



To: V. A. Preto, Manager,  
Applied Geology and Coal

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Copies to: G. McKillop, B. McRae, W. R. Smyth

From: D. V. Lefebure, District Geologist

LOG NO:	0126 T7
ACTION:	WRS → A. Witcox / J. Fontaine for Property File
FILE NO:	

Re: Two Small Mills in the Smithers Area, B.C.

INTRODUCTION

Last spring I visited two small mills in the Smithers area during my property visits. One is located at the Duthie Mine on Hudson Bay Mountain, approximately 25 kilometres by road from Smithers. The other is situated along the Babine Lake road in McKendrick's pass 25 kilometres east of Smithers. Both represent initiatives by local entrepreneurs to process ore from the high-grade, small tonnage vein deposits which are typical of the Skeena Arch (Houston-Smithers-Hazelton-Terrace area).

DUTHIE MINE MILL

93L088(14w)

Mr. Paul Kindrat, a resident of Smithers, has designed and built a 50 ton-a-day mill to process the Ag-Pb-Zn ore from the Duthie Mine. (see photographs). The mill reportedly cost \$400,000 dollars and operates only in the spring, summer and fall. The ore consists of argentiferous galena, sphalerite, ruby silver, arsenopyrite, pyrite and chalcopyrite. Typical head grades are 7.5% Zn, 5% Pb, and 200 g/t Ag. Mr. Kindrat reports recoveries of 96% for silver and 97% for lead.

An analysis of concentrate from his mill (May 28th) contained 25.8% Pb, 27.2% Zn, 4740 g/t Ag, 2.49 g/t Au and 1.4% As (see Table 1). The ore contains significant amounts of arsenic which is concentrated in the tailings. The water in the mill is recirculated and tailings are separated from fluid phase with disk filters before being trucked to the tailings area. The concentrate is trucked to Trail for refining.

In 1986 approximately 1300 tonnes of ore was processed, down from the 1600 tonnes in 1985. This reflects the difficulty that Mr. Kindrat had in delimiting new ore zones to feed the mill. Undoubtedly, the major problem of any complicated small economic enterprise is access to technical expertise. Mr. Kindrat could find \$400,000 to build the mill and has the expertise to mine the ore and run the mill. However, no serious attempt was made to define ore reserves, or stockpile ore, to keep the mill running for extended periods of time.

Last fall the Duthie Mine was sold to Bishop Resources Development Ltd., a Vancouver based resource company. They propose to carry out the exploration to define the ore reserves necessary to expand production to 50 tonnes a day.


### REAKO EXPLORATION MILL, MCKENDRICK'S PASS

A smaller portable mill reportedly worth \$720,000 was purchased by Mr. Martial Levasseur, a promoter active in the Smithers area. (see photographs). In 1982 Reako Explorations Ltd. mined 15,600 tons which included 5,200 tons of 0.046 oz/t Au, 0.082 oz/t Ag, 0.025% Pb and 0.125% Zn. The ore was trucked more than 30 kilometres to the mill at a reported cost of \$5 per ton. The mill location was selected in an area with no large creeks or fish spawning areas and centrally located to several known ore deposits.

The mill processed 100 tons-a-day using floatation to concentrate sulphides including pyrite, the gold-bearing mineral. A small pond was used for tailings disposal. Approximately 40 tons of ore produced 1 ton of concentrate containing up to 300 g/t Au, 600 g/t Ag and 14% Zn. An analysis of concentrate from the mill contains 128 g/t Au, 211 g/t Ag and 12.9% Zn (Table 1). The mill closed in 1981 and has been idle since then. A major problem during the operation of this mill was the variable ore grade, a typical difficulty with low tonnage, high grade mines.

### CONCLUSIONS

The Duthie and Reako mills show that small mills can produce saleable concentrates from high-grade deposits in the Smithers area. However, they also serve to underline the difficulties for a small operator to supply the varied expertise necessary to operate a mine. Both operations could not find enough ore to operate their mills for extended periods of time (Reako) or near capacity (Duthie). These problems could be remedied by securing rights to several deposits in the same area and by developing more local expertise in all areas of mining. Government and community groups could play a leading role in the development of local mining expertise. The recent study, "Resource Assessment for Coastal and Western British Columbia and the Development of a Portable Modular Mill Design" is an excellent example of government assistance.



## REFERENCES

- Reako Explorations Ltd. and Panther Mines Ltd. (1981):  
Stage One Report, Free Gold Project, Smithers, B.C.
- Biss, R.P. and Rutherford, J.A. (1975): A Feasibility Study of a Custom  
Milling Project for Minerals in the Smithers, B.C. area.
- Unpublished Report, Customer Mining Services Ltd., Smithers Library.

<u>NAME</u>	<u>RESULTS</u>	<u>SAMPLE #</u>	<u>LAB. #</u>
Reako Mill Concentrate	Au 128 ppm Ag 211 ppm Cu 0.46% Pb 2.03% Zn 12.9% spectrographic report (%) Si >10.0 Al 5.0 Mg 0.9 Ca 1.7 Fe 3.5 Pb 2.05 Cu 0.25 Zn 8.0 Mn 0.09 Ag T V T Ti 0.06 Co T Na <0.3 K <0.3 W - Sb 0.15 As 0.25 Bi 0.02 Cd 0.15 Mo 0.01 Trace: Zr, Ni, Sr, Ba, Au	DVL 86 A3	32633
Duthie Mill Concentrate	Au 2.49 ppm Ag 4740 ppm Cu 0.80% Pb 25.8% Zn 27.2% Si 4.0 Al <1.0 Mg 0.1 Ca <0.1 Fe 3.5 Pb >10.0 Cu 0.7 Zn >10.0 Mn 0.4 Ag T V - Ti T Ni T Co T Na <0.3 K <0.3 W - Sb 0.5 As 1.4 Cd 0.07 Trace: Zr, Ni, Sr, Ba Au	DVL 86 A4	32634

Spectrographic  
report (%)

T = trace



86-Roll 4 - 7     Duthie Mine mill is 11 km west of Smithers on Hudson's Bay Mountain. Truck used to transport tailings is located in foreground.



86-Roll 4 - 1     Crushed mill feed entering on conveyor belt.

DUTHIE     **PROPERTY FILE**



86-Roll 4 - 2    Feed goes directly into a ball mill with automatic recycling until it is pulverized to a fine powder.



86-Roll 4 - 3    Eight flotation cells are used to separate concentrate.

PROPERTY FILE



86-Roll 4 - 5 Four disk filters are used - dark one for ore concentrate and three light coloured filters for tailings. Mill is a closed circuit with water being recycled and dry tailings.



86-Roll 4 - 4 After much experimentation with the disk filters, Paul Kindrat has found that material (green) bought in town for \$6 is more effective than the prefitted \$25 bags used by Equity Silver Mine.

PROPERTY FILE



86-Roll 4 - 8     Ore concentrate is gravity-fed to a bin with an electrically heated cement floor. A similar bin is used for dry tailings.



86-Roll 4 - 14     View of the mill, tailings pile and Aldrich Lake. Tailings are alternated with layers of gravel.

PROPERTY FILE