Preliminary Report - 1971 Work

III. PREVIOUS WORKS.

The SILEURIAN CHIEFTAIN property has been offered to PECHINEY DEVELOPMENT at the beginning of November 1970 and was visited in the second half of the same month.

At this time, the following data regarding this sector were available:

In 1959, two prospectors of ALICE ARM: GUNN FIVA and OSCAR, discovered a mineralized showing of molybdenum on the left side of SUNSHINE CR, tributary on the left side of the ROUNDY CR.

SOUTHWEST POTASH optioned the claims in 1960, carried out 15 m2 of geological survey and 2517' of drilling subdivided into 6 drill holes. Three of these were situated East of the ROUNDY CR., and 3 in the West in close proximity of the showing.

The option was consequently taken up by SILEURIAN CHIEFTAIN, BETHEX in 1966, then again by SILEURIAN CHIEFTAIN company, which carried out the following work: drillings, IP survey, geochemical survey and exploration work.

In November 1970, the following works were carried out:

a) East of ROUNDY CR.

- 28 drill holes totalling approx. 7336' showed reserves of 6.5 to 7 million tons, averaging 0.11 % MoS2 (according to our calculations).

b) West of ROUNDY CR.

- 104 drill holes totalling approx. 16185'.
- 2460' of drifts and cross-cuts and 13 underground drill holes of a total length of 2250' showed 3 mineralized zones.

The principal zone:

It is situated on the right bank of the SUNSHINE CR.

It has been recut by a certain number of drillings showing grades of up to 7,2 % MoS2 and exploration work was started with 2 drifts at the 1050' and 850' level.
The operator states 1.400.000 T of 0,40 % MoS2 in this zone.

.- The SUNSHINE CR zone:

Its outcop is on the left bank of the SUNSHINE CR. Its the original showing. It does not seem to have undergone any extensive exploration work.

.- The upper zone.:

It is situated at approx. 1400' altitude on the left bank of the SUNSHINE CR. It had been studied by 16 drill holes totalling approx. 2080' which showed 39.000 t at 1 % MoS2.

The absence of a plan showing the drill hole locations in relation to the topography does not allow us to determine the shape of the mineralized body.

The general geological survey of the property established by SOUTHWEST POTASH, shows that there is a small volcanic mass of acid granite having intruded the volcanic rocks of the HAZELTON group which it gradually transformed into hornfels at its contact. It has roughly the shape of an ellipse (large axis E-W 2300' long, small axis - 800') and is faulted. It constitutes a block at the East of ROUNDY CR and a principal mass at the West of the latter straddling the SUNSHINE CR. This intrusive is situated approximately 3000' from the limit of the granodioritic batholith Coast Range opposite a dioritic differentiation of that Range.

IV. WORKS CARRIED OUT BY PECHINEY.

The principal aim of the visit of the property in November 1970 was concerned with the underground works of the 850' and 1050' drifts. The observation of the mineralization, the host facies and sometimes high grades, made us feel that there could be a mineralized body of an aplitic-pegmatic composition dipping towards the South. (See report of visit).

Following this visit, we proposed a programme of examination and exploration work and underground drilling amounting to $ 160.000 .

Consecutively when studying the drill logs of the ROUNDY sector, we noticed that certain grades exceeded 0.40 % MoS2 and that the R1 drill hole, drilled in AQ WIRE LINE, showed a grade exceeding 0.20 % MoS2 for nearly 300' with a recovery exceeding 90 %. The other drillings with AX diameter often had a poorer recovery. (lower than 90 %).

Is it not possible that there is an higher average grade than the 0.11 % calculated ?

IV.1. OPTION - PROGRAMME OF WORK CARRIED OUT BY PECHINEY DEV. LTD.

The SILEURIAN CHIEFTAIN property was optioned by Pechiney which committed itself to an expenditure of $ 60.000 prior to June 30. (phase I)

IV.2. WORK CARRIED OUT AS ANTICIPATED IN PHASE I.

The drilling contract was signed with the ARGOSY DRILLING Company. The material arrived at ALICA ARM around April 6. Right from the beginning, the drillers encountered heavy difficulties.

a) In order to reach the 850' drift where the snow did not melt yet, what logically could have been expected at this time of the year; The 1970-1971 winter brought heavy snow (more than 4 times the average amount) and

spring was very late, cold and not rainy (around April 30, it was still snowing at the entrance of the 850' drift.

The access road had to be cleared of 2 to 5' of snow before the underground drill could be installed. (see enclosed photos) Drilling started on April 20, but was frequently interrupted due to compressor breakdowns (HOLMAN 600 cfm). It was completed on June 4.

The drill used was a BOYLES JVA equippéd with a WIRE LINE system.

b) With respect to the surface drillings, the difficulties of the topography and the erosion of the ROUNDY CR which swept the access road away, obliged us to conduct the 2 drillings from the same location. Except for a heavy rising of the water which for a moment constituted a threat to the machine, the drilling advanced at an average rate of 100' per 24 hours, and was completed on the 17th of May. (See photo)

We used a BOYLES 35 A equipped with WIRE LINE as well. Since the drillings were sub-horizontal, the core barrel had to be sent down under water pressure; Only two locking defects occurred.

IV.3. DRILLING RESULTS.

IV.3.1. Surface programme. (see map n° 3)

Two drillings were installed on the same location situated on the right side of the ROUNDY CREEK.

S 71 - 1: length 536', dip -7°, azimuth 113°.

S 71 - 2: length 590', dip -7°, azimuth 145°.

The encountered facies of the two drillings are rather similar with regards to macroscopic determinations. (See log 1 - 2)

- Medium grained biotite granite. (10 % biotite at the most).

- Altered granite: kaolinized feldspar, completely chloritized or entirely disappeared biotite, sericite.
- Fine grained alaskite, saccharoid.
- Diabase: a microgranular type and an aphanitic type.

IV.3.1.1. Fracturing.

The rock is often heavily fractured and the aspect varies according to the intensity of the alteration.

- In the biotite granite, fresh unaltered rock, the fractures are distinct and filled with hyaline quartz. The veinlets are at random and crosscut each other in all directions; their width varies between 1 and 5 mm.
  The veinlet intervals vary from 1 to 20 cm.

- The altered granite is frequently crushed with very heavily argilitized sections. There are fractures with a stylolitic joint aspect. This highly altered granite is sometimes heavily silicified; it then shows fractures in splinters.

- The alaskite is crossed by a small hyaline quartz veinlets and hardly ever shows heavily altered zones.

IV.3.1.2. Hydrothermal alterations.

They are rather spectacular:

- epidotization is scarce.
- Chloritization has been observed to various degrees. There are all kinds of gradation between the fresh biotite and the entirely chloritized biotite.
- Kaolinization is well marked. The feldspar is kaolinized to various degrees and we reach zones which just show a mixture of quartz and argilite grains.

- Sericitization is very important. It occurs as dissemination in the mass, in fine intensive sericite flakes in the fractures where there is a sericite-argilite mixture.
- No potassic feldspar was noticeable with the naked eye.

IV.3.1.3. Mineralizations.

There are sulphides: pyrite, molybdenum, sphalerite.

- Pyrite.

  It exists in cubes disseminated in the mass of the fresh granite and of the alaskite, in powder or in lenses, in veinlets in the altered granite, in lenses in milky quartz veinlets.

- Molybdenum.

  It was observed under several aspects.
  a) In very fine small blebs disseminated along the hyaline quartz fractures.
  b) In fine dissemination and big blebs in the altered granite.
  c) In massive veinlets. (rather few)
  d) As filling of stylolitic joints in the altered granite.
  e) In big blebs in the milky quartz veinlets.

Observations:

We have noticed that the millimetric hyaline quartz veinlets were crossed by milky quartz veinlets of 0,5 to 3 cm width which seem to have brought with them the sphalerite and remobilized the molybdenum and pyrite.

The diabase dykes are not mineralized. They only enclose millimetric veinlets of calcite.

IV.3.1.4. Chemical analysis:

The results of the analysis are as follows:

- S 71 - 2:	average grade for 580'	0,06% Mo.
	from 200' to 590'	0,07% Mo.
- S 71 - 1:	average grade for 520'	0,067% Mo.
	from 21' to 490'	0,086% Mo.

IV.3.1.5. Conclusion of the surface drillings.

The aspect of the fracturing, the presence of hydrothermal alterations, the existence of a constant pyritization and silicification, the presence of molybdenum, all these elements indicate that in the ROUNDY CR zone we have to deal with a mineralization of a porphyry molybdenum type. The average grades on these two drillings, 0.10 and 0.11% MoS2, are very close to the values obtained when calculating the tonnage.

The increase of the recovery percentage of the cores and their bigger diameter did not bring about significant variations in respect of the average grade, what we had hoped.

IV.3.2. Underground drilling programme.

IV.3.2.1. Execution.

The initially anticipated programme called for 11 drillings grouped in fan shape starting from 2 locations at the end of the lower drift (850'). The results obtained during the drilling made us change this programme: the number of drillings were reduced to 9 and the length from 2500' to 2078'.

We carried out the following work: (See map N° 4)

- 2 vertical sections parallel to azimuth 180° comprising respectivelly the drillings:
  71 - 1, 71 - 4, 71 - 6 , and 71 - 7, 71 - 8, 71 - 9.
- 1 vertical section azimuth 215° comprising the drilling: 71 - 2, and 71 - 5 .
- 1 horizontal drilling: 71 - 3.

These sections were supposed to reveal the shape of the hypothetical high grade mineralized body dipping to the south and its downward trend as well as its extension to the west.

These 9 drill holes encountered a rather limited number of facies. (See log n° 3, 4, 5, 6, 7, 8, 9, 10, 11)

- Altered diorite, white greyish rock with quartz, feldspar and sericite. There are hardly any ferromagnesians except chlorite.
- Quartz monzonite with biotite and quartz crystals, often automorphic, globulous and crackéied. We have the feeling that we are dealing with a porphyry. The quartz globules can more or less disappear.
- The biotite in rather fine crystals can be grouped in clusters or in kind of rosettes. This rock is often very hard and very fresh.
- Altered quartz monzonite. The feldspar is kaolinized and the biotite more or less heavily chloritized. The sericite is subordinate, but nearly almost present in fine flakes.
- Alaskite: fine grained saccharoidal mixture of quartz and feldspar with some sericite flakes. Scarcely kaolinized.
- Diabase: we observed at least 2 types: One family of greenish and more or less dark rock where the phenocrysts of feldspar and ferromagnesians are in a paste with no visible texture. The other family has an aphanitic texture. It is a dark rock with cross-fracture , fine grained, ressembling the silex. These last dykes crosscut the preceeding ones. They are certainly the last manifestations of the intrusive phenomenon.
- Hornfels. More or less banded.

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IV.3.2.2. Fracturing.

As well as in ROUNDY CREEK zone the rocks responded differently to the pressure.

The hard rocks were distinctly fractured at intervals of 5 to 20 cm and the fractures have been filled with hyaline or smoky grey quartz. This applies to the quartz monzonite and the alaskite.

The altered rocks seem to have been crushed. (It is also possible that they were altered because they were crushed) Dry fractures with a thin sulphide coating and fractures in stylolitic joints with massive sulphide fillings, are to be found there. The intervals can range from 1 to 5 cm.

The diabase is seldom fractured.

IV.3.2.3. Hydrothermal alterations.

They are the same as the ones observed in the surface drillings: chloritization - kaolinization - sericitization - silicification.

The heavily fractured zones are very rich in a kaolinite - sericite mixture and sericite flakes disseminated in the silicified masses can often be seen.

60'

IV.3.2.4. Mineralization.

There again, the same sulphides as in the ROUNDY CREEK zone - pyrite, molybdenite and sphalerite - are found. They occur in the same cubic shape, fine inclusions, blebs and massive veinlets.

IV.3.2.5. Chemical analysis.

The results of the analysis of the different drill holes are as follow:

Hole	Depth	Grade Mo %	Host rock
1	190'	Between 0,035 and 0,04	No section exceeding 0.09 % Mo.
2	0 - 24 24 - 188	0,03 %	Altered diorite. Not enough mineralization visible by the naked eye to justify an analysis
3	0 - 15	0,02 %	Altered diorite. Same remark as for preceeding one.
4	0 - 70 70 - 195	0,02 %	Unaltered quartz monzonite. Altered diorite. Better section 10' to 0,19 % in a crushed zone.
5	0 - 110 110 - 135 135 - 155 155 - 173	0,02 % 0,04 % 0,02 % 0,06 %	Altered diorite and fresh quartz monzonite. Altered monzonite. Quartz monzonite and altered diorite. Altered diorite.
6	0 - 128 128 - 300 300 - 350	0,035 % 0,01 % 0,000 - 0,01	Altered diorite and quartz monzonite. Fresh and altered quartz monzonite. Alaskite.
7	0 - 15 15 - 40 40 - 70 70 - 120 120 - 175	0,08 0,035 1,93 0,144 0,04	Altered diorite. Quartz monzonite, fresh and altered. Altered diorite. Alaskite. Alaskite.
8	0 - 12 12 - 68 68 - 110	0,84 0,04 0,04	Altered diorite. Fresh quartz monzonite, Alaskite.
9	4 - 28 28 - 90 90 - 215	0,115 0,03 0,01	Altered diorite. Altered diorite. Alaskite.

IV.3.2.6. Conclusion of the underground drilling programme.

IV.3.2.6.1.

The study of the drill cores shows that we are dealing with a rather characteristic mineralization phenomenon. The random fracturing, the hyaline quartz veinlets shifting and crosscutting each other in all direction, the importance of the kaolinization and the sericitization, an often very distinct chloritization of the ferromagnesians, the advanced silicification of certain rock sections, the presence of a disseminated mineralization with pyrite and molybdenite fractures prove the existence of a"molybdenum porphyry phenomenon". The possibility of a pegmatic-aplitic body dipping southwards has therefore to be abandoned.

IV.3.2.6.2.

The study of the drifts shows:

a) The sulphide mineralization is proportional to the fractures and the faults. It is in these heavily tectonized zones where the massive lenses, the altered bands of quartz and molybdenite, the masses of quartz with automorphic molybdenite crystals.occur: during our first visit, these elements made us think of the possibility of a pegmatic-aplitic phenomenon.

There are two families of faults predominant in the underground drilling zone: the N 135 with a dip below 50° which sometimes could have led to thrust and the N 20° faults.
We were also surprised to note that there are numerous subhorizontal fracture planes.

In two areas of the lower drift:
rich crosscut of 1% MoS2 and second drilling location. The tectonic scheme is inextricable and there is massive molybdenite.

b) Problem of the diabase dykes (see map No 5). In the upper drift, we have observed two zones equally rich in dykes: one of them which shows dykes of a rather big width (exceeding 10') is sterile and the other one which comprises a succession of small dykes (1 to 10' wide) is rich in molybdenite. This observation can be made in the lower drift as well and in the underground drillings (very prominent example in drill holes No 71-3 and 71-5).

It seems to me that the fine grained black aphanitic dykes, the most recent ones in comparison to the dark green phenocryst dykes, were very often situated in the neighbourhood of a significant MoS_2 mineralization (except if they are of a very considerable width. see 71-5), and in numerous cases close to a porphyritic quartz monzonite facies.

IV.4. SURFACE PROSPECTING

The geological and geochemical prospecting which we had anticipated to conduct on the west zone of the SUNSHINE intrusion could not be executed because of snow above the 1000' level which had not melted on the 15th of May.

IV.5. GENERAL CONCLUSIONS.

IV.5.1. ROUNDY CREEK - surface programme.

The results of the analysis of the two surface drillings seem to confirm the average grade of 0.10 to 0.12% MoS2 calculated for the whole of the old drillings. These values do not warrant any further exploration work on the ROUNDY zone.

An analysis of the synthesis conducted in establishing a series of drillings on a N 7° level and rising to an approx. altitude of 500' (see map N° 3) seems to indicate that in the ROUNDY CREEK mass there exists an altered granite body apparently richer than the fresh granite, but fractured, which it surrounds (except in the extreme S.E where the grades are higher in the fresh granite and where the alaskite occurs.

The general scheme of the intrusive, the existence of the fracturing, the hydrothermal alterations and the type of mineralization confirm the "porphyry molybdenum" type of the ROUNDY CREEK zone.

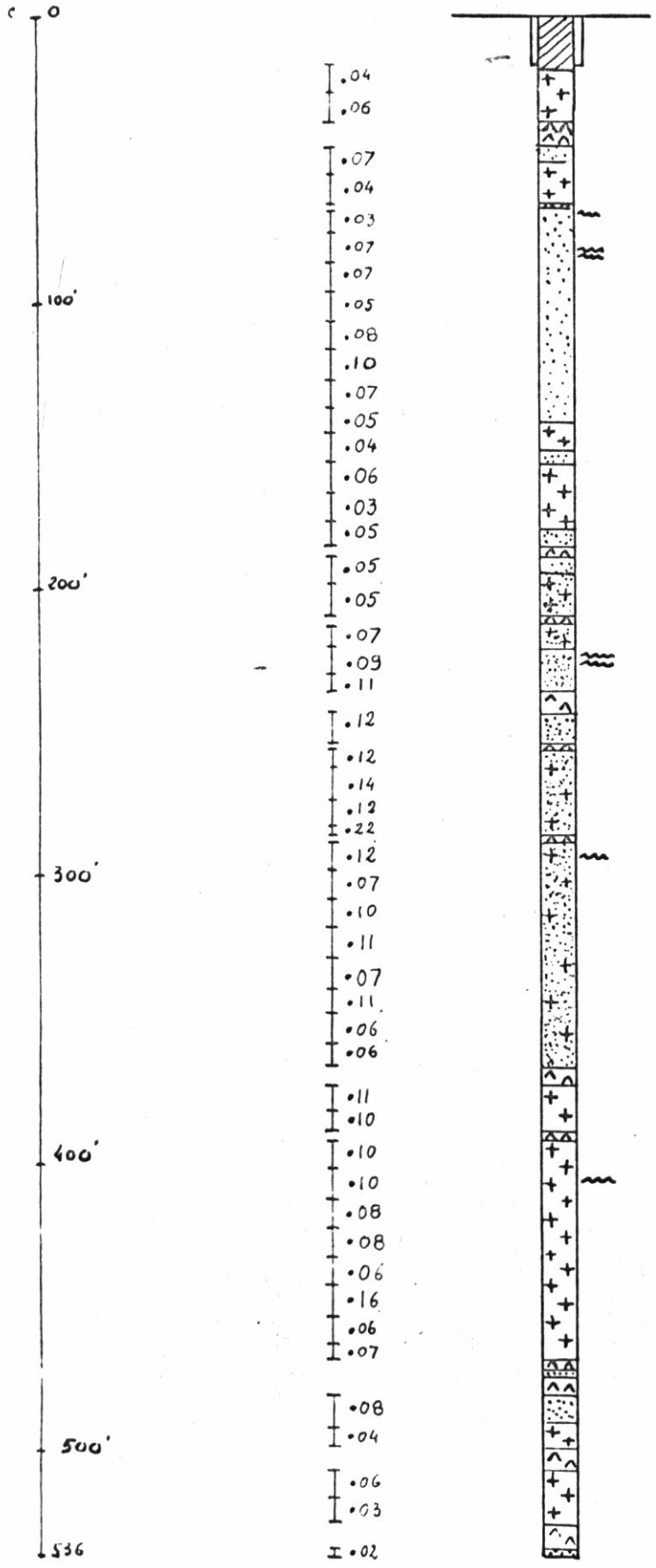
IV.5.2. SUNSHINE CREEK underground programme (See map 6,7, 8,9)

Only drill hole N° 71 - 7 cut a rich mineralized body, that is 30' at 1.93% Mo or 80' at 0.816% Mo which could be considered to be the downward extension of the mineralization encountered in the upper drift.

Unfortunately, it stops very quickly, because it was not found again in drill hole 71 - 8 situated less than 50' below the rich section: this is evidently the result of a tectonic action which is suggested by the presence of numerous accidents encountered in the sector of the second drill site.

But the grades of the ascending drill holes 71-4 and 71-5, of the horizontal drill holes 71-1, 2, 3, 4, and even more of the descending drill holes 71-6 and 9 clearly indicate that the downward and lateral extensions of the high grade mineralized body encountered in the upper drift are very limited and insufficient; it is for this reason that we cannot expect a minimum tonnage of 3 to 5 million tons to allow a profitable underground mining operation.

B. Berthault

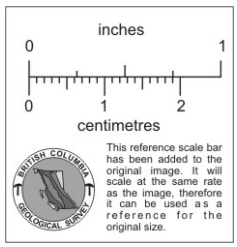


Surface Hole S 71_1

Dip: -6°

Bearing: 113°

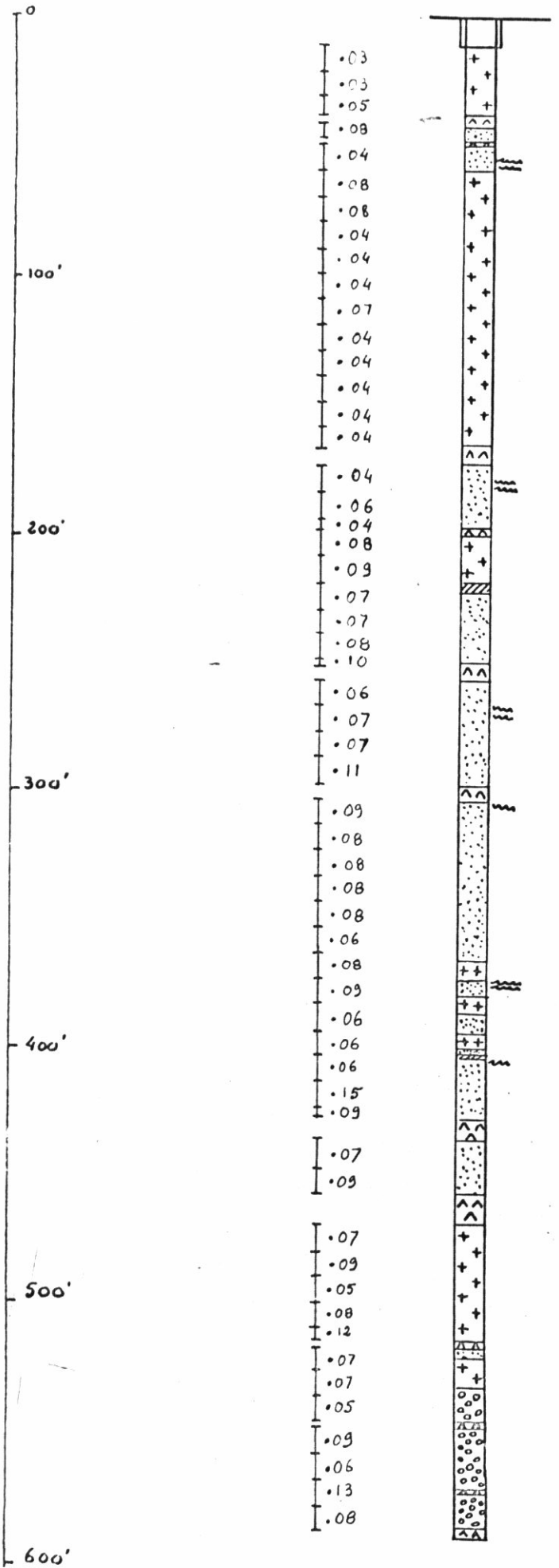
Length: 536'



60'

- Diabase
- Biotitic granite
- Altered granite
- Alaskite
- Breccia
- Crushed zone

Log 1



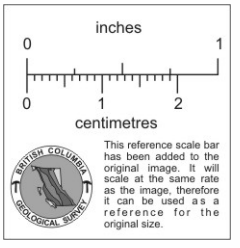
Surface Hole

S 71-2

Dip: -8°

Bearing: 145°

Length: 590'



60'

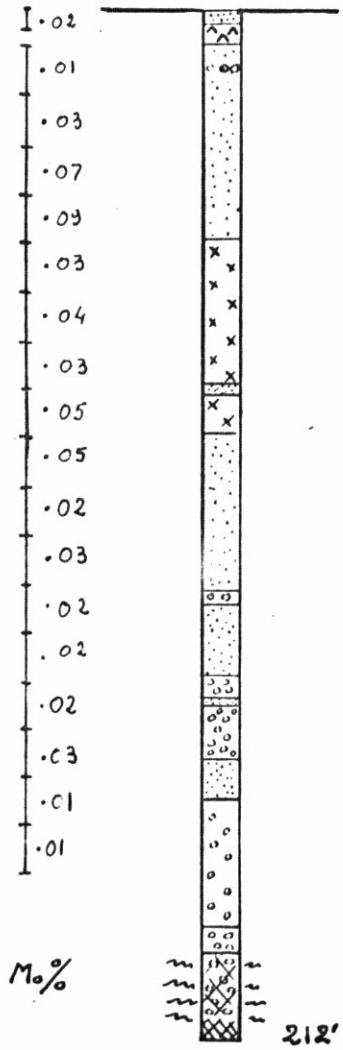
Log 2

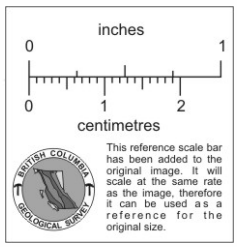
HOLE 71.1 Underground

Horizontal

Bearing 175°

Length 212'





40'

Hornfels

Faulted zone

Altered Quartz Monzonite

Diabase

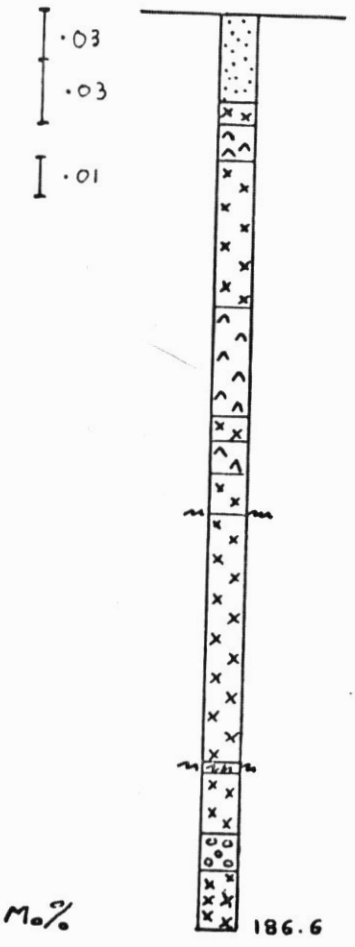
Quartz Monzonite

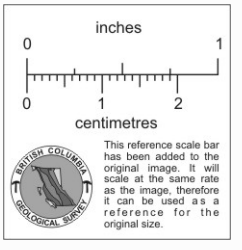
Altered Diorite

Alaskite

Log 3

HOLE 71.2 Underground
Horizontal
Bearing. 215°
Length. 186.5

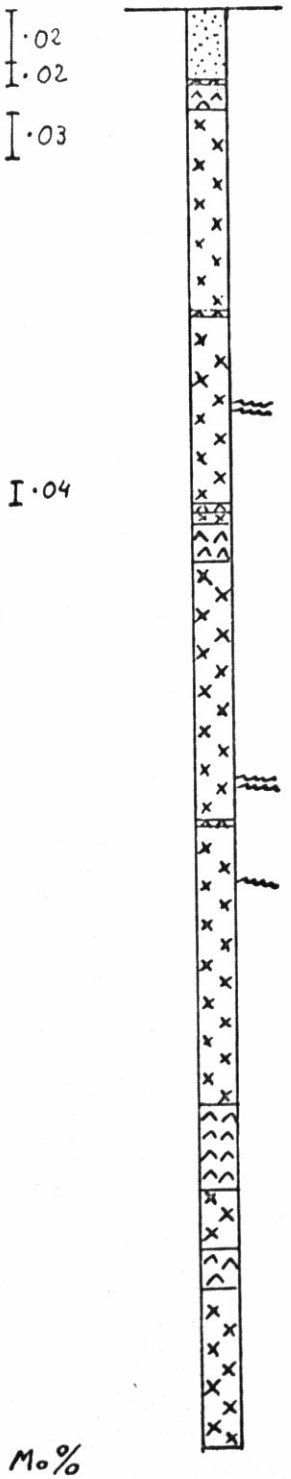


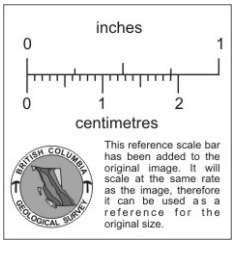


40'

Log 4

HOLE 71.3 Underground
Horizontal
Bearing: 240°
Length: 298'





40'

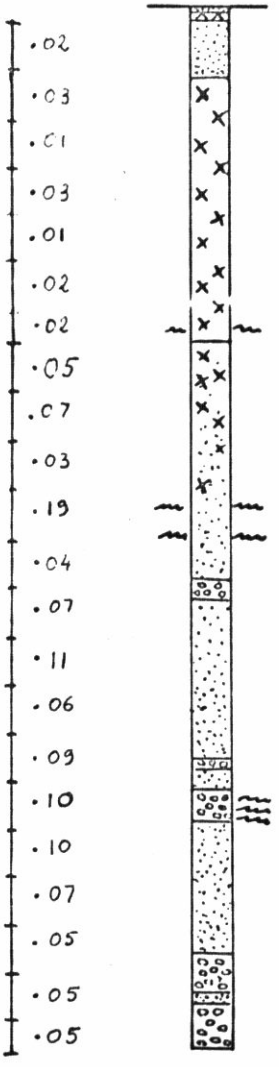
Log 5

HOLE 71-4 Underground

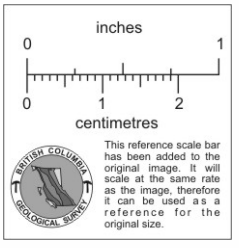
+45°

Bearing 175°

Length 215'



Mo %



40'

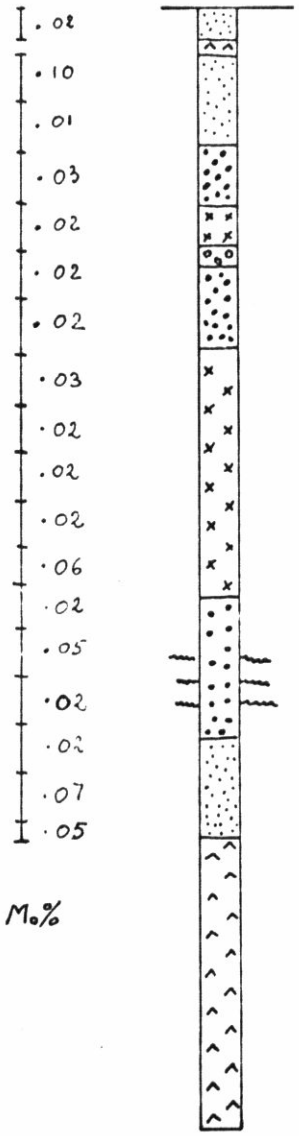
Log 6

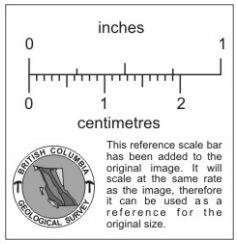
HOLE 71.5 Underground

Dip +45°

Bearing: 215°

Length: 231'





40'

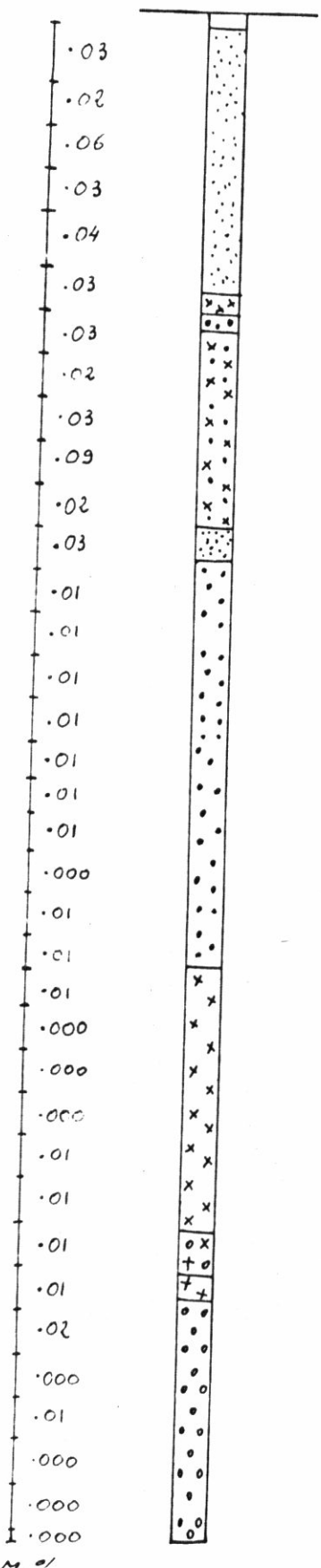
Log 7

Hole 71.6 Underground

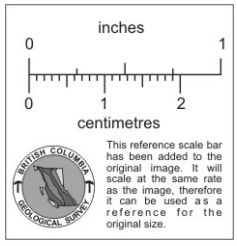
Dip -55°

Bearing: 175°

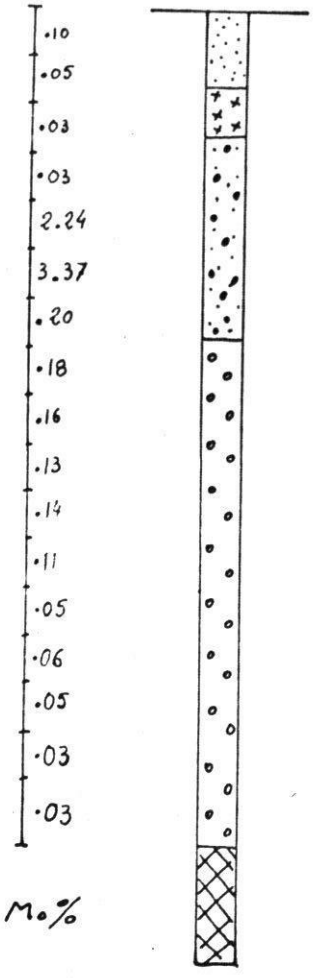
Length: 352'



40'



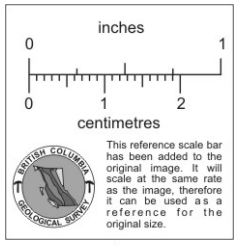
Log 9

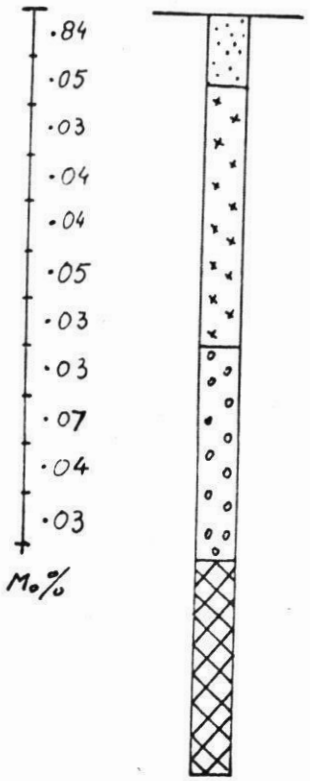


HOLE 71.7

Underground
Dip .+ 45°
Bearing: 165°
Length: 196'

40'





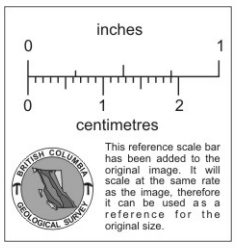
HOLE 71.8 Underground

Dip. Horizontal

Bearing: 165°

Length: 156'

40'



Log 10