

BRITISH COLUMBIA

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OMINECA M.D. - 93/L

SUMMIT (Burbridge Lake) PROJECT

SUMMARY

Between June 14 and June 29, 1977, Asarco did 650m (2130 feet) of diamond drilling (BQ wireline) on the Burbridge Lake (Summit) Prospect under option from Mel Chapman of Smithers. Six holes were completed at a cost of \$ 27,690.00.

Results of the drilling program confirmed the theory that the dioritic intrusion, previously interpreted to be a steeply dipping, crosscutting body by Cities Service (1974), and Hudson's Bay Oil and Gas (1973), is actually a sill which dips between 25° to 45° to the southwest. The upper part of the sill is porphyritic, approaches granodiorite to quartz monzonite in composition and is pervasively altered to clay-chlorite-carbonate-sericite and quartz with 10-15% disseminated and fracture controlled pyrite. Drill holes 77-1, 2, 3, 4 and 6 intersected a zone of intense stockwork fracturing and veining, within the altered zone, which contained low grade concentrations of Cu and Mo. This zone is approximately 76 to 92m (250 to 300 feet) thick, extends for at least 365m (1200 feet) along the strike of the sill and extends for an unknown distance to the west and down dip. Average grade within the stockwork zone is approximately 0.2% Cu. The best grade material occurs in the bottom 15 to 30m (50 to 100 feet) of the stockwork zone which averages between 0.24 to 0.38% Cu and 0.02 to 0.03% MoS₂.

LOCATION AND ACCESS

The Burbridge Lake (Summit) Prospect is situated in West Central B.C. at Latitude $54^{\circ}43'N$, and longitude $126^{\circ}45'W$. The main area of interest is located 245m (800 feet) south of Burbridge Lake (Figure 1) at an elevation of approximately 1190m (3900 feet).

The Prospect is accessible via Woodmere Road, which joins Highway 16 approximately 1.6 km (1 mile) south of the town of Telkwa, and thence via 11.3 km (7 miles) of 4 x 4 access road to Burbridge Lake.

During the program, Smithers situated 12.9 km (8 miles) north of Telkwa, was used as a base for accommodation and supplies.

HISTORY

The Burbridge Lake (Summit) Prospect was staked by Mel Chapman in 1969. In 1973, the property was optioned by Hudson's Bay Oil and Gas, who carried out a program of geological mapping a ground magnetic survey, geochemical soil sampling and 366m (1200 feet) of diamond drilling in 3 holes. Although one of these holes intersected 49m (160 feet) of 0.38% Cu, the option agreement was terminated. In 1974, Cities Service took an option on the property, and in the same year completed IP and magnetometer surveys and did 495m (1622 feet) of diamond drilling in two holes. The diamond drilling failed to encounter any significant copper mineralization and the option was terminated.

In June 1976, the author examined the Burbridge Lake Prospect for Asarco. A cursory examination of the structural and stratigraphic setting of the zone of mineralization, and review of available data, suggested a dip to the southwest, with the host dioritic

intrusion occurring as a sill within the volcanic succession. Both the Cities Service and Hudson's Bay Oil and Gas drill holes were inclined between 45 to 55° to the south, and, therefore, were essentially parallel to, rather than crosscutting the zone of interest. On this basis, it was recommended that Asarco take an option on the prospect.

REGIONAL GEOLOGIC SETTING

The Burbridge Lake (Summit) Prospect is situated along the western margin of the Babine Range, within a block of uplifted rhyolitic to andesitic volcanic rocks of Jurassic Age. These rocks are part of the Telkwa Formation of the Hazelton Group and have been subjected to regional greenschist metamorphism. Major NE and NNW-trending linears intersect in the vicinity of the Burbridge Lake Prospect and probably represent high angle faults.

PROPERTY GEOLOGY

The Burbridge Lake (Summit) Prospect is underlain by rhyolitic dacitic and andesitic tuffs and flows of the Telkwa Formation. These rocks have been regionally metamorphosed to the greenschist facies and are strongly foliated in places, with the foliation occurring along bedding planes. The general trend of the foliation is to the northwest with variable dips to the southwest. Eutaxitic textures are common in the more siliceous crystal and lapilli-tuff units.

In the vicinity of Burbridge Lake, the Telkwa Formation is intruded by a sill-like complex which is between 150 to 200m thick, and at least 1500m in length. The upper part of the sill is porphyritic and approaches granodiorite in composition. Towards the

bottom contact, the sill becomes more mafic-rich and equigranular, with a well developed dioritic texture. The sill is foliated and metamorphosed to the same intensity and degree as the volcanic country rocks which suggests that the sill is of approximately the same age as these rocks, i.e., Jurassic.

ALTERATION AND MINERALIZATION

Both the upper and lower contacts of the dioritic sill are bounded by zones of hydrothermal alteration and sulfide mineralization. The upper zone is exposed along the ridge south of Burbridge Lake, and is characterized by pervasive phyllic and argillic alteration with greater than 10 to 15% disseminated and fracture-controlled pyrite. Within the upper part of the dioritic sill, and immediately south of Burbridge Lake, is an area of pervasive argillic alteration associated with stockwork fracturing and veining containing finely disseminated chalcopyrite and fracture coatings of molybdenite. The western and down dip extent of this zone has not yet been defined. This Cu/Mo zone was the main exploration target on the Burbridge Lake property in 1977.

Although the lower part of the dioritic sill is mineralized with 3-10% disseminated pyrite, only sporadic copper mineralization has been observed in this zone. The lower zone was intersected by the Cities Service drill holes which were collared too far north to intersect the upper zone.

The top of the upper zone is characterized by intense epidote concentration in the volcanic rocks, mainly as spherical masses enclosing massive pyrite and/or magnetite. The best exposures of this part of the

upper zone occur along the crest of the ridge southeast of Burbridge Lake and in the Adit Zone. The latter contains minor concentrations of Cu associated with coarse-grained pyrite in quartz and massive lenses of magnetite, all within a fine-grained green dacitic tuff unit. Minor gold values, up to .009 Oz/T, occur within these rocks. The massive pyrite lenses exposed in the Adit Zone and in trenches along the crest of the ridge north of the Adit Zone appear to be stratabound and could be of a volcanic exhalitive origin. A sample from one of these pyrite lenses assayed .41% Cu, .95% Zn, .11 Oz/T Ag and .009 Oz/T Au.

1977 Drilling Program

Between June 14 and June 29, 1977, 650m (2130 feet) of diamond drilling (BQ wireline) was completed on the Burbridge Lake Prospect. The work was done by J.T. Thomas Diamond Drilling Limited of Smithers, B.C. The drill contract and costs are given in Appendix "A" and drill logs, sections and assay results are given in Appendix "B". Drill hole locations are shown in Figures 2 and 9. (Fig. #9 in pocket)

DDH 77-1 - This hole was collared in a small trench 61m (200 feet) south of Hudson's Bay Oil and Gas' Hole 73-2. The purpose of Hole 77-1 was to test the idea that the copper zone intersected in the top of the Hudson's Bay Oil and Gas hole dipped to the south and that copper mineralization in the trench was part of this zone. Both of these ideas were confirmed by the drilling. The top 49m (160 feet) of the hole averaged 0.18% Cu and .015% MoS₂ (0.25% Cu equivalent), with low Ag and Au values. Between 52 and 67m (170 to 220 feet), a higher grade zone was intersected which averaged 0.38% Cu and .027% MoS₂ (0.51% Cu

equivalent). Below 67m (220 feet) the copper and molybdenum grades drop suddenly, corresponding to a change from pervasive clay-chlorite-sericite-carbonate-quartz alteration associated with stockwork fracturing and veining to pervasive propylitic alteration of a weakly mineralized diorite. The transition is marked by the presence of white irregular quartz veins carrying the occasional coarse bleb of chalcopyrite. There is a good correlation between holes 73-2 and 77-1, as shown in Figure 3. The data suggests that the zone of copper and molybdenum mineralization dips between 25 to 30° to the south and is at least 76m (250 feet) thick.

DDH 77-2 - This hole was inclined 45° to the south and drilled from the same setup as DDH 77-1. The purpose of this hole was to test the down dip continuity of the mineralization intersected in hole 77-1. The hole intersected intense pyrite mineralization and pervasive argillic alteration from surface to the bottom of the hole at 142m (465 feet). However, only the top 82m (270 feet) contained any chalcopyrite or molybdenite, with this part of the hole averaging 0.18% Cu and 0.01% MoS₂ (0.23% Cu equivalent). The higher grade zone encountered in hole 77-1 was not intersected in 77-2. However, this may be due to the fact that the hole began to flatten out at depth and may have been more or less parallel to the zone of better grade copper mineralization by the time it reached the projected point of intersection. The drop in grade towards the bottom of the hole is perplexing in view of the grades encountered in drill hole 77-1. This suggests that there is either a trend to lower grades to the south or that a fault offsets the zones of mineralization in some manner.

DDH 77-3 - This hole was drilled 122m (400 feet) west of DDH 77-1 and went to a depth of 94m (307 feet). The hole was very similar to DDH 77-1, intersecting the same type of alteration and low grade Cu mineralization. The top 64m (210 feet) of this hole averaged 0.18% Cu and 0.02% MoS₂ (0.28% Cu equivalent). A small, higher grade zone, approximately 6m (20 feet) thick, and averaging 0.35% Cu, was intersected between 73 to 79m (240 to 260 feet). Below this zone the rock becomes more dioritic with weak to moderate prophylic alteration and only sporadic pyrite mineralization.

DDH 77-4 - This hole was drilled 122m (400 feet) E and 30m (100 feet) S of DDH 77-1. The hole was drilled vertically to a depth of 93.6m (307 feet) and encountered alteration and mineralization similar to that in Hole 77-1. However, the grade of copper and molybdenum was significantly lower, averaging .06% Cu and .007% MoS₂ from surface to 64m (210 feet). From 64m (210 feet) to 82.3m (270 feet), a higher grade zone was intersected which averaged 0.19% Cu. Below 82.3m (270 feet), the Cu grade drops off sharply, corresponding to a change to moderate to weak prophylic alteration of the host diorite. The lower grades intersected in DDH 77-4 and in 77-3, located approximately 128m (420 feet) to the east, suggest that the Cu-Mo zone pinches out in this direction.

DDH 77-5 - This hole was drilled 122m (400 feet) east and 153m (500 feet) south of hole 77-4, on the crest of an east-west-trending ridge. The purpose of this hole was to test the top half of the Upper Zone. The hole was collared in fine-grained green dacitic tuff with patchy epidote alteration. The epidote occurs as massive dots

enclosing pyrite and/or magnetite. The tuff is locally intensely foliated at 30° to the core axis and is crosscut by quartz and pyrite veins and veinlets. Around 45m (150 feet), the alteration changes to pervasive argillic with 10-15% pyrite. The pyrite typically occurs as massive lenses parallel to the foliation and as very fine-grained disseminations. The only significant copper mineralization intersected was between 73 to 79m (240 to 260 feet) which averaged 0.27% Cu. Below 79m (260 feet), Cu and Mo grades are very low in spite of the intensity of argillic alteration and the presence of 10 to 15% pyrite.

DDH 77-6 - This hole was drilled 122m (400 feet) west and 30m (100 feet) north of DDH 77-3. The purpose of this hole, which was drilled vertically to a depth of 106m (347 feet), was to test the westward extension of the Cu-Mo zone intersected in holes 77-1, 2 and 3. DDH 77-6 did contain low grade Cu and Mo mineralization from top to bottom, averaging 0.17% Cu over 98m (320 feet). The best grade material was intersected from 79 to 93m (260 to 320 feet) which averaged 0.25% Cu and 0.036% MoS_2 (0.42% Cu equivalent).

Although the nature of the alteration and sulfide mineralization intersected in DDH 77-6 is comparable to that intersected in DDH 77-1, 2 & 3, the host rock is much more porphyritic. The porphyry is foliated in places, with the foliation dipping between 40 to 60° to the core axis. Although the Cu grades intersected in DDH -6 are slightly lower than adjacent holes, the MoS_2 content is slightly higher.

CONCLUSIONS

The 1977 drilling program on the Burbridge Lake (Summit) Prospect has confirmed that the diorite is a sill-like body dipping moderately to the southwest. The upper contact of the diorite complex is bounded by a zone of pervasive hydrothermal alteration containing 10-15% disseminated and fracture-filling pyrite. Within this zone is an area of stockwork fracturing and veining with pervasive clay-chlorite-carbonate-sericite-quartz alteration that contains low grade concentrations of Cu and Mo. This Cu-Mo zone is between 75 to 90m (250 to 300 feet) thick and at least 370m (1200 feet) long, extending for an unknown distance down dip. The average copper grade within the area tested by drilling is calculated to be 0.20% Cu.

EXPLORATION TARGETS AND RECOMMENDATIONS

The following exploration targets remain untested on the Burbridge Lake (Summit) Property. (See Figure 9.)

- (1) The coincident IP and Mo geochem anomaly between lines 112E and 120E at 8N. This probably represents the lower zone of sulfide mineralization associated with the diorite sill complex.
- (2) The western extension of the main Cu-Mo zone intersected in Holes 77-1,2,3 and 6. Moderate to weak geochem and IP anomalies to the west of 77-6 could be significant, especially in view of the increasing cover in this area.
- (3) The down dip extension and grade of the main Cu-Mo zone.
- (4) Cu-Mo geochem anomalies along the west margin of the claim block. To date, only pyritized volcanic float has been

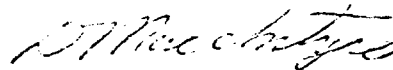
located in this area which is largely covered by till.

- (5) Massive pyrite and magnetite mineralization in the Adit Zone remains untested. To date only weak Cu mineralization has been located in this area. However, anomalous concentrations of Cu occur in soils to the east and on strike with this zone, suggesting possible Cu mineralization in this area.

Although the grade of mineralization encountered in the area tested by drilling is too low to be of economic interest under present market conditions, other parts of the Cu-Mo zone may be higher grade. Since this zone remains open to both the west and down dip to the south, it is recommended that Asarco do more diamond drilling to better define the overall size and grade of this zone. In addition, it is recommended that other targets on the property be tested by percussion drilling.

D.G. MacIntyre.

DGMacl:sm



1977 BURBRIDGE LAKE (SUMMIT) PROJECT

DRILL CONTRACT SUMMARY

CONTRACTOR J.T. Thomas Diamond Drilling Limited
PO Box 394, Smithers, B.C.

PERSONNEL J. Thomas, G. Shaw (runner), M. Beddoes (helper)

EQUIPMENT Longyear Super 38, BQ Wireline

JOB STARTED 13 June/77

JOB COMPLETED 28 June/77

SHIFTS 1 - 12 hour shift per day

TOTAL 650m (2130 feet)

AVE/SHIFT 54m (177 feet)

NO. OF HOLES Six

<u>Hole No.</u>	<u>Attitude</u>	<u>Depth</u>
77-1	90°	90.6m (297 feet)
77-2	45°S	141.8m (465 feet)
77-3	90°	93.6m (307 feet)
77-4	90°	93.6m (307 feet)
77-5	90°	124.1m (407 feet)
77-6	90°	105.8m (347 feet)
TOTAL		<u>649.5m (2130 feet)</u>

DRILL SITES PREPARED - 5

ACCESS ROAD CONSTRUCTION - 488m (1600 feet)

CAMP Drillers provided own accommodation in Smithers.

DRILLING CONDITIONS Upper 30 to 80m broken ground due to solution of gypsum. Below this level, the rock is healed by gypsum and is relatively competent.

90% of the runs were 3m (10 feet). Core recovery was close to 100%.

CORE STORAGE

Presently at 1637 Queens Street, Smithers, B.C.

COST/FOOT

\$ 13.00/foot all inclusive.

TOTAL COST

\$ 27,690.00

J.T. THOMAS DIAMOND DRILLING LTD.

P.O. Box 394, Smithers, B.C.

Invoice No. 77-1-A

Property Summit
Size - B.Q.

To: ASARCO EXPLORATION CO. OF CANADA LTD.
Suite 504 - 535 Thurlow Street
Vancouver, B. C.
V6E 3L2

This invoice is for diamond drilling and other services on the above property per contract.

Hole No.	Date		Overburden		Coring		Total Footage	Rate	Amount
	From	To	From	To	From	To			
77-1	June 13-15		0	7	7	297	297	\$13.00	\$3,861.00
77-2	15-17		0	7	7	465	465	13.00	6,045.00
77-3	17-19		0	30	30	307	307	13.00	3,991.00
77-4	19-20		0	20	20	307	307	13.00	3,991.00
77-5	20-23		0	7	7	407	407	13.00	5,291.00
77-6	23-28		0	20	20	347	<u>347</u>	13.00	4,511.00

Mobilization:

Total = 2,130 ft @ \$13.00 per foot

Demobilization:

Moving Costs:

Mud Costs:

Cementing Costs:

Tractor Rentals:

Core Box:

Testing Hole:

Casing and Shoes Left in Hole:

Camp Provision:

Downtime:

Flytime:

Other:

Invoice Total

\$27,690.00

The above calculations are agreed to by:

Company Representative

J.T. Thomas Diamond Drilling Ltd.

APPENDIX "B"

SUMMARY OF DRILL HOLE ASSAY RESULTS

<u>HOLE NO.</u>	<u>FT. OVERBURDEN</u>		<u>MINERALIZED INTERVAL - FT.</u>		<u>INT. FEET</u>	<u>% Cu</u>	<u>% MoS₂</u>
	<u>FROM</u>	<u>TO</u>	<u>FROM</u>	<u>TO</u>			
77-1	0	7	7	170	163	0.18	0.015
			170	220	50	0.38	0.027
			220	297	77	0.04	0.004
77-2	0	7	7	270	263	0.18	0.010
			270	465	195	0.04	0.004
77-3	0	30	30	270	240	0.21	0.018
			270	307	37	0.02	0.002
77-4	0	20	20	220	200	0.07	0.008
			220	260	40	0.22	0.006
			260	307	47	0.05	0.008
77-5	0	10	10	240	230	0.04	0.010
			240	260	20	0.26	0.003
			260	407	147	0.007	0.004
77-6	0	20	20	160	140	0.17	0.010
			160	347	187	0.21	0.021