HELICOPTER SUPPORTED DRILLING PROGRAM

AT THE KUTCHO CREEK PROJECT

Paper presented
by:

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Esso Minerals Canada Ltd.
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INTRODUCTION

The Kutcho Creek copper, zinc, and silver massive sulphide deposit is situated in the Omineca Mining Division in northwestern B.C., 210 kilometres south of Watson Lake, Y.T. and 105 kilometres southeast of Dease Lake, B.C. Ownership of the deposit is shared by Esso Resources Canada Limited and Sumac Mines Ltd., a consortium of Japanese companies. Work on Esso's portion is managed by Esso Minerals Canada and on Sumac's portion by Sumitomo Metal Mining Canada Ltd.

The mineral claims lie within the Mackenzie watershed on the south side of a westerly flowing tributary of Kutcho Creek. The tributary, known locally as Andrea Creek enters Kutcho Creek, 15 kilometres above Rainbow Lake.

Elevations on the property range from 1200 metres in the valleys to 2000 metres in the mountains south of the deposit. The drilling area is at the 1500 metre elevation.

TRANSPORTATION

Originally, the property was serviced by float planes from Watson Lake to Rainbow Lake and the remainder of the distance by helicopter. In 1976, an airstrip was built in the Kutcho Creek valley and extended to a length of 1200 metres in 1977. The cost of the airstrip was borne by the B.C. Ministry of Energy, Mines and Petroleum Resources, and construction was done by Cry Lake Jade Limited whose camp is located at the airstrip.

Heavy air freight is usually flown in by Twin Otter from Dease Lake. Personnel and small freight shipments are normally flown on B.C. Yukon Air Services scheduled flights from Watson Lake. During the summer of 1978 these flights operated three times a week at a cost of 48 dollars per head or 24 cents per pound.
A helicopter is used to service the drilling operations which lie four to five miles east of the airstrip.

In the event of production, it is anticipated that concentrates would be trucked to Stewart, a distance of approximately 450 kilometres.

HISTORICAL AND GEOLOGICAL BACKGROUND

A regional geochemical anomaly was first noted in 1967 but lack of mineral showings precluded further work. Sumac later acquired claims on a surface showing of disseminated sulphides in a creek bed. In 1973, Paul Ziebart, an Imperial Oil prospector, located a boulder of high-grade copper and zinc sulphides downslope from a small gossan. Airborne and ground geophysical surveys by both companies, followed by diamond drilling, led to the discovery of a large body of massive sulphides.

Since that time approximately 90,000 feet of diamond drilling has been completed by both companies.

The massive sulphide bodies occupy a specific horizon within a group of epiclastic and pyroclastic volcanic rocks of acid to intermediate composition. The group is overlain by a thick bed of conglomerate followed by limestone and argillite. The limestone has been correlated with the Upper Triassic Sinwa Formation by the Geological Survey of Canada. All the above rocks strike westerly to northwesterly and dip at 50° to the north.

Folding and metamorphism to lower green schist facies has produced varying degrees of schistosity and foliation in the rocks hosting the deposit. Foliation is commonly parallel to bedding. Schistosity appears to be a mixture of fracture cleavage and axial plane cleavage, which is generally perceived to be subparallel to the regional dip, except in the apices of minor folds where it is normal to bedding and intensified.

The sulphides are enclosed in and underlain by a finely laminated sericite schist, popularly called "paper schist", a core splitter's nightmare. The hanging wall consists of a thick mass of quartz feldspar crystal tuff
overlain by a series of intermediate tuffs and argillite containing irregular bodies of metagabbro.

Mineralization consists of massive pyrite containing varying amounts of sphalerite, chalcopyrite and bornite. Silver is also present but no silver mineral has yet been identified. Drilling has identified two or more tabular, massive sulphide bodies occupying the same stratigraphic position over a strike length of 3500 metres. At its easterly end, the deposit approaches to within a few feet of the surface; whereas, on the westerly end, its presently explored depth is at 500 metres. (Figure 1).

DRILLING PROGRAM

All drilling on the property has been performed by Arctic Diamond Drilling Ltd. who have three drills (two Longyear 38's and a Longyear Super 38) on the property at present.

All drill core is BQ size and drilling depths have progressed from one or two hundreds of metres on the east end of the deposit to six or seven hundred metres on the west end. Holes are surveyed with the Sperry-Sun magnetic single-shot instrument.

As depths increased, project geologist Dane Bridge initiated the drilling of branch holes using wedging techniques. By this method two or more intersections are obtained with one pilot drill hole. This produces a major saving in both distance drilled and in moving time.

The heterogeneous nature of the hanging wall rocks, plus the foliation and schistosity, causes strong deviation of drillholes to the south. Controlled bit pressures and frequent bit changes somewhat reduce the amount of deviation; however, acting upon the suggestion of Don Coates of D.W. Coates Enterprises Ltd., a significant reduction in deviation was obtained using the Mini-Deve (registered trademark) reaming shell system. The additional cost of using the Mini-Deve system was more than offset by the saving in drilling distance which amounted to 14% for a target 500 metres deep.
Figure 1
Kutcho Creek
Schematic Cross Section
35,900 East
Mini-Deve
Drilling Costs

Drilling costs in 1978 were 24.82 dollars per foot, excluding office overhead.

Freight costs are best indicated by the cost of a barrel of Turbo B jet fuel delivered on-site versus costs at Terrace, B.C. This figure includes the costs of the drum which is returnable at some future date.

<table>
<thead>
<tr>
<th>Terrace</th>
<th>Kutcho Creek</th>
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<tr>
<td>88.62 dollars</td>
<td>165.20 dollars</td>
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Costs mentioned here refer specifically to Esso's work; however, the diamond drilling and helicopter are contracted jointly by the two companies.

ENVIRONMENTAL BASELINE STUDIES

As mineral reserves were added it seemed appropriate that baseline studies should be undertaken to the specifications of a Stage 1 level. B.C. Research was awarded the contract. However, Esso's Dr. Uly Vagners mapped the surficial geology and reported on the distribution of soils.

Vegetation was assessed as falling into two basic categories; spruce-willow-birch in stream valleys, and alpine-tundra above 1600 metres elevation.

The following conclusions can be drawn from this study of the Kutcho Creek environment:

- It is wilderness area.
- It is a good caribou and moose habitat.
- It lies at the head of an unpolluted watershed.
- Trout, char and whitefish inhabit the creeks.
- Trapping and hunting are conducted in the area.
The chief environmental concern is the detrimental effect that could occur from highly acidic and heavy-metal-contaminated waste waters escaping into the watershed from the mine and tailings area. An additional concern is the reduced flow of water into the Kutcho Creek system that would be entailed by the use of water for milling purposes. With these concerns identified, they can be eliminated in the eventual design of a future mining operation.

CONCLUSIONS

Some advantages of a helicopter-supported drilling operation are:
- No capital equipment outlay.
- Little environmental disturbance.
- Quick transportation in the event of accidents.

Some disadvantages are:
- High hourly cost of operation.
- Sensitivity to bad weather conditions.
- Limited lifting capability for large drills.

There is little doubt that the Kutcho airstrip has been a significant factor in keeping down the cost of this helicopter-drilling project.
DISCUSSION RELATED TO CHARLIE AIRD’S PAPER

Did you say 28.00 dollars per foot to drill.

ANS. Yes. 24.82 dollars.

John Errington. How does that compare with southern exploration.

ANS. Well, we are doing exploration with Newmont south of Revelstoke and our drilling costs there are well over 50.00 dollars per foot. Mind you that is high. I think our costs four years ago were about 27.50 dollars per foot, and the reduction is, in part, due to the airstrip shortening our ferrying time in a helicopter. Also we are now flying in practically everything that we use on the property. A barrel of turbo B jet fuel costs 88.62 dollars in Terrace and if it is delivered on the property at the drill, it costs 165.20 dollars. Recent quotes that we had to take stuff in this winter by Cat train were three times as much.