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Mt. Milligan Project

"Economic Growth for B.C. & Shareholder Value for Placer Dome"

12/15/97

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Summary:

The Mt Milligan copper / gold porphyry deposit located in the central interior of British Columbia was written off by Placer Dome in 1992. However, indications from current scoping and engineering studies are that, with the appropriate stimulus, there is an opportunity for Mt. Milligan to become a viable project. Recent evaluations have indicated that by applying an innovative use of existing technologies, Mt Milligan has the potential to become a major open pit mining operation, producing 200,000 ounces of gold and 31,000 tonnes of copper annually for more than 16 years.

However, Placer Dome will be unable to make Mt Milligan into a mine without some assistance from one of the project's major stakeholders, the Government of British Columbia. Mt Milligan could generate large revenues and tax pools, but the project's after tax profits are too small to warrant the large capital investment. While the province of British Columbia would benefit from a development at Mt. Milligan, Placer Dome should also be rewarded for taking on the risk associated with a mine costing M\$Cdn 615 to construct.

As Placer Dome continues its prefeasibility study during early 1998, it would also like to work with the government of BC to evaluate any assistance they can provide to make the project a reality. Placer Dome believes that such concessions for Mt Milligan are in the best interest of British Columbia. The project has the potential to create over 310 high tech, high paid jobs with high multipliers. In addition to job creation, Mt Milligan has a potential to generate up to \$250 million in cash flow accruing to provincial coffers. British Columbia could provide concessions from this large cash inflow and still retain very significant tax revenues from the project.

Another significant way for British Columbia to support to the project is through "Power for Jobs". Every \$0.01/kwhr decrease in the cost of power for the Mt Milligan project can improve the Net Present Value of the project by \$30 million. There are many avenues, as listed in Table 1, which British Columbia can use to economically support the Mt Milligan project. We are keen to explore these with provincial officials.

The current prefeasibility study will include a detailed concept review with the objective of lowering capital and operating costs. If Placer Dome successfully reduces cost estimates, a feasibility study would be completed which would include the refinement of the metallurgy. If the feasibility study produces positive economics, an investment decision could be made. As shown in Figure 1, Placer Dome is planning to have a completed feasibility study by the first quarter of 1999. Permitting would be completed during the feasibility study. Construction of Mt Milligan could begin during the second quarter of 1999 and would last approximately 2 years. Production of gold and copper would commence by 2001 for at least 16 years.

Table 1
How Can BC Help Make Mt. Milligan a Reality?

<u>Alternative to Reduce Direct Costs</u>	<u>Alternatives to Reduce Indirect Costs</u>
1) Low cost power, less than \$0.02/kwhr	1) Reduction of any of the following taxes: Income tax (M\$70.75) Mining tax (M\$31.19) PST (M\$24.66) Property tax (M\$24.0) Capital tax (M\$17.14) Fuel tax (M\$7.2)
2) Provide infrastructure: Road (M\$11) Power line & sub-station (M\$15)	2) Investment tax credits
3) Fort St. James housing: Placer has budgeted M\$15 to provide some housing in Fort St. James. This may be an opportunity for a developer or the First Nations community with some assistance from B.C.	3) Subsidize cost of employee training including training of First Nations employees
	4) Priority for project permitting
	5) Road Maintenance
	6) Water rental rates ???
	7) Assistance linked to commodity price
	8) Preferential transportation and port rates

Mt Milligan Highlights

- Major open pit mine producing 200,000 ounces of gold and 31,000 tonnes of copper annually
- Mt Milligan will create 450 jobs during the two year construction period
- The mine would employ 310 people annually during its 16 year life
- More than \$250 million in tax revenue would flow to the province over the life of the operation
- The mines \$615 million construction cost would provide significant economic benefits for the four local communities: Fort St. James, Mackenzie, Prince George, and Vanderhoof
- Significant potential for local Aboriginal employment, skills training, and economic development
- Innovative use of recovery technology has the potential to build new, value-added capacity
- Innovative technology holds the potential to increase viability of other orebodies.

Introduction:

The Mt. Milligan copper-gold deposit is located at 55°08' north latitude and 124° 04' west longitude in the Omineca Mining Division of North Central British Columbia. Four well established communities are within 160 km of the proposed mine site. These communities are Mackenzie, 100km to the northeast, Prince George, 155 km to the southeast, Vanderhoof, 155 km to the south, and Fort St. James, 86 km to the south. Please refer to the Figure 2 location map.

In 1990, Placer Dome Inc. became the primary proponent of the Mt. Milligan Project after acquiring through a wholly owned subsidiary all the shares of Continental Gold Corp. Continental Gold Corp then applied for a mine development certificate, which it received in 1993, despite the fact that the project was written off by Placer Dome in 1992.

Since early 1995 a series of evaluations have been completed by Placer Dome in an effort to improve the project's profitability. The most recent of study incorporates new hydrometallurgical processing technologies developed by Placer Dome. This hydrometallurgical process has improved the project economics, but not enough for Placer to make a positive investment decision. It is felt that with continued design improvements and cost reductions coupled with government assistance, Mt. Milligan has the potential to be a viable operation.

Mineral Resource & Reserve:

The bulk of the gold and copper mineralization occurs in sulphides which are disseminated through a large rock mass, rather than occurring in veins. The Mt. Milligan copper-gold porphyry deposit has a measured and indicated resource of 5.94 million ounces of gold and 959,000 tonnes of copper contained in 445 million tonnes of ore as described below.

• **Resource:** 445Mt 0.415 g/t Au 0.215% Cu

More than 70% of the measured and indicated resource is considered as a mineable reserve which is economically viable to extract. Mt Milligan's reserve contains 4.21 million ounces of gold and 617,000 tonnes of copper in 257 million tonnes of ore as described below.

• **Reserve:** 257 Mt 0.510 g/t Au 0.240% Cu

Metal production:

The most recent economic evaluation of the Mt. Milligan deposit has indicated that a 45,000 tonne per day process facility optimally balances low operating costs and a relatively high production rate minimizing the facility capital costs. A 45,000 tonne per day process facility will:

- Produce copper & gold for 16 years based on current reserves (including 3.5 years of low grade stockpiles)
- Employ on average 310 mine, mill, and staff personnel
- Recover approximately 77% of the gold in the ore
- Recover approximately 81% of the copper in the ore
- Produce a total of 3.21 million ounces of gold
- Produce a total of 1.089 billion pounds of copper
- Require Mining of 131,500 tonnes of ore and waste per day on average at a 1.31:1 waste to ore strip ratio

Mining:

Conventional open pit mining methods with large scale equipment will be employed at Mt Milligan. Large 33 cubic metre electric rope shovels will load 218 tonne haul trucks. A total of 624 million tonnes of ore and waste will be mined from the Mt Milligan open pits over a 13 year period at an average rate of 131,500 tonnes per day. Stockpiled material will be processed for the last 3 years of the mine life. The single largest cost in mining is the cost of hauling, due in large part to the cost of fuel and the associated taxes.

For every tonne of ore mined from the open pit, 1.31 tonnes of waste will be removed and placed on a waste dump. The waste dumps will be placed adjacent to the open pit (see Figure 3, Facility Layout) and will be constructed so that they can be recontoured and revegetated at completion of operations. Before a waste dump is constructed, surface water will be diverted from the drainage.

Milling:

Typically copper-gold porphyry deposits like Mt. Milligan are processed using a flotation circuit, in which finely ground ore from the mine is mixed with water to form a slurry before chemicals are added that will physically separate, or "float" the metal bearing sulfide material from the barren rock. The resulting gold/copper sulfide concentrate is then transported by road, rail and ship to a smelter where the metal is separated from the concentrate and refined into a saleable product. Mt. Milligan concentrate is projected to contain 19% copper metal and 300g/tonne of gold. For remote, low grade deposits like Mt Milligan the shipping, smelting, and refining costs can be prohibitively high, as much as 50% of the mine's total operating costs. This has an extremely negative impact on the project economics. Consequently, Placer Dome is considering hydrometallurgical treatment of the concentrate produced at Mt. Milligan.

The hydrometallurgical technique being considered by Placer Dome will process the concentrate produced at Mt. Milligan in an autoclave. The company currently uses autoclaves to process gold ores at several of its mines around the world, including in North America. The concentrate is oxidized, or cooked, at relatively low temperatures and pressures in an autoclave to breakdown bonds between the metal and the sulfide material. Acid is generated during the autoclaving that puts the copper into solution. After the autoclave has oxidized the concentrate and dissolved the copper, gold dore and copper cathodes can be produced with low cost leaching, electrowinning and refining processes. Figure 4 illustrates the flow of ore in the proposed treatment process.

Mill Tailings:

Tailing produced from the hydrometallurgical process will be placed in an impoundment immediately to the east of the open pit. Water will be recycled from the impoundment to the mill so there will be no surface water discharge to the environment.

Infrastructure:

Access

Though the mine site will be accessible from both the east and the west of the mine, the principal access will be from the west off a road running north of Fort St. James toward Manson Landing and then by 28 kilometers of new road to connect with site. The total distance along the western route is 86 km.

Water Supply

Fresh potable and process water will come from a catchment on Rainbow creek. However, the majority of process water will be recycled from the tailing impoundment.

Power Supply

Four 500 kW diesel generators will be used to supply power during construction. Permanent power for the operations stage will be transmitted via an 87 km, 230 kV transmission line which will be constructed from B.C. Hydro's Kennedy substation near the Windy Point junction, south of Mackenzie (see Figure 2, Location Map). The average load from Mt Milligan operations will be approximately 87 MW, while the peak load is estimated at 91 MW.

Environmental Matters:

Environmental protection is a very high priority for Placer Dome. An extensive environmental assessment was completed in 1991-92 and was approved by the provincial and federal governments in 1993. Studies have continued since 1993 with the objective of reducing potential impacts even further. Placer Dome intends to work closely with provincial and federal agencies, First Nations and local communities in a focussed review of the environmental aspects from the proposed modifications to the project. Placer Dome will maintain high environmental standards throughout the planning, monitoring and reclamation stages at Mt. Milligan.

Construction Schedule and Cost:

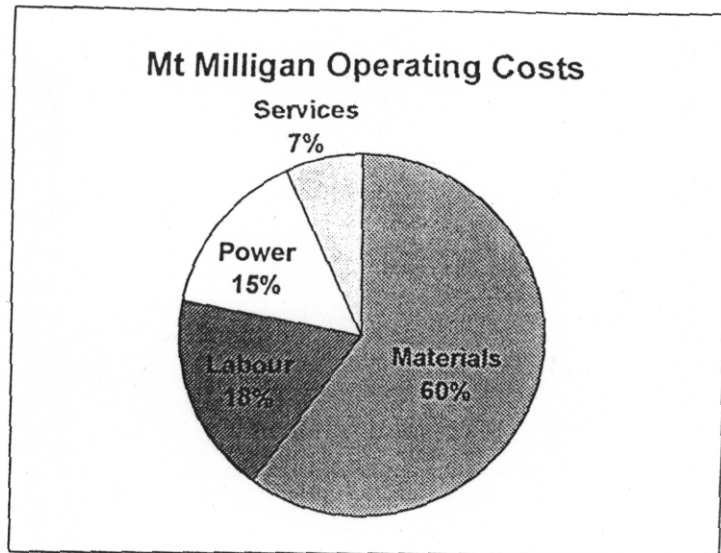
Construction of the Mt. Milligan facilities will last approximately 2 years. The capital cost of the project is currently estimated at M\$615 Cdn. Table 2 summarizes the construction cost areas for the project.

Table 2
Mt Milligan Construction Cost
(45,000 tonne per day Hydrometallurgical facility)

<i>Cost Area</i>	<i>M\$Cdn</i>
<i>Direct Costs</i>	<i>456.1</i>
<i>Indirect Costs</i>	<i>115.9</i>
<i>Contingency</i>	<i>42.9</i>
<i>Total Construction Cost</i>	<i>614.8</i>

Operating Costs:

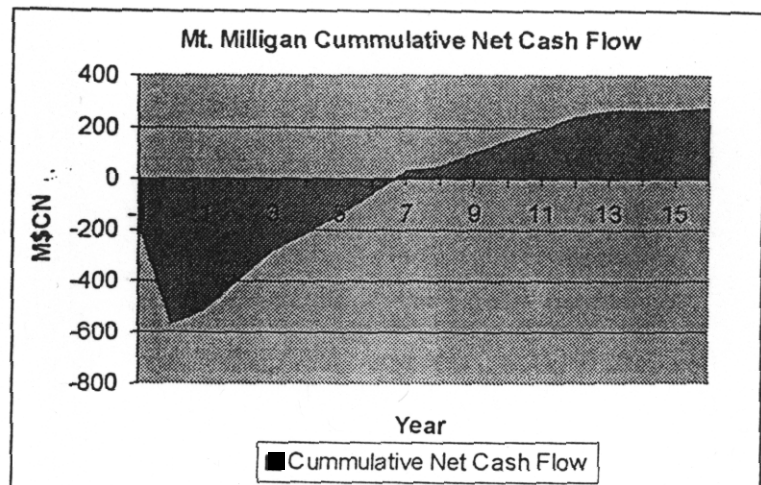
The cost of sales at the Mt Milligan project are estimated at \$Cdn 7.02/tonne milled, or approximately M\$Cdn 115.3 annually. Power is a very significant part of these costs, at a \$0.024/kwhr rate, power makes up 15% of the total operating costs with the balance of the operating cost distributed between materials (60%), labour (18%), and services (7%).



Project Economics:

Although the economic results from the most current Mt. Milligan evaluation are marginally positive, generating a M\$Cdn 27.7 net present value from a cash flow discounted at 6%, they are not adequately positive to justify the risk associated with M\$Cdn 615 mine development investment. The Mt Milligan project cash flow is summarized below, indicating a 6.7 year payback. These economics are based on a \$US 375/oz average gold price, a \$US 0.95/lb copper price and an exchange rate of \$ 0.75US/\$1.00 Cdn.

Area	M\$Cdn
Revenue	\$2,981.0
<u>-Cost of Sales</u>	<u>\$1,801.7</u>
Operating Profit	\$1,179.3
-Capital Expenditure	\$639.1
<u>-Taxes</u>	<u>\$264.9</u>
Net Cash Flow	\$275.3
Discounted Cash Flow (6%)	\$27.7



Conclusion:

Placer Dome typically requires an estimated project net present value greater than 20% of the up front project investment. Placer Dome will be able to improve the current estimated M\$Cdn 27.7 net present value of the Mt. Milligan project by incorporating efficiencies to reduce costs and improve operating. However, this project will require British Columbia to concede a small part of the large M\$Cdn 250 tax pool or the M\$Cdn 270 power supply revenue so that all stakeholders can benefit equitably from the project. After agreements for an equitable distribution of profits, Placer Dome can take on the project risk so that all of the Mt Milligan stakeholders can benefit.

**PLACER DOME NORTH AMERICA
Mt Milligan Gold/Copper Porphyry Mine Project - British Columbia**

**Project Schedule - 45,000 Tonnes/day Scenario
Version #1 - December 1997**

A Project of Innovative & Partnership with British Columbians

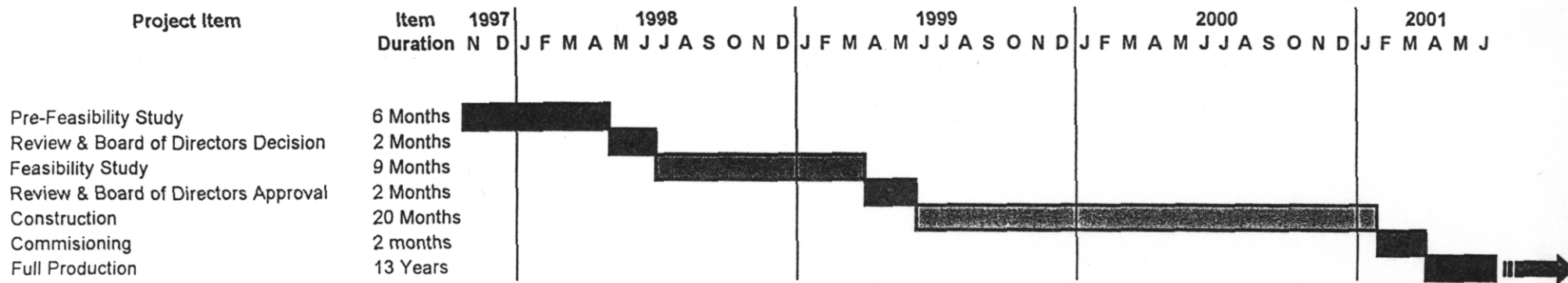


Figure 1

Figure 2: Mt. Milligan Location Map

