GEOLOGICAL AND GEOCHEMICAL REPORT
ON THE
ROBERTA MINERAL CLAIM

for
CK&G Management Ltd.
Owner-Operator

NTS 93L/10E
Omineca Mining Division

Latitude 54°31'N
Longitude 126°39'W

December 12, 1984

Robert Holland, B.Sc.
Holland Geoservices Ltd.
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SUMMARY AND CONCLUSIONS

The Roberta mineral claim, owned by CK&G Management Ltd., lies 3 kilometers southeast of the Copperhill copper-zinc-silver prospect currently being developed by Ramm Ventures Ltd. and Teck Corp. It also lies east and adjacent to the Mineral Hill property of Noranda Exploration Ltd., where significant copper-silver-lead-zinc mineralization has been reported. Mineral reserves of 1,080,000 tonnes of low grade material have been outlined thus far on the Copperhill property and current work indicates a good potential to substantially increase these reserves. Mineralization is widespread in the Grouse Mountain-Mineral Hill area, particularly to the north, where a 2 kilometer wide belt extends southeast towards the Roberta claim. Occurrences have also been reported to the east (Lakeview) and south (Mt. Harry Davis).

Mineralization appears to be spatially related to a series of dykes and stocks, and likely emanates from a larger intrusive body at depth. Current work suggests a large scale hydrothermal system associated with the intrusive mass. A large granodiorite stock has been mapped by the Geological Survey of Canada to lie adjacent to the Roberta claim. However, no mineralization has yet been discovered associated with it.

A program of reconnaissance soil geochemistry was undertaken in October 1984 on the Roberta claim. Results indicate a strong correlation between silver and copper, with a number of small scattered anomalous zones. Geochemistry for zinc, lead and arsenic were generally poor and non-coincidental, with the exception of a single 270 ppm arsenic value.
Work to date is insufficiently detailed to assess the mineral potential of the Roberta claim area. Some interesting silver-copper soil geochemistry results have been obtained and the presence of intrusive bodies near the property is encouraging. Further work is required.

LOCATION AND ACCESS

The Roberta mineral claim, consisting of 20 units, is located just southeast of Grouse Mountain and northeast of Mineral Hill, 38 kilometers southeast of the town of Smithers and 13 kilometers north of the town of Houston, in north central British Columbia. Elevations range from 3500 feet to 4000 feet. The terrain is moderately steep in the east and west, with flat and swampy sections in the central part of the claim. Rock exposure is generally poor except in the west, and most of the area is well timbered with balsam and lesser spruce and pine.

The claim region can be reached via a rough old logging road which extends through the middle of the claim. This road accesses to the Yellowhead Highway, a major arterial route connecting Smithers and Houston to points east and west. The Yellowhead Highway passes within 5 kilometers of the claim area. Daily air service to Vancouver, Prince George and Terrace is available in Smithers, and railway and helicopter facilities can be found in both Smithers and Houston.

INTRODUCTION

Interest in the Grouse Mountain-Mineral Hill area began in 1914 with the discovery of copper-zinc-silver mineralization at Coppermine Lake near the summit of Grouse
Mountain. Since that time, the area has been worked inter-
mittently, with the main focus being on and around the 
Ruby zone, about 500 meters southwest of Coppermine Lake 
and within 4 kilometers of the Roberta claim. This pro-
erty, referred to as the Copperhill prospect, has seen 
extensive development work, with over 1100 meters of drift-
ing and crosscutting and over 8400 meters of diamond dril-
ling to 1983. Published mineral reserves from the Ruby 
zone are 360,000 tonnes of 0.38% copper, 4.23% zinc and 
0.88 oz/ton silver, with an additional 720,000 tonnes of 
lower grade material in extensions to this zone. Current 
work, including extensive drilling, is being carried out 
by Teck Corp. under option agreement with Ramm Ventures 
Ltd. and recent reports suggest a good potential to sub-
stantially increase these reserves.

Work has also been carried out recently by Noranda 
Explorations Ltd. on the Mineral Hill occurrences on 
claims which lie just west of the Roberta claim. Sig-
nificant silver-lead-zinc-copper-gold mineralization has 
been reported in the past. Several similar mineral occur-
rences have also been recently explored to the south on 
Mount Harry Davis by Placer Development Ltd. and to the 
southeast by Bittech Energy Resources under option from 
Butler Mountain Minerals Corp. The latter property had 
a diamond drill program proposed for 1984.

The Roberta claim was acquired by staking on behalf 
of CK&G Management Ltd. in September 1984. A program of 
reconnaissance soil geochemistry was completed in October 
1984 by Holland Geoservices Ltd. under contract to CK&G 
Management Ltd. A total of 96 soil samples were collected.
GEOLOGY

The Grouse Mountain-Mineral Hill area is underlain mainly by tuffs, tuffaceous sediments, and flow rocks of the lower Jurassic-aged Hazelton Group. These rocks are cut by numerous, generally north to northwest trending dykes ranging from a few meters to in excess of 200 meters wide. The dykes belong to four lithological types: a) trachytoidal feldspar porphyry, b) crowded feldspar porphyry, c) biotite-feldspar porphyry, and d) lamprophyre. These dykes appear to be related genetically and likely stem from the same magma source. In addition to these dykes, a number of small stocks, compositionally similar to but coarser grained than the biotite-feldspar porphyry, have also been observed. Hornfelsing is common but extremely variable within the Hazelton Group adjacent to the dykes and stocks.

The geology of the Roberta claim is shown in figure 2, as adapted from Geological Survey of Canada surveys of the area (Open File 351). The claim is largely underlain by grey, green or maroon tuffs and tuffaceous greywackes with lesser argillites (unit B). These rocks are highly variable compositionally and texturally. Intruding these rocks just south of the claim is a large feldspar porphyry granodiorite stock belonging to the Bulkley Intrusions of late Cretaceous age. No geological investigations were conducted on the Roberta claim during 1984.

MINERALIZATION

Mineralization in the summit area of Grouse Mountain, northwest of the Roberta claim, appears to form a 2 kilo-
meter wide, northwest trending belt, parallel to and including most of the dykes in the area. Included in this belt is the important Copperhill mineral occurrence. This mineralization appears to be a result of a large scale hydrothermal system, likely related to a large buried intrusive from which the dykes have originated.

There are no known mineral occurrences on the Roberta claim, however there are numerous widespread occurrences throughout the Grouse Mountain-Mineral Hill area. The most important thus far are the Grouse Mountain zinc-copper-silver showings (Ramm Ventures). Here abundant to locally massive sphalerite-chalcopyrite-pyrite occur in quartz-carbonate gangue within zones of hornfelsing and manganese staining. On Mineral Hill, just west of the Roberta claim, veins up to 1.2 meters wide have been reported, mineralized by galena-sphalerite-tetrahedrite-chalcopyrite in quartz and altered wall rock gangue. Good silver values have been reported in the past.

Southeast of the Roberta claim, the Lakeview occurrences consist principally of specularite-chalcopyrite, with silver values, in altered wall rock zones up to 3 meters wide. No description was available for mineral occurrences further south on Mount Harry Davis, but values of silver-lead-zinc-copper have been reported.

GEOCHEMISTRY

A program of reconnaissance soil geochemistry was completed over much of the Roberta claim. A total of 96 samples were taken at a spacing of 100 meters along wide spaced grid lines run mainly east-west from a north-south
baseline, also sampled. Samples were collected, using a prospector's 'grub hoe', as nearly as possible from the 'B' soil horizon (15 to 25 cm depth) with an effort to avoid organic rich, disturbed or leached material. Each sample was stored in a labelled kraft soil bag and shipped to Acme Analytical Labs in Vancouver, B.C. for analysis for copper, silver, lead, zinc and arsenic. Standard aqua regia digestion and ICP analysis methods were used on a -80 mesh size fraction. All results are reported in parts per million (ppm) and are tabulated by element in figures 3 to 7.

Silver
Previous work in the region has suggested an anomalous threshold level of 0.8 ppm silver with values greater than 2.0 ppm considered highly anomalous. Six scattered anomalous zones were outlined, with values to 3.4 ppm. Background levels for this property appear to be lower than normal, rarely exceeding 0.4 ppm and usually less than 0.2 ppm. Several scattered high background values (0.6 to 0.8 ppm) may also be of significance.

Copper
Threshold value for copper for the area has been indicated to be 50 ppm with results over 100 ppm considered highly anomalous. Six scattered copper anomalies were revealed with values to 108 ppm. Four of these are coincidental with silver anomalies, and the remaining two with high background silver values.

Arsenic
Values greater than 35 ppm are considered anomalous for arsenic, and those greater than 100 ppm, highly anom-
alous. One strongly anomalous value of 270 ppm was obtained along the northern edge of the claim. Two other scattered, weakly anomalous values were also received in this region, one of which is coincidental with a weak copper-silver response.

Zinc

Zinc background levels for the region are generally up to 250 ppm with highly anomalous values being above 500 ppm. No anomalous values were obtained for zinc, and background levels were generally low in this region, usually less than 150 ppm. The highest zinc value was 205 ppm, and there appears to be no significant correspondence between the higher background zinc values and anomalous zones for other elements analysed.

Lead

Regional lead values indicate anomalous threshold to be 35 ppm for lead, with values greater than 60 ppm being highly anomalous. Only one anomalous value of 60 ppm was received for lead on the Roberta claim. This occurs in the western part of the property and was not coincidental with any other responses.
RECOMMENDATIONS

Reconnaissance work to date has produced some encouraging results and further work is warranted to further define and test favorable areas. Follow-up work should initially include grid establishment and detailed geological, soil geochemical, and VLF electromagnetic surveys (Phase 1), followed by an I.P. survey and backhoe trenching (Phase 2), and finally by diamond drilling (Phase 3).

The estimated cost of Phase 1 is as follows:

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<th>Activity</th>
<th>Days</th>
<th>Rate</th>
<th>Cost</th>
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<td>Line Construction</td>
<td>15</td>
<td>$150.00/day</td>
<td>$2250.00</td>
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<td>Geological Mapping</td>
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<td>Geochemical Analysis</td>
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<td>Camp Costs</td>
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<td>Equipment and Supplies</td>
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<tr>
<td>Report and Supervision</td>
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<td>2500.00</td>
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<tr>
<td>Mobilization</td>
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<td>Contingencies @ 10%</td>
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<td><strong>Total of Phase 1</strong></td>
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<td><strong>$26400.00</strong></td>
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SELECTED REFERENCES


Geol. Surv. of Canada Open File 351, Smithers, B.C., 95L, 1976.
**STATEMENT OF COSTS**

The following costs were incurred by Holland Geo-services Ltd. on behalf of CK&G Management Ltd., for work conducted on their Roberta mineral claim in the Grouse Mountain area near Smithers, B.C. Work was carried out during the periods October 6 to 13 and November 17 to December 12, 1984.

<table>
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<th>Cost Description</th>
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<td>Camp Costs (food)</td>
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<td>Equipment and Supplies</td>
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<td></td>
<td>135.15</td>
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<td>Geochemical Analysis</td>
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<td>96 samples @ $4.60/sample</td>
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<td>Labour Costs</td>
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<tr>
<td>R. Holland, geologist</td>
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<td>3.5 days @ $250.00/day</td>
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<td>Nov. 17, 20, Dec. 9, 10, 11, 13</td>
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<tr>
<td>D. Septer, field assistant</td>
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<td>3 days @ $150.00/day</td>
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<td>Oct. 6, 12, 13</td>
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<td>clerical - 6 hours @ $10.00/hr</td>
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<td>Transportation (gas, freight)</td>
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<tr>
<td><strong>Total Costs</strong></td>
<td>$2220.49</td>
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QUALIFICATIONS

I, Robert Holland of 13451 - 112A Avenue, Surrey, British Columbia, hereby certify that:

1. I am a graduate of the University of British Columbia (1976) and hold a B.Sc. degree in geology.

2. I am currently employed as a consulting geologist with Holland Geoservices Ltd. of 13451 - 112A Avenue, Surrey, British Columbia.

3. I have been employed in my profession by various mining exploration companies for the past nine years.

4. The information contained in this report was obtained as a result of field work carried out under my supervision by Holland Geoservices Ltd. in 1984.

5. Neither Holland Geoservices Ltd. nor myself have any interest, direct or indirect, in the property described, nor in the securities of CK&G Management Ltd.

[Signature]

Robert Holland, B.Sc. consulting geologist