TITAN PROJECT

Report on Exploration of Galena Hill Property

December 16, 1963

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Gentlemen:

I visited the Titan Project from November 23 to December 9, 1963 and examined all work, tied in previous surveys and compiled a more accurate map of exploration data.

PROSPECT SHAFT RESULTS

Area B - 2

Prospect shaft No. 1, sunk on a mercury anomaly at 30 + 00 E, 12 + 95 S, hit relatively unaltered schist and quartzite, dipping south at a depth of 27 feet. A short 10-foot drift both NW and SE encountered no significant difference, nor was any sign of mineralization seen in casual examination of panned concentrates from different levels in the hole. Geochemical samples taken at 5-foot depths have not been tested.

It does not appear that this shaft is anywhere near any vein-fault structure, nor is there any definite geophysical suggestion of any in this locality.

A second prospect shaft was therefore selected to test both a mercury anomaly and a general NE-trending zone of slight EM response and resistivity lows opposite a probably quartzite band at 26 + 00 E, 11 + 50 S. At a depth of 20 feet this shaft encountered quartzite and minor schist dipping 65° south (much steeper than normal), which is all intensely altered and fractured and contains brecciated vein quartz seams up to 6 inches wide. Panning above bedrock showed no mineralization, suggesting that if any mineralization is present it probably lies to the northwest on the leeward side of glaciation. Because of the steep dip, alteration and brecciation, and lack of mineralization in pannings, it appears that this shaft may lie on the hanging wall side of a vein-fault zone. A limited amount of drifting is accordingly being done to the northwest.

Area A

The first prospect shaft, sunk on a mercury anomaly and a slight EM anomaly on the NW side of the main resistivity high, is encountering bedrock at about 32 feet. The material at a depth of 32 feet on December 10th appeared to be locally derived ground moraine consisting of well shattered vein quartz and fragments of grey quartzite, but bedrock had not yet been encountered. Pannings showed traces of galena and sphalerite. Drifting was being started in both directions.

COMMENTS ON GEOCHEMISTRY

Recent results from the prospect shaft sinking programme on the Galena Hill property strongly suggest that most of the geochemical anomalies obtained by near-surface soil sampling may be either spurious hydromorphic anomalies or products of float in the overburden, and probably have no direct relationship to mineralization in the immediately underlying bedrock, unless overburden is shallow.

Although successive pits are designed to test a better coincidence of both geochemical and geophysical anomalies, it is felt that geochemical anomalies should be discounted in favour of structural and geophysical indications unless overburden is extremely shallow. Soil sampling may be useful as a positive method of indicating a general area in which mineralization is glacially or otherwise distributed from a nearby vein-fault system but it does not appear to be applicable directly to detection of ore in this locality except under exceptional conditions, or unless the overburden is sampled within a foot or less of bedrock by means of prospect shafts or an overburde drill.

Elsewhere in the district soil sampling should be useful in areas of light overburden and silt sampling should be a useful reconnaissance tool, but interpretation of results should depend on soil conditions, depth, topography etc.

STRUCTURAL COMPILATION

Regardless of the apparent inapplicability of short cuts such as geochemistry, a comprehensive prospect pit-sinking programme is justified on the Galena Hill property in view of the economic possibilities implied by a compilation of our present data. Compilation of data on the KPO No. 1 - LEO No. 1 section of the Galena Hill property suggests a most intriguing similarity between this locality and the Hector-Calumet structure which has been the most prolific ore producer in the Mayo district.

For this comparison the reader is referred to the compilation of exploration data on the eastern half of the Galena Hill property, December, 1963, and to the Geologic plans and Sections, Hector-Calumet Mine, Figure 3, G.S.C. Paper 57 - 1, and other plans and sections therein.

The two localities compare as follows:

1. Both are in the same position in the favourable Central Quartzite section, just above outcrops at the most competent central band of massive siliceous quartzite; thus comparable depth possibilities may be anticipated.

2. Structural interpretation of the compiled data suggest typical "cymoid loop" type vein structures formed against a cross-fault; this entire vein-fault complex being of the same magnitude, i.e. 2500 feet or more long, as the productive part of the Hector-Calumet system.

3. The strongest resistivity lows occur on the main KPO No.1 zone which would correspond to the No. 3 vein, the most con-tinuously mineralized in the Hector-Calumet system.

4. The strikes, angles of divergence, etc. are all very similar.

Every place explored near this structure has shown some signs of mineralization as follows:

(a) A minor galena stringer in a 31' deep pit on the hanging wall side of the zone of resistivity lows on KPO No. 1 claim. (Section 1)

(b) Fractured quartzite with abundant pyrite and sphalerite in two pits 31 and 34 feet deep (Section V) and sphalerite float in the overburden between 17 and 22 feet depth in the second pit, all on the NE side of the inferred cross-fault on LEO Fraction. From comparison with the other producers, the abundance of pyrite strongly suggests proximity to an important vein-fault zone.

(c) Rusty fractures in massive Hector-Calumet type quart-zite from which 15 oz/ton silver was reported near the claim posts of LEO 1, 2, 3, and 4 claims, about 100 feet east of the main area of interest.

(d) Traces of galena and sphalerite being found in the over-burden above bedrock at 32 feet depth in the first pit on LEO No. 1 claim. (Section VII or Area A)

(e) A trace of galena in a strong shear intersected by drill holes T-1 and T-2 1000 feet or more NE of the main area of interest.

Other points worth noting are:

(1) In the Silver King, Elsa, and Hector-Calumet mines the zone of dilation in which ore shoots occur sometimes extends to, and includes the cross-fault or vein-fault intersections but more often is strongest up to 150 or 200 feet away and extends several hundred to 1500 feet away along the vein zone. Thus the optimum location for prospect pits should be 150 to 200 feet away from such intersections.

(2) The main KPO No. 1 zone shows the most marked resistivity lows as may be expected if it were the older of the two or more branch veins and had suffered more repeated movement resulting in development of more graphitic shearing and/or sulfides.

(3) The coincidence of a resistivity low with the Gerlitski vein adds weight to the KPO 1 - LEO 1 zone of resistivity lows. None of the other resistivity lows tested in the past had as definite a trend as the KPO No. 1 zone or were not subject to some other interpretation.

(4) Comparison of the two resistivity surveys on the KPO No. 1 and LEO No. 1 areas shows resistivity highs of magnitude similar to ones elsewhere that are known or interpreted to be massive siliceous quartzite. If it is assumed that these highs are the same quartzite member, then apparent offset on (a) the cross-fault would be about 150 to 200 feet right lateral, and on (b) the vein-fault would be about 300 to 400 feet left lateral (apparent offset due to lesser dip slip). A cross-fault may also extend through the "eye" of the resistivity highs, or other vein-fault and cross-fault offsets may occur. All panned concentrates, especially from Section V, are being studied in more detail at the University of British Columbia.

RECOMMENDATIONS

In view of recent results it is recommended that prospect shaft sinking on structural targets be continued as the most effective means of ex-- ploration, and that use of an overburden drill for geochemical sampling and further exploration on vein zones be considered for next season. Unless induced polarization or some other indirect method is successful, it is strongly recommended that exploration be confined entirely to this direct physical testing of targets until ore-bearing sections are found.

A revised layout or prospect shafts has been designed to:

(a) Test the main KPO No. 1 - LEO No. 1 system in the most likely localities 300 to 400 feet apart that would lead to initial discovery of ore.

(b) Test the NE extension of the Gerlitzki vein system if justified by results of the second shaft on Area B-2.

KPO NO. 1 - LEO NO. 1 ZONE

The revised layout of prospect shafts on the KPO No. 1 - LEO No.1 zone is as follows:

1. Section 1

   Baseline A 9 + 50 W, 2 + 40 N about 35' NW of old shaft with seam of galena. (Resistivity low 200' NE of vein split and cross-fault)

2. Section 11

   Baseline A 7 + 00 W, 4 + 60 N (along resistivity low)

2. Section 111

   Baseline A 4 + 00 W, 7 + 75 N (along resistivity low)

1. Section IV

Baseline A 2 1 00 W, 10 1 00 N
(Strongest resistivity low
150 - 200' SW of cross-fault)

Section V

Already tested by two shafts 31' and 34' deep in spring of 1963 - abundant pyrite and sphalerite.

2. Section VI

Baseline 2 1 00 E, 7 1 00 N
(Mercury and heavy metals anomaly in possible shallow overburden along NE strike of zone in Section V)

2. Section VII (Area A)

Baseline 1 7 1 50 E, 4 1 85 N Bedrock at 32 feet crushed rock, quartz, traces galena and sphalerite, cross cuts started. (Strong mercury anomaly near slight EM response in resistivity high suggestive of quartzites)

Baseline 1 6 1 00 E 5 1 50 N
(Drop off in resistivity along projected vein trend and possible vein-fault intersection, near heavy metals anomaly and slight EM and magnetic anomaly)

Baseline 1 4 1 00 E, 6 1 00 N
(Mercury and heavy metals anomaly on resistivity low) Alternative to 6 1 00 E, 5 1 25 N

The above sections would test the KPO - LEO zone along its N 28°E strike at 300 to 400 foot intervals sufficient to pick up any main ore-bearing sections that sub-outcropped under the overburden.

3. Section VIII (Optional)

Baseline A 6 + 00 W 2 + 00 N
(EM anomally on second vein-fault zone 400 - 600 ' NE of intersection of main KPO No. 1 vein-fault and cross-fault.

Area B - 2, B - 1

If the present drifting at Area B - 2 shows mineralization in the immediate vicinity of the shaft at 26 + 00 E, 11 + 50 S, further work should be planned in this locality or on strike in the vicinity of 24 + 00 E, 12 + 00 S where several geophysical trends appear to converge.

Optional holes in Area B - 1 would be at Baseline N 48° E, line 9, 1 + 80 S, and line 8, 2 + 70 S.

The immediate vicinity of the Gerlitski vein does not appear to warrant any further exploration on the basis of presently available data. A hole at about line 16 E, 10 + 50 S would test a resistivity low at a break in slope, and a hole at 18 E, 13 + 25 S would test a moderate EM anomaly along the NE strike of the vein, but more supporting data should be obtained.

Criteria for Followup:

In each section of shafts designated above, decisions on follow up can be made on the following bases:

1. If bedrock is barren with flat dip to south and overburden above bedrock carries no mineralization. May be some distance from any target and probably on the hanging wall side unless overburden is washed gravel suggesting that glacial ground moraine or float could have been washed away. (A bedrock hump would be an exception to this)

2. If bedrock barren but steeply dipping. May be local fold but more likely near hanging wall of vein-fault especially if bedrock is rusty or slightly mineralized, or altered.

3. If same as (1) with float or grains of sphalerite and galena in overburden. On footwall side; vein is to SE and source of float is to E unless severe differences in bedrock topography caused unusual glacial or stream direction (cf. Silver King in 1929).

4. If same as (2) with float or grains of sulfides in overburden. Probably simply on footwall side but could possibly have converse float direction just mentioned or may be between two zones.

5. If bedrock well fractured and mineralized, may be close to vein zone on either hanging or foot wall; use presence or absence of float as above as guide, but drift both ways to decide anyway.

6. If in vein-fault zone. Crosscut to solid walls on both sides, keep going if justified by float or other indications.

7. If in ore. Follow it.

The present practice of taking geochemical samples and panning and examining concentrates at 5-foot intervals and at bedrock and labelling and carefully storing such samples for further study should be strictly adhered to.

The nature and attitude and any other variations or data from bedrock should be recorded in each case.

Geologic study and interpretation of the data should be carried out as frequently as possible, especially when moving from one locality or section of shafts to another.

ESTIMATED COST (From about Nov. 30)

1. Contracts on shafts ($ 30 / foot to 30' depth and two thaws or about 10' drifting each way; $5 per foot additional beyond these limits)

Assume following number of shafts

Done — Area B - 2 35 ft. done	40	
Shaft at E 26 1 00 (total including drifting)	40	(35)
Area A (Section VII)		
2 in progress → Two @ 60' total each	120	
Sections I, II, III IV VI one shaft each say total of 5 shafts @ 50'	250	
Total footage	450 feet	

Contract cost 450 ft. x $30.00 — $ 13,500.00

2. Salaries (4 mo.)

Vic Foley 4 mo. @ 400	1600.00	
M.O. Hampton 4 mo. @ 500	2000.00	
	3600.00	
Benefits @ 7 1/2 %	270.00	
	3870.00	
Accounting & Administration @ 15%	580.00	
		$ 4450.00

3. Food 6 men x 4 mos. 720 man day x $500	3600.00
4. Vehicle operation @ $200/mo.	800.00
5. Management & miscellaneous	1500.00
6. Travel	500.00
7. Fuel	500.00
8. Contingencies @ 10%	2485.00
	$ 27,335.00

This expenditure, of which about $4500 has already been incurred, will be well justified to test the Hector-Calumet type vein system suggested by present indications.

Respectfully Submitted,

Dr. A.E. Aho