

# CANADIAN GEOSCIENCE CORPORATION

809 - 626 WEST PENDER STREET, VANCOUVER, BRITISH COLUMBIA, CANADA V6B 1V9

For personal contact, please dial (604) 687-1022

reference:

## SUMMARY of UNDERGROUND and SURFACE GEOLOGY in the VICINITY of EMANCIPATION MINE

21 JANUARY 1981

AQUARIUS RESOURCES LIMITED

New Westminster Mining District  
Hope, B.C.  
Canada

# CANADIAN GEOSCIENCE CORPORATION

809 - 626 WEST PENDER STREET, VANCOUVER, BRITISH COLUMBIA, CANADA V6B 1V9

For personal contact, please dial (604) 687-1022

reference:.....

January 5, 1981

Dr. K. Warren Geiger, P. Eng.  
President  
Aquarius Resources Ltd  
1002 - 475 Howe St.  
Vancouver, BC

Dear Sir:

Re: Interim report on Emancipation Mine, December 1980.

Following your instructions I have examined and mapped the accessible underground workings of the Emancipation Mine and rock exposures in road cuts above the workings. My accommodation in Hope and transportation and meals out of Hope was provided by Messrs. John Stewart and Dan Cardinal of your organization. Some incidental expenses for transportation and meals enroute to Hope were incurred. Other expenses relate to the preparation of the plans and sections.

The geological information is now being transferred to a set of cross sections to illustrate the relationship between the veins on different levels. These sections will provide a base upon which proposed exploratory drill holes can be laid out to ensure good coverage by the drill program.

The system of cross sections has been designed to cut the major structures of the mine as nearly as possible at right angles so that the sections through the veins will show true dips. A scale of 1 inch to 50 feet is being used to correspond with the surface map. The secondary system is rectilinear and its origin has been placed at a point near the portal of No. 2 tunnel on the road with coordinates 3200N, 10, 600E. The sections are being developed at intervals of 50 feet as measured to the north-west along the reference line from section "O" through the origin up to Section 700 N.W. at the upper end of the road. The reference line bears  $N26^{\circ} 33'54''W$ , this angle being that which has a tangent ratio of 0.5.

CGC

To locate the reference line or individual section lines on the coordinate grid, intersections can be calculated from the equations below which result from the descriptive geometry of the section system.

Equation of Reference Line:  $\text{Lat.} - 2 \text{ Dep.} = 24,400'$

Equation of Section "0 NW":  $2 \text{ Lat} - \text{Dep.} = -4200'$

Equation of Any Section "N NW":  $2 \text{ Lat.} - \text{Dep.} = -4200 + 2.236(N)$

Assay information is not being shown on the sections except where some specific information has been provided. A brief review of the history of the Emancipation Mine as outlined in the annual reports to the Minister of Mines of B.C. indicates almost continuous development from 1915 to about 1938 but there is little information on tonnages or grades of production. From consideration of the volumes of drift and stoped ground in the underground workings material produced has been possibly about 10,000 tons. The substantial waste dump at the No. 2 Portal indicates that only a part of production was considered mill feed.

The 1933 Report provides some interesting but limited information regarding the lower tunnel which is now completely inaccessible due to caving at the portal. This was apparently called No. 4 Tunnel. It is described as 185 ft. below No. 2 Tunnel. During that year it was driven 570 feet with cross cuts at intervals to north and south with the face nearly directly under the ore body in No. 2 winze. The face of the tunnel shows a vein zone of about 11 feet with intercalated country rock and some calcite. The central part is well mineralized with sulphide and chip sample over 8 feet assayed 0.40 oz. per ton in gold and 0.10 ounces per ton in silver. A picked sample from the face assayed 2.12 ounces per ton in gold. At that time ore was being produced from stoping on No. 2 level and this material was being transported to the mill lower down by the aerial tram. The mill operated at 25 tons per day. Operations by Dawson Consolidated Ltd. continued at least to 1938 but no quantities or grades of production are given.

Yours very truly,

CANADIAN GEOSCIENCE CORPORATION

Keith C. Fahrni, P. Eng.  
Vice President

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809 - 626 WEST PENDER STREET, VANCOUVER, BRITISH COLUMBIA, CANADA V6B 1V9

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reference:.....

January 21, 1981

Dr. K. Warren Geiger, P. Eng.,  
President  
Aquarius Resources Ltd.  
1002, 475 Howe Street  
Vancouver, B.C.

Dear Sir:

Re: Proposed drilling, Emancipation Mine, January 21, 1981

This property, held by Aquarius Resources Ltd., is located on the west side of Coquihalla River about 15 miles northeast of Hope in New Westminster M.D. It was examined and mapped by the writer from December 15th to December 18th, 1980. The underground workings, which were immediately accessible, had been recently washed down and a survey had been carried out. The underground maps were provided on a scale of 20 feet to the inch. A surface plan on a scale of 50 feet to the inch was provided as a mapping base to map road cuts above the workings. Mr. Dan Cardinal and Mr. Jon Stewart of Aquarius staff acted as guides. Sampling had been previously carried out, and results were provided.

## SUMMARY

The underground development has been carried out on several levels by drifting on quartz veins. The levels are referred to according to the approximate floor level at the portal. They are briefly described as follows from the upper to the lower levels.

### Level 2725

This drift has followed a major quartz vein which is from 2 feet to 10 feet in width for 340 feet in a North 26 degree West direction. The portal is on the immediate hanging wall, or southwest wall of the vein, which is inclined to the west at from 55 degrees to 65 degrees from the horizontal. Some narrow veins occur above the large vein for the first 50 feet, but the drift swings to the right and follows the larger vein for the rest of its length. The hanging wall or west wall of the vein is andesite and the footwall is bedded argillite with bedding close to the vein in strike, but with a steeper dip, beds being truncated by the vein. The andesite is slightly schistose at its contact with the vein. No assays are available, but apparently previous

operators did not get much encouragement, as no stoping was attempted, although a raise was connected through from below to handle production from the drive.

#### Level 2650

This level had the most development, and it may be the earliest tunnel driven. A description of the exposure before tunnelling began in 1914, which is contained in the 1915 Minister of Mines Report, resembles this level. The present portal is now accessible with difficulty across a steep rock face on the surface. A quartz vein which was exposed about 50 feet from the large vein has been followed for about 560 feet by the drift. Several crosscuts into the hanging wall and footwall rocks were driven. The large vein was explored by crosscuts and limited drifting for about 230 feet, being 6 feet to 10 feet in width with a slope of 65 degrees to the west. Some stoping was carried out on the hanging wall vein above the level for the first 80 feet of the drift. Stopping from below has broken into the floor for about 100 feet from a point 30 feet inside the portal. The drift is conveniently entered through this opening from the drift below. A major vein about 1 foot in width branches from the vein being followed, with an easterly dip and several minor veinlets occur in the footwall side of the drift. A short winze, now partly covered and inaccessible, has been driven down on the reverse dipping vein which is at 68 degree slope, but it was not accessible for mapping. A crosscut into the footwall nearby intersected the reverse dipping vein and the large vein, but it could not be entered without clearing away backfilled muck. Six raises were started, to follow the vein upward from the drift, but while the vein persisted to the faces, widths were narrow and no stoping was done from the raises. The hanging wall of the main drift is andesite at the start, but from 180 feet to 420 feet, it is serpentine. At that point a transverse fault brings in andesite which is proven by a crosscut to extend for at least 120 feet to the west. The vein of the main drift gradually approaches the large vein and shows some increased width and gold values at Section 500 NW. Gold values occur throughout the first 250 feet of the drift. The rock between the drift and the large vein is fractured andesite and the large vein marks the contact with the argillites which lie at a steeper slope than the vein, and are truncated by it.

#### Level 2620

This drift started near the outcrop of the large vein, and was driven toward the hanging wall vein through factured andesite. It was continued for 130 feet until it encountered the vein which had flattened in dip and was there enclosed in serpentine on both sides. A branch was made which picked up the vein in about 100 feet after meeting several reverse dipping

and flat dipping veinlets which must have been mineralized as a section of about 100 feet of the roof, was stoped from Section 100 NW to 200 NW. The drift followed the vein to 360 feet NW with scattered good gold assays in the vein and in the fractured andesite of the footwall. The hanging wall is serpentine. No crosscuts test the large vein at this level.

#### Level 2597

At Cross Section 250 NW in Level 2620 tunnel, an incline was driven at a downward slope of about 20 degrees to follow down the intersection of the main reverse vein with the hanging wall vein. A short drift followed back along the reverse vein, and this section was stoped out. The main hanging wall vein flattens and thins out. It is enclosed on both sides with serpentine. A vertical raise from a lower drift occurs near the bottom of the incline. It is open, but timbering and ladders are rotten, and it was not entered. ~~JK~~

#### Level 2440

This drift is reported to be caved at the portal and the portal site was not visited. Drainage from Level 2597 and a draught suggests that caving is not extensive. Descriptions of good gold grade at that elevation in an 11 foot vein in the Minister of Mines Report of 1933 proves interesting, and opening the tunnel might be considered. A 1940's report indicates some good gold values about halfway up the raise to Level 2597. ~~JK~~

#### Roads above Workings

A steep road has been put in above the tunnels. At several points a contact between the andesite of the hanging wall and the argillites was uncovered. There is from 2" to 4" of schist suggesting a fault contact, but there is no quartz. The large vein is exposed some 70 feet to the east at elevation 2890 where it is entirely enclosed in argillites. The vein dip has flattened to about 40 degrees. Some gold is reported in footwall branches. A vein outcrop at about elevation 2950 which is reported to carry visible gold, but which has now been covered by the road construction, lies about 280 feet east of the andesite contact fault. The vein termination is possibly a fault displacement. The offset of a band of thinly-bedded argillite suggests that the vein will be picked up in its displaced position above the road. The road provides access for a drill program to locate the vein and test rocks adjacent to it.

#### GEOLOGICAL CONCEPT

The principal structure which has been identified in the geology is the


contact between the andesites on the southwest and the argillites on the northeast. This contact is evidently a fault contact, since it truncates beds of the argillites. From the lower workings up to about elevation 2750 the large vein follows the line of this fault plane and carries limited and small gold values.


Above 2750, the vein flattens and swings into the argillites with some minor faulting and branching. Gold values are improved. Exposures are limited, so this part of the large vein requires testing by the surface core drilling program.


Below 2750 elevation, a branch vein with a dip to the west of about 45 degrees leaves the 65 degree dipping large vein with a small strike difference, so that the intersection line which is at above the portal of 2725 drift plunges gently to the northwest to occur at the extreme northwest end of Level 2650 drift, giving it a plunge of about 12-1/2 degrees to the northwest.

Near the intersection of the hanging wall vein with the big vein, widths increase and some gold values occur as illustrated at the 2725 portal and at the inner end of Level 2650. This linear zone was not reached by raises driven up from Level 2650.

Within the volcanic rocks of the mine area there appears to be at least one, and possibly several, changes from andesitic, hard, dark, fine-grained rock to soft serpentized volcanics. This change appears to follow an almost horizontal plane. From outcroppings in the road cuts down to about Level 2650, the rock is hard and dark-coloured. At this elevation it changes to greenish serpentized volcanics, except in the wedge between the hanging wall vein and the large vein. In this wedge the floor of the harder volcanic rock is about at Level 2597.

Where the hanging wall vein has two andesite walls, it is narrow and continuous with very low gold values. 

Where the hanging wall vein has serpentized volcanics above it and hard andesite below it, there are good gold values with many branches and reverse dipping veins throughout the zone between the hanging wall vein and the big vein. 

Where the hanging wall vein has serpentized volcanics on both walls, it flattens and thins out to a hair line. I would expect any branch veins which cut into the serpentize volcanics to act in the same way. 

The geological situations in the raise and at level 2440 are not known, but

values reported they may be related to other stratas of more rigid rocks in the serpentinized volcanics which occur below Level 2597.

A limited program of underground core drilling has been designed to explore the portion of fractured volcanics which lies under the serpentine wall between Level 2597, and Level 2650, and test it for gold content. Downward trending holes will verify the position of the floor of the favourable fractured volcanics, and will test the serpentinized volcanics for other layers of harder formation in which gold-bearing vein structures might be found.

## CONCLUSIONS

We have four gold-bearing structures to develop:

1. The upper part of the big vein entirely within the argillites: This presents an excellent target, and we have good drill sites prepared to check it on 100 foot grid spacing by surface drill holes.
2. The wider lense at the junction of the hanging wall vein and the big vein: This linear structure may be too small to present a target for surface drill holes.
3. The fractured lower part of the andesite wedge between the hanging wall vein and the big vein as well as the big vein in that section: The strike convergence of the hanging wall and the big vein, together with the flat floor to the fractured andesite formation, gives this body of rock the slope of a long tapered pyramid on its side with maximum size at the outcrop and a limit somewhere beyond the end of present workings. The hopes for some substantial widths of mineralization are tempered by the apparent limits as to the size of from 60,000 to 70,000 tons.
4. The reports of good assays in the raise below Level 2597 and at Level 2440: The limited drilling proposed may provide information for more detailed follow-up.

The proposed drilling to investigate these structures is shown on geological plans and sections recently prepared. Thirty-two holes total 6,900 feet. Twenty-one holes are planned to be drilled from surface and account for 5,120 feet. The remaining eleven holes, totalling 1,780 feet, are to be drilled from underground stations on 2620 and 2650 levels. Some mining work will be required to obtain access and open these drill stations.

If you have any questions on any of the above, please let me know.

Yours truly,  
CANADIAN GEOSCIENCE CORPORATION

Keith C. Fahrni, P.Eng.  
Vice-President, Geology and Mines



PROPOSED DRILL HOLE ELEMENTS.

SURFACE PAGE 1

Drill Hole No.	DH COLLAR			TARGET			DISTANCE TO TARGET			ELEMENTS OF DH			
	LAT	DEP	ELEV.	SETHW	DIST. NE	ELEV.	HOR.	VERT	INCLINE	BEARING	SLOPE	LENGTH	HOR DIST.
A (1)	3890	10550	3110	650	455	2923	190	187	267	N 63 1/2° E	-45°	360	212
B (1)	3890	10550	3110	650	358	2900	92	210	229	N 63 1/2° E	-67°	280	109
C (1)	3890	10550	3110	650	263	2875	-	235	235	N 63 1/2° E	-90°	280	0
D (2)	3790	10448	3057	650	182	2820	75	237	249	N 18° E	-72 1/2°	360	90
E (2)	3790	10448	3057	650	108	2755	48	302	306	N 48° W	-81°	350	55
F (2)	3790	10448	3057	550	275	2887	154	170	229	N 80° E	-48°	275	184
G (3)	3790	10448	3057	550	195	2845	81	212	227	S 83° E	-69°	275	94
H (2)	3790	10448	3057	550	125	2775	44	282	285	S 22° E	-81°	325	51
I (3)	3723	10550	3030	450	235	2856	62	174	185	S 75° E	-70°	240	82
J (1)	<del>3785</del> 3785	10713	2994	550	458	2933	123	61	137	N 23° E	-26°	200	180
K (1)	<del>3785</del> 3785	10713	2994	550	363	2914	78	80	112	N 27° W	-46°	175	122
L (1)	<del>3785</del> 3785	10713	2994	450	427	2914	65	78	101	N 85° E	-50°	150'	96
M (1)	<del>3785</del> 3785	10713	2994	450	327	2896	43	98	107	S 32° W	-66°	160'	65
TOTAL FOR PAGE											3310		

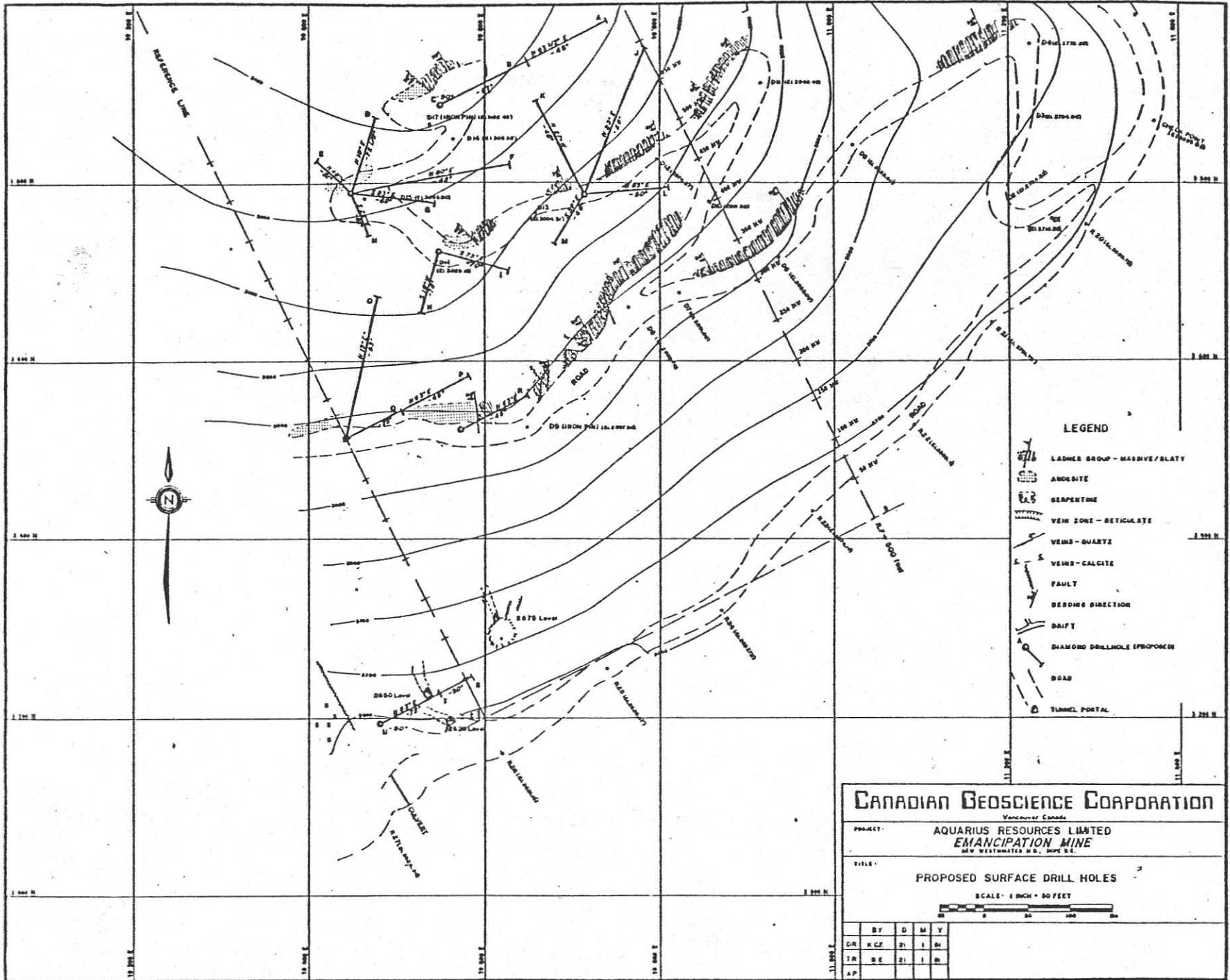
PROPOSED DRILL HOLE ELEMENTS. (SURFACE) PAGE 2.

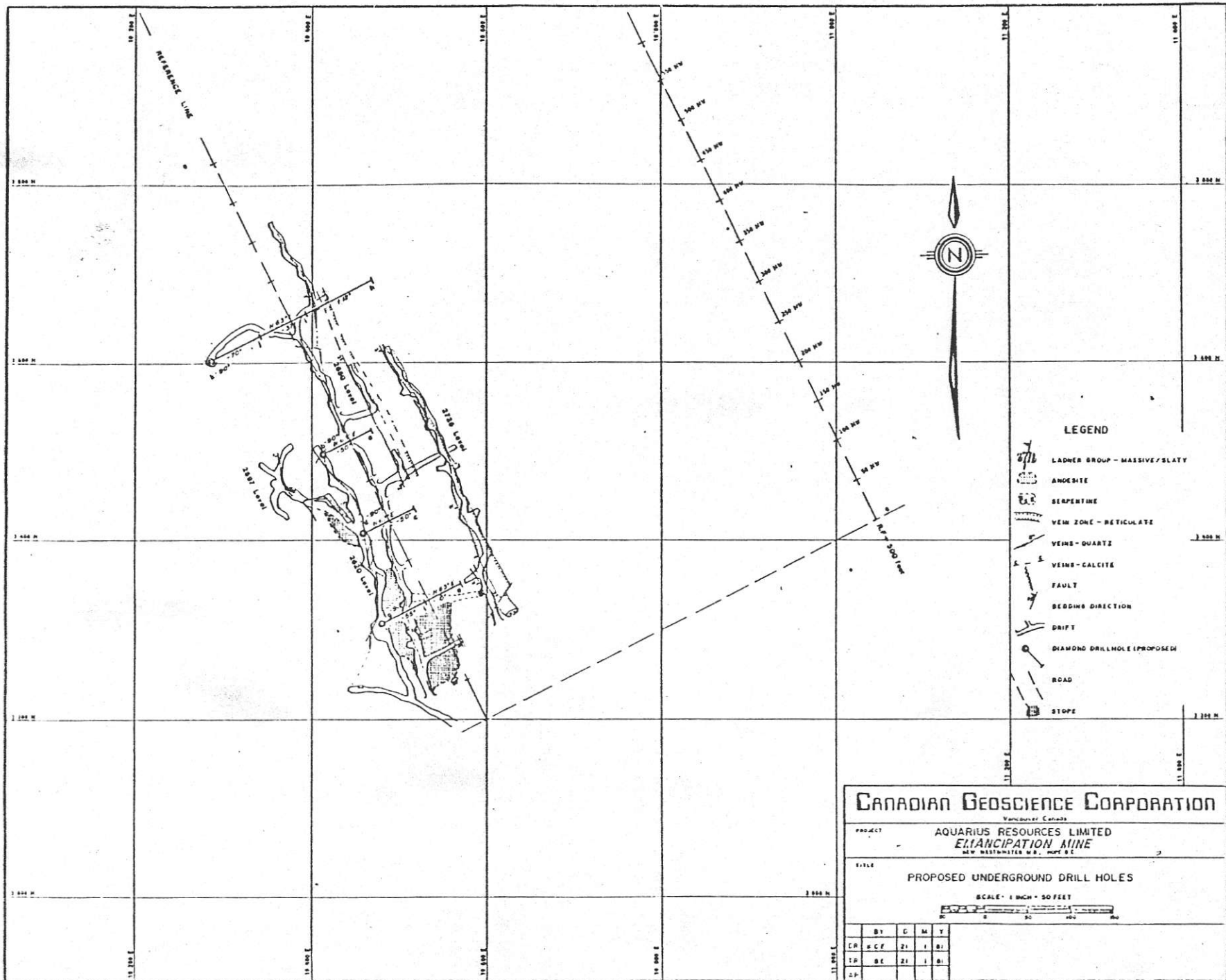
DRILL HOLE No.	DH COLLAR			TARGET			DISTANCE TO TARGET			ELEMENTS OF DH			
	LAT	DEP	ELEV.	SECTION	DIST. NE	ELEV.	HOR.	VERT	INCLINE	BEARING	SLOPE	LENGTH	HOR DIST.
N ③	3723	10350	3030	450	150	2800	157	230	237	S 12° W	-76°	300	73
O ③	3513	10442	2895	450	83	2725	130	170	214	N 13° E	-53°	270	163
P ⑥	3513	10442	2895	350	115	2780	115	115	163	N 63° E	-45°	220	156
Q ③	3513	10442	2895	350	57	2683	57	212	230	N 63° E	-75°	270	70
R ⑥	3522	10573 10473	2890	300	178	2835	58	58	82	N 63° E	-45°	120	85
S ⑦	3195	10480	2640	50	20 SW	2553	75	87	115	N 63° E	-50°	180	116
T ⑦	3195	10480	2640	50	61 SW	2505	55	135	146	N 63° E	-72° -68°	280	75
U ⑧	3195	10480	2640	50	108 SW	2436	0	204	204	N 63° E	-90°	250	0
TOTAL FOR PAGE 2												1810'	
TOTAL FOR PAGE 1												3310	
TOTAL FOR SURFACE												5120 FT	
(120)												1810	

PROPOSED DRILL HOLE ELEMENTS. (UNDERGROUND)

PAGE 3.

Drill Hole No.	DH COLLAR			TARGET			DISTANCE TO TARGET			ELEMENTS OF DH			
	LAT	DEP	ELEV.	SECTION	DIST. NE	ELEV.	HOR.	VERT	INCLINE	BEARING	SLOPE	LENGTH	HOR DIS
a □	3495	10413	2625	350	0	2587	31	38	49	N63E	-50°	100	64
b □	3495	10413	2625	350	31 SW	2528	0	97	97	-	-90°	200	0
c □	3408	10457	2625	250	33 SW	2593	26	32	41	N63E	-50°	100	64
d □	3408	10457	2625	250	33 SW	2543	0	82	82	-	-90°	200	0
e □	3287	10478	2624	150	3	2628	60	0	60	N63E	Hor.	100	100
f □	3287	10478	2624	150	29 SW	2580	30	44	53	N63E	-55	100	57
g □	3287	10478	2624	150	62 SW	2533	0	91	91	-	-90°	200	0
h □	3603	10286	2666	500	67	2700	155	+34	159	N63E	+12°	210	205
i □	3603	10286	2658	500	0	2597	81	-61	101	N63E	-37°	150	120
j □	3603	10286	2658	500	43 SW	2535	45	-123	131	N63E	-70°	180	62
k □	3603	10286	2658	500	82 SW	2466	0	-192	192	N63E	-90°	240	0
TOTAL FOR UNDERGROUND											1780		
TOTAL FOR SURFACE											5120		
TOTAL SURFACE AND UNDERGROUND.											6900	ft	





**CANADIAN GEOSCIENCE CORPORATION**  
Vancouver, Canada

PROJECT: **AQUARIUS RESOURCES LIMITED**  
**ELANÇIPATION MINE**  
NEW WESTMINSTER B.C., SHEET 9-C

TITLE: **PROPOSED UNDERGROUND DRILL HOLES**

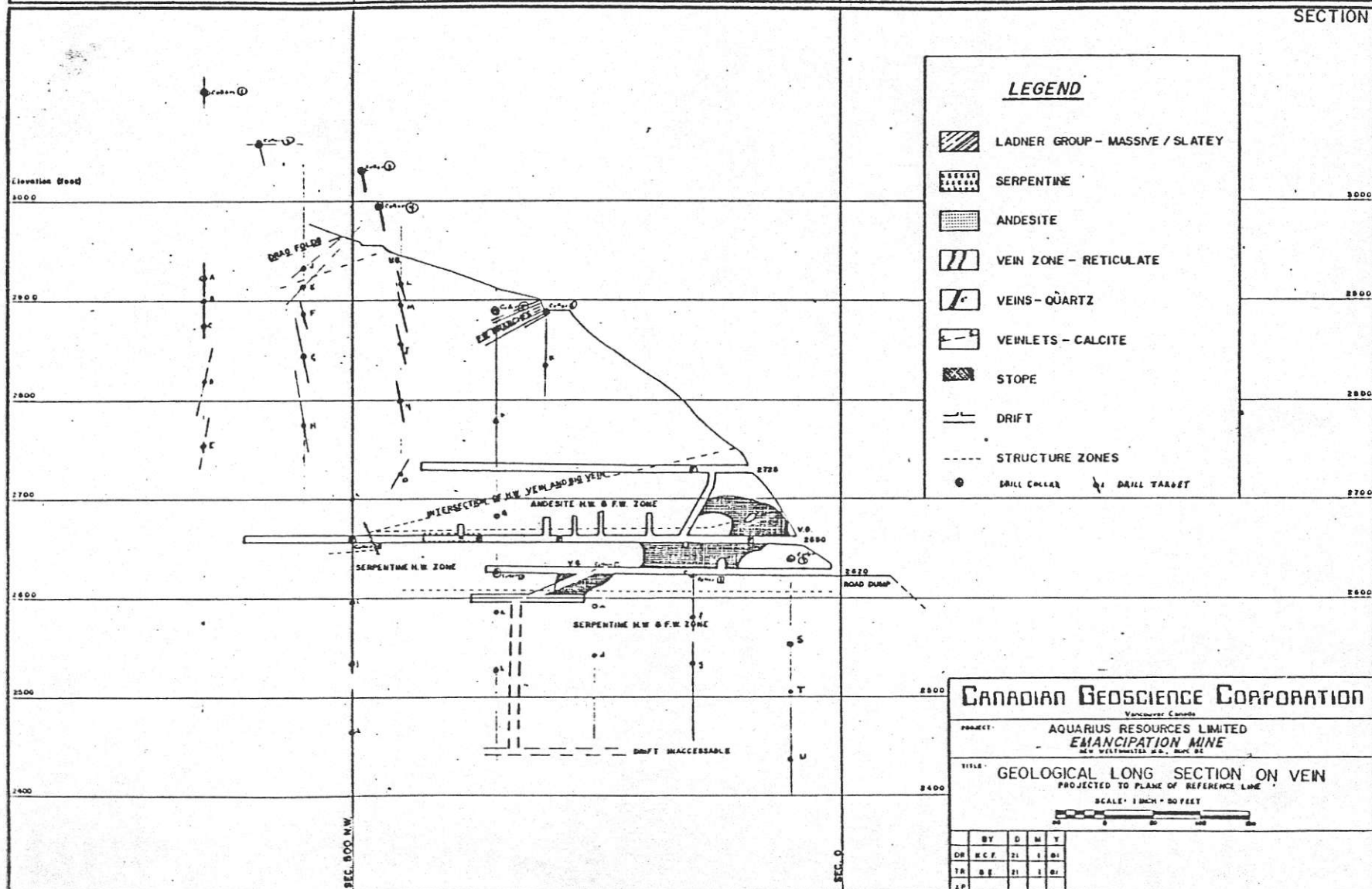
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








PLAN

REFERENCE LINE

SECTION



**LEGEND**

-  LADNER GROUP - MASSIVE / SLATEY
-  SERPENTINE
-  ANDESITE
-  VEIN ZONE - RETICULATE
-  VEINS - QUARTZ
-  VEINLETS - CALCITE
-  STOPE
-  DRIFT
-  STRUCTURE ZONES
-  DRILL COLLAR
-  DRILL TARGET

**CANADIAN GEOSCIENCE CORPORATION**  
Vancouver, Canada

PROJECT: **AQUARIUS RESOURCES LIMITED**  
**EMANCIPATION MINE**  
NEW WESTMINSTER B.C., BRIT. C.

TITLE: **GEOLOGICAL LONG SECTION ON VEIN**  
PROJECTED TO PLANE OF REFERENCE LINE

SCALE: 1 INCH = 50 FEET

BY	D	M	T
DR	KCF	21	1 01
TR	BE	21	1 01
IP			