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171 WEST ESPLANADE
NORTH VANCOUVER, B.C.

February 24, 1971

Mr. F. A. McGonigle, President,
Croydon Mines Ltd. (N.P.L.),
27th Floor, Board of Trade Tower,
1177 West Hastings Street,
Vancouver 1, B.C.

Dear Mr. McGonigle:

SUMMARY REPORT - GENERAL EXPLORATION
MT. BALDWIN COPPER-ZINC PROSPECT
SQUAMISH, B.C. - VANCOUVER MINING DIVISION

PRELIMINARY:

This report is based principally on the writer's synopsis of various maps, reports, and other records resulting from successive exploration programs carried out since 1946; a relatively minor part of the content derives from the writer's own fieldwork for Kennedy Silver Mines Ltd. during 1969.

The following is an abbreviated history of the prospect:

1924-25•••J.G. McVicar and J. Brown stake key claim group.

1925-28•••Britannia M. & S. Co. option the property in each of these years and carry out shallow diamond-drill exploration of the 'McVicar' showings.

1929-36•••Owners accomplish only enough work to fulfil assessment requirements due to the low copper prices prevailing.

1946•••••Surf Inlet mining group acquire the McVicar property, expand the group via additional claim locations and options. During the following years this company carried out additional surface exploration - principally trenching - but did considerable diamond drilling in 1950.

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1953-55...Britannia M. & S. Co. again option the ground, and continue exploration via trenching, diamond drilling, and geological mapping.

1956-61...No activity reported.

1962.....Horizontal-loop electromagnetic survey and geologic mapping done for Western Surf Inlet Mines Ltd.

1963.....No activity reported.

1964-65...Property optioned to Anaconda. This company carried out geological mapping, geochemical soil-sampling, and restricted I.P. surveying.

1966-68...No activity reported.

1969.....Kennedy Silver Mines Ltd. acquire Dal-Lily-Agape claims adjoining McVicar Crown-grants, and carry out short soil sample - geological traverses.

1970.....Croydon Mines option Kennedy and Matachewan claims carry out a comprehensive Turam E.M. survey.

Maps with this report comprise:

(a) "Geology, Drilling, & Geochemistry, Mt. Baldwin Copper-Zinc Prospect", Scale 1" = 100'.

(b) "Composite Exploration Plan, Kennedy Option", Scale 1" = 400'. This embodies J. E. White's 400-scale plan, pantographic reductions of (a), and details of the writer's 1969 fieldwork for Kennedy Silver Mines Ltd.

To augment (a) and (b), and prior to resuming exploration in 1971, a 200-scale base-plan should be prepared. This would be particularly appropriate for the planning and recording of the exploratory work contemplated for the coming field season.

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TRENCHING

The bulk of this work was done prior to 1955. It appears to have been efficiently planned and executed, and successful to the extent that practically all of the currently-known areas and zones of mineralization were discovered and generally delineated by this work.

Successive groups of trenches opened fair to good copper-zinc mineralization in five intervals of the N.N.W.-trending main McVicar shear zone. From south to north, these are the Whistler (No.2 zone), the South Harding (No.3 zone), the North Harding (No.4 zone), the Rainstorm (No.5 zone), and the Cabin Fr. (No.7 zone). The collective system of trenches (and drill holes) explores a 4000 foot strike length of the through-going McVicar structure.

In addition to the above, three other groups of trenches explore mineralization within short, parallel zones on the Violet, Lily-Rose, and Mamquam Crown-granted claims.

More northly and southerly extensions of the main shear zone, although indicated by the combined geological-geochemical data, exist as relatively unexplored, possible ore-bearing structures.

The principal trenches, as completed by the fall of 1947, were carefully surveyed, mapped, and sampled by A. J. Ingraham, mining engineer. His record of this work comprises a set of small 10 and 20-scale maps - each of which refer to one specific zone. To provide a more useful record, the general data should be 'filtered' and combined into one 50-, or 100-scale geological-assay plan.

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The following assays derive from representative samples of more significant trench exposure within the various zones:

| Zone | Sample No. | Width Ft. | Ag.oz/ton | Cu% | Pb% | Zn% |
|---|---|---|---|---|---|---|
| Lily | M10 | 18.0 | 0.15 | 2.15 | - | 0.90 |
| | M11 | 10.0 | 0.15 | 0.70 | - | - |
| | M13 | 17.0 | 0.80 | 2.20 | - | - |
| Whistler | M8 | 8.0 | 1.0 | 2.00 | 4.2 | 8.2 |
| | O.G. | 4.75 | 3.5 | 3.30 | 14.5 | 14.4 |
| | M9 | 7.0 | 2.1 | 4.80 | - | 12.1 |
| Harding--South | M15 | 12.0 | 0.6 | 3.15 | - | - |
| | M16 | 10.0 | 0.5 | 1.15 | - | 0.70 |
| | M5 | 2.0 | 0.8 | 3.15 | - | 4.4 |
| Harding--North | M33 | 3.0 | 0.1 | 1.80 | - | - |
| | M42 | 4.5 | 0.48 | 1.05 | 0.15 | - |
| Rainstorm | M2 | 6.0 | 1.5 | 7.90 | - | 1.0 |
| | M4 | 10.0 | 1.5 | 9.10 | - | 0.3 |
| | M49 | 6.0 | 2.0 | 2.90 | 1.4 | - |
| | M51 | 7.0 | 0.75 | 3.30 | 0.05 | - |
| | M43 | 4.0 | 0.32 | 0.85 | 1.4 | 2.4 |
| Violet | M55 | 2.5 | 1.6 | 6.30 | tr. | tr. |
| | M56 | 3.0 | 0.4 | 1.20 | tr. | tr. |
| Cabin Fr. | M31 | 9.0 | 0.4 | 0.10 | - | - |
| | M32 | 7.0 | 0.4 | 0.35 | - | - |
| Mamquam | D4 | 5.0 | tr. | 0.40 | - | - |
| | D2 | 6.0 | tr. | 2.50 | - | - |
| | D3 | 5.5 | tr. | 0.90 | - | - |

DIAMOND DRILLING

Each of the five specific exploration zones along the 'McVicar shear zone' have been tested by short to medium-length small diamter (X-ray, EX, AX?) drill holes. Including the few drill holes on the parallel Lily-Rose and Violet zones, a total of 21,194' has been drilled via 72 holes. Drilling has been carried out quite systematically in closely-spaced patterns - thus thoroughly testing the composite mineralized shear panels to a depth range of generally less than 400 feet.

As most, or perhaps all of the drilling appears to have been done with X-ray and EX equipment, and as much of the formation and mineralization is sheared and fractured, recoveries were probably less than adequate for purposes of ore reserve estimation. However, results appear to have been adequate for at least preliminary and shallow delineations of two ore blocks - these being estimated as:

North Harding...92,000 tons @ approx. 2% Cu and average width of 6.8 ft.
Rainstorm.....40,000 tons @ 2% Cu and average width of 9.8 ft.

A minor to significant content of silver, lead and zinc probably occurs with the copper mineralization but evidently was not computed.

On the basis of the drill-hole assay data Davidson (1953) surmises that the tenor of the Rainstorm mineralization decreases with depth. Until further drilling is done with BQ-W.L. equipment, the possibility that the apparent weakening of the orebody with depth is a result of diminishing core recoveries must be suspected.

From generalized determinations of structure-mineral trends via trench and drill-hole evidence, it appears that splitting and branching along the northerly course of the main zone occurs within the North Harding and Rainstorm trenches, respectively. If this is actually the case, closer exploration of ground east of the North Harding and Rainstorm trenches is required. Local V.L.F.-E.M. surveys might be most efficient in detecting such possible splits or, at the same time, parallel sulphide bands and/or shear-fracture zones.

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Drilling by Croydon during 1970 comprised 6 drill holes, C-1 to C-6, for a total of 2000 feet. BQ wire-line equipment was employed - generally effecting good core recoveries except within highly fractured or sheared zones, where recoveries of 60% are noted. All cores were proficiently logged by J. E. White; however, more detail concerning core recoveries might aid in subsequent structural interpretations. In view of the reported tendency towards the deflection of long drill holes within the Britannia (Anaconda) mine panel, the writer suggests that future long drill holes at Mt. Baldwin be surveyed with the appropriate (Tro-pari) down-the-hole equipment.

Holes C-1 and C-2 were drilled to intersect the (main) Turam anomaly, or conductor-axis traversing the Whistler - Main 2 claim boundary. As no sulphide-conductors were intersected, it is assumed that this, and other Turam anomalies relate to conductive shear-fracture zones. On the basis of the 1969 geochemical survey data, the writer suspects that the structural source of the pronounced geochemical anomaly is, probably, a mineralized shear lying closely west of the main prong of quartz diorite. In this position, and with a probable steep westerly dip, the indicated target would situate west of the drilled section. The 1-line Turam anomaly comprising the d.d.h. C-3 target also appears related to a similar non-sulphide conductor.

Holes C-4 and C-6 intersected dip extensions of a local body of Zinc-iron mineralization discovered while constructing the road to the drill site. The local geological setting suggests that this occurrence is peripheral in respect to a possible mineralized shear traversing this general locality.

Although holes C-1 to C-3 were void of sulphides, the cores produced evidence of a wide zone of shearing and alteration, characteristic of a strong ore-bearing structure.

## GEOLOGY

The claims are mainly underlain by finely-fragmental, andesitic to rhyolitic volcanic rocks and locally cut by felsite, feldspar-hornblende porphyry, diabase, and lamprophyre dykes. Some of the felsitic bodies show strong resemblances to the Britannia dacite.

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The volcanic rocks are weakly to moderately schistose; within and adjacent to shear zones these have been altered to chloritic or sericitic schists, or more-or-less silicified. Alteration within masses and prongs of quartz diorite, etc. is characterized by the presence of pink feldspar, chlorite, epidote, kaolin, and sericite.

The general trend of bedding, schistosity, and shearing is N.N.W., with steep westerly dips.

Mineralization, typically occuring as large to small lenses, short veins, and disseminations in wide zones of shearing and fracturing, comprises pyrite, chalcopyrite, sphalerite and, more locally, galena - all associated with more-or-less quartz and calcite. The better mineralization appears to favour flexures in shear zones; more tenuously, it appears to associate with zones of felsite intrusion.

GEOCHEMICAL SURVEYS

A soil-copper survey covering an average 1000' x 4000' area of the Crown-granted claims was performed by Anaconda in 1964. The area sampled covers the main McVicar shear along its N.N.W. course between the Whistler and Noonday claims.

The resulting copper anomalies, as shown on the 100-scale plan, include the areas of the N. and S. Harding 'copper zones', a small southerly section of the Rainstorm zone, the Cabin Fr. trenches, and a probable 'drainage trough' traversing the N.E. corner of the Rainstorm claim. Due to minimal sample coverage, none of the anomalous areas has been fully delimited. Within these, soil-copper levels generally range between 20-100 p.p.m. and locally (South Harding) to plus-200 p.p.m. Values exceeding 25 p.p.m. were considered significant.

The report on the survey omits most details of the sampling procedures followed; consequently, the results cannot be compared to those accruing from other briefer, but better documented surveys. Also, as analyses were by the dithizone method the results, however, well calibrated, cannot be compared with others done by the more accurate atomic absorption method. Also, in testing samples for copper only, the additional geochemical information which would have accrued from parallel zinc and lead determinations was not made available.

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## GEOPHYSICAL SURVEYS

### A. I.P. Survey

The type of equipment used and the results of the 2-line survey conducted by Anaconda are not known. However, the character of the Mt. Baldwin mineralization is such that it should be generally detectable by I.P. methods. Zones of predominant zinc mineralization would not respond but would, if present as relatively shallow occurrences, be readily detectable by geochemical methods.

### B. Horizontal Loop E.M. Survey

This, done in 1962, employed 800 and 2400 c.p.s. frequencies. It covered pre-selected intervals of the main ore zone between the Whistler and Noonday claims and a 25-claim block of located claims to the north of the Crown-grants. Readings were taken at 100-ft. station on N60E grid lines spaced 300 ft. apart. The full grid was surveyed at 2400 c.p.s., and resulting anomalies re-run at 800 c.p.s. - the latter for increased depth penetration. Individual anomalies were evaluated on the basis of r = phase response @ 800 c.p.s./ditto @ 2400 c.p.s.

Conductors were classified as:

| | |
|---|---|
| 'Good' | @ r = 0.8 or higher |
| 'Moderate' | @ r = 0.5-0.8 |
| 'Fair' | @ r = less than 0.5 |

On the basis of the poor results obtained the horizontal-loop method must be considered inapplicable; only weak responses were obtained over the well-mineralized Harding and Rainstorm zones - phase response ratios being in the range of 0.25-0.45. A similarly doubtful conductor was detected on the northerly claim group.

In the writer's view, the lack of response is due to the low conductivity of the McVicar-type mineralization - this typically comprising an aggregate zone of separate, relatively short bodies of conductive Fe-Pb-Cu sulphides, more-or-less cemented or joined by sphalerite (non-conductor). In addition the slight depth-penetration characteristics of the horizontal-loop equipment precludes possible responses due to occasional 'bulking' effects from numerous small ore streaks or lenses. Also the low power and penetration characteristics preclude responses from associated geologic conductors such as (wet) shears and/or fractures.

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C. Magnetic Survey

This was run in conjunction with (A) and reportedly registered small but definite lows in the vicinity of the E.M. conductors (anomalies).

In the writer's opinion, magnetometer coverage of the Mt. Baldwin showings would not produce much in the way of direct evidence of ore. Within the southerly (Kennedy) claims it might assist in delineating areas of intrusive rocks.

D. Turam-E.M. Survey (1970)

This generally covered all claims held in 1970. The survey, ordered by Croydon, totalled 37.4 line-miles. It was run via a grid of N.E.-S.W. lines on approximate 400 ft. spacings, with readings on 100-foot line-stations. Frequencies of 400 and 800 c.p.s. were employed.

Of the three linear anomalies detected, only one could be considered important on the basis of its strike-extent and/or geological-geochemical affiliations. This was tested by d.d. holes C-1 and C-2 with negative results - as regards the detection of 'sulphide-conductors'. Results could be considered positive to the extent that it revealed strong elements of the S.S.E. extension of the McVicar shear zone within a comparatively unexplored interval south of the Whistler showings.

Other conductors detected comprised single-line anomalies and are not considered significant.

In respect of the known McVicar sulphide zones, none were revealed as distinctive single, or multiple linear conductors. Only the Harding zone responded, and this only as a general area of complex or distorted electromagnetic responses, but of lesser magnitude than the one embodying the main (C-1 & C-2) linear anomaly. Similar large areas of complex response occur within areas to the west of the claims, and are interpreted as mainly relating to overburden and lithology - the latter possibly involving graphitic argillaceous rocks.

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In summary, it appears that the Turam method, like the earlier horizontal loop survey, does not provide distinct drilling targets. The fundamental reasons for the responses obtained are probably similar to those given in respect of the horizontal loop method. Obviously, geophysical techniques which respond to very slightly conductive - dispersed zones of sulphide mineralization and/or to 'geological conductors' should be more productive. V.L.F.-E.M. and I.P. techniques should, with these parameters, prove more definitive. In any case soil sampling, to detect Cu, Pb & Zn, is a necessary adjunct.

RECOMMENDATIONS

1. Re-establish the exploration grid from 64S to 32N @ 400' line-spacing, 100' line-stations; plot stations.

2. Run V.L.F.-E.M. survey over grid on 100'/50' stations.

3. Soil sample grid; analyze for total Cu-Zn-Pb.

4. Carry out a standard 7.5 K.W., pulse-type surface I.P. survey over grid area to be designated on basis of the Turam data and results of (2) and (3) above.

5. Design pattern of diamond drill holes to explore selected target-intervals of the main McVicar zone and strike extensions. Holes will probably be in the 600'-800' depth range, spaced at uniform strike-intervals, parallel to the grid-lines, and inclined at 60 degrees. The resulting pattern of deep drill holes will permit their use for deep I.P. exploration to gross depths of the order of 1500 feet. Suggested layouts and procedures have been furnished by R. Caven, P. Eng. of Barringer Research Limited.

6. Explore further by diamond drilling and/or tunnelling - as indicated by evaluation of the combined exploration data.

Respectfully submitted,

W. M. Sharp, P. Eng.

Encl.