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# GEOLOGICAL, GEOCHEMICAL, AND GEOPHYSICAL REPORT

# ON THE OKEOVER PROPERTY - POWELL RIVER, B.C.

92K/SW

Vancouver, B. C.
May 31, 1972

T. G. Schroeter

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## SUMMARY AND CONCLUSIONS

The OK property, located 20 miles north of Powell River, essentially comprises a central silicic core intrusion that is the locus of hydrothermal alteration and accompanying copper-molybdenum mineralization. A broad zonal alteration pattern appears to be radially distributed around this central silicic core. This alteration pattern is coincidental to mineralogical variations with chalcopyrite and molybdenite in the inner sericitic envelope with pyrite in the outer fringes.

The mineralization is fracture controlled with only rare instances of disseminated mineralization.

The presence of ubiquitous dacitic dykes with no mineralization introduces a dilution into the mineralized zone by as much as 20%.

The area of the claim groups has been thoroughly investigated and no other centres of alteration have been detected.

Geochemical surveys over the claim groups conducted by Noranda and Falconbridge showed several anomalous zones, many of which have subsequently been diamond drilled.

Noranda drilled 15 holes totaling 11,000 feet in 1966. Asarco drilled 8 holes totaling over 3,000 feet in 1968. Falconbridge drilled 6 holes totaling 1,996 feet on the northern part of the property where no previous drilling had been done.

The drill data indicates that within the inner hydrothermal zone there are no mean assays greater than 0.3% Cu, though individual sections may assay 0.5% over 20 or 30 foot sections.

The OK property is of too low grade to be of economic interest at this time, despite its favorable location and the potential for low cost transportation.

The contr  mine  tion  its rel  ıship to alteration has been  ıblish  l shc  serve  guide for regional exploratic  n the

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## DESCRIPTION OF PROPERTY

The OKEOVER property lies in the Vancouver Mining Division and consists of 102 full sized claims and 18 Fractions (Figure 1). The following claim status exists:

| Claim | Record No. | Expiry Date |
|---|---|---|
| O.K. 1 - 4 | 12064 - 12067 | July 7, 1979 |
| 5 - 8 | 12131 - 12134 | July 22, 1979 |
| 9 - 11 | 12135 - 12137 | July 22, 1973 |
| 12 | 12138 | July 22, 1972 |
| 13 - 16 | 12172 - 12175 | August 1, 1979 |
| 17 | 12176 | August 1, 1972 |
| 18 | 12177 | August 1, 1979 |
| 19 - 20 | 12313 - 12314 | August 26, 1979 |
| 21 - 29 | 12337 - 12345 | September 6, 1979 |
| 30 | 12346 | September 6, 1974 |
| 31 | 12347 | September 6, 1979 |
| 32 | 12348 | September 6, 1974 |
| 33 | 12349 | September 6, 1979 |
| 34 | 12350 | September 6, 1973 |
| 35 | 12351 | September 6, 1978 |
| 36 | 12352 | September 6, 1973 |
| 37 | 12353 | September 6, 1978 |
| 38 | 12354 | September 6, 1973 |
| 39 | 12355 | September 6, 1979 |
| 40 | 12356 | September 6, 1974 |
| 41 | 12357 | September 6, 1979 |
| 42 | 12358 | September 6, 1974 |
| 43 | 12359 | September 6, 1979 |
| 44 | 12360 | September 6, 1974 |
| 45 | 12361 | September 6, 1979 |
| 46 | 12362 | September 6, 1973 |
| 47 | 12363 | September 6, 1974 |

| Claim | Record No. | Expiry Date |
|---|---|---|
| 48 - 49 | 12364 - 12365 | September 6, 1973 |
| 50 | 12366 | September 6, 1974 |
| 51 - 60 | 12435 - 12444 | September 13, 1972 |
| 63 | 12447 | September 13, 1972 |
| 65 | 12449 | September 13, 1972 |
| 67 | 12451 | September 13, 1972 |
| 69 - 74 | 12453 - 12458 | September 13, 1972 |
| In 1 - 2 | 12501A-12502A | September 16, 1974 |
| 3 | 12503A | September 16, 1973 |
| 4 | 12504A | September 16, 1974 |
| 5 - 12 | 12505A-12512A | September 16, 1973 |
| 149 - 151 | 12636-12638 | September 30, 1972 |
| 152 | 12639 | September 30, 1973 |
| 153 | 12640 | September 30, 1972 |
| 154 | 12641 | September 30, 1973 |
| 155 | 12642 | September 30, 1972 |
| 156 | 12643 | September 30, 1973 |
| 161 - 164 | 12648 - 12651 | September 30, 1973 |
| 180 | 12664 | September 30, 1973 |
| 181 - 184 | 12665 - 12668 | September 30, 1973 |
| Inlet Fraction 1 | 13057 | November 15, 1978 |
| 2 - 6 | 13087 - 13091 | December 7, 1978 |
| 7 - 10 | 13092 - 13095 | December 7, 1972 |
| 11 | 13096 | December 7, 1974 |
| 12 | 13097 | December 7, 1973 |
| 13 | 13098 | December 7, 1974 |
| 16 | 13146 | December 16, 1972 |
| Kydidle Fraction 1 | 13144 | December 16, 1972 |
| 2 | 13145 | December 16, 1973 |

## LOCATION

The OK property is located about 20 miles north of Powell River, B. C., which is approximately 90 miles NW of Vancouver (Figure 2). The property is located about 2 miles east of Okeover Inlet at longitude $124^{\circ}$ 40' and latitude $50^{\circ}$ 02'.

## ACCESS

Powell River has regular air service to Vancouver. From Powell River, the property is reached by four-wheel drive vehicle by way of a logging road which joins the Lund highway from Powell River. A heliport exists at the southern end of the property.

Low cost transportation would be readily available.

## OWNERSHIP

At the present time, all claims are owned by M. V. Boylan and R. E. Mickle. Amoco was in contact with R. E. Mickle.

## HISTORY AND EXPLORATION TO DATE

The OK property was initially investigated by Noranda in 1966 and 1967. In 1966 Noranda carried out a geochemical survey covering the grid from 18N to 154N. The sampling was at 200' intervals on a line spacing of 400'. The samples were analyzed for Cu and Mo. The geology of the property on grid lines 32N to 154N was mapped at a scale of 1" = 400' by W. Osborn in 1966 (see Map 1).

The Noranda organization drilled 11,000' of AQ core on the property from late 1966 to early 1967.

Asarco optioned the property in 1968. An induced polarization survey covering the southern portion of the property was run by Lockwood Survey Corp. in 1968 on behalf of Asarco. Eight diamond drill holes were drilled. A total of 2,783 feet was drilled in 6 of these holes.

Falconbridge re-examined the geology, undertook regional geochemical work, and drilled subsequent targets in the 1969 and 1970 field seasons. A regional stream silt sampling programme was carried out in 1969. Also in 1969, the extension of the grid from 154N to 182N was sampled. The geology of the property was remapped at an unknown scale. In 1969 Falconbridge undertook SP magnetometer and EM-16 studies.

A magnetometer survey was carried out using an Askania and a fluxgate magnetometer.

Five diamond drill holes totaling 1,996 feet were drilled by Falconbridge in 1970.

## REGIONAL GEOLOGY

The OK property is located on the western flank of the Coast Crystalline Belt, a major regional zone of granodioritic and gneissic complexes extending through British Columbia from northern Washington State to the vicinity of the north-trending part of the Alaska-Yukon boundary. It includes only the eastern fringe of southeastern Alaska and excludes Vancouver Island, except for the small segment that juts farthest northeast, and Queen Charlotte Islands (see Figure 3).

Information on the composition of the plutonic rock in the Coast Crystalline Belt is limited. Diorite and quartz diorite are more common in the western part, and biotite-bearing granodiorite and quartz monzonite in the eastern part.

The geology of the OK property does not resemble the major portion of the Coast Range, but resembles a ring or collapse type of high level igneous structure.

To the north of the OK property, there is a large circular structure in the Redonda Islands. This feature may represent an arcuate dyke system. The OK complex may be related to this circular structure, which may be a collapse caldera. Such structures are atypical of the coast complex.

The structural environment in and around the OK property has been investigated by a study of air photo linears. The results indicate a complex structural pattern. The area is characterized by a closely spaced network of northerly trending linears. Easterly trending widely spaced linears are represented by andesitic dykes that post date all igneous and hydrothermal processes.

## GEOLOGY OF PROPERTY

The OK lake property essentially comprises a central silicic core intrusion that is the locus of the hydrothermal alteration and the accompanying mineralization. Exposure is about 15%. Many outcrops are elongate and have been mapped as dykes, but close examination indicates that their "ribs" of granitic rocks remain as contact altered "skins", adjacent to the dykes. The early mapping by Noranda (according to Falconbridge) did not indicate this, and gave rise to large areas of "volcanics" on the map, whereas, in fact, they consist of dykes transgressing the granitic rocks.

Central Granitic Core

The central granitic core in the property comprises a porphyritic granite, medium grained, and considerably altered to sericitic assemblages.

The rocks are somewhat granulated, have a color index of about 20, and quartz phenocrysts predominate over potash feldspar phenocrysts. In thin section, despite the attendant alteration, delicate oscillatory zoning can be seen in the potash feldspars. The matrix is frequently granulated and mafic minerals are generally degraded to chloritic aggregates.

Quartz stringers and pods are present, but characteristically, are predominant towards the margins of the intrusion. The intrusive contact is nowhere observed, but any intrusive effects appear to be obscured by the superposed hydrothermal alteration. The contact zone appears to be displaced at several localities by the later northerly trending faults. Sulphide mineralization is present but is generally not abundant and is more common in the altered zones outside the intrusion. Secondary magnetite is present in rosettes up to 1/2" diameter, in the marginal zones. It is scattered, however, and does not give rise to a substantial magnetic expression.

Outer Granodiorite

The western and eastern margins of the property are underlain by medium grained biotite-hornblende granodiorite that is relatively unaltered.

These rocks are relatively structureless with a color index of about 45 to 50.

In thin section the plagioclase exhibits marginal normal zonation with the matrix being partially granulated. The outer granodiorite grades into the al teration envelope by a process of alteration along joint planes. The reticulate alteration pattern develops by the appearance of "bleaching" adjacent to the joints. The appearance of bleaching is accompanied by the presence of pyrite, both along the joints and as scattered disseminated grains.

Inner Alteration Zone

The inner alteration zones comprise a variation from the chloritised monzonite of the outer zones to the sericitised stockwork characteristic of the altered rocks adjacent to the granite plug.

The rocks are leucocratic in nature with mafic minerals extensively altered to chloritic material and in some cases, complete reduction of the mafic minerals. The plagioclase becomes clearer in color because of exsolution of oxide rodlets within the feldspar.

Dacite Dykes

The OK property is underlain by a major dyke swarm of dacitic composition.

The dykes were originally classified in the field as sparsely porphyritic dacite and porphyritic dacite with approximately 50% phenocrysts. Subsequent field work clearly established that the two types were gradational. The smaller dykes consist of the sparsely porphyritic units while the larger ones comprise a marginal zone of the sparsely porphyritic variety gradational into a core zone of the porphyritic dacite.

The phenocrysts are largely of hornblende with subordinate potash feldspar with a matrix that is greenish/grey in color. The dykes have locally undergone retrograde alteration though they post-date the major phase of mineralization and alteration. Where altered they have become cream colored, fine grained units initially mapped as rhyodacites. In thin section they consist of fine grained quartz-sericite aggregates with minor chlorite present. The alteration has been observed as marginal in some specific dykes, controlled along fractures and in certain instances as a pervasive alteration throughout the dykes.

The dykes are essentially sub-vertical, but locally they exploit flat lying fractures to appear sill-like in form. The latter is uncommon, however.

Sulphides are not uncommon in the dykes and where found is essentially disseminated pyrite up to 2% in amount. Only rarely has copper mineralization been observed in the dykes and, where found, occurs in the altered varieties that have undergone late stage of hydrothermal alteration. The latter is uncommon.

Assay data from drilling clearly reveals that the dacitic dyke suites are essentially unmineralized and introduce a major dilution in the mineralized zones in the property. The proportion of dykes in the central portion of the property is at least 30% by volume, and measures up to 100' in width, though generally about 15 - 20' wide.

Diorite Dykes

A number of diorite dykes are found, especially in the central portion of the property. These cut the earlier dacitic dykes, but also exploit the pre-existing contacts of the dacitic dykes.

The latter is especially evident near Pyrite Lake, where dioritic plugs and lenses are found in the cores and at the margins of the dacitic dykes.

It is clear that these dioritic plugs post-date the dacitic dykes but have been emplaced along planes of weakness of the contacts of the pre-existing dykes.

The dykes are apparently fresh and do not carry any sulphides.

Andesitic Dykes

These appear to be the latest episode of igneous activity in the OK Lake area. They generally trend nearly easterly, cross-cut the earlier dacitic dykes, and can be observed to cut some dioritic dykes.

Some dioritic dykes also trend easterly and it is possible that some coarser, central portions of this suite are of dioritic composition.

These andesitic dykes occasionally exploit the older dacitic dykes with thin zones of andesite at, and also cross-cutting, the dacites but such occurrences are not common.

## Geologic Summary

The granitic intrusion, dyke swarm, and later faulting are interpreted as developing along a northerly trending zone of weakness. Emplacement of the granitic plug was accompanied by the hydrothermal alteration of the country rock, and succeeded closely by the emplacement of the intense swarm of dykes.

The dyke swarm of dacitic composition is suggested to be tapped from a nearby igneous source as is suggested by the composite nature of the dykes and emplacement of dioritic plugs and dykes along the same zones of weakness.

It has been suggested that the circular structure on Redonda Island is a large ring structure into which several phases of igneous rocks were introduced.

The displacement of the hydrothermally altered units is suggested to be a re-activation of the same stress systems responsible for the emplacement of the granite plug.

The andesite dykes appear to be later tension features as they cross-cut all units in the property.

## MINERALIZATION

The distribution of sulphide mineralization in the OK property is systematically related to the areal distribution of alteration.

The sulphide mineralogy is not complex. The sulphides present are pyrite, chalcopyrite, molybdenite, sphalerite, and minor amounts of bornite. The sulphides are, to a large extent, distributed in fractures and only occasionally is the mineralization disseminated in character.

The areal distribution of sulphides can crudely be termed annular if the post mineralization deformation is neglected. A crude zonation can be discerned with an outer rim of pyrite succeeded inwards by a mixed pyrite and chalcopyrite zone, then an inner zone with chalcopyrite, molybdenite and minor pyrite.

The distribution of sulphide mineralization is accompanied by a sympathetic variation in the alteration pattern. The extreme outer fringes of the alteration zone is characterised by a reticulate alteration pattern with bleaching of feldspars along joints. These form zones about 1" either side of the joint in which iron oxides have been redistributed in the plagioclase, giving rise to a pale cream coloration. At this stage, the mafic minerals are not altered. The appearance of the reticulate alteration pattern is frequently but not ubiquitously accompanied by the appearance of pyrite.

The intermediate alteration zones are characterised by the general change in coloration of the feldspars with the progressive reduction of mafic minerals to chloritic aggregates or in the more altered material the complete reduction of mafic assemblages, giving rise to a leucocratic monzonite. In these rocks potash feldspar is strongly sericitized with plagioclase altered to scapolite, micaceous horizons.

The granitic plug that is the locus of mineralization is strongly altered to sericite, magnetite assemblages.

Where the sericitic alteration appears, there is a crude correlation with the appearance of chalcopyrite and molybdenite along the fractures. Locally, the chalcopyrite is disseminated and where found, is developed at interfaces of mafic minerals. Disseminated mineralization is not common and the predominant control is structural.

An attempt was made to measure structural intensities but because many of the exposures of granitic rocks are of thin plates against the dykes, this was abandoned as insufficient detail could be obtained.

As a rough guide, the fracture intensity appears to be partially correlative with the inner alteration zones, but there is no factual data to support this. There does not appear to be a relationship between mineralized fractures and the later faulting, i.e., the latter does not appear to be a re-activated fault zone, but rather, a re-activated stress system.

## GEOCHEMICAL SURVEYS

During the late summer of 1969, a reconnaissance silt sampling programme was carried out on and around the OK property by Falconbridge. The survey revealed a previously unsuspected strongly anomalous zone in the north of the property and a detailed soil anomalous zone in the north. (See Appendix 1.)

Copper, total molybdenum, silver, iron, manganese, cobalt, and cold-extractable copper and cold-extractable molybdenum values were obtained from all soil samples on the extension of the grid from line 154 northwards towards Theodosia Inlet. The following mineral claims were involved:

OK 21, 22, 23, 24, 26, 35, 37, 38

IN 154, 156, 161, 162

Grid lines were spaced 200 feet apart and soil samples were collected at intervals of 100 feet and 200 feet on alternate grid lines, giving a total of 275 samples.

Soil samples were taken from the B horizon. At selected localities, pits were sunk and soil profiles were tested.

Results

(a) Soils - concentration ranges for the various metals are summarized below: -

| | Regional bkgd. | Local bkgd. | Anom. | Very Anom. | Range | Mode |
|---|---|---|---|---|---|---|
| Cu ppm | <50 | 50-100 | 100-500 | > 500 | 5,11, 750 | 11-20 |
| Mo ppm | < 5 | 5-10 | 10-25 | > 25 | 2-100 | <2 |
| Ag ppm | <0.7 | 0.7-1.0 | >1.0 | N.A. | 0.2-1.6 | 0.4-0.6 |
| Co ppm | <10 | 10-15 | 15-50 | >50 | 1-162 | <5 |
| Fe pct | <1.0 | 1.0-1.5 | 1.5-2.5 | >2.5 | 0.07-3.34 | 1.0-1.1 |
| Mn ppm | <80 | 80-150 | 150-300 | >300 | 5-9, 340 | 31-40 |
| CxCu ppm | <10 | 10-15 | 15-50 | >50 | 3-6, 600 | <5 |
| CxMo ppm | < 2 | 2-3 | >3 | N.A. | 2-8 | <2 |

OVERBURDEN PROFILE RESULTS FOR PITS I TO VIII

| Sampling Depth (ins.) | Horizon | Cu ppm | Mo ppm | Remarks |
|---|---|---|---|---|
| PIT I | | | | |
| 4 | Ah | 17 | 6 | Minor mineralization with bornite, pyrite, chalcopyrite and molybdenite in nearby outcrop |
| 18 | B | 19 | 8 | |
| 30 | B | 202 | 6 | |
| PIT II | | | | |
| 30 | B | 69 | 7 | Pit filled with water |
| PIT III | | | | |
| 18 | B | 1540 | 45 | Pit filled with seeping groundwater |
| 30 | C | 1480 | 20 | |
| PIT IV | | | | |
| 12 | B | 1050 | 50 | Steep, well-drained slope |
| 24 | B-C | 830 | 18 | |
| 36 | C | 600 | 12 | |
| 48 | C | 460 | 2 | |
| PIT V | | | | |
| 36 | B | 400 | 35 | Steep slope. Ground water seepage at depth of 78 inches. |
| 42 | B-C | 480 | 25 | |
| 60 | C | 230 | 25 | |
| 73 | C | 202 | 38 | |
| PIT VI | | | | |
| 24 | B-C | 960 | 168 | Water logged soil sloughed into pit. |
| PIT VII | | | | |
| 2 | Ah | 29 | $<2$ | |
| 6 | B | 170 | 4 | |
| 14 | B | 188 | 5 | |
| 36 | B-C | 164 | 7 | |
| PIT VIII | | | | |
| 4 | Ah | 74 | 2 | Trace of pyrite in bedrock exposed by pit. |
| 12 | B | 75 | 12 | |
| 24 | B | 76 | 14 | |
| 40 | B-C | 105 | 18 | |
| 48 | B-C | 120 | 13 | |

Laboratory Techniques

The samples were dried in a gas-fired hot air drier and hand screened through 80 mesh standard nylon screens.

The minus 80 mesh portion of the dried sample was analysed for copper and molybdenum by standard geochemical techniques. In addition, soil samples from the main grid were analyzed for silver, cobalt, manganese and iron, and for cold-extractable copper and molybdenum using standard geochemical methods.

Copper, silver, cobalt, iron, and manganese were determined by standard atomic absorption techniques, following digestion of the sample with boiling 10% nitric acid. Total molybdenum was determined by fusing 250 m.g. of sample with alkaline flux to render the molybdenum soluble. The fusion was leached with demineralized water and an aliquot of the leach liquor treated with 2.5% solution of hydroxylamine hydrochloride in hydrochloric acid and 1% zinc dithiol solution. After shaking to develop the colored molybdenum complex, the samples were compared with previously prepared standards to obtain the molybdenum concentration.

Cold extractable copper and molybdenum were determined after shaking 1.0 g. of sample with 10 ml. of buffer solution for two minutes in a mechanical shaker. The buffer solution has a pH of 4.0 and consists of 100 g. of ammonium citrate and 100 g. of hydroxylamine hydrochloride dissolved in 1 litre of demineralized water. The copper content of the leach solution was determined by standard atomic absorption methods. Molybdenum was determined on an aliquot of the leach solution using the same colorimetric method as for total molybdenum.

Interpretation

Falconbridge took duplicate samples over the Noranda grids for comparative purposes. This sampling indicated a reliable correlation between the Noranda and Falconbridge sampling.

A composite map suggests that there is a good correlation of bedrock mineralization to the geochemical anomalies. Because of the subdued relief, it has been suggested that secondary dispersion from the primary mineralization is subdued. In the southern portion, the bedrock mineralization occurs in the sericitic envelope adjacent to the granitic intrusion.

Essentially the Falconbridge survey differentiated between areas of secondary accumulation and those related to bedrock mineralization. The anomalies over areas without substantial hydrothermal alteration, which were unexplained, were indicated to be caused by saline dispersion.

Secondary accumulation in the case of molybdenum soil anomalies has apparently played a minor role. On the other hand, it is evident that secondary accumulation from metal-enriched ground water is locally a significant factor in the development of copper anomalies.

A short discussion by J. Barakso concerning the geochemical survey done by Falconbridge is included in Appendix 2.

Drilling in 1970 was carried out on anomalies suggested in a geochemical report by R. B. Band. Some low grade mineralization was encountered.

Geochemical sampling, both stream and silt, is an effective tool in this environment, both in terms of cost-effectiveness and in rapidity.

## GEOPHYSICAL SURVEYS

Several geophysical techniques have been employed to obtain information on both structural geology and on the distribution and character of the sulphide mineralization. The geophysical techniques were only of moderate success and it is only the combination of techniques with geological data that gives any valid information. Noranda did not apparently undertake any substantial geophysical programmes, while Asarco in 1968 undertook an I.P. survey. Falconbridge in 1969 undertook SP magnetometer and EM-16 studies.

### Induced Polarization

In 1967, Canadian Aero Mineral Surveys Limited carried out an induced polarization survey on behalf of Asarco. A total of approximately 21 line miles was surveyed.

A reconnaissance spacing of 200 feet with readings taken at 200 foot intervals was used. Detailing was carried out in some areas with a 100 foot spacing and a reading interval of 100 feet.

Background chargeabilities varied but in general tended to be in the order of 2-4 milliseconds. Readings above 6.0 milliseconds were considered anomalous and on this basis 5 anomalous zones were outlined. All anomalous zones were later drilled with discouraging results.

It is believed that the interpretation of I.P. results for Asarco is invalid. Drilling revealed that the major anomalies were chiefly caused by pyrite and did not reveal the widespread copper mineralization present within the property.

It is thought that the I.P. anomalies are caused by pyrite in the outer pyritic halo, by disseminated pyrite in dacite dykes, and by pyritic shears in the outer halo. It is suggested that the inner zone of fracture controlled chalcopyrite and molybdenite is not anomalous and is essentially a low response area for I.P.

Self Potential

Self potential methods were carried out on the OK #1 claim and on the extension of the grid in the northern portion of the property.

Short period anomalies were interpreted as being caused by the ubiquitous dyke swarms.

There appears to be a good correlation of self potential anomalies of a large dimension with the soil geochemical expression.

EM-16

An EM-16 survey was conducted using 18.6 kcs. and 24.0 kcs. frequencies.

The survey delimited major structural features such as major fault zones. The anomalies do not coincide precisely with the mapped faults.

## Magnetic Data

A magnetometer survey was carried out using an Askania and a fluxgate magnetometer. The problem of the ubiquitous dyke swarm introduced an anisotropy into the data.

The difference in magnetic expression between the core rocks and the hydrothermal aureole proved to be minimal.

The area covered clearly reveals the narrow, elongate anomalies correlative with the dyke swarms.

## Summary

The effictiveness of geophysical techniques is questionable and is certainly of but secondary value.

DIAMOND DRILLING

The OK property has been drilled on several different occasions by Noranda, Asarco, and Falconbridge (see Map 1 for locations). The Noranda drilling was largely controlled by favorable geology and geochemistry.

The drilling by Asarco was apparently on I.P. targets in part, and on geochemical targets. The siting of the Falconbridge holes was primarily on favorable geological targets and on geochemical targets.

The following drill results depict only the best mineralization.

NORANDA DRILLING

The Noranda organization drilled 11,000 feet of AQ core on the property from late 1966 to early 1967.

| DDH | FOOTAGE | INTERSECTION | % Cu | % Mo |
|---|---|---|---|---|
| 66-1 | 524' | 520' | 0.223 | |
| 66-2 | 500' | 480' | 0.215 | |
| 66-3 | 506' | 450' | 0.117 | |
| 66-4 | 500' | 380' | 0.142 | |
| 66-5 | 501' | 340' | 0.243 | |
| 66-6 | 507' | 150' | 0.317 | |
| 66-7 | 500' | | | 0.1 |
| 66-8 | 506' | 390' | 0.215 | |
| 66-9 | 506' | 40' | 0.190 | |
| 66-10 | 606' | 550' | 0.105 | |
| 66-11 | 682' | 600' | 0.188 | |
| 66-12 | 666' | 20' | 0.31 | |
| 66-13 | 626' | 20' | 0.14 | |
| 66-14 | 785' | 320' | 0.291 | |
| 66-15 | 534' | 290' | 0.286 | |
| ASARCO DRILLING | | | | |
| 68-1 | | | | |
| 68-2 | 500' | 40' | 0.24 | |
| 68-3 | 500' | 190' | 0.19 | |
| 68-4 | 500' | 10' | 0.22 | |
| 68-5 | 494' | 140' | 0.26 | |
| 68-6 | 401' | 210' | 0.32 | |
| 68-7 | 388' | 360' | 0.18 | |
| 68-8 | | | | |

## FALCONBRIDGE DRILLING 1970

The Falconbridge drilling was primarily to investigate geological targets in the northern portion of the grid where no drilling was performed by previous investigators.

| DDH | FOOTAGE | INTERSECTION | % Cu | % Mo |
|---|---|---|---|---|
| 70-1 | 402' | 10' | 0.15 | |
| 70-2 | 400' | 20' | 0.15 | |
| 70-3 | 391' | 160' | 0.29 | 0.01 |
| 70-4 | 401' | 370' | 0.24 | 0.01 |
| 70-6 | 402' | 230' | 0.29 | 0.01 |

For more detailed drill data, see Appendix 3.

Unfortunately, dilution by dacite dyke swarms is a major problem.

## EXPLORATION POTENTIAL

The OK property is of too low grade to be of economic interest at this time. Even though some ore-grade sections do exist, the dilution problems caused by dacite dykes of up to 30% makes the property uneconomical.

The control of mineralization and its relationship to alteration has been established. The area of the claim group has been thoroughly investigated and no other centres of alteration have been detected.

T. G. Schroeter
Geologist

TGS:mel

Vancouver, B. C.
May 31, 1972

# MEMO

AMOCO MINING

To: T. SCHROETER Date: 29/5/72

From: J. J. B.

Subject: GEOCHEMICAL REPORT ON THE THEODOSIA GROUP OF THE O.K. PROPERTY by R. B. Band

This geochemical report is restricted to soil geochemical interpretation and shows a fairly exhaustive study of the anomalous zones.

The writer of the report seems to concentrate his thoughts on two major problems: possible transported anomalies and supergene enrichments.

The first problem was tackled by profile sampling, which is perhaps the better one and also by analysing for exchangeable copper and molybdenum.

It seems that most of these profiles were taken on hydromorphic fans with the exception of pits VII and VIII, which are situated above less important pyritized zones. It is unfortunate the writer could not demonstrate the meaning of his point by one or two residual "superjacent" anomalies.

The other approach was used in the laboratory to relate the exchangeable copper and molybdenum values with total Cu and Mo. This seems to have been less successful, perhaps because of various fixations of metals taking place on different levels of the hydromorphic fan (see enclosed diagram ). Possibly a more vigorous leaching approach (e.g., $\overline{HSO_3}$ attack) could produce more meaningful numbers when not only the adsorbed ions are released from the samples.

The other question of possible supergene enrichment of the soils during the secondary dispersion is explained in this report. It can be suspected of areas with noted shallow overburdens retain residual soils of this region, where enrichment of the "B" horizon is 50-70 in comparison with surface bedrock.

The approach used to detect enrichment is somewhat coupled with the hydromorphic activities using a laboratory method when analysing for Mn, Fe, Co.

These methods are very successfully used in stream sediment sample interpretation where Mn scavanges Cu (among other heavy metals) and Fe (where $Fe^{+++}$ ions precipitate) with molybdenum. Cobalt is used to certify scavanging of heavy metals since cobalt is thought to be scavanged almost 100% by manganese oxides.

In the case of soils to make these kinds of interpretations, one always has to keep in mind that these elements are characteristic porphyry type halo elements and in some cases may be difficult to sort out.

In general, it can be concluded that the existing anomalies have been enlarged somewhat by hydromorphic activities, but there is not a great deal of transportation of these. It also can be remarked that this whole zone indicates a good assemblage of trace element contents characteristic of a porphyry type situation and this may deserve some thoughts of exploration of the surrounding areas.

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