State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

Powers
C005

MEMORANDUM REPORT

SUBJECT: BOLIVAR COPPER COMPANY

A preliminary examination of the holdings of the Bolivar Copper Company was made by Hollis M. Dole, Director, and Len Ramp, field geologist, on May 7, 1957. The examination consisted of one-half day on the property inspecting surface outcroppings uncovered during the exploration program of the company and a general reconnaissance of the geology.

Location

The Bolivar Copper mine workings are in secs. 10 and 15, T. 32 S., R. 10 W.W.M. in the southeast corner of the Powers mining district and the southeast corner of Coos County, Oregon. It is about 33 miles southeast of Powers by good mountain road via Eden Valley. Access is also available from Glendale by 40 miles of road, and from Galice by 39 miles of road.

Geologic setting

The holdings of the company are in metavolcanic rocks at the base of the Jurassic Dothan formation and near their western contact with sediments of the uppermost Jurassic Riddle formation. The zone of metavolcanics is one that has been outlined and is known to extend from west of Marial on the Rogue River northeastward to Mt. Bolivar, Gold Mountain, then westward to the northeast quarter of the Dutchman Butte quadrangle, on past Nickel Mountain and up to the South Umpqua near Peel where it is covered by Tertiary volcanics of the Western Cascades. This band of volcanics, varying from one-half mile to 8 miles in width, is generally bounded on the west by a strong fault probably of deep-seated origin that has brought the volcanics up and has dropped the sediments of the Riddle and Days Creek formation down, thus protecting them. The eastern contact is gradational into sediments of the Dothan formation.

Structural setting of mineralization

Subsidiary shears attendant to the major fault between the Dothan volcanics and the Riddle and Days Creek marine sediments are common

and mineralisation in these shears has been frequently investigated. Occurrences similar to the Mt. Bolivar holdings are found at the Melody mine on upper Rice Creek near Dillard and at Brushy Butte on the drainage divide between north Myrtle Creek and the south fork of Deer Creek. The subsidiary shears have localised either intrusives into the Dothan volcanics or the more mobile constituents of the volcanics at the time of granitization. As a result, scattered mineralization is found. This mineralisation invariably is copper and gold-silver. Unlike the porphyry coppers of southwest United States, the mineralisation occurs in "bunches" and stringers and although it might be considered as disseminated mineralisation, it is not sufficiently regular to predict the possibilities of a mineralized zone without extensive exploration work. Exploration to date in this belt of volcanic rocks has not determined a large economically minable deposit.

Development work by Bolivar Copper Company

Preliminary stripping has been done at the Bolivar Copper Company in a shear zone in which mineralization is found. Insufficient detailed exploration work has been done to disclose anything except sporadic occurrences of mineralisation. Until a great deal further drilling, trenching, and sampling have been done, this property should not be considered as differing from other known prospects in this same geologic setting. Recommendations were made to the company that a competent mining engineer be retained to conduct the exploration program in order to determine if plans should be made to mine. In the meantime the property cannot be evaluated differently than covered by earlier reports on file in this Department.

Report by: Hollis M. Dole
May 29, 1957

MOUNT BOLIVAR REGION (continued)

approximately 50 tons of copper ore, chiefly chalcopyrite and bornite. The works were closed at the time of my examination, but the occurrence of so much ore on the dumps apparently shows the existence of ore bodies of considerable size."

Ref.: Diller, 14:53 (quoted)

Powers district
Coos County

CONFIDENTIAL

1819 S. E. Fern Street
Grants Pass, Oregon
April 29, 1957

Bolivar Copper Company
Rt. 4, Box 1570
Roseburg, Oregon

Attn: Mr. R. F. Carr, President

Gentlemen:

Pursuant to your request, I am submitting the following report on your copper property near Mt. Bolivar, Coos County, Oregon. It is based on my examination of the property on April 1-5 and 17, 1957. During this time, a geophysical survey of the immediate surface area was made, using the Ruska "scout" model magnetometer.

INTRODUCTION

A geological and geophysical examination was made of the Bolivar Copper Company's property at the headwaters of the West Fork of Cow Creek, Coos County, Oregon, on April 1-5 and 17, 1957, with the objective of development of sufficient economic copper orebodies to justify operation of the mine. An underground mine examination was made, and a magnetometer survey was completed in the immediate vicinity of the mine.

LOCATION AND ACCESSIBILITY

The Bolivar Copper mine workings are in Sections 10 and 15, T. 32 S., R. 10 W., W.M. in the southeast corner of the Powers Mining District and the southeast corner of Coos County, Oregon. It is about 35 miles southeast of Powers by good mountain road via Elen Valley. Access is also available from Glendale by 40 miles of road, and from Galice by 39 miles of road. Powers and Glendale both have Southern Pacific rail facilities. Economic considerations of ore or concentrate shipment would depend upon the trucking rates to each rail station and the freight rates therefrom. These narrow gravelled Forest Service roads can be used for transportation and haulage during the normal dry months of June to December. During the periods of heavy rain and snow, much maintenance and snow-plowing would have to be done. Telephone communication is reported as available over the Forestry Department system.

PHYSICAL FEATURES AND CLIMATE

The mine is at an elevation of 2600 feet on one of the rugged northeast-trending spur-ridges of Saddle Peak. The most prominent topographic feature of the district is Mt. Bolivar with an elevation of 4500 feet. Drainage is effected by the West Fork of Cow Creek, a tributary of the Umpqua River. The topography of the area is steep and mountainous with the slopes heavily forested with conifers, with hardwoods in the

gulches. Brush and soil obscure most of the outcrops. Annual precipitation is about 75 inches, with a maximum-minimum temperature range of 0°-100° F. Snow may remain on the higher elevations(above 2000') until late in the spring, but the lowlands seldom have snow for more than a few days. Water for milling is available the year round in the West Fork of Cow Creek near the camp site.

LABOR SUPPLY AND LIVING CONDITIONS

Ordinary labor would be available from the Powers district, especially during the lull periods of the local logging and sawmilling operations. Experienced miners would have to be imported. The prevailing wage rates are high due to the seasonal lumbering operations. Bunkhouses and the warehouse are available on the property for a small limited operation.

HISTORY AND PRODUCTION

The copper ore of this locality has been known for many years. Mr. J. M. Thompson located the original "Noonday" claim in 1900, and followed it by several others in later years. He prospected and dug on it sporadically until it was optioned by the Wolverine and Western Development Company in 1913. They completed approximately 1000 feet of exploratory drifts and crosscuts by the end of 1916. In addition, 10 underground diamond drill holes with a possible total footage of 1000 feet were completed. No information of the hole logs are available. In 1916, they packed out 15 tons of highgrade ore to Glendale for smelter shipment. It was reported to have assayed 16.9 percent copper, with minor amounts of gold and silver.

In 1957, the Powers-Glendale road was completed. This passed within one mile of the mine and contributed to the future exploration and development of the mine. In 1959, Mr. Earle Young of Grants Pass, Oregon, mined and shipped 30 tons of ore from the #2 tunnel. Results were disappointing and operations ceased.

Originally known as the "Thompson Mine", it continued under that name until 1956. The property at the present time is owned by Mr. Nesbey, Administrator of the Estate of J. M. Thompson, and under option to the Bolivar Copper Company, Mr. R. F. Carr, President, Rt. 4, Box 1370, Roseburg, Oregon.

THE PROPERTY

The property consists of 24 unpatented mining claims and 3 mill sites in the Siskiyou National Forest. The combined area is 495 acres. These claims amply cover the entire ore-bearing structure. The 3 mill sites available are located along the West Fork of Cow Creek below the camp site, and have plenty of gravity hillside, water, and room for tailings disposal.

The property is equipped for surface mining on a small scale. Equipment on the site at the present time include: 2 trucks (dump), 1 TD-18 bulldozer, 1 Sullivan surface diamond drill equipped for AX drilling, 1 3/8-yard shovel, 1 15-KW electric generator, and 1 portable air compressor.

Sufficient timber, principally fir and cedar, is available on the property for construction and mining purposes. It is reported that a

small custom sawmill is located within 4 miles, where mine and mill construction timbers could be sawed.

MINE WORKINGS

There is 1050 feet of underground workings on the property. This includes a 15' winze in #2 Tunnel and a 15' inclined shaft above #3 Tunnel. All the rest is exploration and development drifts and cross-cuts. Most of it is in good condition, with the exception of about 100 feet just beyond the portal of #1 Tunnel, which is partly caved and in poor condition, nevertheless passable. A small amount of stoping was done in the #2 Tunnel workings by Mr. Earle Young in 1935. Ten diamond drill (EX) holes with a possible total footage of 1000' can be seen in the faces and cross-cuts of #1 Tunnel workings. No record of their logs is available.

DESCRIPTION OF THE DEPOSIT

Diller* says:

"Mention should be made of the copper ore that has been found in a mineralized belt nearly 25 miles to the northeast in the vicinity of Mount Bolivar, the most prominent peak in the greenstone belt that is shown near the northeast corner of the map. The greenstone of this belt is impregnated at a number of places by pyrite, chalcopyrite, and bornite, and contains numerous veins of quartz and calcite. The most important copper prospect noted in this region is on the west fork of Cow creek At the locality known as the Thompson mine. It has been exploited by several tunnels and inclines and yielded at least 50 tons of ore, chiefly chalcopyrite and bornite. The works were closed at the time of my examination, but the occurrence of so much ore on the dumps apparently shows the existence of ore bodies of considerable size. This prospect, although only 17 miles from the main line of the Southern Pacific railroad at West Fork and all down grade, is reached by trail only. Numerous prospects have been opened in this mineralized belt between Mount Bolivar and Rogue River, but none of greater promise than that already noted has yet been found."

Dr. F. G. Wells, in an unpublished reconnaissance, has reinterpreted this above "greenstone" of Diller's to be the Dothan metavolcanics of upper Jurassic age. This mineralized belt has a northeast-southwest trend for some 22 miles, with widths up to 2 miles. In the vicinity of the Thompson mine, it is 2 miles wide. The mine workings are approximately in the north center of this belt. Contact on the northwest near the West Fork creek is with the Knowville formation, in this case being a dark gray to black shale and siltstone.

Evidence of the basalt origin of the formation around the Thompson mine is apparent. It weathers to various shades of green or yellow-brown color. A fresh specimen of the basalt is green and fine-grained, and often shows a porphyritic structure. Some specimens are amygdaloidal, with the amygdules (spherical) commonly filled with white or light-green chalcedony, green crystalline epidote, chlorite, or secondary copper

*Mineral Resources of Southwestern Oregon, U. S. G. S. Bulletin 546, 1914, by J. S. Diller.

minerals (chrysocolla, malachite, etc.). Feldspar crystals about 1 mm long, light green hornblende, and some stubby pyroxene crystals were noted with the hand lens. Occasional specks of magnetite and epidote were also noted. The metabasalt is sheared in places to a dark-green phyllitic rock, which has the appearance of dark serpentine.

Ore minerals observed were chiefly bornite and chalcopyrite, with minor amounts of chalcocite. The usual secondary copper minerals were in evidence near the surface outcrops of the mineralized zones. They consisted of malachite, azurite, chrysocolla, with minor to trace amounts of cuprite, tenorite, and native copper. Hypogene sulfides are present within a few feet of the surface outcrops, and any secondary enrichment zone appears to be negligible. Gangue minerals in the ore zones were quartz, calcite, and barite. A talcose zone with very fine-grained homogeneously disseminated pyrite was observed in the #2 Tunnel crosscut in the north wall. Sample #5 was taken here.

No well-defined vein structures were observed; rather the copper minerals were scattered indiscriminately over a large area as mineralized fault zones and possible replacement deposits. Underground development of the mine would necessarily be expensive, and ore tonnage production low. Most of the apparent ore occurs in irregular bunches and masses. Usually that which appears to be an ore vein extends only a short distance and pinches out. Sample cuts taken in the ore zones indicate this sporadic nature. Please refer to Appendix I, and samples Bolivar #1-5, incl., and Bolivar #7 through #11.

Due to the irregular outline of the deposits and because the ore shoots terminate abruptly, mining and development will proceed more or less simultaneously, and hence very little ore will be proved in advance of mining, except by diamond drilling. Because of the nature of the deposits, projections of ore bodies and veins as a basis of tonnage estimates of ore in place are extremely hazardous and not reliable.

MINING AND MILLING

To develop an economically feasible copper mine at the present time from this property, it will be necessary to block out by grid-pattern diamond drilling (for mining by open pit methods) sufficient tonnage of good quality copper ore to justify the installation of a small concentrating mill. The minimum requirements in this case, commensurate with the capital investment of the mill installation, would be 30,000 tons of 3% copper ore on a 50 ton-per-day basis. This is also predicated upon the high metallurgical recovery of the 3% copper ore into a good shipping concentrate, and using a simple flotation flowsheet.

DEVELOPMENT DIAMOND DRILLING

In order to develop this commercial orebody, diamond drilling should proceed on a grid pattern of 25 feet, progressing outward to delineate the orebody, with holes to a minimum depth of 50 feet. In this case, assuming solid 3% ore in the 50-foot holes, it would take approximately 10,000 square feet, or a square 100' on a side. To completely outline this possible orebody would require 16 50-foot holes.

Assay results of the intervals of the 2 completed diamond drill

holes are tabulated in Appendix I. These samples were given to us for assay, and were reported as being representative of the two holes. #1 hole appears to be of uniformly good ore, with chalcopyrite and bornite observed in the sludge sand. The two sample intervals from #2 hole appear to be very low grade mineralization, and not commercial ore at the present time. It is recommended that diamond drilling be resumed in the vicinity of #1 Hole, with the objective of blocking out an orebody of comparable grade and character to the interval assays of this first hole. Please refer to Appendix I and assays Bolivar #15 through #19.

Sludge and all core from development drill holes should be carefully saved for a metallurgical test sample. Sludge should be kept covered with water to prevent surface oxidation of the ore minerals. Ore dressing testwork on a representative and composite sample of ore should be started as soon as it is apparent that a commercial orebody possibly exists.

MAGNETOMETER SURVEY

The immediate area of the mine was covered by a grid of 50' stations. Cat roads and trails were utilized wherever possible in order to speed the set-ups. Results indicate a geologic structure of fairly uniform magnetic character.

The magnetic susceptibility of the copper ore was variably higher than the Dothan meteroleamic country rock. This was probably due to the small amounts of magnetite disseminated throughout the ore, wherever noted.

One positive magnetic anomaly was outlined in the vicinity of the old inclined shaft above and to the southwest of #3 Tunnel. Please refer to Magnetic Survey Map and anomaly marked MA #1. This 500 gamma anomaly corresponds to the area containing the most of the best copper ore outcrops. Two vertical diamond drill holes have already been drilled in this area, one with good and the other with poor results. (please refer to Appendix I for interval assays).

The magnetometer used during this examination was a Ruska "Scout" model, having an accuracy of 25 gammas per scale division, and equipped with compensating magnets to give a maximum range of 15,000 gammas.

RECOMMENDATIONS AND CONCLUSIONS

1. Magnetic anomaly MA #1 should be diamond drilled by a 25' grid pattern to delineate the ore body. At the present time, drilling depth need not be more than 50', or enough to plan an efficient open-pit operation for the initial production stage of the operation.

2. In the future, representative samples of the drilling progress should be taken at 5' intervals and assayed for copper content. This is in addition to saving all the sludge and core for metallurgical testing.

3. Ore dressing testwork on a representative and composite sample of ore should be initiated as soon as it is apparent that a commercial ore body possibly exists. Results of this testwork would be the basis for the mill design.

It is recommended that caution be exercised in the development of this property. The outlining of a commercial orebody by diamond drilling as previously mentioned is only "good insurance" that a future continuous and profitable operation can be secured. Standard procedures in this phase are recommended.

In conclusion, it is possible that a small commercial orebody can be developed, and I can recommend only a limited investment in this preliminary phase. Procedure from there is dependent upon the results obtained from it.

Respectfully submitted,

John W. Pressler
CONSULTING MINERAL ENGINEER

JWP/ee
Encl. Mine Map
Magnetic Map
Appendix I - Assays

September 23, 1975

LOG RB# 6-75

38-45.7 1101	Very altered pillow basalt. 38.6" thin section. Visible sulfides - minor bornite basic feldspar
45.7-53 1102	as above. 38-45.7 Box 1 rec $\frac{38}{53} \times 100 =$
53-60.9 1103	pillow basalt
60.9-67 1104	pillow basalt. chloritic basalt.) 66 bornite stringer) mineralized zone
67-73 1105	interfinger with porphyritic basalt chloritic basalt. visible bornite.
73-78 1106	porphyritic andesite. Thin section 76'.
78-83 1107	as above. visible narrow stringer of bornite 1" - 1-1/2" long x 1/8" wide, some disseminated specs. both bornite and chalcopyrite.
83-87.3 1108	Rx more altered - more chloritic sulfide content in chalco and bornite increasing.
87.3-93 1109	chloritic basalt. Heavy chalco - bornite. Mineralization in bands @ -45°
93-100.8 1110	Massive porphyritic basalt. No visible sulfides
100.8-105.6 1111	As above.
105.6-111 1112	Core more highly fractured with fractures filled with soft white mineral - not calcite not qtz. 1/2" band of pyrite, chalco and bornite at 106. Grey chert and pyrite up 3/4" wide in sample.
111-116 1113	Massive porphyritic andesite to 114. 114 chert - pyrite bands. No visible copper minerals. 115.6-116.2 altered bands of white mineral and pyrite.

116-121.2 1114	as above. Sections of sample rehealed with white mineral and pyrite.
121.2-126.1 1115	as above.
126.1-131.1 1116	More highly altered than above, visible bornite and chalco.
131.1-136.2 1117	Not as altered. Visible bornite and chalco. Same rx type.
136.2-141.2 1118	Altered porphyritic andesite.
141.2-147 1119	Chloritic basalt - visible chalco - bornite.
147-153.6 1120	Chloritic basalt.
153.6-159 1121	as above.
159-164 1122	Less altered - porphyritic andesite
164-169 1123	Very altered zone. Some heavy chalco. Not as much bornite as up the hole but is visible to naked eye.
169-174 1124	as above. Rock very altered and sheared. Chalco predominate sulfide.
174-179 1125	Rx not quite as altered as last 5 ft. Not so heavily mineralized
179-184 1126	Porphyritic andesite? No visible sulfides.
184-189 1127	as above.
189-195 1128	Porphyritic andesite. - Tuff? Not very altered.
195-200 1129	Rx more altered and sheared than above.
200-205 1130	as above - not as altered.

205-210 1131	Unaltered porphyritic andesite. No visible sulfides.
210-215 1132	as above.
215-220 1132	TD. as above.

SAMPLE INDEX RANCHERS BOLIVAR
HOLES RB# 6-75, 7-75, and 8-75
COOS COUNTY, OREGON

September 23, 1975 RB# 6-75

Assay No.	Hole No. & Ft. Int.	Cu	Zn	Au	Ag
1101	38-45.7	0.126			
1102	45.7-53	0.151			
1103	53-60.9	0.245			
1104	60.9-67	0.567			
1105	67-73	0.126	Trace		
1106	73-78	0.025	0.2		
1107	78-83	0.126	Trace		
1108	83-87.3	0.347	Trace		
1109	87.3-93	2.242	0.4	0.060	None
1110	93-100.8	0.050			
1111	100.8-105.6	0.006			
1112	105.6-111	0.006			
1113	111-116	0.018			
1114	116-121.2	0.012			
1115	121.2-126.1	0.094			
1116	126.1-131.1	0.245	None		
1117	131.1-136.2	0.648	None		
1118	136.2-141.2	0.541			
1119	141.2-147	0.485			
1120	147-153.6	0.170			
1121	153.6-159	1.058			

Assay No.	Hole No. & Ft. Int.	Cu	Zn	Au	Ag
1122	159-164	0.119			
1123	164-169	1.965	Trace		
1124	169-174	0.825	Trace		
1125	174-179	0.132	None		
1126	179-184	0.012			
1127	184-189	0.006			
1128	189-195	0.006			
1129	195-200	0.012			
1130	200-205	None			
1131	205-210	None			
1132	210-215	None			
1133	215-220	0.006			

September 24, 1975

RB# 7-75

28-51.3 1134	Very oxidized RX. ??
51.3-62.1 1135	Very oxidized Rx. ??
62.1-67 1136	Very oxidized Rx - diorite or andesite?
67-72 1137	Less oxidized - andesite? Minor magnetite olivine
72-77 1138	As above.
77-82 1139	As above. Heavy iron mangenes.
82-87 1140	As above.
87-92 1141	As above. One main shear vertical.
92-97 1142	Rx more fresh. Fine grained H.B. Very minor pyrite FeS_2. 94' change - feldspar more chloritic, more white mineral.
97-102 1143	As above except some of the black mafic looks like biotite? Minor pyrite and chalco.
102-107 1144	Light green-grey fine grained andesite. Note 103' breccia. 105' no visible sulfides
107-112 1145	As above. Some breccia. Visible sulfides FeS_2. Pyrite. White and pink zeolites? No reaction with HCL.
112-117 1146	As above. Pyrite heavier. No visible chalco or pyrite. Rock auto-brecciated. Fragments same material as ground mass.
117-122 1147	As above.
122-127 1148	Contact 45°. Contact at 125'. Chloritic schist. Same as 124-127 very chloritic basalt unit. sheared almost gouge.

127-132 1149	Less shear as above. 130'-131' heavy wine maroon colored altered zeolite? Very lightly pyritized. Magnetite and olive green mineral.
132-137 1150	Note change 135'. Porphyritic andesite? Visible pyrite and chalcopyrite. Pyrite predominates. 137' massive pyrite, very minor chalco.
137-142 1151	Porphyritic andesite. 140' massive pyrite 6" band offset by small fault. Cu Au Some minor qtz.
142-147 1152	As above. Massive sulfide pyrite at 143'. Cu, Au and AG.
147-152 1153	Porphyrite andesite. Massive 6" band of Pyrite with blotches of chalcopyrite.
152-157 1154	Porphyritic andesite. No visible sulfides.
157-162 1155	As above. 160'-162' more altered chloritic schists with numerous white stringer of zeolite.
162-167 1156	As above.
167-171.5 1157	As above. TD

September 24, 1975 RB# 7-75

Assay No.	Hole No. & Ft. Int.	Cu	Zn	Au	Ag
1134	28-51.3	None			
1135	51.3-62.1	None			
1136	62.1-67	None			
1137	67-72	None			
1138	72-77	None			
1139	77-82	None			
1140	82-87	None			
1141	87-92	0.006			
1142	92-97	None			
1143	97-102	None			
1144	102-107	None			
1145	107-112	None			
1146	112-117	None			
1147	117-122	None			
1148	122-127	0.006			
1149	127-132	0.151			
1150	132-137	0.390			
1151	137-142	0.050		0.020	
1152	142-147	0.056		0.015	0.2
1153	147-152	0.510			
1154	152-157	0.289			
1155	157-162	0.006			
1156	162-167	0.107			
1157	167-171.5	0.006			

September 24, 1975

LOG RB# 8-75

39.8-45 1158	Andesite? Light grey blue - altered. Chlorite blotch - veinlets of white soft zeolite?
45-50 1159	As above. Disseminated pyrite. No visible copper mineral.
50-55 1160	As above.
55-60 1161	Andesite?
60-65 1162	As above.
65-70 1163	As above.
70-75 1164	73' 1" band of pyrite. Angle 60° in andesite.
75-80 1165	Andesite.
80-85 1166	Andesite - 3" wide band of brecciated light pink soft mineral.
85-90 1167	Andesite.
90-95 1168	Andesite. Minor pyrite on some of the fractures. Most fractures filled with soft white zeolite?
95-100 1169	As above.
100-105 1170	Altered andesite - more chloritic.
105-110 1171	Altered andesite - as above. Very minor FeS_2.
110-115 1172	As above.
115-120 1173	As above.
120-125 1174	As above. Rx somewhat harder.

125-130 1175	As above.
130-135 1176	As above.
135-140 1177	Andesite chloritic. Softer than upper 10'. More altered. Minor FeS_2.
140-145 1178	Andesite. 144' minor sulfide pyrite. Small amount of silica.
145-150 1179	Chloritic andesite? pyritized with chert.
150-152.8 1180	As above. TD.

September 24, 1975 RB#. 8-75

Assay No.	Hole No. & Ft. Int.	Cu	Zn	Au	Ag
1158	39.8-45	0.018			
1159	45-50	0.012			
1160	50-55	0.006			
1161	55-60	None			
1162	60-65	None			
1163	65-70	None			
1164	70-75	None			
1165	75-80	None			
1166	80-85	None			
1167	85-90	None			
1168	90-95	None			
1169	95-100	0.006			
1170	100-105	None			
1171	105-110	None			
1172	110-115	None			
1173	115-120	None			
1174	120-125	None			
1175	125-130	None			
1176	130-135	None			
1177	135-140	None			
1178	140-145	0.006			
1179	145-150	None			
1180	150-152.8	None			

REPORT ON THE DIAMOND DRILL PROGRAM BOLIVAR COPPER PROSPECT
SEC. 10, TWP. 32 S, R 10, WWM, COOS COUNTY, OREGON
JULY 18 TO AUGUST 31, 1974

REPORT ON THE DIAMOND DRILL PROGRAM BOLIVAR COPPER PROSPECT
SEC. 10, TWP. 32 S, R 10, WWM, COOS COUNTY, OREGON
JULY 18 TO AUGUST 31, 1974

I SUMMARY

A total of 742 ft. of NX drilling consisting of 5 holes were drilled in the immediate pit area of the Bolivar Copper prospect. The drilling indicates that the copper mineralization consists primarily of bornite (Cu_5FeS_4) with minor amounts of chalcocite (Cu_2S) and chalcopyrite ($CuFeS_2$). The host rocks are pillow basalts and chloritic basalts of the Rogue formation of Jurassic Age.

Copper mineralization above 0.20% was drilled in the following holes (Ranchers Bolivar Nos. = RB Nos.):

RB# 1A.	5 ft., 61-66 ft. = 1.021% Cu	Core
RB# 1C.	50 ft., 0-50 ft. = 0.807% Cu	Sludge
	5 ft., 73-78 ft. = 0.718% Cu	Core
RB# 2.	20 ft., 0-20 ft. = 0.468% Cu	Sludge
	10 ft., 27-37 ft. = 0.774% Cu	Core
	10 ft., 37-47 ft. = 2.808% Cu	Core
	10 ft., 47-57 ft. = 0.809% Cu	Core
RB# 3.	20 ft., 0-20 ft. = 0.252% Cu	Sludge
	1 ft., 52-53 ft. = 0.819% Cu	Core
	6 ft., 111-117 ft. = 2.066% Cu	Core
RB# 4.	5 ft., 50-55 ft. = 0.365% Cu	Core
	5 ft., 65-70 ft. = 0.270% Cu	Core
RB# 5.	10 ft., 104-114 ft. = 3.744% Cu	Core
	8 ft., 114-122 ft. = 1.391% Cu	Core

Assaying was done by Union Assay Office Inc., Salt Lake City, Utah.

The drill hole spacing explored an area 350 ft. x 280 ft. = 98,400 sq. ft. The average for a composite of 70 ft. of the mineralization from the 5 holes is 82,000 tons of 1.5% Cu. The host rocks for copper mineralization appear to extend east, south and north from the drilled area.

3000 ft. southwest from pit area an exposure of basalt with stringers of bornite has been exposed in a bulldozer trench. 5000 ft. from the pit in a southwest direction another exposure of basalt with very minor amounts of bornite has been exposed in a bulldozer cut.

II RECOMMENDATION

The following drill program is proposed to lineate the ore zone in the pit area.

P-1	vertical	TD	150 ft.
P-2	vertical	TD	150 ft.
P-3	vertical	TD	150 ft.
P-4	vertical	TD	100 ft.
P-5	vertical	TD	120 ft.
P-6	vertical	TD	120 ft.
P-7	vertical	TD	250 ft.

The mineralized zone 3000 ft. southwest of the drilled area should be explored with a series of bulldozer trenches. If the zone appears to have any extent, a drill program should be planned to explore the area.

III GEOLOGY & MINERALIZATION

Bornite is the main copper mineral in the deposit. Very minor amounts of chalcopyrite were observed. A fine coating of chalcocite forms on the bornite but no massive chalcocite was seen. Very minor amounts of malacite were observed. Zinc is not uniformly present with the copper. The highest zinc value is 0.9% in an 8 ft. section in hole RB#5. Gold is nil to trace. The ore horizon appears to be very flat.

Six rock-types appear in the pit area and in the drill holes. Five volcanic units make up the major portion of the rock-types. The writer's field classifications are as follows:

(1) Pillow Basalt. The pillow basalts are the main rock type in the pit area and one of the main mineralized units. The drilling indicates this unit may be 60 ft. thick. Bornite veinlets occur in the shearing around the pillows. There doesn't appear to be disseminated mineralization into the pillows themselves.

(2) Chloritic Basalt. This is a dark green rock made up primarily of chlorite. The unit is highly-fractured with the fractures filled with a soft white mineral. This unit contains the strongest copper mineralization found in the drilling. The bornite mineralization occurs as bands or veinlets in the highly sheared chloritic rock. The old mine workings in part followed the contact between the pillow basalts and the chloritic basalt. The sheared contact between these two units appears to be vertical.

(3) Volcanic Unit No. 3 is a fine-grained, grey-green, porphyritic rock made up of 20-30% white phenocrysts of fresh-looking feldspar crystals and a rounded white unidentified mineral. In outcropping the white rounded mineral and the feldspar crystals stand out in relief of the ground mass. Hole RB#4 was drilled in this unit which contained a 67 ft. section of weak copper mineralization in the form of bornite. The mineralized rock consisted of very tiny veinlets of bornite in the shear zones. This unit is not highly

sheared in hole RB#4. There does not appear to be any dissemination of the bornite away from the shearing.

(4) Andesite? A light-grey, fine-grained rock, non-porphyritic makes up the outcropping to the west of the pit and appears to be interfingered with the other 3 volcanic units. This fine-grained rock may be dikes or sills within the volcanic units. This unit does not appear to be mineralized with copper.

(5) Quartz Diorite? A wedge-shaped block of very altered granitic textured rock is exposed in the pit and appears to cut through the volcanic units. The quartz diorite does not appear to be mineralized.

(6) Porphyritic rhyolite. Light colored rock with both quartz and feldspar phenocrysts. This unit makes a flat to 10° contact with the pillow basalt and chloritic basalt.

The regional mapping of the prospect area by the Oregon Department of Geology and Mineral Industries Bulletin 80, Geology and Mineral Resources of Coos County, Oregon, 1973, classifies the rocks in the prospect area as Rogue volcanics and contemporaneous diorite and gabbro stocks of Late Jurassic Age. No paragenesis of the ore deposit is made in the report and no attempt was made to divide the volcanic units.

The mine area is approximately 1000 ft. southeast of the thrust fault contact of the Rogue volcanics over the younger sediments which consist of conglomerates and sandstones of the Riddle formation.

The writer does not know if the thrust faulting has any relationship to the mineralization at the Bolivar mines; however, it is a structural feature that should be closely examined.

IV CONCLUSIONS

The Bolivar Copper prospect consists primarily of bornite mineralization distributed as veinlets throughout 3 volcanic units. Volcanic unit (1) consists of pillow basalt where the bornite mineralization forms veinlets in the shear zones around the pillows. There doesn't appear to be any dissemination of the bornite into the pillows themselves. The attitude of the pillow basalt unit has not been determined, nor has its relationship to the other rock types in the pit been established. This is due mainly to the complex faulting that is present in the pit area. The drilling did not delineate the pillow basalt unit. The pillow basalt and the mineralization appear to extend east, south, and north beyond the drilled area.

Bornite and minor chalcopyrite mineralization appear to be strongest in an intensely sheared and altered chloritic basalt. Bands 4" to 6" wide of massive bornite were drilled in RB#5 where a 10 ft. section assayed 3.7% Cu. The chloritic basalt was not delineated by the drilling and must be regarded as one of the most important units carrying the copper mineralization at Bolivar This chloritic basalt unit does not appear to contain disseminated copper

mineralization throughout the unit itself. The mineralization appears to be confined solely to bands or veinlets within the shear zones. These sheared zones vary from a few inches wide to 18 ft. wide. The attitude and the relationship of the chloritic basalt to the other rock types has not been established. This chloritic basalt unit appears to extend beyond the pit and drilled area and should be one of the main exploration targets.

Volcanic unit (3) consists of a light-grey, porphyritic rock containing very minor veinlets of bornite in minor shearing. RB#4 was drilled in this unit. 67 ft. of the hole assayed 0.19% Cu. This unit appears less altered, less sheared and less mineralized than either the pillow basalt or the chloritic basalt. In outcrop west of the pit area this unit appears to contact with and dip under the pillow basalt. The attitude of the contact is S15°E/50°NE. This contact may serve as a guide to determine the extent of the pillow basalt and the chloritic basalt. It is the writer's opinion that to determine the economic potential of the Bolivar deposit, the pillow basalt and the chloritic basalt must be lineated and assayed. A flat lying flow or sill of porphyritic rhyolite (0-10°/N) occupies a portion of the ridge north and east of the drilled area and appears to cover the pillow basalt and the chloritic basalt. The rhyolite appears to be approximately 30 ft. thick. Any drilling in this area should allow for the thickness of the rhyolite. If the rhyolite is a flat lying sill, it may be an ore-control feature accounting for the flat nature of the ore horizon.

This report is respectfully submitted this 6th day of January, 1975, in Grants Pass, Oregon, by

ASSOCIATED GEOLOGISTS

Lloyd E. Frizzell

Lloyd E. Frizzell, B.Sc.

ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No.: RB1A

Contractor: Fran-Berg Drilling Co.
Hood River, Oregon

Coordinates: 96', S48°E OMEX No. 10

Bearing:

Inclination: Vertical

Total Depth: 101 ft.

Collar Elevation: 2723'

Hole Diameter: NX

Date Started: 7/18/74

Date Finished: 7/22/74

Reason Stopped: Target reached

Casing: 40 ft.

Recovery: 0 - 48 ft. = 50%
48 - 101 ft. = 95%

Summary: 61 - 66', 1.02% Cu
bornite in chloritic basalt

0 - 43.6'	Diorite? Altered med.-grained porphyritic diorite? feldspar crystals 2 mm. - 1/4 inch. minor quartz phenocrysts - slightly rounded. Mafics altered to clay and chlorite. clays yellow to brown, some minor manganese in fractures. very fractured - poor core recovery - no visible sulfides.
43.6'	Contact. Light colored fine-grained siliceous rock, highly fractured, contact angle not definite. Numerous quartz stringers - no sulfide mineralization.
43.6' - 48.6'	Porphyritic basalt; highly fractured, very minor pyrite in some fractures.
48.6' - 101'	Contact. Chloritic basalt. Dark green, fine-grained, highly fractured; fractures filled with soft white zeolite, minor calcite.
48.6' - 59.6'	Interfingering of fine-grained rock and chloritic basalt, minor pyrite.
59.6' - 68.6'	Chloritic basalt; highly sheared visible bornite stringers in shear zone. Bornite appears as tiny veinlets, very little disseminated bornite. No visible chalcopyrite - minor pyrite.
68.6' - 101' TD	Chloritic basalt with very minor sulfide mineralization.

ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No. RBIB

Hole Diameter: NX

Contractor: Fran-Berg Drilling Co.
Hood River, Oregon

Date Started: 7/24/74

Coordinates: 130', S72°E OMEX No. 10

Date Finished: 7/27/74

Bearing:

Reason Stopped: Passed over target

Inclination: -45°

Casing: 30 ft.

Total Depth: 50 ft.

Recovery: 0 - 50 ft. = 10%

Collar Elevation: 2721'

Sludge: 0 - 30 ft.

No water return 30 - 50 ft.

Summary: Inclination to shallow
hole passed over target

0 - 50' Altered volcanic - no core
Sludge not assayed
Target to be explored with Hole RBIC

ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No.: RBIC

Hole Diameter: NX

Contractor: Fran-Berg Drilling Co.
Hood River, Oregon

Date Started: 7/28/74

Coordinates: 120', S66°E OMEX No. 10

Date Finished: 8/4/74

Bearing: S80°W

Reason Stopped: Target reached

Inclination: -70°

Casing: 47'

Total Depth: 100'

Recovery: Sludge 0 - 50' good
Core 50 - 100' 95+%

Collar Elevation: 2721'

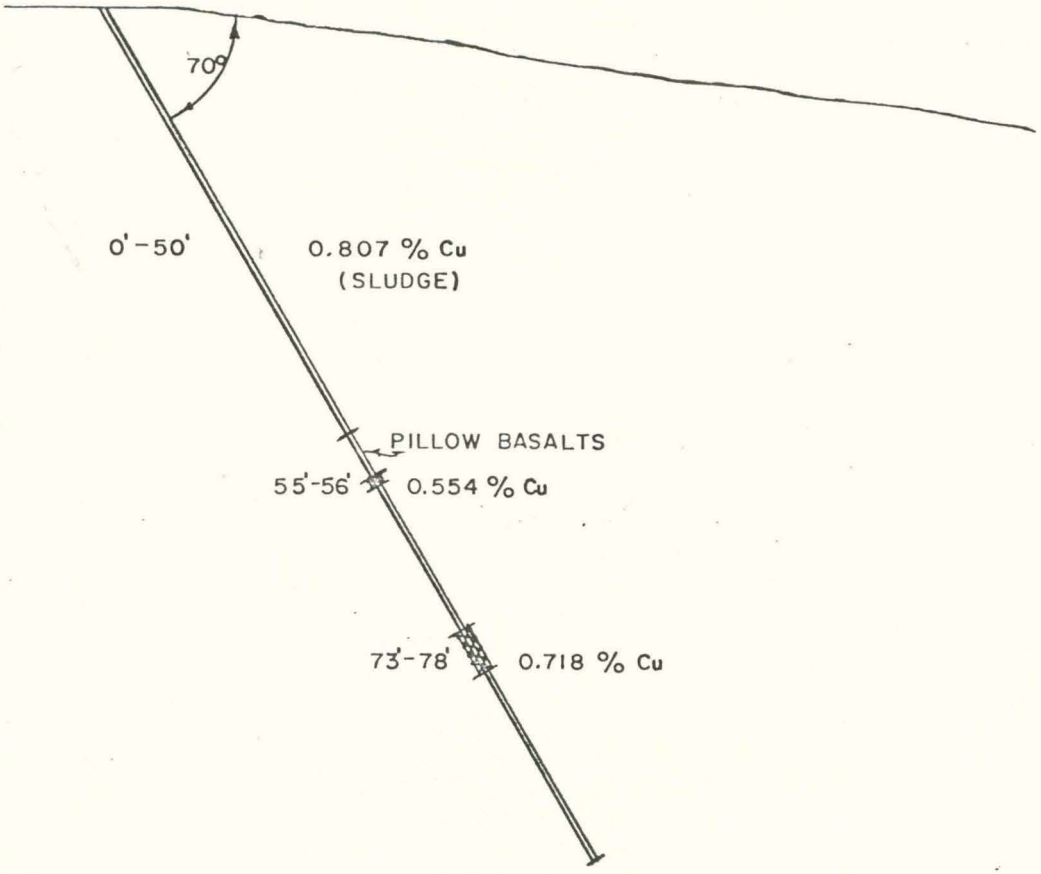
Summary: Sludge 0 - 50' averages 0.807% Cu in pillow basalt
Core 55 - 56' = 0.554%
73 - 78' = 0.718% Cu in chloritic basalt

0 - 50'	Very altered volcanic rock. Cuttings indicate rock to be porphyritic. Phenocrysts altered feldspar. Panned cuttings indicate bornite mineralization. Magnetite predominate tail in pan.
47' contact Rec. 10%	Fine-grained porphyritic basalt with chloritic basalt. No definite contact angle. Contact zone highly fractured
47 - 55'	As above.
55 - 57'	Sheared zone in chloritic basalt, minor bornite mineralizatio
57 - 78'	Sheared chloritic basalt, bornite veinlets visible in shear zone.
78 - 92'	Chloritic basalt - rock not so highly fractured. Dark green, predominately chlorite, minor olivene crystals and H.B. Magnetite 2-4%.
92 - 100' TD	Rock fine-grained, light greenish-grey. Massive. Only weakly fractured. No visible sulfides.

RB-1C
S 80° W
— 70°

BOLIVAR COPPER
COOS COUNTY, OREGON

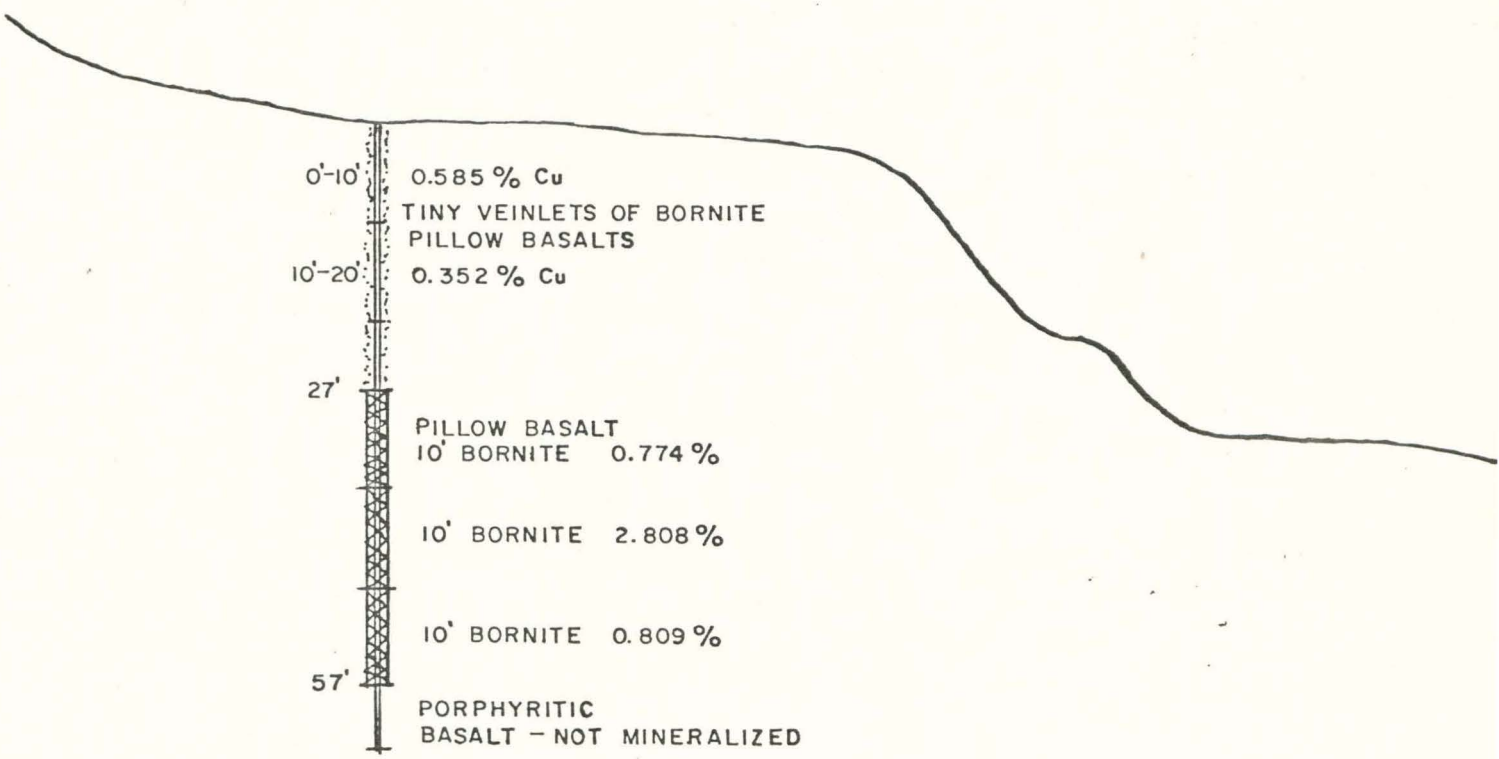
SCALE: 1" = 20'



RB-NO.2.

BOLIVAR COPPER
COOS COUNTY, OREGON

SCALE: 1" = 20'



ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No. RB3

Hole Diameter: NX

Contractor: Fran Berg Drilling Co.
Hood River, Oregon

Date Started: 8/11/74

Coordinates: 165', S15°W OMEX No. 10

Date Finished: 8/16/74

Bearing:

Reason Stopped: Target drilled

Inclination: Vertical

Casing: 27'

Total Depth: 130'

Recovery: Sludge 0 - 40'
Core 40 - 142' 95+%

Collar Elevation: 2720'

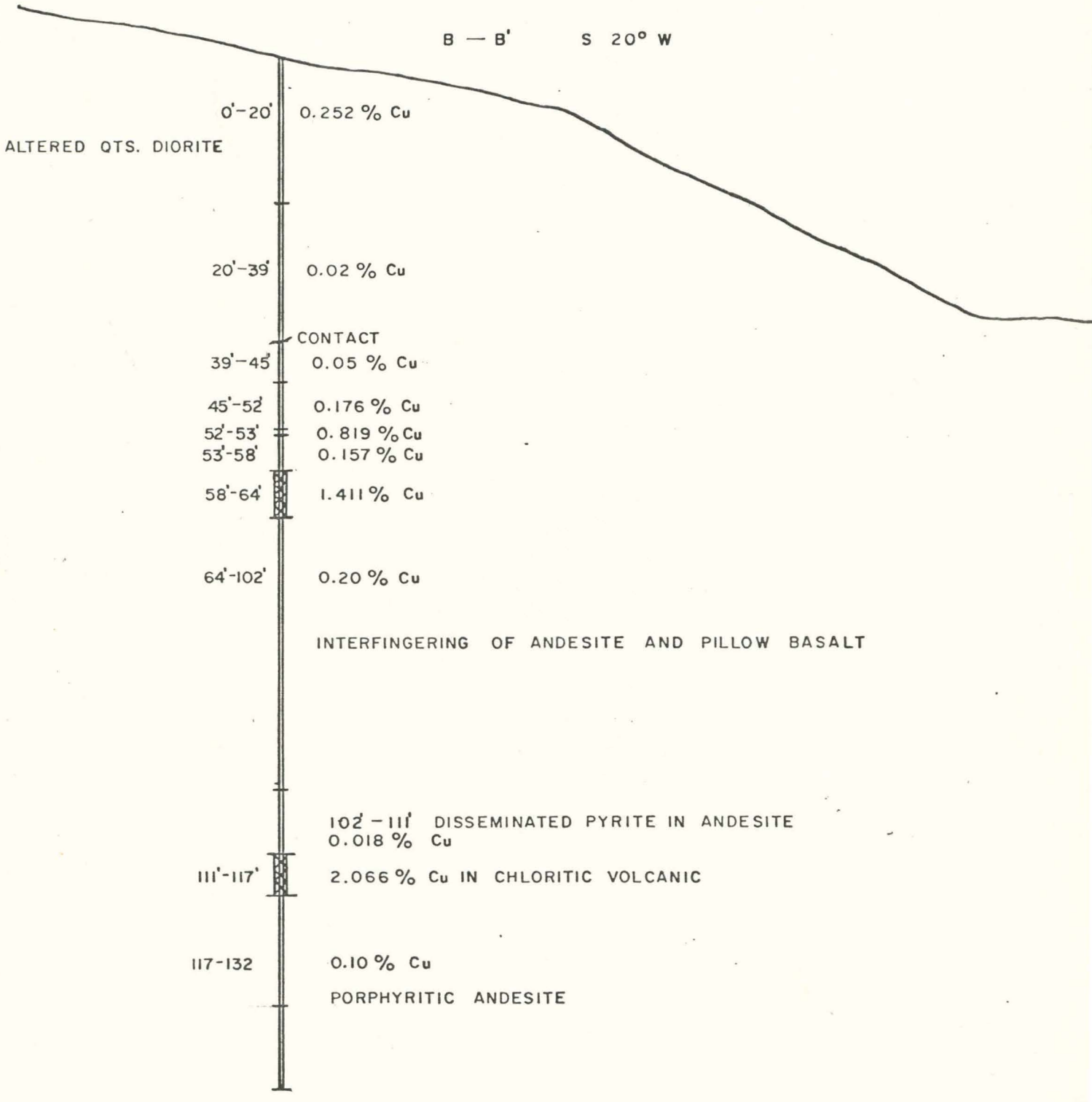
Summary: 52 - 53' = 0.819% Cu
58 - 64' + 1.411% Cu
sheared fine-grained andesite
111 - 117' = 2.066% Cu bornite
stringers in chloritic basalt

0 - 39'	Very altered yellowish brown porphyritic rock
40'	Contact - water loss. Fine-grained andesite. C/a 45° with porphyritic basalt.
40 - 102'	This section is interfingering of fine-grained andesite with porphyritic zones approximately 5 ft. thick. Bornite stringers occur in the shear zones. The bornite mineralizat consists of very tiny veinlets of bornite 1/2 - 1" long by 1/32 to 1/4 inch wide. Mineralization is confined to the limited number of veinlets. There does not appear to be any disseminated mineralization.
102 - 111'	Siliceous massive fine-grained dark grey rock. Pyritized up to 10%.
111 - 117'	Sheared chloritic basalt with bands of bornite, one band 4" wide and numerous narrow bands.
117 - 130' TD	Porphyritic andesite interfingered with fine-grained andesite.

RB-NO. 3.

BOLIVAR COPPER
COOS COUNTY, OREGON

SCALE: 1" = 20'



ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No.: RB4

Hole Diameter: NX

Contractor: Fran-Berg Drilling Co.
Hood River, Oregon

Date Started: 8/18/74

Coordinates: 325', S20°W OMEX No. 10

Date Finished: 8/28/74

Bearing:

Reason Stopped: Target drilled

Inclination: Vertical

Casing: 27'

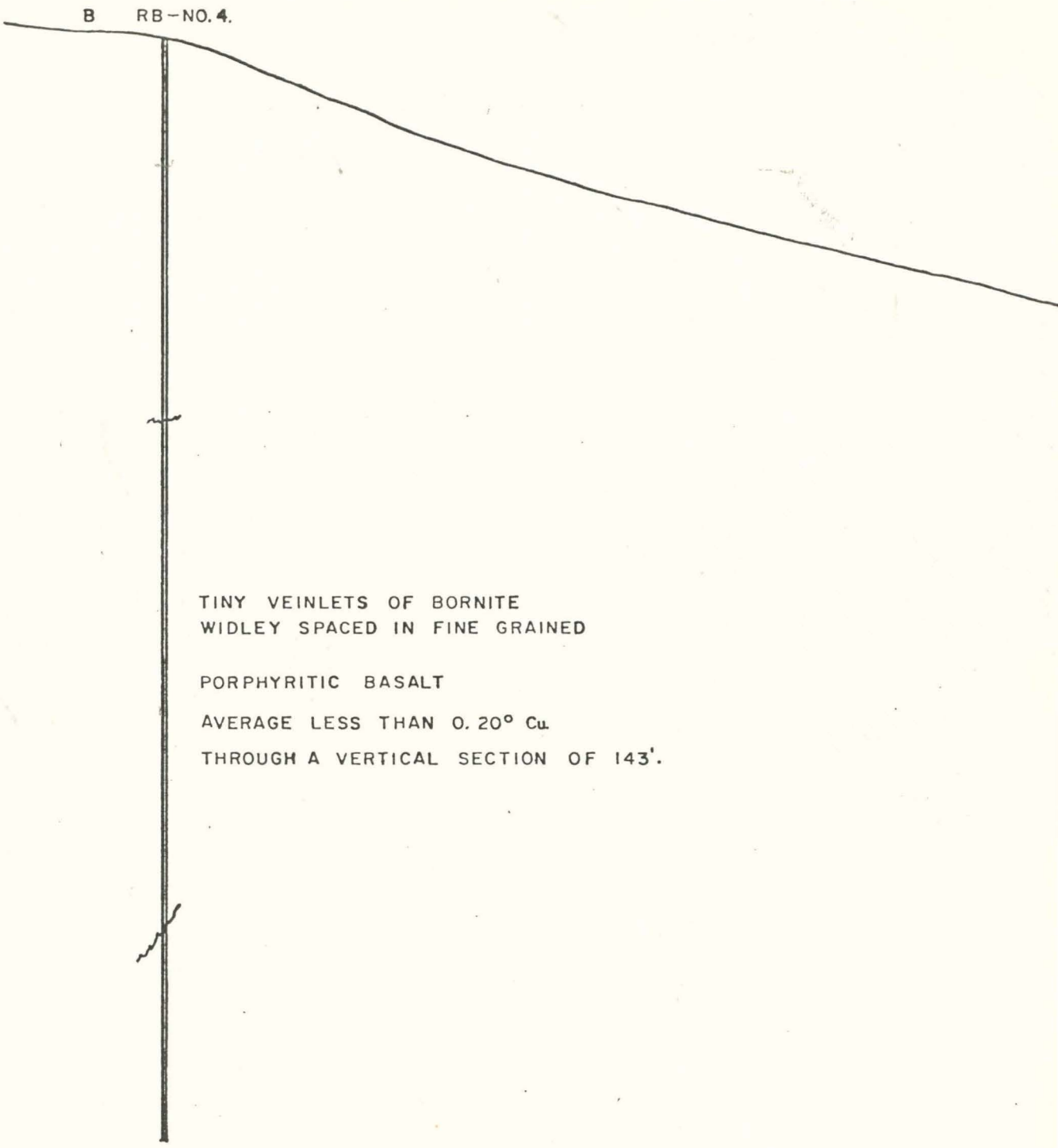
Total Depth: 142'

Recovery: 27 - 142' 95%

Collar Elevation: 2824'

Summary: Copper mineralization less than 0.2% Cu. Hole drilled in porphyritic andesite.

0 - 27'	Sludge - altered porphyritic andesite.
27 - 142'	Andesite. A series of fine-grained light-grey green andesi zones interfingered with a porphyritic rock consisting of 20 - 30% phenocrysts consisting of feldspar and a semi-rounded white mineral. In outcrop the rounded feldspar stands out in relief of the ground mass. Very minor veinle of bornite where observed. The rock is tight. Some fracturing contained minor pyrite.



TINY VEINLETS OF BORNITE
WIDLEY SPACED IN FINE GRAINED

PORPHYRITIC BASALT

AVERAGE LESS THAN 0.20° Cu.

THROUGH A VERTICAL SECTION OF 143'.

BOLIVAR COPPER
COOS COUNTY, OREGON

SCALE: 1" = 20'

ASSOCIATED GEOLOGISTS - DRILL LOG

Project: Bolivar Copper

Hole No.: RB5

Hole Diameter: NX

Contractor: Fran-Berg Drilling Co.
Hood River, Oregon

Date Started: 8/30/74

Coordinates: 200', S42°E OMEX No. 10

Date Finished: 9/5/74

Bearing:

Reason Stopped: Target drilled

Inclination: Vertical

Casing: 70'

Total Depth: 154'

Recovery: 0 - 73' 20%
73 - 154' 95+%

Collar Elevation: 2808'

Summary: Hole collared in med.-grained porphyritic diorite?
104 - 114' = 3.74% Cu in chloritic basalt-bornite and chalcopyrite bands 4 - 6" wide.
114 - 122' = 1.39% Cu. Sheared chloritic basalt with both bands and disseminated chalcopyrite.

0 - 70'	Sludge. Very altered light-colored porphyritic rock. Feldspar crystals up to 1/4" long. Minor quartz phenocrysts. Fault gouge - water return good - zone incompetent.
73'	Fine-grained altered volcanic - fractured - contact angle not determined.
74 - 104'	Interfingering of porphyritic dark grey volcanic with fine-grained light-grey andesite. No visible copper sulfides.
104 - 114'	Chloritic basalt. Dark green highly sheared, non-porphyritic containing bands of bornite and chalcopyrite 6" wide and numerous small bands.
114 - 122'	As above. More chalcopyrite present in the ore.
122 - 154'	Rock becomes less sheared. Chloritic volcanics interfingered with fine-grained light-grey green andesite. No visible sulfides.

INDEX TO SAMPLE PROGRAM, BOLIVAR COPPER, COOS COUNTY, OREGON

Sample No.	Location	From - To	Type of Sample	Assay Value Cu %	Zn %
3101	RB#1-A	52 - 57	SP-C	0.012	
3102	"	57 - 61	SP-C	0.012	
3103	"	61 - 66	SP-C	1.021	
3104	"	66 - 71	SP-C	0.069	
3052	"	71 - 76	SP-C	none	
3053	"	76 - 81	SP-C	none	
3054	"	81 - 87	SP-C	0.012	
3055	"	87 - 92	SP-C	none	
3056	"	92 - 97	SP-C	none	
3057	"	97 - 101	SP-C	none	
3105	"	0 - 5	Sludge	0.069	
3106	"	5 - 10	"	0.069	
3107	"	10 - 15	"	0.081	
3108	"	15 - 20	"	0.075	
3083	"	20 - 30	"	0.012	
3084	"	30 - 40	"	0.018	
3085	"	40 - 50	"	0.018	
3109	RB#1-C	55 - 56	SP-C	0.554	
3110	"	63 - 65	SP-C	0.037	
3111	"	73 - 78	SP-C	0.718	0.60
3112	"	78 - 83	SP-C	0.018	tr
3147	"	56 - 63	SP-C	0.006	
3148	"	65 - 73	SP-C	0.056	
3149	"	82 - 87	SP-C	0.006	
3150	"	87 - 92	SP-C	0.006	
3051	"	92 - 100	SP-C	none	
3086	"	0 - 10	Sludge	0.669	
3087	"	10 - 20	"	1.065	
3088	"	20 - 30	"	0.895	
3089	"	40 - 50	"	0.599	
3113	RB#2	0 - 16	SP-C	0.195	
3116	"	16 - 27	SP-C	0.119	0.8
3117	"	27 - 37	SP-C	0.774	0.4
3118	"	37 - 47	SP-C	2.808	0.6
3119	"	47 - 57	SP-C	0.809	0.1
3114	"	0 - 10	Sludge	0.585	
3115	"	10 - 20	Sludge	0.352	
3120	RB#3	39 - 45	SP-C	0.050	tr
3121	"	52 - 53	SP-C	0.819	none
3122	"	58 - 64	SP-C	1.411	tr
3123	"	102 - 111	SP-C	0.081	0.1
3124	"	111 - 117	SP-C	2.066	0.2
3135	"	45 - 52	SP-C	0.176	

Index to Sample Program, Bolivar Copper
Page 2.

Sample No.	Location	From - To	Type of Sample	Assay Value Cu %	Zn %
3136	RB#3	53 - 58	SP-C	0.157	
3137	"	64 - 69	SP-C	0.132	
3138	"	69 - 74	SP-C	0.012	
3139	"	74 - 79	SP-C	0.025	
3140	"	79 - 83	SP-C	0.012	
3141	"	85 - 88	SP-C	0.025	
3142	"	88 - 93	SP-C	0.018	
3143	"	93 - 98	SP-C	0.018	
3144	"	98 - 102	SP-C	0.018	
3145	"	117 - 122	SP-C	0.044	
3146	"	122 - 130	SP-C	0.018	
3090	"	0 - 20	Sludge	0.252	
3091	"	20 - 30	"	0.119	
3092	"	30 - 35	"	0.189	
3125	RB#4	0 - 10	Sludge	0.012	none
3126	"	10 - 20	"	0.006	none
3093	"	20 - 30	"	0.006	
3058	"	27 - 32	SP-C	none	
3059	"	32 - 37	SP-C	none	
3060	"	37 - 41	SP-C	0.088	
3061	"	41 - 50	SP-C	0.050	
3127	"	50 - 55	SP-C	0.365	tr
3062	"	55 - 60	SP-C	0.018	
3128	"	60 - 65	SP-C	0.138	none
3129	"	65 - 70	SP-C	0.270	none
3130	"	70 - 75	SP-C	0.151	none
3131	"	75 - 80	SP-C	0.100	none
3063	"	81 - 88	SP-C	0.025	
3064	"	88 - 93	SP-C	0.138	
3065	"	93 - 98	SP-C	0.113	
3066	"	98 - 103	SP-C	0.163	
3067	"	103 - 111	SP-C	0.037	
3068		118 - 123	SP-C	0.006	
3069	"	123 - 128	SP-C	0.069	
3070	"	128 - 133	SP-C	0.050	
3071	"	133 - 137	SP-C	0.018	
3072	"	137 - 142	SP-C	0.012	
3094	RB#5	0 - 10	Sludge	0.006	
3095	"	10 - 20	"	none	
3096	"	20 - 30	"	0.012	
3097	"	30 - 40	"	none	
3098	"	40 - 50	"	--	
3099	"	50 - 60	"	0.006	
	"	60 - 70	Missing		
3100	"	70 - 85	Sludge	0.006	
3073	"	86 - 91	SP-C	0.025	
3074	"	91 - 96	SP-C	0.006	
3075	"	96 - 101	SP-C	0.012	

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Page 3.

Sample No.	Location	From - To	Type of Sample	Assay Value Cu %	Assay Value Zn %
3076	RB#5	101 - 104	SP-C	0.012	
3133	"	104 - 114	SP-C	3.744	0.2
3134	"	114 - 122	SP-C	1.391	0.9
3077	"	122 - 127	SP-C	0.069	
3078	"	127 - 132	SP-C	none	
3079	"	132 - 137	SP-C	0.012	
3080	"	132 - 142	SP-C	0.107	
3081	"	142 - 147	SP-C	0.012	
T.D. 3082	"	147 - 154	SP-C	0.025	