

TRANSPORTATION SYSTEMS AND THE MINERAL INDUSTRY

A presentation to the plenary session of the 43rd annual meeting
of Mines Ministers, Banff September 14-17, 1986

By the Provincial Geologists Committee

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SUMMARY

Historically, transportation systems in much of Canada were built to service mineral developments, and in the long run such transportation systems were paid for, both the construction and the operation, by levies made on the transportation of the mineral commodities produced, or on the supplies and personnel the mines required.

Future discoveries of world class mineral deposits can:

- a) make existing transportation routes profitable, ensuring their continued service and,
- b) make it feasible to construct new transportation routes that will permit other developments and settlement to take place.

Enhancement, expansion and improvement of access to the Geoscience data base will greatly assist mineral exploration in finding more world class deposits, thus making the mining industry and Canada's transportation systems more viable.

INTRODUCTION

Minerals constitute both the largest tonnage and greatest bulk of all materials moved on modern transportation systems. During times of slow economic growth, such as at present, the economics of mineral production and mineral exploration are much more affected by transportation costs than during times of rapid economic expansion and high mineral prices. During the past five years, as mineral prices fluctuated widely, transportation systems that are dependent on minerals have been seriously affected. Mineral producers competing in a shrinking market have seen transportation costs become a major factor in their survival and, in many jurisdictions, exploration has shifted steadily away from the high bulk, low value commodities to high value low bulk commodities, particularly gold, and more recently the platinoids.

Mining and mineral exploration have been in the forefront of development in many of Canada's frontier areas. Transportation routes, developed to serve the Caribou and Klondike goldfields, the silver-base metal rich Kootenay, Slocan and Rossland areas of B.C., and the silver and oil deposits of the western Mackenzie District, laid the foundation for development and settlement in these areas. The most recent major mineral transportation system built in Canada, the Norman Wells Pipeline, was financed by private capital.

Because other organizations making presentations to-day will cover most aspects of mining and commodity transportation, the Provincial Geologists Committee's presentation will concentrate on the effects of transportation costs on mineral exploration, and particularly, its effect on the metals side of that exploration. **It will also draw attention to the importance of mineral deposit development in financing transportation routes that open up new areas for exploitation and settlement.**

MINERAL EXPLORATION

Canadian mineral exploration is a multi-billion dollar industry. In 1985 hard rock mineral exploration expenditures in Canada exceeded one billion dollars, and oil and gas exploration expenditures were at least 5 times as great. These levels of exploration expenditure are

critically affected by the world demand for minerals which are quickly reflected in commodity prices.

Governmental attempts to ameliorate the effects of decline in demand and prices on the minerals industry are usually directed towards improving the competitiveness of various sections of the production side of the industry. Royalty and tax aspects of the complex cost equation are most commonly the major concern of the producers. Assistance with major costs, such as power, transportation, and other infrastructures, have recently become more important. Likewise, the increasing public concern over the environment and wilderness preservation has made costs related to these issues an important impediment to profitability, and hence threatens viability of existing operations and the development of new ones.

Such concerns and their related costs also affect mineral exploration. Any increase in costs raises the threshold of grade and tonnage required for the progression of a mineral deposit from the exploration stage to the development stage, and finally to the production stage.

THE MINERAL EXPLORATION INDUSTRY AND TRANSPORTATION

Transportation costs can be a major portion of the cost of exploring for and exploiting a mineral deposit. Exploration in frontier areas is most obviously affected. The more remote the region, the more likely exploration groups are to reject the exploration opportunities presented because they cannot justify the expenditure when, for example, transportation costs may be greater than 50 % of the exploration budget.

Small exploration groups and prospectors are most strongly penalized by transportation costs. They do not have as ready an access to tax deductible dollars as do the mining operators and larger companies. Thus we find that most junior mining companies, exploration syndicates, and prospectors work close to transportation networks.

It is an axiom in the mining industry that it is the smaller organizations, the prospectors, the syndicates, the promoters, who find the mineral showings and develop them to a state that attracts the developmental dollars of the larger mining companies. Mineral exploration attracts small scale entrepreneurs and is one of the last enterprises that provides a home for the entrepreneurial capitalist. The importance of the efforts of such people is underscored by the recent Hemlo discoveries. They represent an important and highly productive mine finding segment of the exploration industry and governments at all levels should strive to assist their efforts. There are two main ways that governments can assist small exploration groups, without taking on the problems of monitoring and attempting to control their expenditures.

First they can provide the geological data base on which all explorers depend. Expenditures on the geological data base are of use to all explorers, and give little advantage to one group over the other, with the exception of course of the more enlightened users.

Second they can provide more roads, or in some frontier areas such as the Northwest Territories, strategically placed airstrips to reduce transportation costs, and extend the frontiers of exploration. Such expenditures also give little advantage to one group over the other, and better, cheaper transportation alternatives can only enhance regional economic expansion.

We suggest that these expenditures should be considered long term investments. The roads we build today will certainly be in use 25 years from now, and possibly 100 years from now. For example, the road built in Saskatchewan during the 1970's to supply the Rabbit Lake uranium mine and nearby exploration is, in the 1980's, supporting gold exploration and the new Star Lake gold mine development. Portions of the Canol Road, built during the war, have greatly assisted in exploration in parts of the Yukon and adjacent NWT.

MINERAL DISCOVERIES: AN ENGINE OF DEVELOPMENT

Much has been said about the need to provide transportation routes to assist in economic development and in exploitation of mineral deposits. But the history of mineral deposit development records a different perspective. It is rarely that major mineral discoveries follow on the

construction of transportation routes. There are far more examples of routes developed in order to exploit major discoveries. Canadian examples are legion and include the systems established recently in the Yukon to exploit the Keno Hill silver deposits, the Clinton Creek asbestos deposit, the Anvil Range lead zinc deposits and the Cantung tungsten deposit. The main transportation routes in the NWT were also built to reach and exploit mineral resources at Norma Wells, at Port Radium, at Pine Point and at Yellowknife. Transportation systems have even more recently been built in British Columbia to exploit coal deposits and earlier in Saskatchewan and Manitoba to reach major resources at Flin Flon, Snow Lake, Lynn Lake and Thompson. Numerous examples can be found in Ontario and Quebec, notably roads to Red Lake and to Chibougamou, and railroads to tap the iron deposits along the Quebec-Labrador border.

These routes were all developed because mineral deposit exploitation required them. The final cost to the public treasury has been minimal. We should therefore consider how we can ensure discovery of more world-class deposits which will stand the cost of any new transportation link needed for their exploitation.

Mineral discoveries result from the application of exploration techniques in areas of favourable geology. Governments can ensure further discoveries:

1. by assisting in the development and preservation of the geological data base by expanding support for geological survey work, particularly in the area of detailed geological mapping, and by providing incentives to industry to record their exploration data in publically available data base systems,
2. by providing support for research and development in mineral exploration technology, and
3. by ensuring that lands with mineral potential are not withdrawn from exploration.

Continued development of the geological data base is in any case required to ensure our mineral economy has access to modern data when the next increase in demand for minerals comes, as it surely will, and a modern expanded road network is needed to provide access to potential mineral lands for efficient and cost effective exploration and development. Ensuring future major discoveries by improving exploration technology and the geological data base through which it operates will contribute to the development of new transportation systems at minimal long term cost to the taxpayers of this nation.