

Mining the ore  
is one thing  
— particularly in today's  
rich, but remote,  
mining areas.  
Getting the ore  
to market is another.  
Mining transportation  
is becoming as complex  
as the mining itself.

by Robin Brunet

If man hadn't invented the wheel there still might be mines today, but little hope of transporting the spoils to civilization.

Mining Review has frequently studied the latest in transportation equipment and the importance of transportation to the industry, but rarely the organization of transportation.

This summer saw two excellent examples of organizing transportation capture the attention of the B.C. industry. One involved the potential development of a new copper mine, the other accessing a new lead-zinc mine. Both examples typify the complexities of transportation organization today.

The first example is Geddes Resources Ltd.'s Windy Craggy project, the proposed mine that promises to be a major player in the Canadian copper industry: 165 million tonnes is the latest estimate, with copper grading at 1.89 per cent.

The proposed mine would be located in the extreme northern corner of the province in what can charitably be called a hostile environment, surrounded by snow-covered mountains and a network of glaciers, 60 miles from the lonely Haines Road.

The Geddes people have used a DC-3 — and the property's airstrip — to assess the property, and are cur-

## MINING TRANSPORTATION



PHOTO COURTESY GEDDES RESOURCES

# Making moves



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Alaska's Red Dog Mine . . . the link from mine to port was one of the greatest challenges facing project engineers.

rently undertaking detailed plans for mine development. These plans hinge on the building of a 104-kilometre road — with it the mine can be built and copper concentrate hauled to the

Haines Road.

"Our production will reach 450 000 tonnes yearly, 1 500 tonnes per day," says Geddes vice-president of mine development, Keith Somer-

ville. "Transporting that tonnage to Haines, where it will be shipped to foreign destinations, is of vital concern."

Since various remote mines rely on airborne transport to shuttle produce, the Geddes people studied aircraft. But companies using aircraft are mostly gold mines whose produce is relatively compact, and a likely aircraft for copper concentrate transportation — such as a C-5 heavy-duty hauler — is costly. Somerville was even approached with — and subsequently studied and considered — the idea of dirigibles to airlift the concentrate.

"Don't laugh," he says. "The use of dirigibles may seem eccentric, but they're feasible."

It boiled down to the decision to build a road. It's the two possible kinds of roads that could be built, as well as the road's location, that have earned Geddes additional industry recognition.

To wit, a high-quality road linked to the Haines Road would handle 50 truckloads of copper per day and employ a staff of about 100, including maintenance people. A lesser-quality road could be built to install a pipeline, which in turn would be linked

to a post-World War Two pipeline that was built along the Haines Road for pumping oil from Alaska. A pipeline transportation system would employ a half-dozen workers.

Either road would run along the same route, down the Tats Creek plateau for about 30 kilometres, along the Tatshenshini River for 20 kilometres, then 30 kilometres up to Scottie Pass for a remaining 20 kilometre stretch to Haines Road.

Veteran industry planners will appreciate the decisions Geddes Resources must make. Building a pipeline means a huge capital outlay, but would be more than compensated by cheap maintenance — and it would be environmentally friendly. However, if the Haines Road pipeline is kaput, the pipeline scenario will have to be scuttled. Somerville says a proper assessment of the Haines Road pipeline will be complete in a few months.

A truck road, on the other hand, is cheaper to build but could cause, and indeed already has caused, some environmental concern.

"Trucking would add noise and traffic congestion and heavy loads to what is essentially a tourist road," says Somerville. "The people of Haines are worried about it. They don't know how to deal with 50 trucks a day coming through their town."

It seems Geddes won't win any points from the environmentalists no matter which kind of road is built, mainly because of the aforementioned route along the Tatshenshini River.

"The Tatshenshini River is sold as a wilderness rafting river, and a business takes rafters up into the Yukon and back, along the Tatshenshini, along the Alsek River and down to the ocean," explains Somerville. Rafters, paying big bucks to boldly go where no man has gone before, will soon raft past a bridge and along a shoreline where a 20-kilometre roadway will be intermittently visible. They have voiced their concerns to Geddes representatives, who in turn can only offer partial pacification.

"Yes, the area won't be the same, but on the other hand, the road can provide access to other wilderness ac-

tivities like hiking or kayaking," says Somerville.

Presumably able to withstand the environmental brickbats, Geddes has another road to build over 10 kilometres of glacier, from the airstrip and living quarters to the actual mine.

"Some roads have been built over glaciers in places like Stewart, but they're not common," says Somerville. "However, we're in touch with a contractor in Smithers who has this kind of work experience. It's just another part of our transportation package."

Capping off that package will be a Windy Craggy fly-in operation for 500 workers on a two-week turnover basis, the cost of which could easily exceed several million dollars yearly. For this transportation necessity, Somerville is thinking about chartering a 75-seat Electra turboprop airplane.

"By flying people in, we'll be able to get the skills we need from places like Whitehorse, Prince George, Smithers, Prince Rupert — and the workers won't need to uproot their homes and families. These are some of the transportation considerations you're faced with when you locate an ore body in such a remote corner of the globe."

This seems to be the beginning of a long production life for Geddes' Windy Craggy project. On the other side of the coin, Cominco's smelter at Trail had, up until recently, been sourcing most of its lead-zinc concentrate deposits from its mine at Kimberley. However, as the Kimberley mine is virtually depleted, Cominco has put into production a new source of lead and zinc concentrates — in Red Dog, Alaska, 200 kilometres from salt water.

Herein lies the birth of one of the most interesting and complex mining transportation systems in the industry. Commencing in July '90, Cominco trucks its Red Dog concentrates to Alaskan waters, where it is transferred to barge. The produce is shipped to Vancouver Wharves, which has been upgraded to the tune of \$31.5 million to deal with the lead/zinc concentrates. From Vancouver, the concentrates go by railcar via the U.S. to a transfer point south of Trail, then by truck north to be fed into Cominco's Trail smelter. ▶



through to mine planning, design, and operations. Their client list, says Ed Rychkun, vice-president of marketing and business development, includes 20 per cent of the top 200 mining companies in the world, a fact illustrated by the hundreds of pins covering a huge world map in his office.

Lynx's success stems from the universality of their applications, available either for the PC or for Unix-based workstations. It is "generic" software, says Rychkun, that "serves as well for geological modelling as for designing and optimizing any kind of mine, as well as modelling cost information, potential extraction sequence, production schedules, and the like."

Other, smaller companies are also producing new software products customized for mining. Craig Speirs, systems consultant for Softree Technical Systems Inc. of West Vancouver, a relatively new player in the mining software game, says the company is presently developing two major systems with applications for mining, a short-range mine planning system that will allow engineers to optimize dragline performance and mine configuration graphically, and an integrated survey and road-design package.

Along with the great advances in image processing and modelling, technological change is coming to many other aspects of mining. For example, expensive directional drilling, now accomplished through hit-and-miss mechanical deflection, will soon be aided by laser technology, so that an operator will be able to direct the bit, guided by relational values obtained from gravitational and magnetic fields, precisely and exactly where needed. The technology is already being used to sink perfectly plumb centre shafts, and will be used in the future to reach horizontally embedded samples, or for precision drilling beneath coal waste dumps.

Just as computers are becoming more and more evident in our lives, rapid advances in technology ensure that they will remain an essential part of the mining industry. Who knows, with the vast improvements that are sure to take place in imaging systems, maybe even I will excitedly be able to point out "folds" on my flickering computer screen. . . Naw. . . . □

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It is this link from mine to port that is a prime example of the challenge facing today's project engineers.

The road was built across the coastal plain, crossing areas of high environmental concern and waterways, as it winds its way through the tundra. There are 646 drainage crossings, with nine bridges and four major culverts crossing 13 major streams. To protect the underlying tundra and to ensure the road remains stable through the summer thaw, the base consists of 1.9 million cubic metres of fill material and 1.75 million square metres of woven geotextile fabric. The road had to be built tough to withstand the huge trucks rolling at speeds of up to 75 km/h from mill to port, each handling 65 tonnes of concentrate.

While Cominco uses the road, the mining industry giant did not build it nor own it: the State of Alaska, through the Alaska Industrial Development and Export Authority, handled construction of the thoroughfare. Cominco pays an annual toll fee as well as absorbing maintenance costs.

But once the concentrate hits the high seas, the problems don't end. Vancouver Wharves project manager, Les Hemsall, said the port expansion will allow the operation to receive Cominco's total annual shipment from the Red Dog mine, about 500 000 tonnes, in a three-month period. "The shipping period is approximately three months: July, August and September — approximately 100 days — where their shipping point in Alaska is ice-free," he explains. "So we have to receive the total annual shipment, which is destined for the smelter at Trail, in a similar period."

Hemsall points out that the Red Dog project is unique to this province, reversing the flow of companies' normal operations. "Certainly, in British Columbia, there are to my knowledge no systems which receive concentrate by water, then ship it inland. So this is a first."

B.C. Rail marketing representatives, whose company acts as a switching carrier from Vancouver Wharves to the Trail-bound railway,



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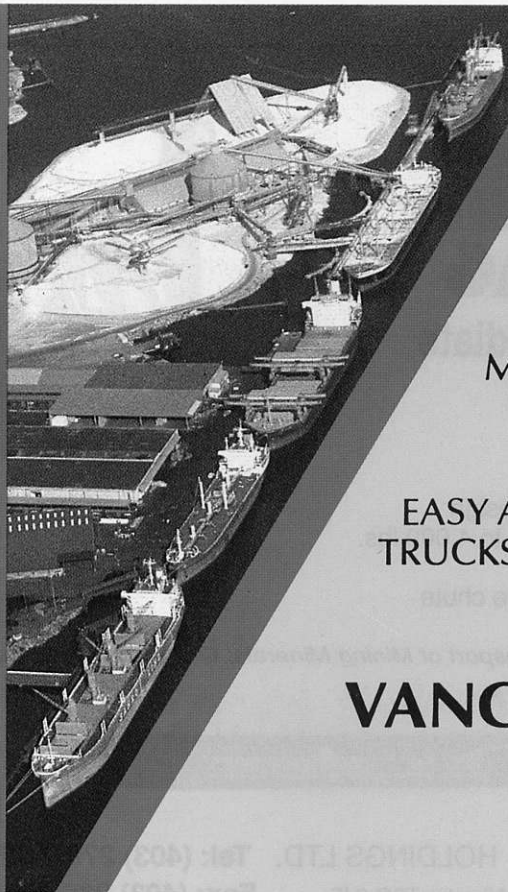
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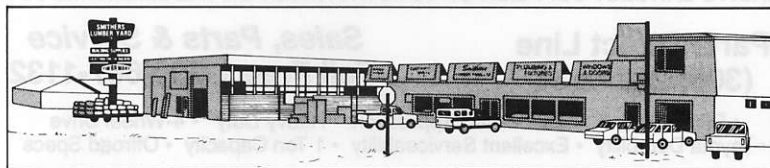
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Vancouver Wharves just recently completed a \$35-million expansion to handle lead and zinc concentrates from Cominco's Red Dog mine. The concentrates are then moved by rail to the company's massive Trail smelter. PHOTO: MARK BOWEN

believe Cominco did a good job of assessing its competitive transportation options.

"The Red Dog story points up the fact to transportation companies that mining companies no longer choose a railway or road system simply because it's the closest to their mine," says B.C. Rail marketing representative Doug Evanchuk. "There were a number of wharves in competition for this contract Cominco had to choose from, and two Trail-bound railway lines: CP and Burlington Northern. The Burlington Northern deal proved to be more attractive even though its line doesn't go directly into Trail. And once they'd settled on Vancouver Wharves, Vancouver Wharves approached us with the switching carrier job."

B.C. Rail, a "minor" participant in the Red Dog package, will, within three years, be hauling 5,000 rail cars a year for the next 20 years. Alaska is enjoying increased barging activity, and Vancouver Wharves has a \$31-million facelift.

F. Roy Dawson, market manager of bulk products for B.C. Rail, says deregulation is a key factor in the changing face of transportation organization — and the reason transportation has become a multi-faceted package over the past few years.

"We've experienced rail and truck deregulation, and it's forced us to be more competitive and aware of our customers' needs. You now see the various transportation industries bartering with each other on a con-

tract-by-contract basis. For example, we can now convince shippers to increase their carload numbers so that our costs will be decreased. It's good news for the mining industry."

Finally, the B.C. government will likely play an increasing role in road building in the 1990s as a solution to the enormous expense of airlift operations.

"Cominco's Snip project airlifts everything in and out at the cost of \$2 million yearly," says J.F. Brenner, coordinator of road programs for the B.C. Ministry of Energy, Mines and Petroleum Resources. "I think the government will get more involved with various companies to develop resource-type roads in highly mineralized areas."

Currently, Brenner's ministry is collaborating with Cominco and Calpine on the much-heralded Iskut Valley Road — a \$20-million project which, if developed, the government will fund.

"There are still many logistics and legalities to solve before we start construction, such as native land and heritage rights and environmental concerns," says Brenner. "But if it's developed, the Iskut Road and the government/mining company collaboration could be a model for other projects in the 1990s."

Whatever the outcome, as the 1990s ripen and ultimately close the 20th century, we're likely to witness transportation stories that will make these endeavours pale by comparison. □

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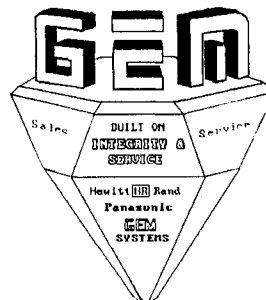
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