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Progress and Final Report
on the
Altair - Marshall Creek Project
in the
Port Hardy Area
of the
Nanaimo Mining Division, B.C.
for
Inspiration Development Company
by
MacDonald Consultants Ltd.

Vancouver, B.C.

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INTRODUCTION

Field work in the form of geological, geophysical and geochemical surveys and diamond drilling has been performed on the Altair - Marshall Creek Properties in the Port Hardy area, Nanaimo Mining Division, B.C. from July through November 1970.

This work has been done for Inspiration Development Company by MacDonald Consultants Ltd., Seigel and Associates Ltd., and Pacific Diamond Drilling Ltd., all of Vancouver, B.C.

The Altair - Marshall Creek Properties are held under an option agreement by Inspiration Development Company.

Since several other reports are available that include details of location, access, history and property legalities, etc., these details have been omitted from this report which is an interpretation and description of work carried out since August 1970 on the properties, and summary of the July to August 1970 work.

FIELD WORK PERFORMED

1. Additional Claim Staking

Twenty-four full size mineral claims, the ID 1-24, have been located near Quatse Lake along the northern boundaries of the Altair - Marshall Creek Properties. This was done to cover any open ground along a possible northern extension of the IP anomaly outlined in that area by Seigel Associates in their August program.

Subsequently, it has been found that the ID 8-24 were staked in contravention to article 12 (1) C of the B.C. Mineral Act. Delays in assessment work notifications reaching the Vancouver Mining Recorder's Office caused the above situation.

Map 293 shows the claim situation in the area.

2. Geological Surveys

Detailed geological mapping on a scale of 1" = 50' was performed over selected parts of the northeastern section of the claim blocks and surroundings and over areas of interest outside the claim blocks. Mapping was also detailed between lines 92W and 104W on Mamoser Creek.

Fracture patterns and fillings, shearing and faulting directions were especially detailed. This work was part of a program outlined by Mr. H. Olmstead of Inspiration Development Company. Maps 293-9 to 293-18 show individual 1" = 50' scale map areas. Map 293-25 is a composite on a scale of 1" = 400' of most of these areas.

3. Diamond Drilling

Pacific Diamond Drilling has completed 3,147 feet of NQ and BQ wireline drilling in three holes which are located in two separate areas.

Holes MAR #1 and MAR #2, which total 1,402 feet of NQ drilling, were located in the pyrite zone on the MAR #5-8 claims, where an IP anomaly was outlined by Seigel Associates.

Drill hole MAR #3 was located on the BON claims south of Quatse Lake in an area interpreted to have structural possibilities for the localization of a Bay type ore deposit.

4. Ground Magnetometer Surveys

(i) A survey was performed over a line grid established on the BID 7-10, 17-20, 28, 30 claims in conjunction with a geochemical soil survey.

(ii) A survey was completed over two long reconnaissance lines that run northeastward across the BID and BON claims.

(iii) A survey was performed over part of the IP grid in areas where anomalous values were outlined by the Seigel survey.

The above surveys were carried out by Mr. J. P. Henry and Mr. E. A. Burnett of MacDonald Consultants Ltd. A Sharpe MF1 fluxgate magnetometer, serial #2083-1, was used.

5. Geochemical Soil Surveys

As mentioned in the previous report, geochemical soil surveys were completed on the

(i) BID 7-10, 17-20, 20-30 claims, where 314 samples were collected over approximately 12.5 miles of line grid.

(ii) EB 1-13, 15-16 claims, where 400 soil samples were collected over approximately 16.0 miles of line grid.

(iii) WIZ 1-20, 23-28 claims, where 621 samples were collected over approximately 26.5 miles of line grid.

(iv) MAR claims near the "pyrite zone" where 71 samples were collected at 24 profile locations.

RESULTS AND INTERPRETATION OF FIELD WORK

1. Geology

Details of the regional and structural geology are outlined in the previous progress report and are not included in this report.

Since the previous progress report, Mr. M. Young of Utah Mining and Construction has given a paper on the Bay Deposit at a meeting of the CIMM in Kamloops. Mr. P. DeWilliam of Inspiration Development Company attended the meeting and supplied the following information on the economic geology of the Bay Deposit:

- (i) The deposit consists of pyrite and chalcopyrite in a silicified and altered fault zone in Bonanza Subgroup volcanics.
- (ii) Mineralization is mainly in fractured and silicified andesites and generally includes 2-3% pyrite and locally 15% pyrite.
- (iii) The deposit lies in a northwest trending structural zone with associated small leucocratic plugs (quartz-feldspar porphyries).
- (iv) A sequence of alteration proposed was
 - a) silicification
 - b) argillization
 - c) pyritization
 - d) biotitization
 - e) development of zeolites and dumortierite

2. Detailed Mapping

(i) Mapping and sampling was completed along Mamoser Creek, between lines 92W and 104W on the IP grid. A zone of silicified

and pyritized Bonanza Subgroup volcanics was outlined in proximity to a northeast trending fault structure (Map 293-18). Chip samples taken gave the following results:

<u>Sample No.</u>	<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>MoS₂</u>	<u>Width</u>
25101	Tr	Tr	Tr	.001	10'
25102	Tr	.10	Tr	.001	8'
25103	Tr	Tr	Tr	Tr	15'
25104	Tr	Tr	Tr	Tr	6'

(ii) In the northeastern part of the claim blocks and surroundings, mapping was completed in nine areas which are detailed in maps 293-9 to 293-17 and compiled on map 293-25. It is noticeable that fracture densities and orientations decrease from the quarry exposures near the Utah road to the Quatsino limestone exposures east of Quatse Lake.

The same situation occurs for fracture fillings of quartz and pyrite.

3. Diamond Drilling

(i) The MAR #1 and MAR #2 drill holes were located in the pyrite zone on the MAR 5-8 claims where an IP anomaly was outlined. Both holes were spotted close to where the IP survey gave maximum response for sulphides. Both holes had very similar geology, cutting thick sequences of andesitic tuffs - with minor breccia and lapilli sections - and andesitic flows and massive diabase dykes. Mineralization was mostly concentrated in the tuff to breccia horizons and

was entirely pyrite. Sulphide content averaged 1-2% with locally 4-5% in the first 300 feet or so of both holes, and then decreased with depth until minor in amount.

Clay alteration was also predominant in the pyroclastics in both drill holes.

Almost all the mineralized pyroclastic sequences were sampled and assayed for copper and molybdenum, and every tenth one of these samples was additionally assayed for silver and gold. None of the results was of apparent economic significance.

MAR #1 was drilled to a depth of 789.0 feet (293-19).

MAR #2 was drilled to a depth of 613.0 feet (293-20).

The drill results indicate that the IP anomaly outlines an area of pyritization with no associated copper mineralization at any depth. The pyrite zone thus does not appear to represent an upper or lower alteration halo of the type often associated with a porphyry copper deposit. The drilling, however, does not rule out the pyrite zone representing lateral zoning from a porphyry-type deposit.

(ii) The MAR #3 drill hole was located south of Quatse Lake near the northern boundary of the BON claims, in an area having the following features:

- a) anomalous geochemical soil values for copper and zinc
- b) a northwest-southeast structure trend traceable to the Bay deposit area from Quatse Lake
- c) the presence of small quartz-porphyry plugs (?)

d) the presence of Quatsino limestone to the north and dipping to underlie the area

e) a possible contact area of limestone and intrusive at depth.

The hole mainly cut a massive sequence of volcanic breccias and agglomerates with thin interbedded tuffs and andesite flows. Fossiliferous sediments were seen in the upper part of the hole and argillaceous sediments close to the bottom of the hole. No alteration that could indicate intrusive activity was seen. The Quatsino limestone was not reached in the hole which was stopped at a depth of 1745 feet. Map 293 illustrates the situation.

The results of the above hole indicate that there is great variation in the Bonanza Subgroup in the claim areas. There is no similarity between the sequences cut in MAR #1 and MAR #2 and those cut in MAR #3. It would appear that block faulting in the area has had considerably more effect on the regional stratigraphy than was at first realized.

4. Geophysical Ground Magnetometer Surveys

(i) BID Claims

The survey over the BID claims was performed with the object of establishing the magnetic pattern of the area in the hope of delineating the contact between Bonanza volcanics and the Nanaimo sediments. This was not realized in the survey.

In general the magnetics were relatively flat with a total relief of approximately 1,000 gammas. The significance of the relative lows on the BID 7, 8 and 10 claims is unknown, but it should be pointed out that this coincides with a geochemical anomaly.

The relatively high readings in the vicinity of the BID 18, 19 and 20 claims are somewhat surprising as this area is believed to be underlain by Cretaceous sediments. It is possible that the low magnetic relief could be the result of variations in overburden depths and not necessarily an expression of bedrock magnetics.

The results of the above survey are shown on map 293-7-1.

(ii) N.E. Reconnaissance Lines

The magnetometer survey completed on the two long reconnaissance lines over the eastern part of the claim blocks provided information that could be used to further detail the underlying geology in that area.

On both lines a pronounced increase in response occurred in the vicinity of the projected Quatsino limestone belt which outcrops east of Quatse Lake. Values in excess of 4000 gammas were recorded in proximity to these limestone outcrops. Projection between the two reconnaissance lines would indicate that the Quatsino limestone belt strikes east-westerly with a surface expression of approximately 1200 feet in width. The relatively high response is attributed to the possible development at depth of magnetite in contact areas of the limestone with the underlying batholith (see previous progress report).

Low magnetic responses were recorded in various areas previously interpreted as the possible fault structures on the basis of topography. The magnetic results tend to strengthen this interpretation.

A definite correlation between magnetic readings and the diorite could be made on the western reconnaissance line which ended in a large quarry of dioritic intrusive.

The lower magnetic response between the diorite and Quatsino limestone is thought to be an expression of a cover of Karmutsen volcanic material. A small area of high response just north of the postulated limestone contact is thought due to metal culverts in the road bed.

The magnetic response south of the Quatsino limestone is generally low and represents the expression of the underlying Bonanza sequence of volcanic rocks. Minor variations are attributed to variation in overburden depths and not attributed to expressions of bedrock magnetics.

(iii) IP Grid Area

The magnetometer survey on the part of the IP grid showed very little in the way of marked relief. However, a general correlation can be seen between the IP anomaly outlined on lines 92-108W and the magnetic response on these lines. No real magnetic relief can be seen on the reconnaissance line run south over the pyritized area on the MAR claims. The response in the northern IP area can be attributed to expression of underlying bedrock and is tentatively thought to represent a small content of pyrrhotite in the sulphides known to be

present in the underlying bedrock as seen in creek exposures.

5. Geochemical Soil Surveys

(i) BID 7-10, 17-20, 20-30 Mineral Claims

Background values for copper were estimated to lie between 35 and 50 ppm. Values in excess of 100 ppm. might therefore be considered significantly anomalous. A prominent area of such readings exists in the vicinity of BID 7, 8, 9, 10 and 29. Although the readings are relatively low, ranging to 190 ppm., it may be significant that in general the anomaly shows a northeasterly trend approximately paralleling a major fault direction in this area. In addition there is fair correspondence between the geochemical 'highs' and a magnetometer 'low' (see Magnetometer Survey).

The geochemical anomaly may be the expression of underlying mineralization, drainage features or transported metal-rich till. Further investigation will be required to firmly establish the cause.

(ii) EB 1-13, 15-16 Mineral Claim

Background values for copper were estimated to lie between 35 and 50 ppm. Values greater than 70 ppm. were considered to be significantly anomalous. Small areas of such readings exist in the vicinity of the EB 2, 5, 7 and 9 claims, with spot high values on the EB 1 and 4 claims.

The EB 5 claim has been interpreted as being underlain by Lower Cretaceous sediments. No real correlation with possible structural

and geological features has been observed in the other areas. It is probable that the anomalous values are the expression of metal-rich glacial till in this area.

(iii) WIZ 1-20, 23-28 Mineral Claims

Background values for copper were estimated to lie between 30 and 35 ppm. Values in excess of 70 ppm. were considered to be significantly anomalous. Values in the anomalous range exist in the vicinity of the WIZ 7, 9, 19, 20 and 28 mineral claims as spot highs. There does not appear to be any correlation between these anomalous values with possible structural or geological trends. The anomalous values are thought to be the expression of glacially transported metal-rich tills.

(iv) Soil Profiles - MAR Claims

Soil profiles were taken at twenty-four locations over part of a geochemically anomalous area outlined on the MAR claims in the 1968 survey. Comparison of the "B" and "C" horizons in both surveys shows good correlation. A slight increase in values is apparent in several instances from the "A" to "B" to "C" horizons. This suggests that the geochemical response is related to underlying bedrock and not from seepage or glacially transported metal-rich till. The correlation of the geochemical anomalies in both surveys with an interpreted north-east fault structure and a postulated northwest geological contact suggests that the overall response is related to the underlying bedrock.

SUMMARY AND CONCLUSIONS

1. MAR Pyrite Zone and Vicinity

Two drill holes were completed in the pyrite zone coincident with an IP anomaly. Assay results of mineralized sections in the holes were completely negative for copper, molybdenum, silver and gold values.

Adjacent to the above zone to the east, a weak geochemical anomaly exists which appears to coincide with structural conditions interpreted from geological field mapping. This correlation suggests that the geochemical anomaly may represent an expression of the underlying bedrock and not an expression of glacially transported metal-rich till. The suggestion is that lateral zoning of sulphides exists in the area. Thus the area underlying the geochemical anomaly may represent a copper-bearing sulphide zone with the pyrite zone to the west, the halo to the copper zone.

Opposing the above suggestion is the fact that absolutely no copper mineralization was encountered in the drilling in the pyrite zone. Some response for copper could be expected to be apparent if lateral zoning is in effect. In addition, the lack of silicification in the pyrite zone needs explanation, since this alteration is apparently a prime alteration at the Bay Deposit. Fault barriers or damming may be an explanation of the above two factors.

2. MAR #3 Area

The hole encountered massive sequences of lower Bonanza volcanics and sediments which were unaltered and lacking in mineralization.

It would appear that block faulting is of greater significance than was apparent from surface geological mapping. Although in a north-west structural trend from the Bay Deposit area to Quatse Lake, stratigraphically the postulated favourable horizons in the Bay Deposit area are not seen in the MAR #3 area.

3. Northern IP Anomaly

A reconnaissance IP survey north on lines 92W, 100W and 108W showed anomalous response from approximately 26N on all lines.

Detailed mapping along Mamoser Creek, along the southern part of the IP anomaly, showed an area of lower Bonanza volcanics which are pyritized and silicified, with associated faulting. Chip samples on creek exposures gave negative results for copper, molybdenum, silver and gold. However, these exposures are near the southern extreme of the IP anomaly.

The presence of silicification of the volcanics in the area may be of significance as interpreted from the Bay Deposit situation.

4. BID Mineral Claims

A geochemical soil survey outlined a weak copper geochemical anomaly trending northeasterly in a direction paralleling major faulting in the area. A ground magnetometer survey of this area outlined a magnetometer "low" that shows fairly good correspondence to the above geochemical anomaly. Complete lack of outcrop allows no geological interpretation of bedrock conditions in this area.

5. WIZ and EB Claims

Geochemical soil surveys on these claim groups showed occasional spot high values with nothing to indicate defined trends in the area. However, results of an IP survey conducted on the IDA claim block adjacent to both the WIZ and EB claims were shown to the writer.

It is apparent that an IP anomaly lies in the southwest corner of the WIZ claims. This anomaly trends northwesterly across part of the IDA claim group. It appears that this anomaly is "open" to the south onto the EB claims, and "open" to the east onto the WIZ claims. Interpretation of the above anomaly was not made available to the author.

RECOMMENDATIONS

Although sufficient work has been done to downgrade some of the original targets, the writer still believes that the following work should be performed on the property.

1. A drill hole should be located in the geochemical anomaly adjacent to the pyrite zone on the MAR claims.
2. More IP survey should be performed to detail the anomalous trend outlined in the reconnaissance survey on lines 92W-108W and north.

Diamond drilling should be planned for suitable targets outlined by the extended survey.

3. A short drilling program on the BID claims would establish the cause of the coincident geochemical anomaly and the magnetometer low.