinding mills, replacement of the primary crusher (underground), installation of a new overland and plant conveying system, replacement of a majority of mill slurry and clean-up pumps, replacement of the flotation sections, replacement of the concentrate filtration and handling system, refurbishing of the process water system and replacement of the tailings disposal pumps and piping. The estimate has been factored from current equipment quotes at the Afton Mill's capacity at closure of 9,000 stpd. These units realistically match up with the existing plant layout and equipment. Total capital requirements are C\$22,620,000 (w/o contingency) in capital spending.

## **1.7 Operating Costs**

### **1.7.1 Summary**

Operating costs include the routine cost of on-site operations made up of mining, milling, maintenance and general & administrative. In addition, costs for concentrate treatment including freight, smelting and refining have been estimated.

### **1.7.2 Mine Operating Costs**

Estimates of mine operating costs have been based on known costs for similar types of operations, adjusted to reflect differences of scale and site specific conditions. Most block caving operations work at significantly higher rates of production and in economic environments unlike those in Canada. Labor costs are based on recent North American industry surveys.

Operating unit costs vary from C\$8.00/ton mined in year 1 to C\$9.14/ton mined for years 8 through 16.

### **1.7.3 Process Operating Costs**

The concentrator annual operating costs including maintenance and repair are estimated at C\$9,019,000 (C\$5.50/ton milled) for the 5,000 stpd design case. Mill operating and maintenance costs are based upon typical costs for operations of this size and have been adjusted to reflect current planned operating levels (versus the historic Afton operating rate of 9,000 stpd).

### **1.7.4 General & Administrative Operating Costs**

The general and administrative annual operating costs for the project are estimated at C\$1,742,000 (C\$1.06/ton milled). General and administrative costs are based upon typical costs for operations of this size.

## **1.8 Administration & Organization**

The planned structure of the mine, mill and administrative organizations was based upon personal experience and the mining and milling method planned for the project. No detailed manning charts or schedules were prepared for this study. In addition, no

distinction was made between union and union free organizations and their respective efficiencies.

As much as possible, the organizations charts represent minimum staffing levels and direct management control. The example organization charts are attached as Appendix 2.

### 1.9 Financial

A cash flow spreadsheet has been prepared for the project by Behre Dolbear. In addition, the net present value of the project has been determined at various discount rates and an internal rate of return has been calculated. The life-of-project cash flow (undiscounted) is C\$366,279,000. At a discount rate of 10 percent, the net present value is C\$117,815,000. Net present value is determined to the beginning of the development period (beginning of year -2). The internal rate of return is 32.3 percent. The rate of return is determined for a 100 percent equity (no project debt) scenario with constant dollars (no inflation). The net present value NPV for various discount rates, at a capital cost contingency of 30 percent, is shown in Table 1.2.

<b>Table 1.2 NPV And IRR Summary</b>	
<b>Discount Rate %</b>	<b>Net Present Value (C\$)</b>
0.00	366,279,000
5.00	205,263,000
10.00	117,815,000
15.00	67,369,000
20.00	36,709,000
25.00	17,241,000
30.00	4,432,000
<b>IRR = 32.32%</b>	

Utilizing the 10 percent discount rate project economics for 10 percent and 20 percent capital contingencies were determined. The IRR and NPV for the 10 percent

contingency and 20 percent contingency are 37.2 percent with C\$126,915,000 and 34.6 percent with C\$122,365,000 respectively.

## **1.10 Recommendations & Risk Reduction**

### **1.10.1 Summary**

This is a scoping study. It is based on very limited information, supplemented by the many years of experience of the authors of the study. All mine engineering has been predicated upon the Indicated Resource as delivered to Behre Dolbear by DRC.<sup>4</sup> Process recommendations are based upon proven rated capacity of the existing milling facilities and a very limited number of metallurgical laboratory tests.

### **1.10.2 Mine**

The product of this study is an indication of what might be achieved, and how the achievement could be realized, if the mineral resource delineated by DRC can be transformed into a reserve. It is recommended that more geotechnical information be gathered from future diamond drilling programs. Once the expense of drilling has been incurred, as much information as possible should be extracted from the core. Procedures that would contribute to this end include careful photography of core before logging or splitting, and a record of qualitative and quantitative examination of geotechnical characteristics such as rock mass strength, jointing, fracturing and rock hardness.

The use of one of the many computer software packages available for mine design or manipulation of drill-hole data would enhance the interpretation and evaluation of the data, as well as the optimization of drilling programs for upgrading the resource. The validity and value of conceptual mine design and cost estimates are dependent on the quality of the geological information on which they are based. There is a high risk

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<sup>4</sup> "2000 Report on the Afton Mine Property-Amended", J.J. McDougall, P.Eng., January 24, 2001

that the mining method, mine layout and the costs derived from these may prove not to be applicable when the geological information is refined.

### **1.10.3 Process & Infrastructure**

The strongest process recommendations are keyed to gaining a broad understanding of the metallurgical response to be expected from the resource. To this end future drilling and underground exploration must have a strong metallurgical component to assure that milling plans are founded on a solid information base

In addition, the terms of a potential smelting agreement must be investigated at an early date. The assumptions used in this study are the product of current literature and past experience and do not represent face-to-face negotiations with custom smelter personnel.

### **1.10.4 Financial**

Risks for the financial aspects of the project aside from those associated with the limited technical information available are covered by the three levels of contingency as shown in Table 1.3 below.

<b>Table 1.3</b>			
<b>Project Economics Comparison</b>			
<b>(C\$)</b>			
<b>Discount Rate</b>	<b>Net Present Value</b>		
	<b>30% Contingency</b>	<b>20% Contingency</b>	<b>10% Contingency</b>
0.00	366,279,000	371,492,000	376,704,000
5.00	205,263,000	210,101,000	214,940,000
7.50	155,278,000	159,964,000	164,650,000
10.00	117,815,000	122,365,000	126,915,000
12.50	89,326,000	93,755,000	98,183,000
15.00	67,369,000	71,686,000	76,004,000
17.50	50,234,000	54,449,000	58,664,000
20.00	36,709,000	40,829,000	44,949,000
25.00	17,241,000	21,187,000	25,132,000
30.00	4,432,000	8,220,000	12,007,000
<b>Internal Rate of Return</b>	<b>32.32</b>	<b>34.60</b>	<b>37.22</b>

## 10.6 Recommendations And Risk Discussion

The project economics are governed, almost totally, by the technical data available. Aside from the general gain in knowledge associated to bringing the project to the next level no significant changes in economic analysis are predicted. Economic risk centers in the following areas:

- Refinement of capital and operating costs in addition to establishing proper contingency levels;
- The uncertainties associated with tax legislation in the province of British Columbia;
- The adequacy of estimates for working capital, and the purchase of the Teck assets; and
- The adequacy of the reclamation sinking fund. Absent specific data relating to the effluent quality of tailings and mine water, water will be the primary closure issue given the location of the project site. If current assumptions concerning ARD levels prove to be erroneous, the sinking fund could be grossly understated and if the information gained from Teck personnel is accurate the sinking fund could be overfunded.

## **11.0 CERTIFICATION**

### **11.1 Behre Dolbear and Company Ltd.**

Behre Dolbear and Company Ltd. hereby certifies that it is qualified to review the Afton Mine Property for DRC Resources Corporation and that the persons that have reviewed the Afton Mine Property and prepared this Scoping Study are “Qualified Persons” as described in National Instrument 43-101.

Behre Dolbear, founded in 1911 is the oldest, continually operating, mining consulting firm in North America. The company specializes in performing mineral industry studies for mining companies, financial institutions and natural resource firms. Typical studies conducted by Behre Dolbear are reserve compilations and audits, mineral property evaluations and valuations, due diligence studies for acquisition purposes, assistance in negotiating mineral agreements, market analyses, and environmental assessments and impact studies. The firm has worked with a broad spectrum of commodities on a worldwide basis including base and precious metals, coal and lignite, ferrous metals, and industrial minerals.

Behre Dolbear operates from eight offices: Denver, New York, Toronto, Vancouver, Guadalajara, Santiago, Sydney, and London. The offices draw upon personnel from other offices to assure that the best-qualified professionals are assigned to a project.

Behre Dolbear works strictly on a fee basis; commissions, overriding royalties, and interests in properties are not accepted or sought, which assures objective, independent studies.

### **11.2 Qualified Persons**

The following qualified persons contributed to the review of the Afton Mine Project and to the writing of this Scoping Study:



- **Metallurgist – Mr. Mark A. Anderson**, Senior Associate and Chairman of the Board of Behre Dolbear, acted in the capacity of Metallurgist for this assignment. Mr. Anderson has more than 37 years of diversified industry experience in both technical and managerial roles, including project feasibility, mine operations and project due diligence. His experience includes evaluation of copper/molybdenum properties with emphasis on processing, metallurgy, project management, and feasibility analysis. His responsibilities have included construction management and operation of a 9 million tonne per year open pit copper/molybdenum mining operation with a 28,000 tpd concentrator, and milling and smelting operations at a 21,500 tonne per day copper ore mining facility.
- **Mining Engineer – Mr. Colin F. Smith**, Consultant to Behre Dolbear, acted as the Project Mining Engineer. Mr. Smith has more than 40 years experience in the mining industry including long periods of employment with both the RTZ Group and Anglo American. Mr. Smith was the Project Manager for the successful conversion of the Palabora Mine in South Africa from an open-pit to an underground block caving operation.
- **Economic Analysis – Mr. Williams E. Jennings**, Senior Associate and Principal with Behre Dolbear, Mr. Jennings will perform the economic analysis of the project. Mr. Jennings has over 20 years of experience in the mineral industry with over 15 years in preparing economic projections for mining projects.
- **Project Manager – James A. Currie**, Vice President of Behre Dolbear & Company Ltd. acted as Project Manager of this assignment, was responsible for editing the report and will sign as the Qualified Person, on behalf of Behre Dolbear and Company Ltd. Mr. Currie has 22 years experience in the mining industry including exploration, construction and operations management.

- **Project Advisor – Derek C. Rance**, President and CEO of Behre Dolbear & Company Ltd. acted as Project Advisor for this work. Mr. Rance has more than 35 years experience in the mining industry and was previously President and Chief Operating Officer with the Iron Ore Company of Canada, one of Canada's largest mining companies. In addition, Mr. Rance spent 10 years as the General Manager of the Dickenson Gold Mine in Balmertown, Ontario and has worked on many other underground mining projects.

Mr. Anderson and Mr. Smith visited the Afton Mine property on January 15 – 16, 2001, followed up by a visit to DRC's offices in Vancouver, BC to review further data on January 17 – 19, 2001. Mr. Currie has visited the Afton Mine Property a number of times over the past 20 years, but did not make a visit to the property in connection with the preparation of this report.

This report is a scoping study, written for the use of DRC Resource Corporation in evaluating the merits of the Afton Mine Project and to assist DRC in determining whether further investment is warranted. While the report has been compiled by Qualified Persons in industry-standard format, it has not necessarily been written accordance with National Instrument 43-101 requirements for submitting reports of mining properties to Canadian Securities Administrators.

Behre Dolbear hereby consents to the use of this report for a Prospectus, Statement of Material Facts or any other corporate purpose, subject to keeping excerpts from the report in their proper context.

Dated at Vancouver, this 23<sup>rd</sup> day of February 2001.

**Behre Dolbear and Company Ltd.**

James A. Currie, P. Eng.

Vice President