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REPORT ON THE COLOSSUS MINE OF <sup>92K</sup>  
ALQUIN MINES LTD., N.P.L.,  
AT FREDERICK ARM, VANCOUVER  
MINING DIVISION OF B. C.

Oct. 21/66. J.P. Elwell, P.Eng.

TABLE OF CONTENTS

	<u>PAGE</u>
INTRODUCTION .....	1
LOCATION AND ACCESS .....	1
TOPOGRAPHY, CLIMATE, WATER, ETC. ....	2
PROPERTIES .....	2
EARLY HISTORY OF THE PROPERTY .....	3
GENERAL GEOLOGY .....	6
PLANT AND EQUIPMENT .....	7
EXPLORATION .....	8
SUMMARY AND CONCLUSIONS .....	9
RECOMMENDATIONS .....	10
ESTIMATE OF COSTS .....	11

MAPS

Location Map of Colossus Mine  
Claim Group.

Layout of Diamond Drill Holes,  
#2 Level.

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INTRODUCTION

This report covers a description of the Colossus Mine property of Alquin Mines Ltd., N.P.L., and summarizes the exploration work done by the company on the property to date, with recommendations for future work.

The writer made the initial examination of the property on April 27th and 28th, 1966, and a subsequent visit was made September 11th, 1966, and also on October 9, 1966.

LOCATION AND ACCESS

The Colossus mine is located on the mainland coast at the head of Frederick Arm, about 33 air miles from Campbell River, B. C.

The mine workings are on Buker Creek, at an elevation of about 1300 feet above sea level. Buker Creek flows south into Estero Basin which is connected to Frederick Arm by a narrow gap. The direct distance from the head of Frederick Arm to the mine workings would be about 3.2 miles.

At the time of the initial examination the mine was only accessible by helicopter from Campbell River, but since then, the company has completed the road into the mine from the existing logging road leading from the wharf at the head of Frederick Arm. This has made the property easily accessible by float plane and vehicle from Frederick Arm, and heavy equipment and supplies can be

brought in by barge from Campbell River or other coastal ports.

#### TOPOGRAPHY, CLIMATE, WATER, ETC.

The topography of the property from the water to the mine is a generally even slope of about 20 per cent, cut by shallow ravines up to an altitude of about 1500 feet. Above this level, the terrain is more rugged, rising in a series of steep escarpments and cliffs.

The climate is that of the Lower Mainland. At the elevation of the mine some snow can be expected in winter, but it should not be heavy enough to impede operations.

The creeks running down the ravines carry ample water during the spring run-off, but it is felt that a permanent year-round source of water will depend on the small lakes about half a mile below the mine which are fed by the creeks and which could have their storage capacity increased by damming the outlets.

There is sample timber on the property in the form of mature fir, hemlock and cedar.

#### PROPERTIES

The properties of Alquin Mines Ltd., consist of four Crown Granted claims, plus twenty-five claims and three fractional claims held by location, all in the Vancouver Mining Division. The names and record numbers of the claims are as follows:



<u>Name</u>	<u>Record No.</u>
Colossus C. G.	L.256
Bluebell C. G.	L.258
Portage C. G.	L.259
Champness Fr. C. G.	L.260
Lou #1 Fr. and Lou #2 Fr.	11603 & 11604
Lou #3 to Lou #16, incl.	11605 to 11618, incl.
Lou #17 Fr.	11619
Lou #18 to Lou #23, incl.	11620 to 11625, incl.
Lou #25 to Lou #29, incl.	11626 to 11630, incl.

A location plan accompanies this report.

#### EARLY HISTORY OF THE PROPERTY

There are a number of mentions of the Colossus mine in the B. C. Minister of Mines reports from 1902 to 1929 and the following history of the property has been summarized from these accounts.

The property dates from 1899, and in 1902 there is an account of underground development work being done by the B. C. Exploration Co. of London, England. Three levels with connecting raises were driven, and it would appear that practically all the present existing workings were completed during this period.

In 1929 the property was controlled by the Colossus Copper Co. of Vancouver, B. C. In the B. C. Minister of Mines report for 1929 there is a fairly complete description of the mine, and the principal part of this account is quoted below:

"The old Colossus group was first worked in 1899 and altogether some 3,000 feet of underground work had been done when acquired by the present company. The work consists of three adit-tunnels at 1,300 feet, 1,460 feet, and 1,550 feet elevations respectively; raises between the different levels; and an intermediate level between No. 2 and No. 3 levels. The two upper levels are in the ore-zone, but the No. 3 or lowest level did not intersect the ore-body,

as it was cut off by a flat fault a short distance above the tunnel, but there should be no difficulty in locating it on this level.

This underground work shows a shear-zone in the granodiorite in which were many diorite dykes. The shearing action has created a broken-up belt, up to 40 to 50 feet wide, of granodiorite and dykes, the latter displaced in all directions. This was later impregnated with siliceous mineral-bearing solutions, which also infiltrated into the granite and diorite in the zone, as well as along the borders of the "vein." The crushed material in the zones has naturally caused an irregular mineralization, making conclusive sampling rather difficult.

The chief mineral is chalcopyrite carrying very little gold or silver. In some sections of the zone there are indications of molybdenite which as yet cannot be considered other than a possible value. A great number of samples have been taken, resulting in averages of from 1.5 to 3.5 per cent copper. It has been found in sampling that during the many years the property has been opened up there has been a leaching action on the exposed ore, forming a coating which, when included in sampling, gave a lower average than if this outside coating were removed and deeper sampling done.

The No. 1 or top tunnel starts in the mineralized belt and crosscuts it for about 50 feet before entering the solid granite on the north side. East-west drifts in the belt from the main cross-cut prove the extension of the mineralization along its strike for about 100 feet.

The No. 2 tunnel, 80 feet vertically lower, was driven from the surface through the granite to the mineralized belt, in which east-west drifts prove its length for over 200 feet, with a width in

places of 40 feet or more. The extension of the north-east drift on this level runs out of the mineral-belt on the north side, but about 100 feet farther in has encountered another ore-body which may prove important. This is called the "north ore-body" and may be the downward extension of surface exposures in that direction from the main body.

From the No. 2 tunnel a winze was sunk 80 feet, from which depth an intermediate level was driven. The winze follows the ore-body down for 40 feet, where it runs out of it. The intermediate level, a crosscut from the winze, again entered the ore-belt, showing it to be about 20 feet wide. No drifting has been done on the belt on this level. The winze extending down to No. 3 level shows the mineral-belt to be cut off by a rather flat fault. The lowest level has been driven 1,000 feet from the surface well under the ore-body, which, as stated, should be located without difficulty.

So far as opened up, the mineral-belt has been proven for a depth of 340 feet below the surface and about 200 feet in length in No. 2 tunnel. The limits of mineralization have, however, not been reached either east or west in the two upper tunnels and therefore the probabilities of the extension of the ore-bodies have not been exhausted. With the indicated available ore and its probable extension and the average copper content, it is evident that the possibilities warrant extensive development."

In addition to the accounts of the property in the Minister of Mines reports, it has been geologically mapped, sampled and had reports submitted on it on several occasions up to 1947 since the original workings were completed. The reports and maps made available to the writer are as follows:

Report on Lagoon Mine, by James B. Rowley, June 6, 1923.

Report on Colossus Mine by O. B. Smith, M. E.,  
dated Nov. 8, 1924.

Report on Colossus Mine by T. S. Davey,  
dated May 3, 1947.

Geological maps of Colossus Mine by  
A. M. Richmond, M.E., dated May 15, 1947.

In 1960 the property was optioned by Phelps Dodge  
Copper Co. Canada Ltd. The work carried out by this company consisted  
of the cleaning out and rehabilitation of the underground workings  
and the geological mapping of all the levels and surface exposures.  
In addition, a geochemical survey was conducted over parts of the  
claim area. Copies of the geological and geochemical maps have been  
made available to the writer.

#### GENERAL GEOLOGY

The Colossus mine lies within the Coast Range batholith  
of granodiorite cut by a great number of diorite and andesite dykes  
which strike and dip in all directions.

The mineral occurrences lie within a strong shear  
zone which cuts through the granodiorite and dike rocks and has pro-  
duced a shattered zone over 50 feet wide of fragments of granodiorite  
and sections of dyke which have been displaced and contorted. This  
shattered zone has been partially replaced by quartz which carries the  
bulk of the ore minerals present.

As exposed by the three levels developed in the mine,  
the ore-bodies are in the form of irregular shoots which themselves  
show a high degree of fracturing and post mineral fault displacement.  
A major post mineral fault strikes N.60°E and dips 24°N.W. This fault  
is exposed in the intermediate level between #2 and #3 level, and  
appears in #3 level and has effectively cut off the downward extension

of the main ore-body below the intermediate level.

Mineralization consists mainly of pyrite and chalcopyrite with minor amounts of molybdenite and gold-silver values. Malachite and azurite are present as secondary minerals.

#### PLANT AND EQUIPMENT

At the present time the company has on the property a portable air compressor installed outside the #3 level portal with receiver and air line into the #2 level to supply an x-ray diamond drill. A bulldozer-front end loader is used for road maintenance. This equipment is owned or under lease to the company. In addition a new bunk house and office has been constructed near the #3 portal.

#### EXPLORATION

In the original report on the property dated May 2nd, 1966, a three-phase exploration program was outlined to consist of:

- (a) Short-range drilling to prove up the extent and grade of the known mineralized zones.
- (b) Long-range exploration and drilling to locate the downward extension of the mineral zone below the fault.
- (c) Outside exploration to search for orebodies away from the main Colossus workings but within the claim area.

Of the above programs, phase (a) is well under way with drilling being done from the #2 level with an air-powered X-Ray drill. Six holes have been completed to date, and the seventh hole is in progress. The holes are being drilled radially on a

horizontal or flat angle of inclination to delineate the extent and grade of the mineralization within the vicinity of the existing workings.

The details of the holes drilled to date are as follows:

<u>Hole #</u>	<u>Bearing</u>	<u>Inclination</u>	<u>Total Footage</u>
A-2-1	158°30'	-30°	105
A-2-2	175°	0°	67.5
A-2-3	170°	+15°	65
A-2-4	115°	-30°	75
A-2-5	120°	0°	76.5
A-2-6	75°	-30°	drilling
A-2-7	310°	0°	53

The horizontal projections of the completed holes and proposed holes are shown on the plan which accompanies this report.

A visual examination of the cores shows chalcopyrite and molybdenite mineralization in varying amounts as disseminations in both the quartz and adjoining diorite. Assay returns have only been received to date for hole A-2-2 and part of holes A-2-3 and A-2-4. The weighted average of hole A-2-2 over the entire 67.5 feet was 0.89% Cu. and 0.128% MoS<sub>2</sub>. The last 17.5 feet of the hole assayed 0.88% Cu.

Hole A-2-3 averaged 1.10% Cu. with 0.268% MoS<sub>2</sub> over the first 20 feet, and hole A-2-4 averaged 1.34% Cu. and 0.55% MoS<sub>2</sub> over the first 20 feet. When all assay returns are in, it



is anticipated that several of the holes will have to be deepened to cover the full extent of the mineralization.

On completion of the drilling from the #2 level, a similar pattern of holes is planned for the #1 level which will enable the estimation of the probable tonnage and grade of copper-molybdenum mineralization above the fault through a vertical range of about 250 feet.

Phase (c) of the program has also been initiated. A Geomag. survey run over the surface and some of the underground workings resulted in some anomalous trends which may be due to mineralization and deserve further investigation. An S.P. survey is presently being conducted over part of the claim area and it is hoped that correlation of the results of these two surveys will provide targets for outside drill exploration.

#### SUMMARY AND CONCLUSIONS

The Colossus Mine property of Alquin Mines Ltd. is situated near the head of Frederick Arm on the B. C. Mainland coast. Access to the mine is by way of a logging road from a wharf on Frederick Arm for a distance of about 3.5 miles to the lowest adit and camp level which is at an altitude of 1247 feet above sea level.

The mine lies within a wide shear zone in the granodiorites of the Coast Range batholith. The shattered zone within the shear has been partially replaced by quartz. At a later period the zone has been intensely faulted in many directions and is cut

by numerous andesite dikes.

Mineralization consists of pyrite, chalcopyrite and molybdenite carrying minor gold and silver values which occur as disseminations and fracture fillings in the quartz, and also in the adjoining granodiorite. The mineralized zone has been developed by three adits connected by raises over a vertical range of approximately 300 feet. A major flat-dipping fault cuts off the main mineral zone below the intermediate level, and the location of this offset section which is the principal objective of Phase (b) of the exploration program.

Exploration work done to date on the property by the company has consisted of some preliminary geophysical work within the claim area, and diamond drilling from the #2 level to determine the extent and grade of the known mineralized zone. The results obtained to date from this work have been most encouraging, and justify a continuing program as outlined below under "Recommendations".

#### RECOMMENDATIONS

1. Short-range drilling should be continued in #2 level and also in #1 and the intermediate level to provide a complete picture of the known mineral zones as to tonnage and grade. It is estimated that 4,000 feet of drilling should accomplish this.
2. Exploration for the offset section of the zone below the fault should begin immediately. The initial steps would be:
  - (a) A detailed study of the faulting in the mine workings should be made by an experienced geologist to attempt to form a hypothesis to the movement of the ore segment below the fault.




- (b) A deep penetration I.P. survey should be conducted over the surface aimed at locating this offset segment at depth.
3. On the basis of the conclusions reached by the geological studies and I.P. survey, a program of diamond drilling and/or drifting will probably be required to explore the ground where the possible offset body is indicated.
  4. The ore possibilities outside the main mine zone but within the claim block should be explored by further geophysical work to be followed up by diamond drilling as justified.

#### ESTIMATE OF COSTS

The cost of the above outlined program can only be estimated provisionally, as the amount and type of work justified will depend on a frequent appraisal of the program as it advances. For budgeting purposes, however, the following may be used:

1. Short range drilling (say 4000') @ \$6.00 per foot .....	\$ 24,000.00
2. Geological studies and I.P. survey, etc..	6,000.00
3. Long-range drilling (allow 5000') @ \$8.00 per foot .....	40,000.00
4. Drifting and cross-cutting (allow 1000') @ \$50.00 per foot .....	50,000.00
5. Engineering and assaying .....	8,000.00
6. Regional exploration, provisional allow- ance for geophysical work, diamond drilling, etc. ....	12,000.00
7. Administration, travel, etc. ....	8,000.00
TOTAL .....	<u>\$148,000.00</u>

October 21, 1966.

  
J. P. Howell, P. Eng.,  
Consulting Mining Engineer.

CERTIFICATE

I, JAMES PAUL ELWELL, of 4744 Caulfeild Drive, West Vancouver, B. C., do hereby certify that:

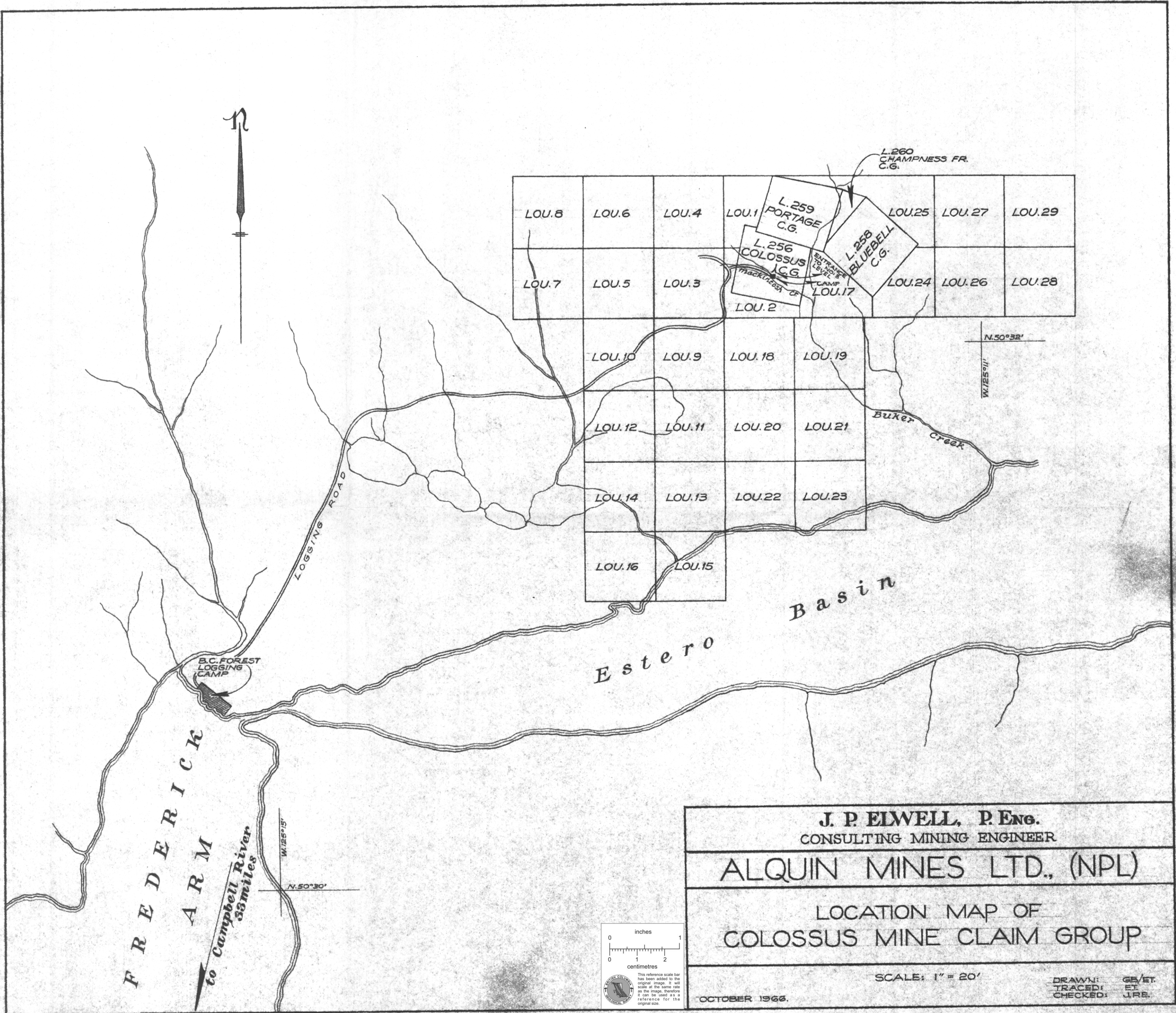
1. I am a Consulting Mining Engineer residing at 4744 Caulfeild Drive, West Vancouver, B. C., and with an office at 929 - 510 West Hastings Street, Vancouver 2, B. C.
2. I am a graduate in Mining Engineering from the University of Alberta in 1940, and am a Registered Professional Engineer in the Province of British Columbia.
3. I have no personal interest, directly or indirectly, in the properties examined or in Alquin Mines Ltd., N.P.L.
4. The findings in this report are based on an assessment of information obtained from various geological reports which have been acknowledged, and from the examination of the property by me on April 27th and 28th, 1966, and during September and October, 1966.

DATED at Vancouver, B. C. the 21st day of October, 1966.

  
JAMES PAUL ELWELL, P. ENG.







LOU.8	LOU.6	LOU.4	LOU.1	L. 259 PORTAGE C.G.	LOU.25	LOU.27	LOU.29	
LOU.7	LOU.5	LOU.3	LOU.2	L. 256 COLOSSUS C.G.	L. 258 BLUEBELL C.G.	LOU.24	LOU.26	LOU.28

LOU.10	LOU.9	LOU.18	LOU.19
LOU.12	LOU.11	LOU.20	LOU.21
LOU.14	LOU.13	LOU.22	LOU.23
LOU.16	LOU.15		

**J. P. ELWELL, P. Eng.**  
CONSULTING MINING ENGINEER

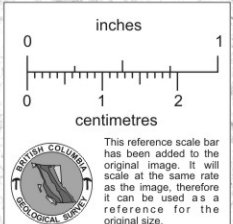
**ALQUIN MINES LTD., (NPL)**

LOCATION MAP OF  
**COLOSSUS MINE CLAIM GROUP**

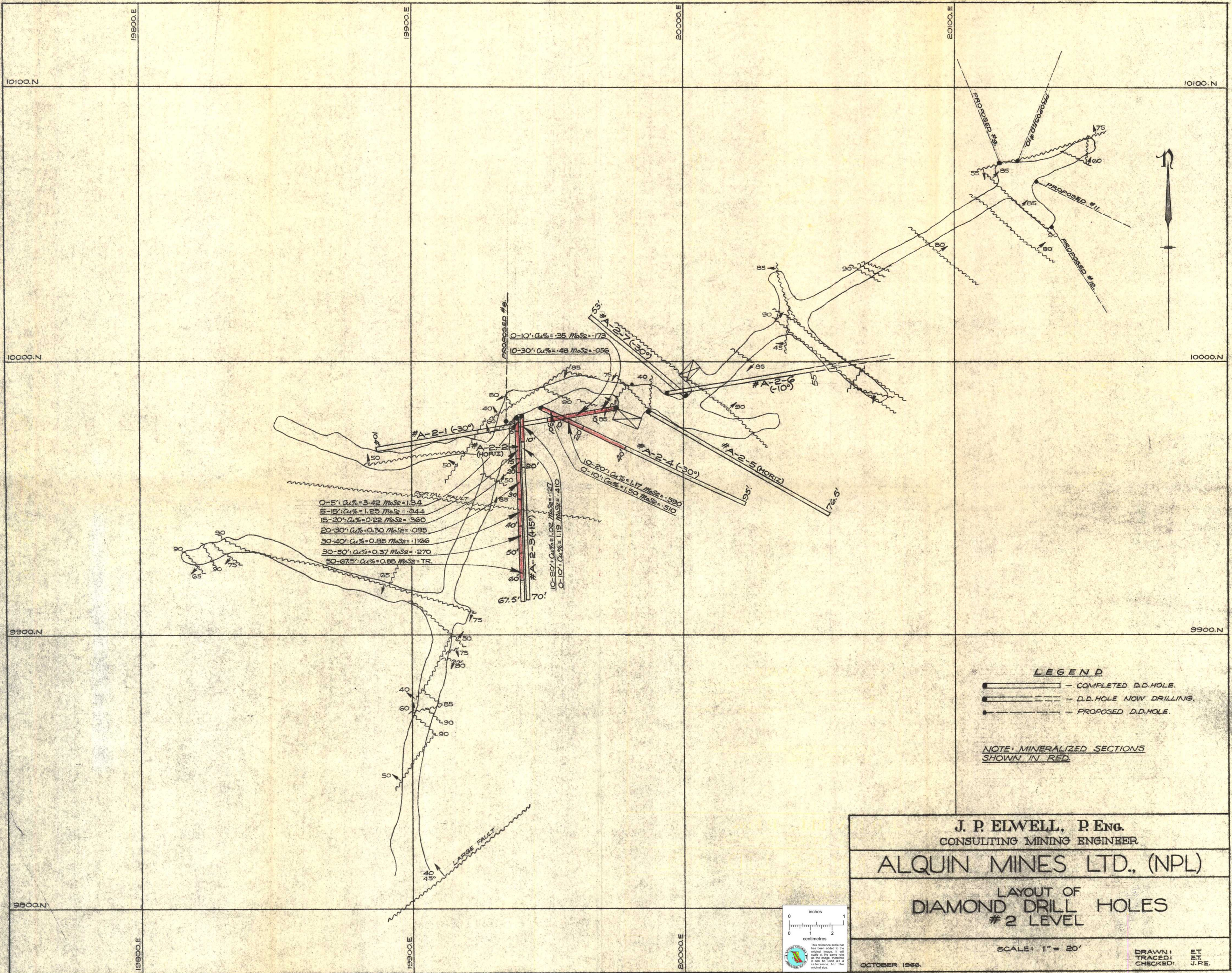
SCALE: 1" = 20'

OCTOBER 1966.

DRAWN: GE/ET  
TRACED: ET  
CHECKED: JRE







MINERALIZED SECTIONS

0-5'	Cu% = 3.42	MoS <sub>2</sub> = 1.34
5-15'	Cu% = 1.25	MoS <sub>2</sub> = 0.44
15-20'	Cu% = 0.22	MoS <sub>2</sub> = 0.60
20-30'	Cu% = 0.30	MoS <sub>2</sub> = 0.95
30-40'	Cu% = 0.85	MoS <sub>2</sub> = 1.166
30-50'	Cu% = 0.37	MoS <sub>2</sub> = 2.70
50-67.5'	Cu% = 0.88	MoS <sub>2</sub> = TR.

- LEGEND**
- COMPLETED D.D. HOLE.
  - - - D.D. HOLE NOW DRILLING.
  - · · · · PROPOSED D.D. HOLE.

NOTE: MINERALIZED SECTIONS SHOWN IN RED.

**J. P. ELWELL, P. Eng.**  
CONSULTING MINING ENGINEER

**ALQUIN MINES LTD., (NPL)**

**LAYOUT OF DIAMOND DRILL HOLES #2 LEVEL**

SCALE: 1" = 20'

OCTOBER 1966.

DRAWN: ET  
TRACED: ET  
CHECKED: J.P.E.

