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January 5, 1990
Project Number 60610

Curragh Resources
Box 1000
Faro, Yukon
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Attention: Mr. L. Hwazdyk

Dear Leo:

RE: FARO UNDERGROUND: VISIT AND DISCUSSIONS

The following letter is a record of my visit on 2 and 3 of January, 1990. The adit was visited and the mining program and rock mechanics were discussed.

There is little to see in the adit at present as very little rock has been exposed. The phyllites are poor to fair but conditions may be influenced by proximity to the pit wall. I concur with your initial support plan of split sets at a 4 foot by 5 foot pattern with screen. The split sets should be installed in hollows so that the screen is pulled tight to the rock surface. Additional split sets should be installed in the area just beyond the corrugated metal section as there is potential for some large unstable wedges. The phyllites are liable to weathering and it may be prudent to plan for shotcreting of the waste development before the spring thaw. But this decision can wait until a review of conditions. I also fully support your decision to mine, at least the initial stages of the waste development, as a pilot and slash with smooth blasting using Exactex.

We had considerable discussion about the type of data that should be collected in the ore-zone and how this data would be used for planning purposes. A number of points were made, the most important being that a flexible approach must be taken for mining layouts as the basic planning information will only be available once a certain amount of ore has been exposed.

There are a number of critical parameters, in the planning process and these are dealt with in order of importance.

Short range geometry; there is potential for considerable short range variation in the inclination of the S2 foliation which will probably form the hanging wall mining plane. The plan to mine the haulage shanty-back and as straight as possible whilst using the contact as a marker may not be practical. If not, it may be necessary to mine an arch profile on line and grade with subsequent directional corrections based on the results of the short roof/floor drilling.

Roof stability; it was agreed that rock mass classification data (Mining Rock Mass Rating system) would be collected and empirical span/support design methods used together with a careful analysis of support effectiveness. Where the roof is parallel to foliation and various sized slabs are formed in the roof the roof stability will also be considered in terms of experience at Elliot Lake and elsewhere. A compromise between the width of the openings, mining efficiency and the cost of support in various rock conditions must be developed as early in the project as possible. Room-and-pillar economics are extremely sensitive to roof conditions. This compromise should be reached with full cooperation of the contractor recognising the availability of equipment and comfort with various support methods. It is anticipated that much of the rock mass classification data will be routinely collected by the site geologist. Periodic visits should be made by a rock mechanics specialist for rock mass data reduction and back-analysis of excavation stability and support methods.

Pillar strength; given the depth below surface, the limited extent of mining and the likelihood of waste zones it is unlikely that extraction will be unduly sensitive to pillar strength. It was agreed that the basic Hedley formula would be used together with an adjustment for pillar shapes (hydraulic radius relationship to give an "effective" pillar width). The 'k' rock strength factor used in Hedley's formula will be calculated using the rock mass quality values to develop a rock **mass** strength. It should be noted that both pillar height and depth below surface vary considerably and it may be inadvisable to have a single pillar size for the whole mining area. Otherwise, the percentage extraction will not be maximised.

It was concluded, during the discussion, that a regular layout for the whole mining area might place impractical constraints on operational flexibility. The most important, early objective should be to rapidly advance the main service/haulage excavations to develop as much mining room as possible and to gather data over as an extensive an area as is feasible. The second objective should be to maximise the efficiency of the "trackless" development recognising the constraints of gradient and hanging wall exposure. Planning of the "cut through" excavations would then depend on the position of this primary development. It is also possible that faulting/folding may naturally delineate extraction areas as blocks in which a particular layout may be the most favourable.

These are simply initial ideas on the planning process but they serve to identify the importance of collecting and analyzing planning data as early as possible.

The eventual mining plan will determine the mineable reserve at certain cut-off grades recognising that the mining costs may vary considerably through the deposit.

Yours truly,

STEFFEN ROBERTSON AND KIRSTEN (B.C.) INC.

Chris Page

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Division Head - Mining

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