

**ARCHER. CATHRO**  
AND ASSOCIATES LTD.  
CONSULTING GEOLOGICAL ENGINEERS

CASCA BUILDING, WHITEHORSE, Y.T. 667-4113

BENTALL CENTRE, VANCOUVER, B.C. 688-3022 OR 522-1562

POST OFFICE BOX 1708  
WHITEHORSE, Y.T.

Summary Report

Stage I

Surface Exploration Program

White River Copper Property.

December 1, 1967 - May 31, 1968

United Pemetex Ltd.

R.J.Cathro, P.Eng.

021318

## Index

Summary	page 1
Diamond Drilling	2
Geology	3
Mineralization	7
Structure	7
Other Developments	9
Ore Reserves	11

## Appendix

Drill logs for Holes 1 to 11.

## Maps

Figure 1	Location Plan	1"=500
2	Drill Hole Plan	1"=40'
3	Section of Drill Hole 1	1"=40'
4	Section of Drill Hole 2	1"=40'
5	Section of Drill Hole 3 & 4	1"=40'
6	Section of Drill Hole 5	1"=40'
7	Section of Drill Hole 6	1"=40'
8	Section of Drill Hole 7	1"=40'
9	Section of Drill Hole 8	1"=40'
10	Section of Drill Hole 9	1"=40'
11	Section of Drill Hole 10	1"=40'
12	Section of Drill Hole 11	1"=40'
13	Copper Geochemical Survey	1"=40' (in pocket)
14	Geological Projection to Elevation 2920	1"=40'

Diamond Drilling

Drill hole logs and sections are included with this report. A summary of the first eleven holes is as follows:

<u>Hole</u>	<u>Azimuth</u>	<u>Dip</u>	<u>Overburden</u>	<u>Depth</u>
1	080	-20	9	93
2	069	-45	10	137
3	264	-30	75	94
4	264	-55	55	317
5	104	-25	-	281
6	100	-39	12	195
7	070	-21	15	250
8	070	-38	68	252
9	082	-35	14	411
10	114	-31	15	301
11	089	-28	-	<u>295</u>
Total				2,626

Drilling conditions were quite good. Core recovery averaged over 95% and productivity was about 30 feet per shift. Caving was the main problem, both in overburden and in greenstone, which is often chloritic and shistose. Permafrost extends to considerable depth but was not a problem as long as water circulation was maintained.

GeologyWallrocks

A great deal of valuable information has been gained on the upper Triassic Mush Lake group which is the host rock for the mineralization. Unfortunately no well-defined lithology has emerged and the attitude and structural history of the volcanics, and the relationship between the attitude of the rocks and the mineralization, is still not definitely established. The volcanic sequence resembles closely the Nikolai Greenstone formation at Kennecott, as described by Bateman and McLaughlin (Econ. Geol., January, 1920, pg. 7).

From section line 10,000N towards the north, the favoured interpretation suggests that the rocks strike about due north and dip about  $70^{\circ}$  east. This interpretation (see fig. 14) indicates that some lensing of individual horizons does occur but that some distinct units are traceable for several hundred feet at least. The best example is betweenholes 5 and 11. The apparent thickening and thinning of individual horizons may be due in part to crossfaulting.

Three distinct rock types have been recognized in the field, of which one is further subdivided according to colour. A fourth, very minor, unit may be merely a contact phase of one of the other three. South of section 10,000N a distinct change in lithology occurs.

(a) Porphyritic Andesite

This is the most common rock encountered and it comprises 75% of the core in the first eleven holes. It is usually light greyish green in colour but often has a faint brownish cast, probably due to hematitic alteration. The grain size of the matrix varies from fine to medium and the presence of white to pale green feldspar phenocrysts is diagnostic. These can be as long as 3/4 inch but are usually much smaller. The rock is weakly magnetic and fairly massive, often coring in pieces as long as 5 feet. Tiny dark phenocrysts (pyroxene?) and amygdaloidal texture are locally present. The coarser varieties of this rock look intrusive. In some sections the crystalline habit is somewhat obscured and the phenocrysts appear rounded. This could be due to metamorphism or recrystallization, or to a tuffaceous rather than an extrusive origin. Microscopic study shows that the plagioclase, which is mainly albite, is strongly saussuritized and that the pyroxene is only weakly altered. Chlorite is abundant, both in patches and vesicles and also as a pseudomorph, probably of olivine. Epidote and calcite are also common, particularly along fractures. This rock could possibly be called a basalt, and the finer grained variety, a diabase. It is definitely a flow rock which has been emplaced in sufficient thicknesses to allow slow cooling and, as a consequence, medium crystallinity. This emplacement could either have been in the form of an intruded sill contempor-

aneously with extrusion of flows, or in the form of thick flows which have undergone partial segregation during cooling. If formed under the latter conditions, the flow would be expected to display gradual change in crystal size, colour and texture from the centre towards the margin.

(b) Greenstone

This rock is medium to dark green, fine grained, and has a dense, matted appearance. It is moderately chloritic and usually cores poorly in small foliated pieces. The chlorite is concentrated on small slips to produce a vague schistose texture. The presence of finely disseminated, tiny flakes of native copper is a ubiquitous characteristic. In thin section, this rock proves to be very similar to the porphyritic andesite-plagioclase (more calcic) is also saussuritized, pyroxene is unaltered, a weak porphyritic texture can be discerned. This similarity in composition, texture and alteration is remarkable considering the significant megascopic differences and suggests that greenstone may represent a contact phase of the porphyritic andesite.

(c) Amygdaloid

This term describes a dense, highly altered, contorted amygdaloidal rock. Colour is a variable but highly distinctive feature. It ranges from brick red to reddish

brown to purplish black. wispy reddish, irregular banding is occasionally present, as is a vague (remnant?) porphyritic texture. Vescicles are filled by chlorite, calcite, and zeolites. Brown is the most common colour.

The ground mass is aphanitic and is, again, remarkably similar under the microscope to the porphyritic andesite and the greenstone. Chlorite is common, particularly in the black variety.

(d) Feldspar Porphyry

This unit is not common and may be a phase of one of the main units. It is characterized by an aphanitic, buff coloured ground mass and distinct euhedral phenocrysts up to 1/4 inch long.

All the rocks seen thus far display volcanic, rather than pyroclastic, texture and composition under the microscope. In composition, they are albitized basalts (spilitic basalts). However, since they have been metamorphosed to the greenschist facies, the origin of the albite (and consequently the original composition) is difficult to determine without chemical data. The albite could be a result of post-extrusion metamorphism or original crystallization of a lava, either (a) through co-precipitation with labradorite or more calcium rich plagioclase,

or (b) as a result of deuteric alteration due to residual magma resorbing the initial calcium rich plagioclase, or (c) the action of sea water ( $\text{Na}^+$ ) during the cooling process.

The contact relationships between the various rock units are not very helpful in determining the genetic and structural relationships. Contacts vary from abrupt to gradational

### Mineralization

Except for a very minor amount of chalcopyrite and pyrite associated with occasional calcite veinlets, native copper and chalcocite are the only metallic minerals seen. Both minerals appear to be primary in origin. The deepest mineralized zone found to date is in hole 5, at a depth of 170 feet. Native copper is present both in fracture and replacement zones with chalcocite, and as a disseminated accessory mineral in greenstone. Chalcocite occurs in replacement textures besides filling fractures. Except for the intersection in hole 5, which is in porphyritic andesite, all ore-grade mineralization occurs in black or brown amygdaloid. Chalcocite is more abundant than native copper in all amygdaloid intersections but not in the porphyritic andesite intersection in hole 5.

### Structure

Structural information is inconclusive and several different interpretations are possible. The interpretation

favoured by the writer is that shown on Figure 14 - a generally north strike with a  $70^{\circ}$  east dip.

The possibility cannot be overlooked that the mineralization strikes N50-60E (See previous report dated April 12, 1968), cutting across the trend of the flows. The main argument in favour of this theory is that the intersection in hole 5 was in andesite whereas the others were in amygdaloid.

If this theory is correct, it requires that holes 3, 4 and 8 passed over the discovery zone in overburden, that hole 6 intersected a parallel mineralized zone and stopped as it entered the main zone, and that holes 5 and 7 did not reach the discovery zone.

South of section 10,000N, the mineralization is absent and a distinct change in the lithology occurs. This has been interpreted as due to a major E-W striking fault, whose surface expression would lie in the creek gully on the south edge of the discovery trench. Since the mineralization and stratigraphy did not project from the discovery trench downwards to hole 9, this major fault is assumed to dip north under the trench. Two small faults with right hand displacement have been postulated north of the trench to simplify the interpretation.

Holes 8, 9 and 10 all intersected a strong shear zone with a distinctive hematitic, "ashy" appearance. If the three intersections lie in one plane, they define a structure having an attitude of N30E/87NW. However, the strong, north dipping E-W fault, which is thought to be south of the discovery trench,

would cut across this structure and, thus, the three points may lie on opposite sides of a fault and not all in one plane.

#### Other Developments

Rehabilitation of the main adit late in May showed that it had only been driven a few feet into bedrock and had not reached the main mineralized zone. A narrow mineralized zone was encountered near the end of the adit. The adit had a total length of under 50 feet. The amount of mineralization found at the portal of the adit and scattered downhill is difficult to explain unless a great deal of mineralized float was encountered in the overburden.

The I.P. Survey was inconclusive because it consisted of only three grid lines near the discovery trench. The winter operating conditions made productivity very low and made electrode contact difficult. The readings obtained appear to be valid but are too scanty to allow serious interpretation. Background chargeability values on line 9900N were distinctly lower than on lines 10,000N and 10,300N, suggesting a different rock type, perhaps due to faulting. A high reading was obtained between 200 and 400 west of the base line on this line, west of the collars of holes 9 and 10, which warrants further investigation. Lower maximum values were obtained 100 feet east of the baseline on line 10,300N and 200 feet west of the baseline on 10,100N. Neither reading is related to known mineralization.

Two previously overlooked reports on the White River

have been found which cast a little more light on the early work in the area. The first is a report by T.A. McLean of the Mines Branch, Ottawa, who reported (Publication 222, Lode Mining in the Yukon, 1914, p.204) that late in 1912, some prospectors had brought out a few tons of ore for the purpose of having it sampled at the Tacoma smelter.

The other reference was contained in a private, unpublished report on copper deposits of southeast Alaska, written in 1907 by J.D. Irving, Professor of Economic Geology at Yale University. The only known copy was found in the files of the Division of Mines and Minerals, Dept. of Natural Resources, Fairbanks, Alaska. Twenty claims were in good standing in 1907. The Pemetex deposits, which occurred on the Discovery claim of the Solomon Copper Company, was referred to as the Harris Property. This was the only mineralization seen in the area.

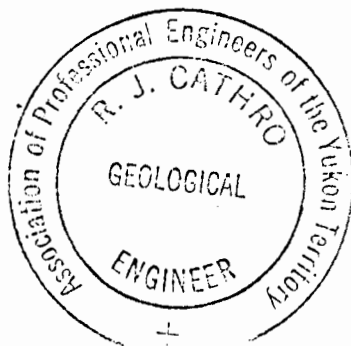
At that time, development consisted of three small open cuts, No. 3 about 25 feet long, 12 feet wide and 7 feet high, another 200 feet south, 10 feet by 6 feet, and a third very small cut a further 42 feet south. Irving classified the host rock as an olivine diabase with occasional porphyritic and amygdaloidal sections. He observed three flat slabs of native copper in the face of cut No. 3, which is situated in the vicinity of drill hole 5. A fourth, larger slab had been removed and was leaning against a tree. This is the same slab now displayed at the Whitehorse Museum. The slabs lay in the joint

planes of the rock, two dipping vertically and the other two 45° north. During the preparation of the drill site for hole 5 a similar slab, about 24 inches long, 12 inches wide and 4 inches at the thickest point was broken loose by the bulldozer. Irving estimated that the material removed from Cut no.3, about 100 tons in all, had averaged slightly over 5% copper. Twelve samples of wallrock taken by Irving all assayed between 0.35 and 0.58% copper. These values are over 3 times the values obtained in modern work and it appears that Irving was receiving poor assays since he noted that he did not see any copper in the samples.

#### Ore Reserves

Because of the inconclusive structural situation, it is impossible to calculate a meaningful reserve figure. A mineralized block cut by holes 1; 2 and 6 and extending from surface to halfway between hole 2 and hole 9 (a depth of 190 feet), and averaging 21.3 feet at a dip of 70° east, has a drill indicated reserve of 33,000 tons averaging about 3.0% copper and 0.2 oz/ton silver. It must be emphasized that this block needs more sampling before it could be classified as possible ore.

July 1, 1968



A handwritten signature in cursive script, appearing to read "R. J. Cathro".

## Summary

Phase I consisted primarily of surface diamond drilling in the vicinity of the discovery showing but included mobilization and installation of a permanent trailer camp and supplies, a rough claim survey over 25% of the property, tagging of all claims, staking of 25 additional claims, about 10 miles of grid linecutting, cleaning out the old adit, and a test program of induced polarization (I.P.). All work was conducted in the vicinity of the discovery zone located by bulldozing in the fall of 1967.

Mobilization to a temporary location beside the airstrip was completed by Feb. 20. A total of 2,626 feet of core drilling was completed in 11 holes between Feb. 18 and May 17. All aspects of the project, including the catering, were contracted. During the period, a D7E bulldozer was used continuously on the project with occasional support by a D8H bulldozer and assorted skidoos, bombardiers and 4X4 trucks. The winter road was used continuously until April 24. Excellent radio communication was established via the CNT microwave system. The trailer camp was moved to its permanent location above the discovery zone in late May.

UNITED PEMETEX LTD.

SURFACE HOLE NO. I.

-20°E Bearing 080° Latitude I0,005N Departure 9,973E Logged by R.J.C. Date Feb. 23/68 Depth 93.0' Core Size BQ

ELEVATION COLLAR 2997

Stage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Au (o/t)
-9	-	OVERBURDEN	I202	44.0	44.1	0.1	tr.	.12	tr.
- 40	99	PORPHYRITIC ANDESITE	I201	47.5	52.5	5.0	0.82	.10	tr.
		-----weakly amygdaloidal throughout, medium grained texture, occasional thin calcite filled fractures trending 45° - 60° to core.	I203	52.5	55.5	3.0	6.40	.36	tr.
		-----10' to 13.5' - rubbly, broken.	I204	55.5	58.5	3.0	4.80	.42	tr.
		-----24.2' to 24.4' - broken, possible weak faulting at 70° to core.	I205	58.5	62.0	3.5	0.15	.16	tr.
			I206	62.0	65.0	3.0	2.10	.20	tr.
			I207	65.0	68.0	3.0	2.00	.20	tr.
			I208	68.0	71.0	3.0	0.78	.26	tr.
			I209	71.0	75.0	4.0	tr.	.06	tr.
			I210	75.0	77.5	2.5	tr.	.12	tr.
			I211	77.5	79.5	2.0	3.40	.10	tr.
- 68	99	BLACK AMYGDALOID	I212	79.5	81.5	2.0	0.10	.18	tr.
		-----generally chloritic throughout.	I213	81.5	84.5	3.0	tr.	.20	tr.
		-----40' to 44.1' character sample of thin grey veinlets of unidentified mineral.	AVERAGES						
		-----47.5' to 52.5' start of mineralized zone with occasional fine chalcocite veinlets.							
		-----52.5' to 68.0' considerable calcite in veinlets and vesicles, erratic disseminations and veinlets chalcocite; occasional fine flecks of native copper 52.7' to 53.0' and at 63.6'.		52.5	58.5	6.0	5.60	0.39	tr.
		-----58.5' to 62.0' medium green, denser and unmineralized.		62.0	68.0	6.0	2.05	0.20	tr.
				77.5	79.5	2.0	3.40	0.10	tr.
				52.5	68.0	15.5	2.98	0.26	tr.
				52.5	79.5	27.0	2.30	0.21	tr.
-81.5	98	BROWN AMYGDALOID							
		-----68.0' to 77.5' frequent chlorite slips, no texture 69' to 75' and strongly amygdaloid from 75' to 77.5'. Chalcocite finely disseminated throughout							
.5 - 93	99	PORPHYRITIC ANDESITE							
		-----medium grained, almost a dioritic texture, no visible mineralization.							



UNITED PEMETEX LTD.

HOLE NO. 3

Bearing 264° Latitude 10,100N Departure 10,167E Logged by R.J.C. Date March 6/68 Depth 93.5 Core Size BQ

ELEVATION COLLAR 3070

Stage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag(o/t)	Au (o/t)
0 - 75	-	OVERBURDEN -----drillers believed that bit hit bedrock at 43' and followed it to 75' flattening to -26° in the process.	I228	82.5	86.5	1.5	0.08	0.3	tr.
			I229	86.5	90.0	1.5	0.11	0.2	tr.
75 - 82.5	99	PORPHYRITIC ANDESITE -----weakly chloritic, medium to coarse grained.							
82.5 - 93.5	28	GREENSTONE -----contains very weakly disseminated flecks and wires of native copper in very broken core.							

UNITED PEMETEX LTD.

HOLE NO. 4

Bearing -55°W 264° Latitude 10,098N Departure 10,171E Logged by R.J.C. Date March 12/68 Depth 317 Core Size BQ

ELEVATION COLLAR 3070

Elevation	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Au (o/t)
0 - 55	-	OVERBURDEN	I230	68.5	71.0	2.5	1.35	0.30	tr.
5 - 69	99	<u>PORPHYRITIC ANDESITE</u> -----slight epidote, weathered looking, contains black chloritic amygdules. -----55' to 59' occasional wispy banding that is probably hematite. -----59.0' to 59.5' has one quarter inch band of chalcocite at 40° to core. -----61' to 69' almost a transition zone, slightly darker colour and less distinct crystallinity; occasional brown spots and wispy brown bands (hematite?), contorted chloritic bands.	I247	58.0	59.0	4.0	tr.		
			I248	59.0	59.5	0.5	1.18		
			I249	59.5	68.5	9.0	tr.		
			I250	68.5	71.0	2.5	1.32	resample	
			I251	71.0	76.0	5.0	tr.		
			I252	133.0	137.0	4.0	1.23		
			I253	137.0	142.0	5.0	tr.		
			I254	154.0	156.0	2.0	0.45		
			I255	199.0	204.0	5.0	tr.		
			I256	270.0	273.0	3.0	tr.		
9 - 89	99	<u>BROWN AMYGDALOID</u> -----chloritic and weakly porphyritic, gradual contact on both footwall and hangingwall. -----69' to 71' occasional chalcocite specks. -----71' to 76' weakly chloritic and vaguely porphyritic.	I257	273.0	278.5	5.5	tr.		
			I258	278.5	283.0	4.5	1.77		
			I259	283.0	288.0	5.0	0.19		
			I260	288.0	298.0	10.0	0.12		
9 - 106	99	<u>PORPHYRITIC ANDESITE</u> -----occasional black phenocrysts, gradual disappearance of porphyritic texture to contact at 106'.							
6 - 133	95	<u>GREENSTONE</u> -----typically broken.							
3 - 142	99	<u>BLACK AMYGDALOID</u> -----colour ranges to a dark purple and dark greenish black, calcite amygdules rimmed by chlorite are common. -----133' to 137' chalcopyrite patches and spherules, some pyrite, possibly minor bornite. -----137' to 142' no visible mineralization							
2 - 148	99	<u>FELDSPAR PORPHYRY</u> -----dense, pale, aphanitic groundmass with gradual contact at 147' to 149'.							



UNITED PEMETEX LTD.

SURFACE HOLE NO. 5

-25° Bearing 104° Latitude 10,313N Departure 9,960E Logged by R.J.C. Date March /68 Depth 282' Core Size BQ

SEALER ELEVATION 2980

Elevation	Rec (%)	Description	Samples							
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Au (o/t)	
0 - 32	99	<u>PORPHYRITIC ANDESITE</u> -----gradual contact 28' to 35', occasional red spots, colour gradually becomes brownish towards 35'.	I010	Character at 85'			0.15	0.08	tr.	
32 - 40	99	<u>BROWN AMYGDALOID</u> -----moderately porphyritic.	I261	I09.0	I14.5	5.5	tr.			
40 - 49	99		I231	I88.0	I92.5	4.5	.04	0.4	tr.	Native
49 - 87	98	<u>GREENSTONE</u> -----chloritic, occasional sections with finely disseminated native copper, character sample taken from highest grade portion.	I232	I92.5	I96.0	3.5	.12	0.5	tr.	
			I233	I96.0	201.5	5.3	6.81	0.5	tr.	3.93
			I234	201.5	206.0	4.5	0.06	0.2	tr.	
			I264	217.0	226.0	9.0	tr.			
- 107	99	<u>PORPHYRITIC ANDESITE</u> -----more chloritic than usual, also fairly broken throughout.	I012	Character at 212'			0.16	.10	tr.	
			I013	Character at 217.0'			0.01	tr.	tr.	
7 - 121	99	<u>GREENSTONE</u> -----very strongly chloritic, typically broken. -----I09' to I14.5' sampled to check the dense chloritic alteration zone, no visible mineralization.								
			I262	I91.5	I92.5	1.0	1.14			
			I263	I92.5	I96.0	3.5	tr.			
I - 217	99	<u>PORPHYRITIC ANDESITE</u> -----faint brown cast throughout, strongest near mineralization zone at I92.5' to 201.5'; chloritic at I89' to I92', I99' to 200', 201.5' to 202'. -----mineralized zone from I92.5' to 201.5' mainly native copper. It is suspected that 2 inches of native copper was stolen from section I92' to I96'. -----character sample I012 taken from richest sec. (at 212.0') of weakly disseminated native copper from 200' to 217'.								
7 - 226	99	<u>BROWN AMYGDALOID</u> -----strongly chloritic, this section was sampled because it is identical to Brown Amygdaloid that is host to mineralization in Holes I and 2.								
6 - 278	99	<u>GREENSTONE</u> -----typically broken, chloritic; slightly porphyritic from 250' to 260'. -----occasional disseminated native copper, sample I013 is character of best mineralized area at 271.0'.								
8 - 281	99	<u>PORPHYRITIC ANDESITE</u>								

SPECIALS  
Assay of average copper metallics from sample I233.  
87.67 9.2 tr.  
\*Assays of samples I231 - I234 by Coast Eldridge, Van.



P \_\_\_\_\_ Bearing \_\_\_\_\_ Latitude \_\_\_\_\_ Departure \_\_\_\_\_ Logged by \_\_\_\_\_ Date \_\_\_\_\_ Depth \_\_\_\_\_ Core Size \_\_\_\_\_ CONTINUED

Shotage	Rec (%)	Description	Samples				%	Ag (o/t)	Au (o/t)
			#	From	To	Rec (ft)			
		-----176' to 178.5' rock continues to darken, only mineralization is occasional speck of pyrite.							
		-----178.5' to 179' contact zone but angle indistinct, weakly fractured with 1% to 2% pyrite-chalco-pyrite mixture.							
79 - 190	99	PORPHYRITIC ANDESITE							
		-----light green, medium grained.							
90 - 194.5	99	BROWN AMYGDALOID							
		-----weakly chloritic, quite red at contact becoming less more brown toward 194.5', contains disseminated blebs and stringers chalcocite, contact at 190' estimated at 30° to core.							

UNITED FEMETEX LTD.

Depth 250' Core Size BQ  
 Bearing 070° Latitude 10,095N Departure 9,942E Logged by R.J.C. Date March 28/68

ELEVATION COLLAR 2986

Elevation	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Au (o/t)
0 - 15	-	OVERBURDEN	I266	34.5	38.0	3.5	tr.		
15 - 177	99	PORPHYRITIC ANDESITE -----brownish wispy stringers 34.5' to 38', brown spots from 70' to 90', moderate epidote at 90', brownish cast after 115', strongly brownish after 160' -----drillers report strong break and loss of water at 110'.	I267	178.5	185.0	6.5	0.90		
177 - 185	98	BROWN AMYGDALOID -----chloritic, blackish, weakly mineralized with chalcocite at 179' and 183'.							
185 - 205	90	GREENSTONE -----gradual contacts.							
205 - 241	99	PORPHYRITIC ANDESITE -----weak reddish-brown cast after 218', moderately amygdaloidal.							
241 - 250	95	GREENSTONE							

UNITED PERMETEX LTD.

ip -38° Bearing 114° Latitude 9,900 N. Departure 9,895 E. Logged by R.J.C. Date April 9/68 Depth 252' Core Size BQ 8

Footage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Au (o/t)
0 - 68		OVERBURDEN							
91	99	BROWN AMYGDALOID -----occasional redspots, moderately porphyritic, slightly epidotic.							
215	98	PORPHYRITIC ANDESITE -----lt. to med. grn; med. grd; dark pyroxene and lt. grn feld. throughout; massive; generally a little darker in colour than similar rocks in Hole I - 7 and tex. more altered. -----95 - 97 mod. epidotic -----99 - 102 fine grained. -----142 - 146 brownish cast; slightly amygdaloidal -----146 - 149 epidotic, chloritic, rubbly -----152 - 155, 158 - 174 dk. green, strongly chloritic sheared rubbly -----174 - 193 texture less distinct but porphyritic throughout rock more massive, minor chlorite -----193 - 194 dark purplish black; no visible minz -----194 - 215 lt. to med. grn; med epidotic; dense with faint porph. trace.texture	1268	193.0	194.0	1.0	0.1	trace	
228	40	SHEAR ZONE -----intensely pulverized and sheared; fragments flaky and foliated; some gauge and fine rubble; strongly chloritic -----217 - 219 strongly hematitic, earthy appearance							
252	95	PORPHYRITIC ANDESITE ? -----intensely sheared and chloritic; med. gry grn.; evidence of porphritic tex. can be seen on lg. fragments wherever shearing less intense; spotted, weathered; pitted appearance, perhaps due to leaching; core is badly broken and crumbles easily.							

Dip -35° Bearing 082° Latitude 10,004 N. Departure 9,795 E. Logged by A.R.A. Date May 5/68 Depth 411 Core Size BQ

Footage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)	Av (o/t)
0 - 14		<u>OVERBURDEN</u>							
14 - 254	95	<p><u>PORPHYRITIC ANDESITE (?)</u>                      -----Dense; hard; greenish-grey; distinctly different from Hole I - 7 but not unlike Hole 8; crystallinity less distinct and rock more altered.                      -----14 - 43 Numerous pyritic calcite stringers, occasional small red spots and patches (hematite ?)                      -----43 - 65 Strongly fractured, altered epidotized; occasional unaltered piece, others almost clay like; shearing @ 25° to hole.                      -----65 - 234 Fine black flecks and larger chlorite patches; weak calcite veining @ 30 - 45°; mod. amygdal locally with occasional reddish cast; fairly massive.                      -----127 - 133 Weakly sheared and epidotized.                      -----190 - 200-30% calcite in large patches and veinlets, weakly pyritic.                      -----212 - 234 Strong brownish red cast.</p>							
234 - 254	95	<p><u>BROWN AMYGDALOID</u>                      -----Reddish brown, dense, fine grained groundmass, weakly epidotic.</p>							
254 - 371	95	<p><u>PORPHYRITIC ANDESITE (?)</u>                      -----As before with faint reddish cast and slightly more broken; becomes increasingly red to 315.                      -----289 - 2" shear @ 50° to core.                      -----315 - 371 Shot through with calcite stringers and weakly epidotic.                      -----338 - 371 Brick red, abundant calcite stringers, becoming amygdaloidal after 350.</p>							

Dip \_\_\_\_\_ Bearing \_\_\_\_\_ Latitude \_\_\_\_\_ Departure \_\_\_\_\_ Logged by \_\_\_\_\_ Date \_\_\_\_\_ Depth \_\_\_\_\_ Core Size \_\_\_\_\_

Footage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	As (o/l)	Au (o/l)
		Hole No. 9 - page 2 - continued.							
371 - 377	95	<p>SHEAR ZONE</p> <p>-----Reddish (hematitic ?), soft and muddy, resembles similar zone in Hole 8, chloritic and foliated; could be fault zone or altered ash bed.</p>							
377 - 411		<p>MORPHYRITIC ANDESITE (?)</p> <p>-----Generally as before but strongly reddish and mod. amygdaloidal.</p>							

Dip -31° Bearing 114° Latitude 10,000 N. Departure 9,795 Logged by A.R.A. Date May 5/68 Depth 301 Core Size BQ

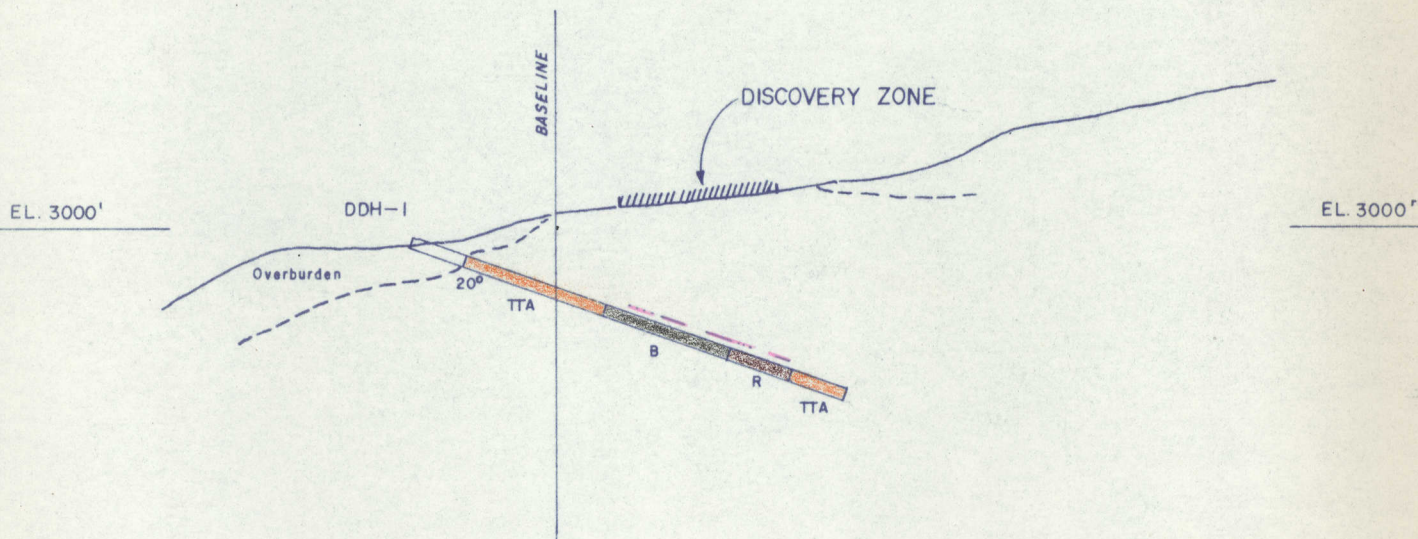
Footage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag(o/t)	Au (o/t)
0 - 15		<u>OVERBURDEN</u>							
15 - 295	95	<u>PORPHYRITIC ANDESITE (?)</u> -----Generally as in Hole 9, greenish grey with short reddish sections and occasional patch of coarse feldspar porphyry. -----15 - 24 Brecciated sand pyrite; weakly amygdal. -----38 - 80 Broken core. -----86 - 88 Sheared, hematite. -----97 - 159 Fine grained, black specks, faint reddish patches. -----159 - 203 Amygdal; occasional reddish patch. -----188-6" epidotic shear. -----217 - 223 Very broken. -----227 - 238 Light green fragments in reddish rock grading to abundant feldspar phenos. -----238 - 286 Very pale green (epidotic ?) with black flecks and weak shears, reddish after 269.							
3 - 301	95	<u>SHEAR ZONE</u> -----Sharp contact @ 60°; reddish ashy appearance; same as Hole 8 (217 - 221) and Hole 9 (371 - 377)							

ip -28° Bearing 089° Latitude 10,400N. Departure 9,987E. Logged by R.J.C. Date May 17/68 Depth 295' Core Size BQ & AQ

Footage	Rec (%)	Description	Samples						
			#	From	To	Rec (ft)	Cu (%)	Ag(o/t)	Au
0 - 48	99	<u>PORPHYRITIC ANDESITE</u> -----lt. grey green; generally as in Hole 5; hard; massive; coarsely porphyritic; occasional large amygdule or cavity filled by calcite; becoming slightly brownish after 20 and strongly red-brown after 40 with gradual contact to brown amygdaloid.							
48 - 56	99	<u>BROWN AMYGDALOID</u> -----dense, brown groundmass with faint porphs. and strongly amygdaloid text.; chlorite and calcite fillings; gradual contacts.							
56 - 65	99	<u>PORPHYRITIC ANDESITE</u> -----generally as before but less porphyritic.							
65 - 100	99	<u>GREENSTONE</u> -----dark green; dense; f.g.; dissem.; flecks native copper in places; occasional large amygdules or patches filled by calcite; locally chloritic on slips to produce broken rubbly core.							
100 - 173	99	<u>PORPHYRITIC ANDESITE</u> -----100 - 119 transition zone - gradational contact; -----130 - 144 weakly amygdaloidal; increasingly brownish. -----144, 145 - 1 - 2" gauge, sharp contact 144 from brown to light green grey. -----144 - 165 strongly porph. with phenos up to 3/4" long. -----165 - 173 amygdaloidal (small, chloritic) and increasingly brownish. -----173 gradational contact.							
173 - 186	99	<u>BROWN AMYGDALOID</u> -----slightly porph. throughout, becoming blackish, resembles discovery trench but no visible mineralization.							

ip \_\_\_\_\_ Bearing \_\_\_\_\_ Latitude \_\_\_\_\_ Departure \_\_\_\_\_ Logged by \_\_\_\_\_ Date \_\_\_\_\_ Depth \_\_\_\_\_ Core Size \_\_\_\_\_

Footage	Rec (%)	Description	Samples					
			#	From	To	Rec (ft)	Cu (%)	Ag (o/t)
continued - Hole II - page 2.								
6 - 230	90	<p><u>GREENSTONE</u>                      -----sharp contact at 186; generally as before;                      becoming strongly chloritic and rubbly after 195.                      -----192 - 6" black amygdaloid.                      -----225 - 230 gradational contact.</p>						
0 - 255	99	<p><u>PORPHYRITIC ANDESITE</u>                      -----massive; v.f.g. groundmass throughout; light                      brown becoming darker and increasingly amygdaloi-                      dal</p>						
5 - 266	99	<p><u>BROWN AMYGDALOID</u>                      -----as before - gradational contact 255 - 260.</p>						
6 - 280	99	<p><u>PORPHYRITIC ANDESITE</u>                      -----sharp contact at 266; as before, becoming f.g.                      towards end</p>						
0 - 295	95	<p><u>GREENSTONE</u>                      -----as before with more native copper.</p>						



### CORE ASSAYS.

SAMPLE No.	INTERVAL	RECOVERY(I)	COPPER %	SILVER Oz./t.
1202	44.0-44.1	0.1	TR.	0.12
1201	47.5-52.5	5.0	0.82	0.10
1203	52.5-55.5	3.0	6.40	0.36
1204	55.5-58.5	3.0	4.80	0.42
1205	58.5-62.0	3.5	0.15	0.16
1206	62.0-65.0	3.0	2.10	0.20
1207	65.0-68.0	3.0	2.00	0.20
1208	68.0-71.0	3.0	0.78	0.26
1209	71.0-75.0	4.0	TR	0.06
1210	75.0-77.5	2.5	TR	0.12
1211	77.5-79.5	2.0	3.40	0.10
1212	79.5-81.5	2.0	0.10	0.18
1213	81.5-84.5	3.0	TR	0.20

AVERAGE: 52.5' - 79.5' — 2.30% Cu, 0.21 oz. Ag / T

### LEGEND

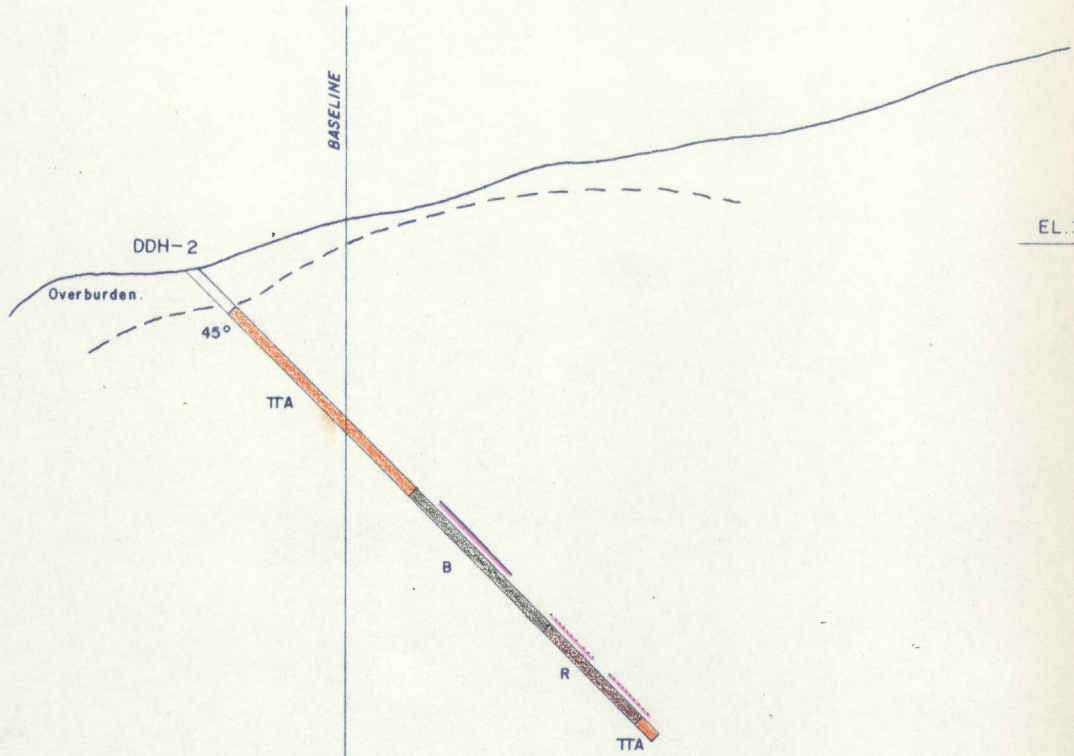
- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA—Not assayed.

<b>SECTION OF DDH - 1.</b>	
<b>UNITED PEMETEX LTD.</b>	
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>	
<i>Consulting Geological Engineers</i>	
DATE	April 10, 1968
DRAWN	H.W.C.
SCALE	1" = 40'

**FIG.-3.**

EL. 3000

EL. 3000



**CORE ASSAYS.**

SAMPLE No.	INTERVAL	RECOVERY (ft)	COPPER %	SILVER oz/T
1214	65.0-68.0	3.0	TR	0.12
1215	68.0-71.0	2.8	0.18	0.76
1216	71.0-75.5	4.2	1.35	0.13
1217	75.5-79.0	3.5	7.30	0.88
1218	79.0-82.0	2.7	20.00	0.30
1219	82.0-86.5	4.5	6.29	0.28
1220	86.5-91.7	5.2	4.50	0.22
1221	91.7-93.0	1.13	15.91	0.88
1222	93.0-98.0	5.0	0.37	0.14
1223	98.0-103.0	5.0	0.22	0.16
1224	103.0-108.0	5.0	0.52	0.16
1225	108.0-110.0	2.0	7.30	0.54
1226	110.0-115.0	5.0	0.70	0.16
1227	115.0-119.0	4.0	0.12	0.20
1245	119.0-125.0	6.0	0.48	0.06
1246	125.0-133.5	8.5	0.49	0.04

AVERAGE: 71.0' - 110.0' 4.72% Cu, 0.30oz/T. Ag.

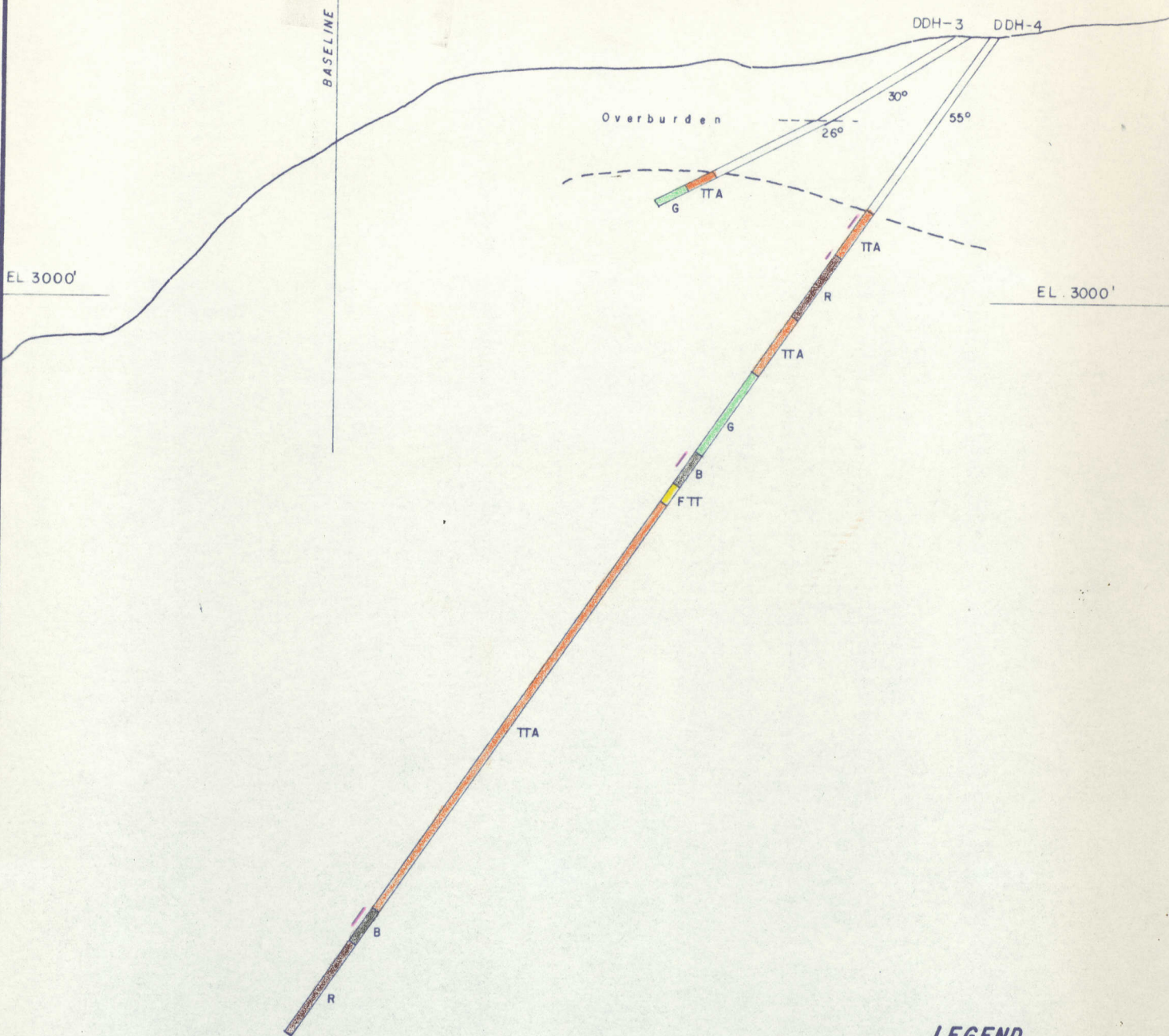
**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
  - GREENSTONE (G)
  - BROWN AMYGDALOID (R)
  - BLACK AMYGDALOID (B)
  - FELDSPAR PORPHYRY (FTT)
  - Copper Assay over 1%
  - Copper Assay between 0.5% & 1.0%
- NA—Not assayed.

**SECTION OF DDH-2.**  
**UNITED PEMETEX LTD.**

**ARCHER, CATHRO & ASSOCIATES LTD.**  
*Consulting Geological Engineers*

DATE	April 10, 1968	<b>FIG.- 4.</b>
DRAWN	H.W.C.	
SCALE	1" = 40'	



**CORE ASSAYS.**

<u>DDH-4</u>				
SAMPLE No.	INTERVAL	RECOVERY(ft)	COPPER %	SILVER oz/T.
1247	55.0-59.0	4.0	TR	
1248	59.0-59.5	0.5	1.18	
1249	59.5-69.0	9.5	TR	
1250	69.0-71.0	2.0	1.32	
1251	71.0-76.0	5.0	TR	
1252	133.0-137.0	4.0	1.23	
1253	137.0-142.0	5.0	TR	
1254	154.0-156.0	2.0	0.43	
1255	199.0-204.0	5.0	TR	
1256	270.0-273.0	3.0	TR	
1257	273.0-278.5	5.5	TR	
1258	278.5-283.0	4.5	1.77	
1259	283.0-288.0	5.0	0.19	
1260	288.0-298.0	10.0	0.12	
<u>DDH-3</u>				
1228	82.5-86.5	1.5	0.08	0.3
1229	86.5-90.0	1.5	0.11	0.2

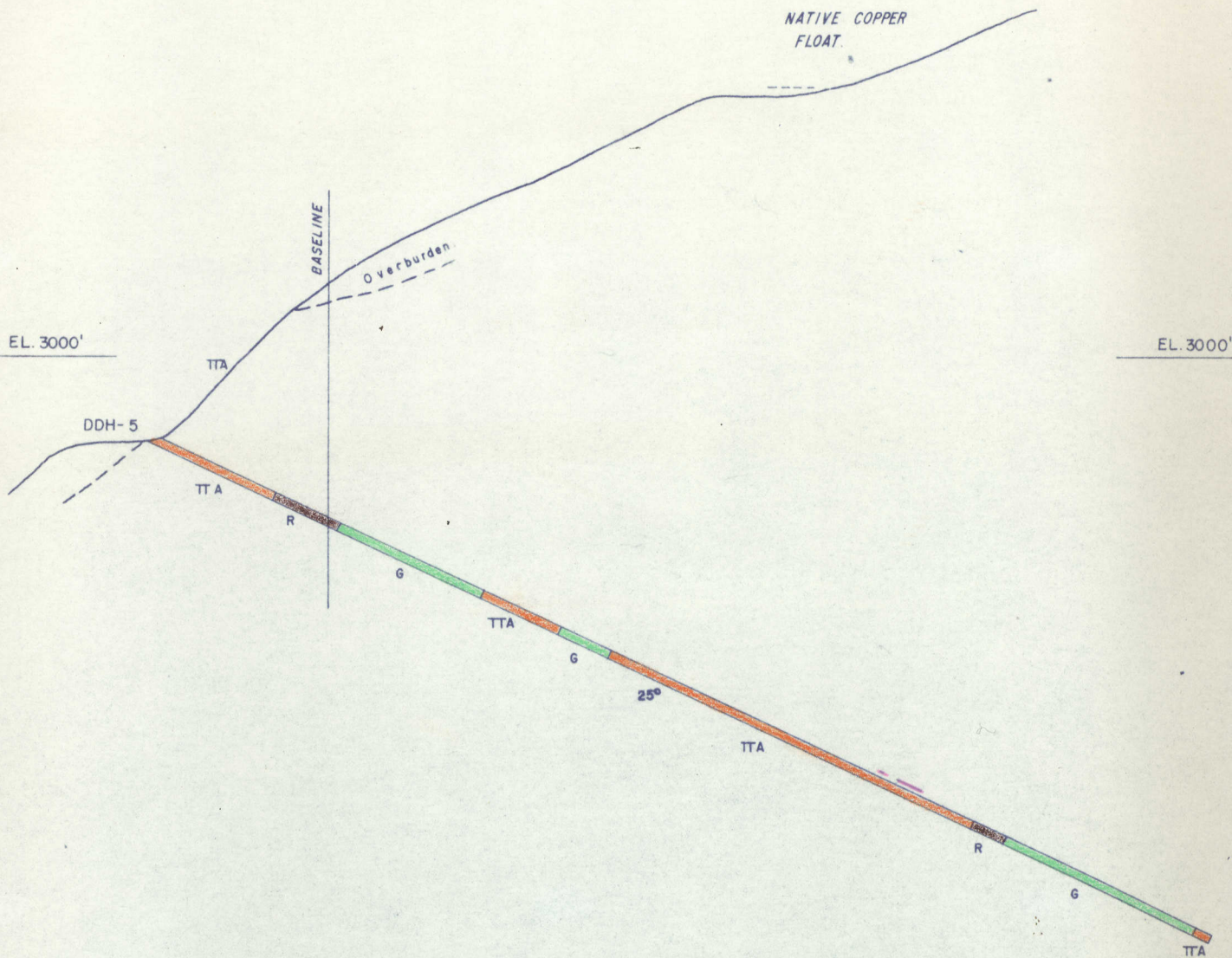
NOT ASSAYED FOR SILVER

**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA—Not assayed

<b>SECTION OF DDH-3 &amp; 4.</b>	
<b>UNITED PEMETEX LTD.</b>	
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>	
<i>Consulting Geological Engineers</i>	
DATE	April 10, 1968
DRAWN	H.W.C.
SCALE	1" = 40'

**FIG.-5.**



**CORE ASSAYS.**

SAMPLE No.	INTERVAL	RECOVERY(%)	COPPER %	SILVER oz./T
1261	109.0-114.5	5.5	TR	NA
1231	188.0-192.5	4.5	0.04	0.40
1232	192.5-196.0	3.5	0.12	0.50
1233	196.0-201.5	5.5	6.81	0.50
1234	201.5-206.0	4.5	0.06	0.20
1264	217.0-226.0	9.0	TR	NA
<i>RESAMPLES</i>				
1262	191.5-192.5	1.0	1.14	NA
1263	192.5-196.0	3.5	TR	NA
<i>CHARACTER SAMPLES</i>				
1010	AT 85.0	-	0.15	0.08
1012	AT 212.0	-	0.16	0.10
1013	AT 271.0	-	0.01	TR

CORE WITH DISSEMINATED FLECKS NATIVE COPPER

**LEGEND**

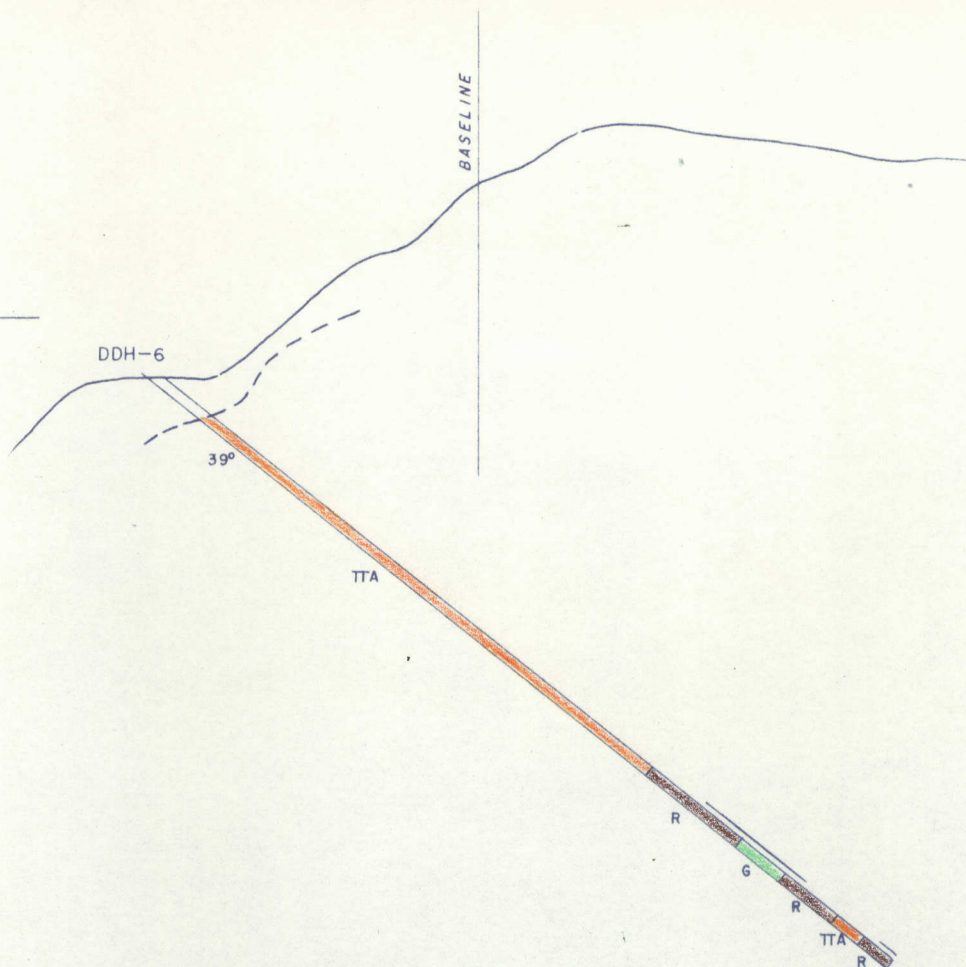
- PORPHYRITIC ANDESITE (TTA)
  - GREENSTONE (G)
  - BROWN AMYGDALOID (R)
  - BLACK AMYGDALOID (B)
  - FELDSPAR PORPHYRY (FTT)
  - Copper Assay over 1%
  - Copper Assay between 0.5% & 1.0%
- NA—Not assayed.

**SECTION OF DDH.— 5.**  
**'UNITED PEMETEX LTD.**  
**ARCHER, CATHRO & ASSOCIATES LTD.**  
*Consulting Geological Engineers*

DATE	April 10, 1968	<b>FIG.— 6</b>
DRAWN	H.W.C.	
SCALE	1" = 40'	

EL 3000'

EL 3000'



**CORE ASSAYS**

SAMPLE No	INTERVAL	RECOVERY(%)	COPPER %	SILVER oz./T.
1265	138.0-143.0	5.0	TR	NA
1237	143.0-146.0	3.0	2.32	0.10
1238	146.0-149.0	3.0	5.24	0.10
1239	149.0-155.0	6.0	1.44	0.10
1241	165.5-171.0	5.5	1.00	0.20
1242	171.0-176.0	5.0	TR	0.06
1243	178.5-179.0	0.5	0.18	0.20
1244	190.0-194.5	4.5	1.14	0.12

**CHARACTER SAMPLES**

1235	AT 160.0	—	0.03	0.02	FINE FLECKS UNIDENTIFIED BLACK MINERAL.
1236	AT 53.5	—	0.12	0.02	SCATTER RED FLECKS (CUPRITE)?

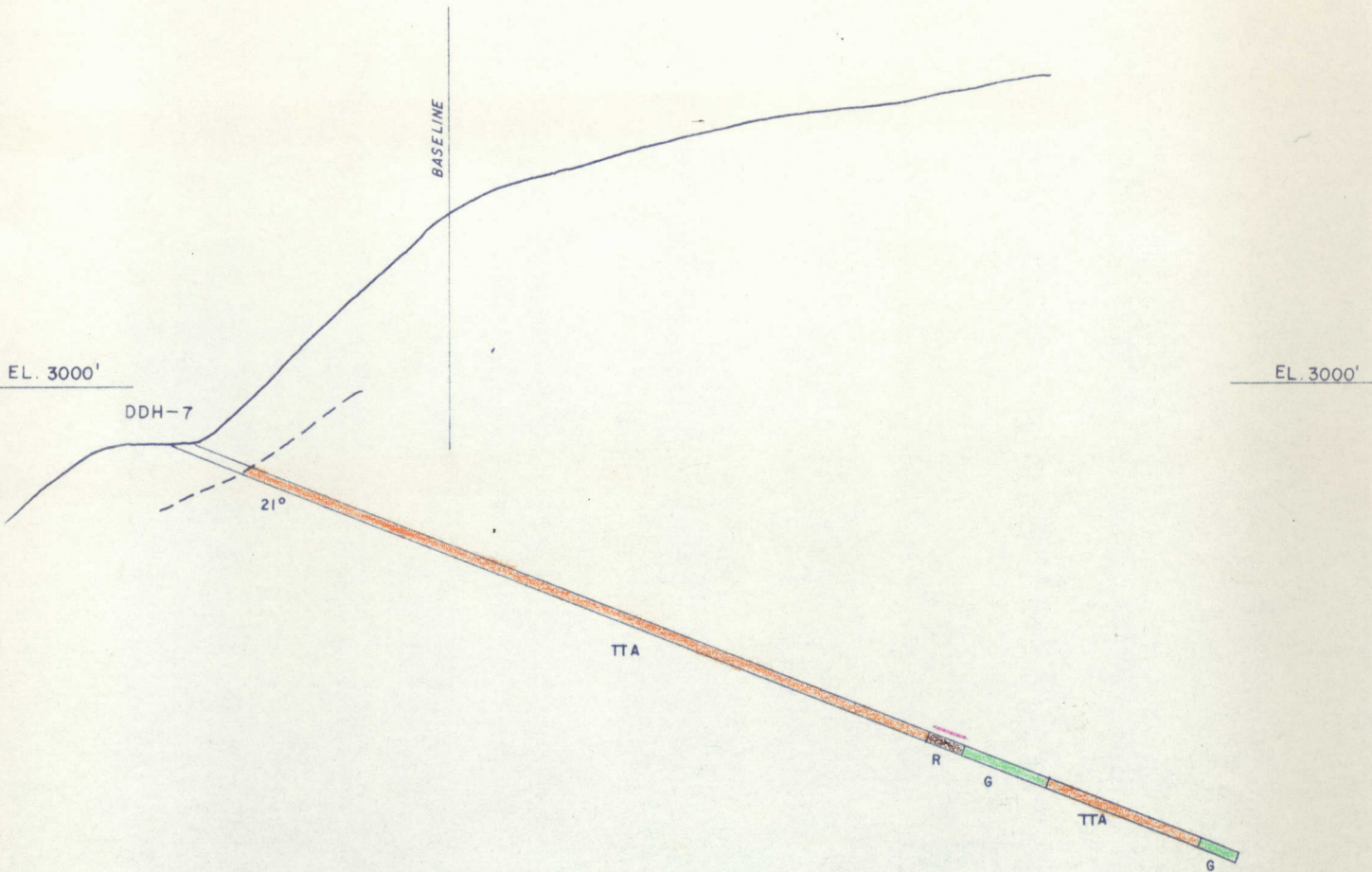
AVERAGE 143.0-171.0 — 2.10% Cu., 0.10 oz. Ag. / T.

**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA—Not assayed

<b>SECTION OF DDH-6.</b>	
<b>UNITED PEMETEX LTD.</b>	
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>	
<i>Consulting Geological Engineers</i>	
DATE	April 10, 1968
DRAWN	H.W.C.
SCALE	1" = 40'

**FIG.- 7.**



**CORE ASSAYS.**

SAMPLE No.	INTERVAL	RECOVERY (%)	COPPER %	SILVER oz/T
1266	345-380	3.5	TR	NA
1267	178.5-185.0	6.5	0.90	NA

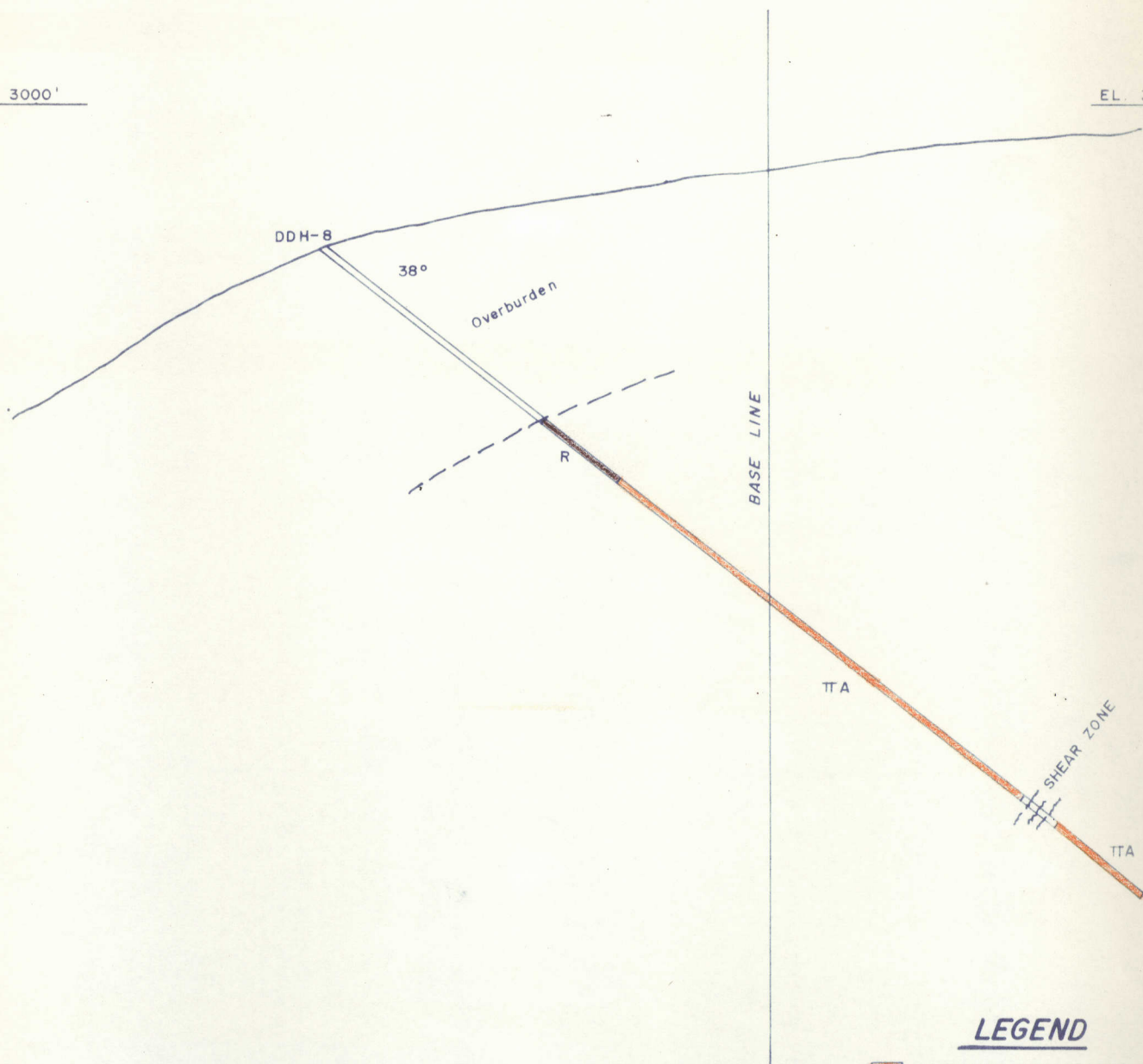
**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
  - GREENSTONE (G)
  - BROWN AMYGDALOID (R)
  - BLACK AMYGDALOID (B)
  - FELDSPAR PORPHYRY (FTT)
  - Copper Assay over 1%
  - Copper Assay between 0.5% & 1.0%
- NA—Not assayed.

<b>SECTION OF DDH - 7.</b>		<b>FIG.- 8.</b>
<b>UNITED PEMETEX LTD.</b>		
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b> <i>Consulting Geological Engineers</i>		
DATE	April 10, 1968	
DRAWN	H.W.C.	
SCALE	1" = 40'	

EL. 3000'

EL. 3000'



**CORE ASSAYS.**

SAMPLE No.	INTERVAL	RECOVERY ft	COPPER %	SILVER oz./T
1268	193.0-194.0	1.0'	0.1	tr.

**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
  - GREENSTONE (G)
  - BROWN AMYGDALOID (R)
  - BLACK AMYGDALOID (B)
  - FELDSPAR PORPHYRY (FTT)
  - Copper Assay over 1%
  - Copper Assay between 0.5% & 1.0%
- NA — Not assayed.

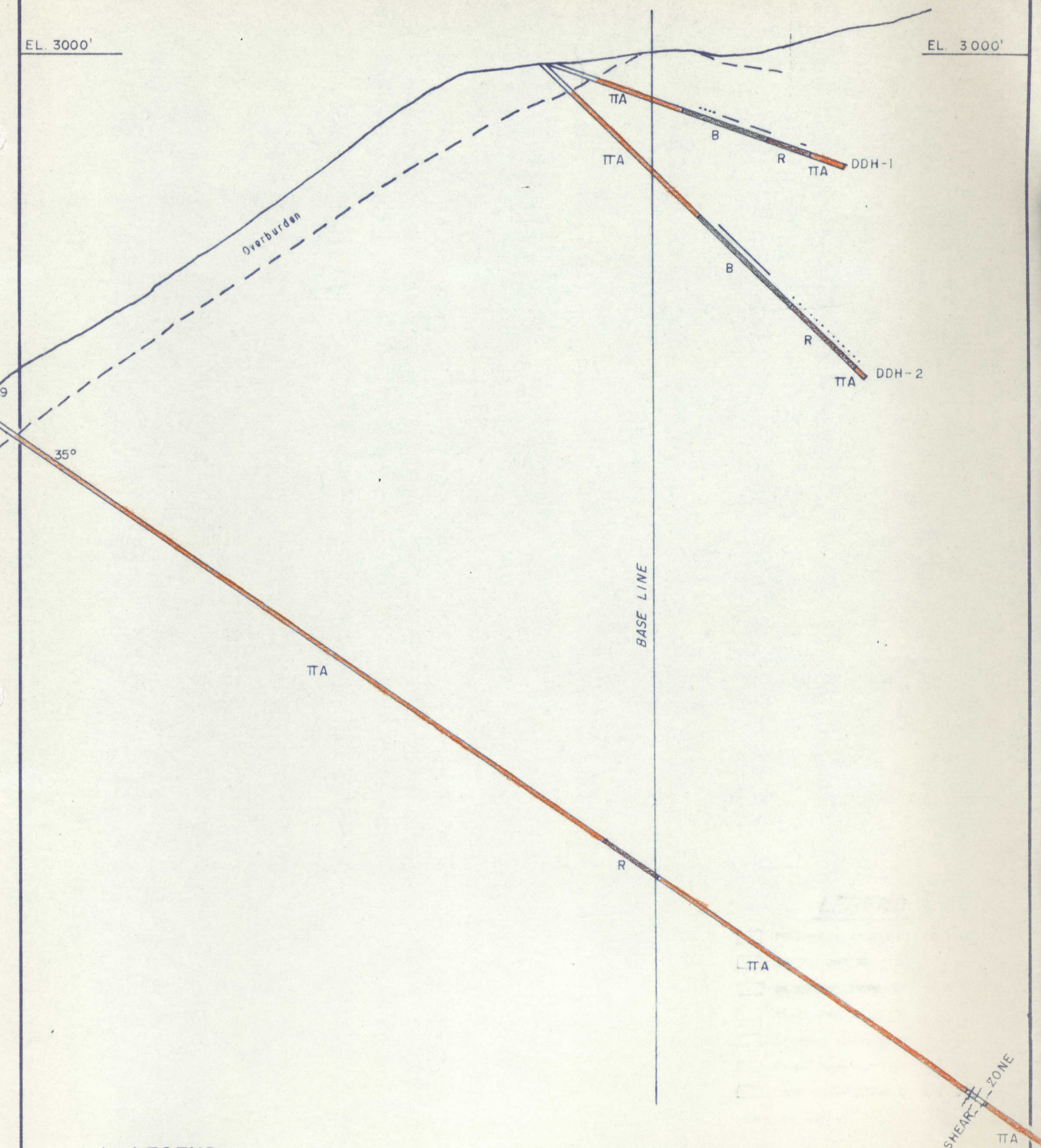
**SECTION OF DDH-8.  
UNITED PEMETEX LTD.**

**ARCHER, CATHRO & ASSOCIATES LTD.**  
*Consulting Geological Engineers*

DATE	May 28, 1968	<b>FIG.— 9.</b>
DRAWN	M.K.	
SCALE	1" = 40'	

EL. 3000'

EL. 3000'



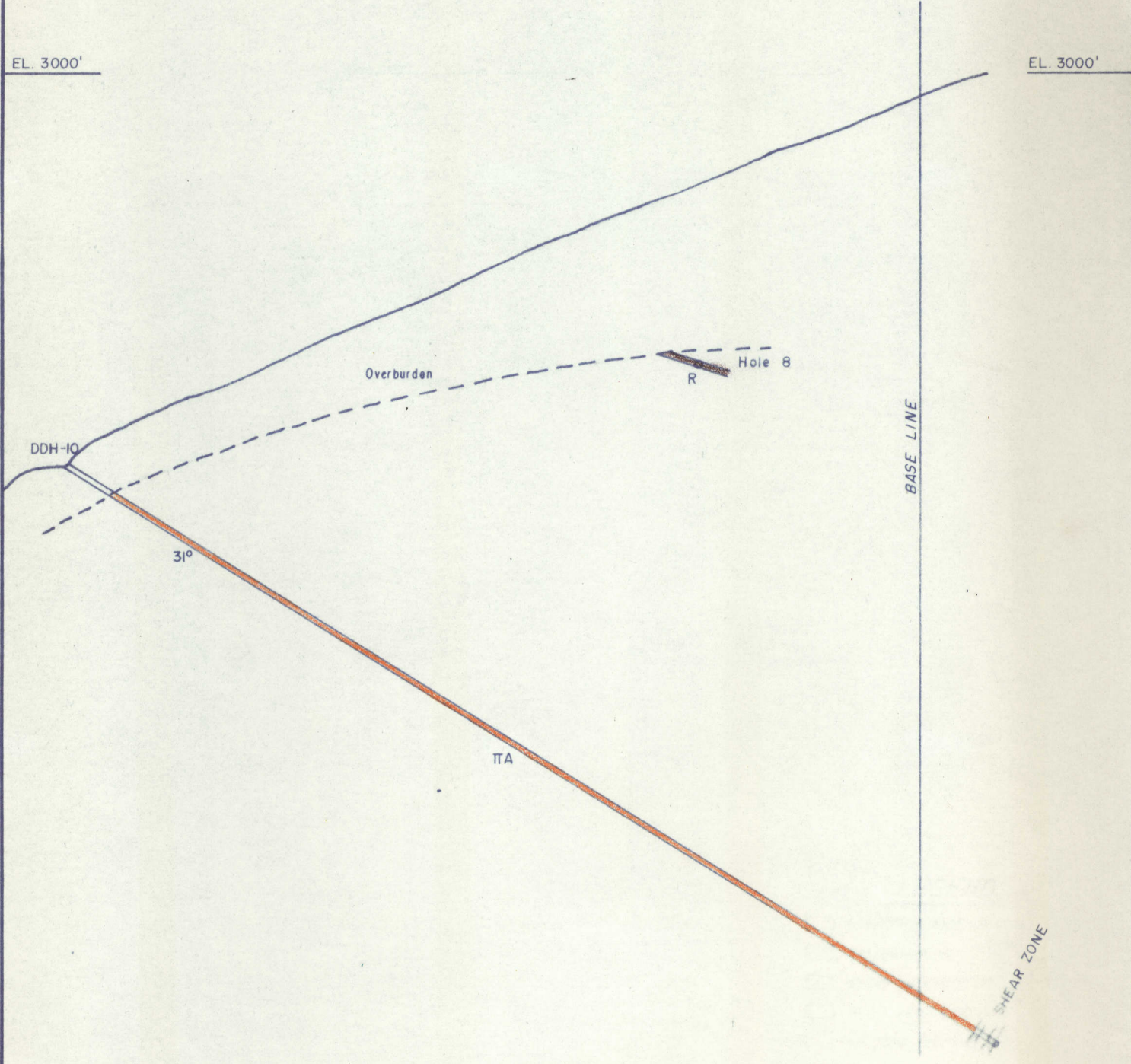
**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FIT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA — Not assayed

<b>SECTION OF DDH-9.</b>		
<b>UNITED PEMETEX LTD.</b>		
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>		
<i>Consulting Geological Engineers</i>		
DATE	May 28, 1968	<b>FIG.-10</b>
DRAWN	M.K.	
SCALE	1" = 40'	

EL. 3000'

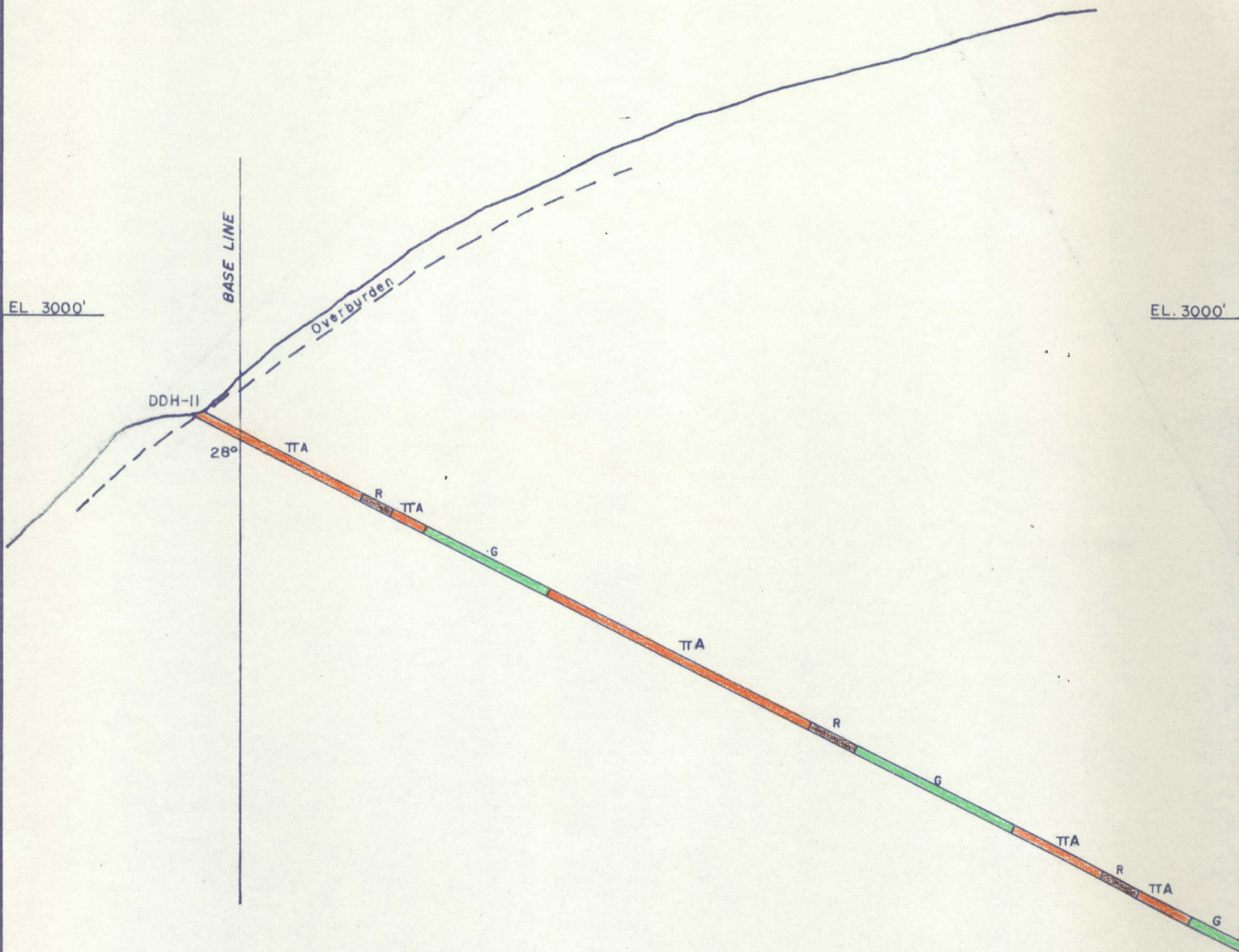
EL. 3000'



**LEGEND**

- PORPHYRITIC ANDESITE (TA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA - Not assayed

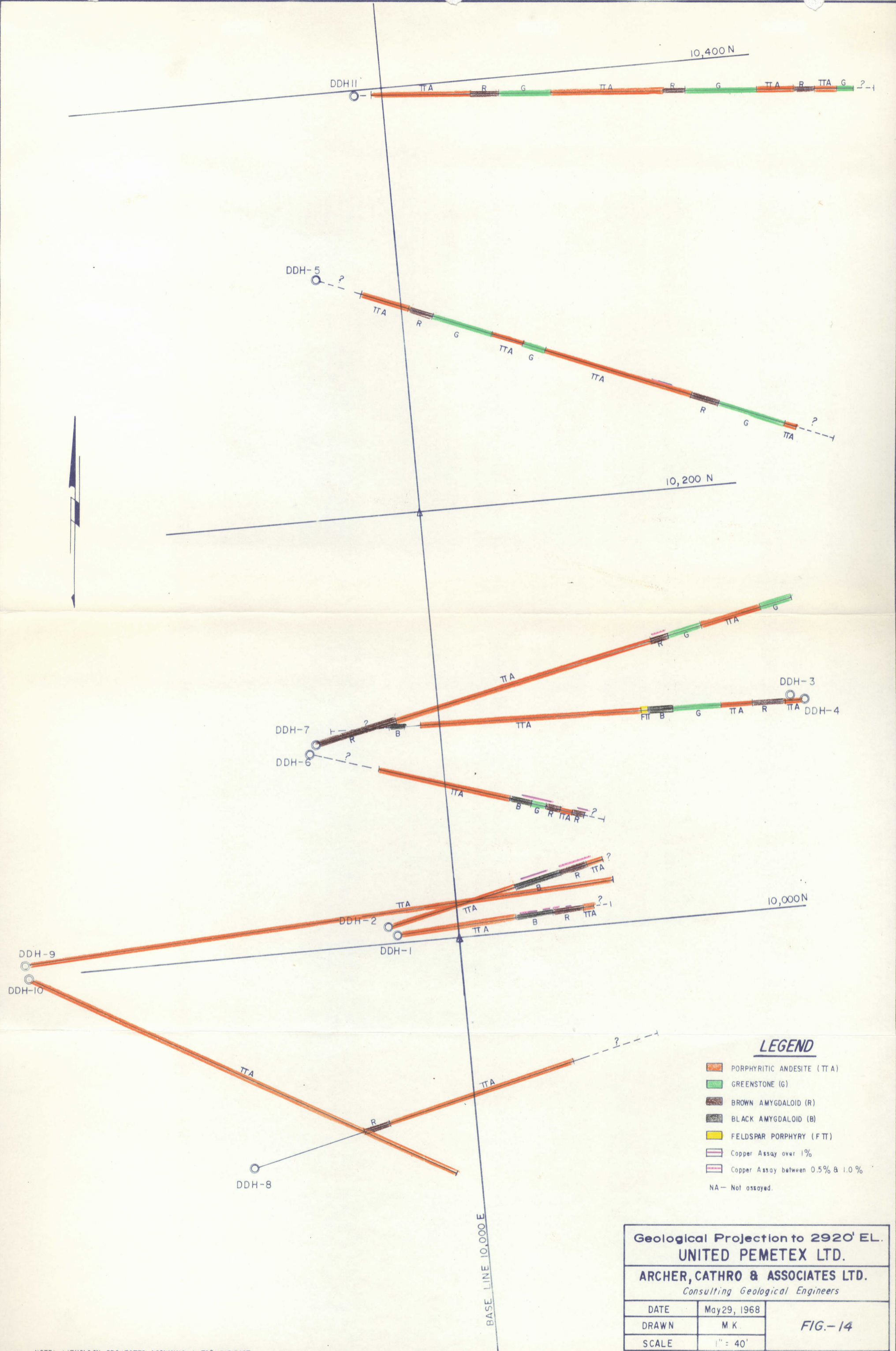
<b>SECTION OF DDH-10.</b>		
<b>UNITED PEMETEX LTD.</b>		
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>		
<i>Consulting Geological Engineers</i>		
DATE	May 28, 1968	<b>FIG-11</b>
DRAWN	M.K.	
SCALE	1" = 40'	



**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA — Not assayed.

<b>SECTION OF DDH.- II.</b>		
<b>UNITED PEMETEX LTD.</b>		
<b>ARCHER, CATHRO &amp; ASSOCIATES LTD.</b>		
<i>Consulting Geological Engineers</i>		
DATE	May 28, 1968	<b>FIG.- 12</b>
DRAWN	M.K.	
SCALE	1" = 40'	



**LEGEND**

- PORPHYRITIC ANDESITE (TTA)
- GREENSTONE (G)
- BROWN AMYGDALOID (R)
- BLACK AMYGDALOID (B)
- FELDSPAR PORPHYRY (FTT)
- Copper Assay over 1%
- Copper Assay between 0.5% & 1.0%
- NA - Not assayed.

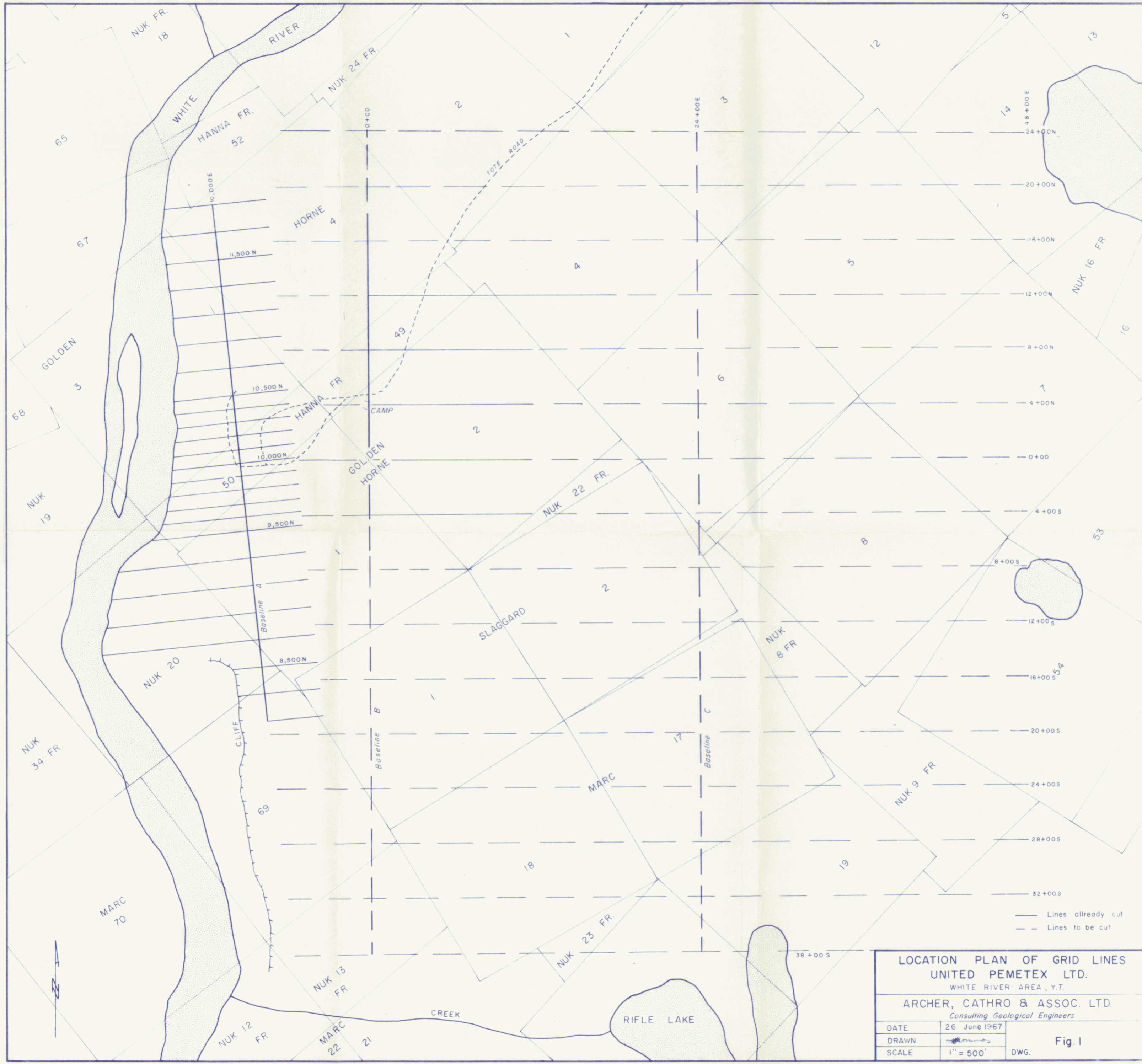
Geological Projection to 2920' EL.  
 UNITED PEMETEX LTD.

ARCHER, CATHRO & ASSOCIATES LTD.  
 Consulting Geological Engineers

DATE	May 29, 1968
DRAWN	M. K.
SCALE	1" = 40'

FIG.-14

NOTE: LITHOLOGY PROJECTED ASSUMING A 70° DIP EAST



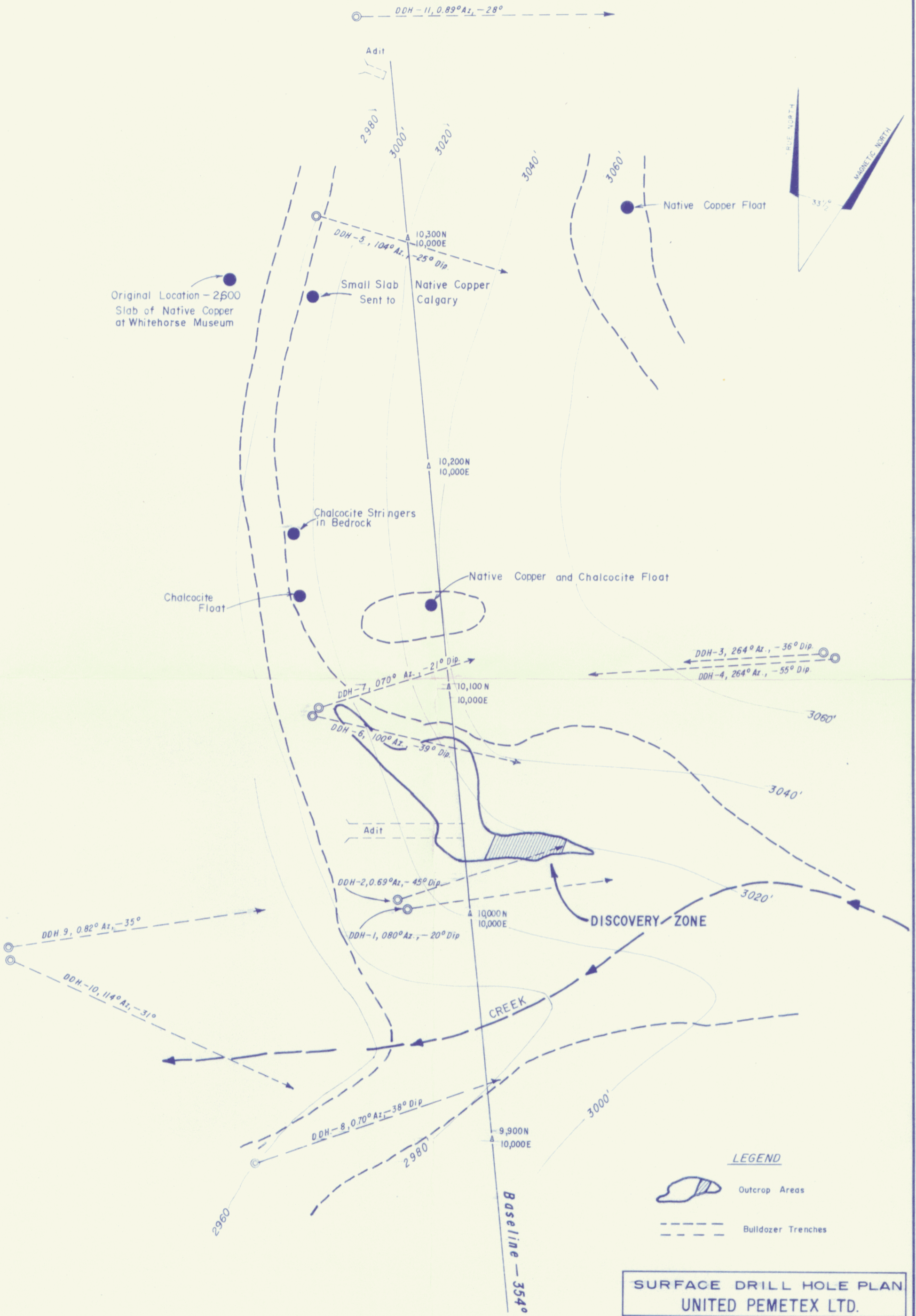
LOCATION PLAN OF GRID LINES  
 UNITED PEMETEX LTD.  
 WHITE RIVER AREA, Y.T.

ARCHER, CATHRO & ASSOC. LTD.  
 Consulting Geological Engineers

DATE	26 June 1967
DRAWN	<i>[Signature]</i>
SCALE	1" = 500'

DWG. Fig. 1







**Legend**

- Soil sample assay in p.p.m. copper.
- B soil layer
- ▨ Volcanic ash layer
- ▩ Bedrock
- Limit of building
- Old cut
- ⋈ Old open cut