

821017

GEOLOGY AND DRILL LOGS
KEL-GLEN OPTION
RIO TINTO

(CM CLAIMS)

1970

INTER-OFFICE MEMORANDUM

File No. 504

To: H.I. Hall ✓

Date August 5, 1970

From: M.B. Mehrtens

Copy: R.V. Longe

Subject: Kel-Glen Option - *Geology*

Brian Abraham was in the office today and in a brief discussion of the property made two observations which I consider to be especially significant:

1. The ore appears to be concentrated in boudins.
2. On surface, and over a large area, the overburden is cemented with secondary Fe oxides.

Taking the second point first:

Oxidation and weathering of massive sulphide ore liberates a large amount of Ferric ion (Fe^{3+}). Ferric ion is stable in solutions within the pH range 1 - 3.0. When the pH increases above 3.0 the Fe is precipitated to form limonite/goethite deposits. The range of pH in which Fe^{3+} is soluble is very restricted and therefore ensures that the element is transported in the zone of oxidation and weathering for only a short distance, to give rise to a transported gossan.

A massive sulphide body contains 60% Fe and it is obvious that such a body must yield a lot of Fe on oxidation. Similar large transported gossans (i.e., similar to that at Kel-Glen) are common in the vicinity of massive sulphide bodies in Norway and elsewhere.

Turning to Brian's first point that the ore appears to occur in boudins; one of the salient characteristics of massive sulphide orebodies is that on strong tectonism they deform plastically (in many cases). Plastic deformation gives rise to swells, pods and other often extremely puzzling geometric shapes which would on surface (and with poor exposure) look like boudins.

Brian's observations (mentioned previously) suggest very strongly that we are dealing with a "volcano-exhalative-sedimentary" type massive sulphide possibility. The large transported gossan together with the so-called boudin habit of the ore indicate that we are very near to a massive sulphide body and not dealing merely with a part of the mineralized horizon with which these bodies are generally associated.

These observations highlight the need to fly E.M. over the area to determine the presence and strike of such a mineralized horizon. It should be noted that whereas the so-called mineralized horizon (often 3 ft. or so thick) is normally concordant with the enclosing formation - the massive sulphide deposits along it are controlled by the structure and will often show discordant relationships with the wall rocks because of a tendency to deform plastically under strong tectonism (as previously mentioned).

A final point: E.M. (ground) should be carried out over Kel-Glen to help site the drill holes.

Airbourne E.M. should be considered to follow up the larger area where a potential for massive sulphide ore and their related (uneconomic) mineralized horizons are indicated.

MBM:lmd

Mike.
M.B. Mehrtens.

92-P-8

R E P O R T
O N

Newhykulston (Coal) Creek Copper Prospect
Kamloops Mining Division, B.C.

E. J. Lees, Ph.D., P.Eng.

Vancouver, B.C.
May 25, 1970



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INTRODUCTION

On April 15, 1970, I examined the trenches of Warner Holdings Ltd., Newhykulston (Coal) Creek Copper prospect, and saw sufficient merit in the copper mineralization to warrant recommending to my associates that something further should be done to expose the immediate areas of the mineralization more fully. A working option was secured from Mr. J. Aceman of Warner Holdings and I again visited the property and supervised the work of a D.8 Caterpillar bulldozer on May 12, 13, 14 and 15, 1970 further opening up the showings.

Mr. P. Connell, field manager for Warner Holdings assisted by Mr. F. Savinkoff conducted me on the first examination and Mr. Connell, assisted by Mr. Jeff Sluggett directed the bulldozing and carried out a soil sampling program, on the second visit. I took five chip samples on the showings on my first visit, and twenty chip samples during the bulldozing on my second visit and made a chain and compass survey of the trenches.

No examination of the claim staking and property ownership was made other than to visit the nearest claim post to the trenches and ascertain that the showings were well within the property boundaries.

LOCATION AND ACCESS

The property is reached by black top highway from Kamloops to Barriere, B.C. and thence by gravel road up the east side of North Thompson river 10.5 miles to the junction of a logging road at an elevation of 1300 feet above sea-level. A logging road passable for four wheel drive vehicles leads easterly and then southerly for 3 miles from the junction up the valley of Newhykulston (Coal) Creek to the trenches which lie between elevations of 3200 to 3350 feet above sea-level.

PROPERTY

The property is shown by a claim plan given to me by Mr. Connell to consist of a contiguous block of 32 mineral claims numbers GW 51 to 70 and ACE 61 to 80 inclusive located in the Kamloops Mining Division, B.C. The trenches are on

claims GW 51 (987081) and GW 52 (987082). Tags on the nearest staking post were dated April 7, 1969. Assessment work in the form of bulldozed trenches 1 to 5 done before my examination are said to put the assessment work on the property in good standing until April 11, 1971.

I got the impression that the directions on the staking plan were diagramatic and do not accurately represent the direction of staking on the ground in the vicinity of the trenches. I would suggest that the staking line be reblazed.

HISTORY

I do not know the history of the property other than indicated by old blazes and posts. These indicate it had been staked before around 1966 and possibly also at some time prior to that. Evidence of 6 drill holes were uncovered. Four of them were in trench 1 and I was told by Mr. Connell that he had them put in with a pack sack drill; that they were 10 feet or less in length and little core recovery was obtained.

Two holes of somewhat larger diameter were uncovered on trench 3, but their lengths are unknown; no cores if any are in evidence, and no results are known. At some time in the past an option was reported taken and a blast set off on a showing on the west side of Newhykulston creek, west of mile post 2. The option was evidently dropped.

GEOLOGY

Geological Survey of Canada Summary Report 1921 Part A, pages 72 to 106 by W. Uglow gives a description of the geology and a small map of the general area but no reference is made to the property. This map indicates the rocks in the vicinity of the property are probably Permian in age and hence formations of the Cache Creek series. This series embraces sedimentary and volcanic formations. These rocks lie between the Baldybiotite granodiorite stock lying to the east and the Darlington granodiorite stock to the west of North Thompson river. The little government map indicates that somewhere in the vicinity of the Newhykulston Creek property there is a westerly dipping sill. This is described as consisting of pyroxenite in the basal part with micropegmatite in the upper part.

Major strike faulting is believed to follow the North Thompson River and a cross fault following Barriere river is shown on the government map.

The rocks at the trenches examined are interbedded argillites, siltstone and amphibolite. The amphibolite is thought to have been originally a greywacke or basic tuff. At trench 3 it has streaks of fine grained magnetite, but these were not seen or detected with magnet in the amphibolite in trench 1. Here a partly cemented fawn coloured regolith dips gently easterly and overlies the steeply dipping siltstone and argillite with marked unconformity. It is only a few feet thick. It is probably tertiary in age.

Gouge reaches 9 feet in width along strike faults. Fracturing is extensive in trenches #1 and #2. The rocks are relatively unfractured in trench 0, the west side of trench 1, and south and west sides of trench 3. The fracturing may be related to folding and changes in strike of the faults.

MINERALIZATION

Mineralization is fine grained pyrite and light coloured chalcopyrite. There is some azurite and malachite and possibly some native copper. Grab samples taken prior to my examination yielded a little gold and silver.

ORE

The highest assays were obtained in black siliceous argillite in trench 1 where two chip samples each across 2 feet assayed 12.37% copper and 11.21% copper respectively. Fractured siltstone assayed around 1.3% copper and interbedded argillite, siltstone and amphibolite gave intermediate values. Grade in trench #1 is 2 to 2.5% copper over a length of 75 feet and width of 20 feet and this could be lengthened by further work.

Mineralization is variable in the magnetite-amphibolite of trench 3, but suggests some tonnage of similar grade to that exposed in trench #1.

OUR GRID 'A'
AREA?

- 4 -

The ore in the trenches just described is around mile post 3 on the road. Another "showing" is reported on the west side of the canyon of Newhykulston creek west of mile post 2 or 1 mile north of those described above. It would appear to be roughly on the strike of the showings sampled. An attempt to reach it was made, climbing down the canyon from the road, over glacial moraine and andesite. A rope or ladder would be required to reach it, and these were not available on the occasion of our examination. It is said to have had a blast put in it and contain copper and gold.

CONCLUSIONS

It is concluded that there is some copper mineralization of ore grade in the trenches examined, and that the property warrants further investigation. Outcrops are rare to non-existent in the part of the property around the trenches. Drilling is required to ascertain if further ore is present. Line cutting with, a soil sampling survey and magnetometer and I.P. or E.M. surveys are required to better guide the expensive drilling.

RECOMMENDATIONS

It is recommended that \$100,000 be raised to carry out the line cutting, geochemical, geophysical surveys and drilling, and to afford sufficient funds for office, overhead supervision and travelling.

Respectfully submitted



E. J. Lees, Ph.D., P. Eng.



ACE 79	ACE 77	ACE 75	GW 52	GW 54	GW 56	GW 58	GW 60	GW 62	GW 64
NEW HYDRO STON	CREEK	TRENCHES							
ACE 80	ACE 78	ACE 76	GW 51	GW 53	GW 55	GW 57	GW 59	GW 61	GW 63
			ACE 73	ACE 71	ACE 69	ACE 67	ACE 65	ACE 63	
			ACE 74	ACE 72	ACE 70	ACE 68	ACE 66	ACE 64	

Newkirkston (Coal) Creek
 Copper Prospect
 Plan of Claims
 as supplied by P. Council

Appendix 3

R TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

LOCATION: 5 & 65 N 1 & 99 W

AZIMUTH: N 76°E

PROPERTY: KE

DIP: 50'

LENGTH: 500'

ELEVATION: 3400

CLAIM No: K-

STARTED: AUGUST 1970

CORE SIZE: NQ

DATE LOGGED:

SECTION:

COMPLETED: AUGUST 1970

DIP TESTS: 200' -

500' -

LOGGED BY: B

PURPOSE:

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH		
from	to			from	to			
0	53	CASING						
53		The rock is an extremely fine grained pale green relatively siliceous one. It has areas which are more quartz (?) rich which contain perhaps 5% disseminated pyrite. There is also an unknown silvery metallic sulfide which may be pyrite disseminated in the rock. The mafics are completely chlor'd and extremely fragmented. The feldspars also appear to be chlor'd. The origin of the rock may be volcanic. Shears have c/a's of 70° and have a carbonate (?) along them. Carbonate stringers have random orient'ns up to 5mm. thick. Strips with chlorite along them and C/A's of 15° are common about 56'. Minor hematite staining is sited as we land, it may be from the alter'n of magnetite altho no magnetite is noted. 57'-59' - possibly a fault zone. Joints have a common orient'n 2 sets have C/A's of 45°. The carbonate(?) appears to have filled tension fractures.						

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		C/A's vary from 30-70° mostly 45°							
		64' distorted quartz stringer C/A 30°							
		- small bleached(?) areas 2mm. across							
		noted incore - possibly feldspars(?)							
		69' pyrite noted as blebs elongated in							
		U.B. looking material - possibly the							
		U.B. is an incline							
		60-70 0.7 ft. core lost							
70	90.6	Poor Recovery rounded samples,							
		possibly some extremely heavily							
		fractured rock.							
		70-80 5.0 ft. core lost							
		Rock may be more heavily chlorated and							
		altered. Rock possibly altered due to							
		shearing and hydrothermal activity,							
		80-90 5.5 ft. core lost.							
90.6	94	Rock heavily altered and shows quite a							
		bit (25%) quartz in irregular blebs							
		94-100 - poor recovery, rounded samples							
		- extremely heavily fractured							
		90-100 4.0 ft. core lost							
		- still irregular quartz stringers							
		108' - tiny slip which has displaced							
		core with a C/A = 0°. The rock is quite							
		siliceous and brecciated - the rock might							
		well be an angular breccia - minor							
		disseminated pyrite is noted.							
		C/A's random - 45° most common							
		100-110 1.0 ft. core lost							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		113.6 - Rock is brecciated and has siliceous zones with a 45° C/A - possibly U.B. Breccia. The quartz is cut by a quartz stringer with a C/A of 30° which is 7cm. thick. The stringer contains chlorite							
		110-120, 3.0 ft. core lost The alteration still appears to be inclining							
		120-127 - Poor recovery and it may be a fault - pieces are rounded							
		120-130 6.0 ft. core lost							
		132' C/A 40° ½ quartz vein with chlorite							
		Rock now very heavily chloritized with carbonate(?) stringers							
		133' - heavily chloritized and sheared zone 2" wide C/A 45°							
		139' C/A 3mm. carbonate stringer 30° Rock still brecciated but chloritization is less than before							
		140-150 2.0 ft. core lost							
		143 C/A 70 - 75° trace of disseminated (pyrite, carbonate(?)) stringers are still common							
		146-148 crushed and broken core with poor recovery. The core is heavily chloritized especially visible along the tiny randomly oriented shears							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		150' - The rock might well be an altered siltstone or other fine grained sediment which has been re-chrysalized and heavy chloritization of the feldspars has occurred. The grain size is .1 mm. and quartz is not common nor are mafics although the mafics may have been completely chloritized. It contains numerous carbonate stringers with random orientations. The larger quartz veins have C/A's of 45°							
		150-160 0.5 ft. core lost							
		158' 2 cm. wide quartz vein C/A 45° which contains chloritized mafics or blebs of mafics. The contacts are extremely sharp. The quartz looks as if it pushed a pre-existing chloritic vein apart and then formed							
		- some of the carbonate veins also appear to have formed in a similar manner - at 161' one noted							
		- these veins appear to be completely lacking in mineralization							
		- The quartz veins cut the calcite(?) veins and so are a later feature							
		- I would guess the major structure to be almost vertical							
		165' - the randomly oriented carbonate stringers are common with the regular (C/A 45°) carbonate stringers are thicker .5 cm. thick on the average							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		162'- extremely fine grnd.sulfides noted along FP's with random orientations - they may not be sulfides as they are extremely hard to see							
		174' 2 cm. quartz vein with chloritized material along its contacts about .2 cm.' thick C/A 45° - The core immediately around this vein seems to be less chloritic							
		174.5 3 cm. quartz vein C/A 45° The quartz appears to have incorporated calcite and chlorite in it and it itself appears to be brecciated							
		179 The quartz veins themselves show evidence of having been displaced and there is little chloritic material in the quartz vein here so the core is very chloritic - excellent sample of structural complexity at 179' - where there are many quartz veins the core appears to be bleached of chloritic material and has a paler green color							
		182.5 4cm. quartz C/A 30° very chloritic stringers too C/A 40°							
		183 - heavily bleached zone 1' wide, with 3 cm. quartz vein C/A 20° and numerous chloritic stringers - possibly a fault zone too! as the core is brecciated.							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE N ^o	FOOTAGE		LENGTH			
from	to			from	to				
		183-185 - heavily brecciated zone - less chloritic than normal as one might expect in a fault zone because of hydrothermal bleaching.							
		180-190 1.0 feet core lost							
		198.5 - Possibly small fault.							
		203' - chloritic veins Where these chloritic veins occur the core contains less chlorite than before.							
		210' 0.5m - carb stringe C/A 45 ^o Still lots of irregular stringers.							
		200-210 0.5 feet core lost							
		215' Rock appears to be fractured all to hell with carbonate cement in the irregular stringers.							
		214' 3cm wide bleached zone of what once was very basic rock. C/A ~45 ^o							
		There is less evidence than before of grain size except for chloritized mafics (?) - start of minz'd zone(?)							
		216' Pyrite noted on FP's WC/A 10 ^o							
		The fine grained rock may be the rock which contains the minz'n							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu
from	to			from	to		
		The most common joint C/A is 45°. I suspect the mineralized zone is a siltstone - minor pyrite and cpy is noted in FP's (irregular) in the rock - the rock may even be a chert!					
		The siltstone (?) has finely dissolved pyrite in it and pyrite along FP's. The fractures are irregular but 45° is the most common one.					
		210-220 0.5 feet core lost					
		224.5 Pyrite in a gouge zone 5 cm wide.					
222		The fractures irregular and regular contains fine grained pyrite up to 1mm wide with occ'l blebs - the rock appears to be more silicious than before although it retains its fine grained appearance.	C22651	210.0	220.0	10.0	.02
			C22668	220.0	224.0	4.0	.04
			C22652	224.0	230.0	6.0	.30
			C22653	230.0	234.0	4.0	.52
			C22654	234.0	244.0	10.0	.26
			C22655	244.0	246.0	2.0	.03
		225 - Remnants of what might have been chert beds 2cm thick noted - these are contorted but have C/A's = 45°	C22656	300.0	310.0	10.0	.01
			C22657	310.0	320.0	10.0	.02
			C22658	340.0	343.0	3.0	.01
			C22659	348.1	348.3	0.2	TR
		227 Cpy and Py blebs to 2cm are common and they appear to be banded.	C22660	348.3	349.3	1.0	.01
			C22661	350.0	360.0	10.0	.01
			C22663	380.0	390.0	10.0	.01
		220-230 0.5 feet core lost	C22663	410.0	420.0	10.0	.01
			C22664	420.5	422.0	1.5	.01
		231 Good blebs of Cpy up to 2cm accross noted closely associated with pyrite.	C22665	425.0	426.0	1.0	.01
			C22666	430.0	440.0	10.0	.01
			C22667	469.0	470.0	1.0	.01
231.5		Quartzite (?) bed - highly fractured and sheared into small breccia - like pieces.	C22669	330.0	340.0	10.0	.01
		0.5cm pyrite blebs are common as is finer grained dissociated pyrite.	C22670	340.0	348.1	8.1	.01
			C22671	360.0	369.0	9.0	.01

0.324% Cu
20ft
(6.10m)

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
234		Siliceous brecciated zone with good amounts of pyrite and it appears to be a fault gouge zone. The common F.P. C/A is still 45°							
		237-240 - 10% pyrite in rock with C/A's from 45-60° and pyrite beds .5 cm. thick being very common - no cpy. noted in this though							
		- the quartz rich zones seem to fault and form gouge very easily.							
		235. Rounded U.B.(?) fragment seems very out of place in the rock							
		230-240 0.2 ft. core lost							
240		Extremely fine grained bleached rock which contained quite a bit of feldspar and has altered mafics							
		- it has a black gouge contact (C/A 45°) with the rock above it - the rock may have been originally an arkose and is now heavily altered and possibly metamorphosed as well - the rock appears to be very contorted @ 241' and this may indicate a turbidity current in a grey wacke(?)							
		245'-46' - black ufg'd rock which contains finely disseminated pyrite and probably chalco pyrite too - it has a 1 cm. wide gouge zone in the centre of it with C/A 40° - the fault has sericite like mud in it.							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		246 - 248.5 - Faultgouge - intensely sheared							
248.5		Siliceous fractured rock - extremely fine grained appears to have a C/A contact - 45° - has finely disseminated pyrite - possibly a chert.							
		249-250.5 - fault zone							
		240-250 0.5 ft. core lost							
		C/A's still mostly 45° especially small shears and prominent joints.							
		250-260 2.8 ft. core lost							
		- siliceous rock has tiny black irregular stringers 1mm. thick in it.							
		260-270 2.8 ft. core lost							
		273' strip 1 cm. wide C/A 15°							
		277' 1 cm. white quartz band C/A 45°							
		281' Excellent banding - black and white bands C/A 45°							
		- some of the quartz is a pale pink							
		284.5 - 285 fault zone							
		280 -290 2.0 ft. core lost							
		298.5 fault zone 6"							
		300.5 6" fault zone C/A 45°							
		290-300 3.5 ft. core lost							
300.5		Pale green heavily altered sediment with 1 mm. grain size. The mafics appear to be completely chloritized. has black carbonaceous bands 3 mm. C/A 45°							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		306' - Fault zone with carbonates The rock contains very fragmented disseminated pyrite and probably chalco pyrite too Pyrite also occurs in irregular quartz grains in the rock. The rock appears to be extremely heavily altered and probably re-chrysalized to a moderate degree 300-310 0.5 ft. core lost 310-312 - heavily altered and sheared gouge - possibly a big fault. 310-320 0.2 ft. core lost							
319.6	320.6	319.6-320.6 1" quartz band C/A 45° - contains black 2 mm. bands							
320.6		as before and contains disseminated pyrite							
323.5	326.0	Heavily altered and gouged zone							
		327 4" quartz band							
		328 1" Fault zone with pyrite 320-330 0.2 ft. core lost 331 thin lmm. pyrite bands noted C/A 35°							
338		Rock is bleached version of one before it with larger feldspar grains and tiny lmm. thick chloritic veins 330-340 0.3 ft. core lost 343-344 1' quartz band - very heavily fractured 341 - possibly lmm. band of chalco pyrite							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		345' - Pyrite seems to be "sweating out" with quartz in random orientations in the rock.							
		343-344 - quartz has gouge contacts with a C/A = 45°							
		347.5 2 cm. quartz band C/A 45°							
		348.1 - 348.3 5cm. Black gouge - very pyritic							
348.3	349.3	Black siliceous band - highly distorted with cemented fractures, 2 mm. disseminated pyrite blebs							
		340-350 0.2 ft. core lost							
349.3		Drak rock - probably contains a lot of mafics grain size of 1mm. - irregular pyrite blebs, some minerals (feldspars?) appear to be weathered out, the odd purple mineral possible hematite staining disseminated pyrite, chrystals have a "matted" appearance							
		350-360 1.5 ft. core lost							
		361 1 cm. shear C/A 15°							
		- heavily chloritized							
		365 6" heavily chloritized band C/A 45°							
		360-370 0.5 ft. core lost							
		371 quartz band for 2" 5mm. thick							
		- they have a sweated out appearance							
		375-376 chert(3) band with contact							
		C/A's = 45° - it contains inclines of the matted rock							
		370-380 0.5 ft. core lost							

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DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		381 5mm. slip with carbonate C/A 45°							
		383.5 quartz eyes 3 cm. across							
		384 6" Fault gouge - very heavily chloritized							
		386 6" fault gouge							
		There is commonly pyrite developed along the slips and shears							
		388' - still finely disseminated pyrite and chalco pyrite (?)							
		380 -390 0.3 ft. core lost							
		392' slip C/A 25° - pyrite developed along it							
		394-398 crushed and broken rock							
398		Rock as before but the chrystal "matting" is less obvious, pervasive chloritization and the feldspars are completely altered grain size is probably about 1mm.							
399		Chrystal matting again							
		390-400 1.5 ft. core lost							
		404' several 5mm. quartz bands with C/A = 45°							
		408 - bleached areas 5 cm. plus across in the rock - they appear to have been chlorite at one time.							
		- irregular borders and pyrite is still common both in the inclines and in the bleached areas							
		400-410 0.8 ft. core lost							
		411 C/A 45° Black siliceous zone with 5% pyrite and possibly chalco pyrite too							

RIO TI O CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE NO	FOOTAGE		LENGTH			
from	to			from	to				
		There seems to more pyrite in the rock when the black siliceous bands are noted. The pyrite occurs as disseminated blebs and as tiny irregular veinlets which might be "sweated" out of the rock by a metamorphic process							
		415.5 2cm. of fault gouge							
		410-420 0.2 ft. core lost							
420.5	422.0	The rock is as before but it contains highly irregular quartz areas and the rock appears to be bleached. It contains only minor disseminated pyrite							
		422-425 Crushed and broken core with gouge zones							
425	426	Siliceous bleached rock - contains disseminated and fracture filling pyrite							
		428-428.5 crushed and broken core							
		429 - rock is fractured and cemented 420-430 0.5 ft. core lost							
		431-433 quartz and carbonate veins with random C/A's very common and they are up to 5mm. thick.							
		434.5-436 lost core							
		438 - pyrite common as is the unknown purple mineral							
		430-440 2.0 ft. core lost							

RIO TIO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		446 4" bleached rock with irregular chlorite mafics in it C/A 25°							
446.5	469.5	Ufg'd heavily altered rock has 1mm. grain size, no matted crystal appearance and mafics completely chlor- itized and feldspars completely altered - the grain boundaries are very indistinct. 440-450 1.0 ft. core lost 450- C/A 5° on a quartz vein with inclines - no mineralization noted							
		453 slip C/A 40°							
		455 1' irregular quartz blotches							
		456 Rock appears to be heavily sheared 450-460 0.2 ft core lost 461 irregular quartz areas 1' wide - like its been extremely heavily distorted due to metamorphism and/or compaction. The quartz stringers go in all directions							
		463 - still disseminated and "sweated" pyrite							
		469 2" fault gouge with a 6" siliceous layer showing heavily chloritized mafics with irregular borders							
		460-470 0.3 ft. core lost							
469.5	472	A brecciated zone with calcite cementation							

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		469 sheared fractured and cemented siliceous rock with chloritic mafics - it contains lots of pyrite and probably chalco pyrite too. The pyrite is disseminated and also forms a border to the zone which is 2" wide							
		470-480 0.5 ft. core lost							
		473 siliceous band 1 cm. wide C/A 30°							
		475: still disseminated pyrite and possibly chalco pyrite too							
		476.5 small fault gouge							
		477.5 broken and crushed core							
		480-490 1.8 ft. core lost							
		478-482 Rock is brecciated but still held together possibly by carbonate stringers acting as cement, C/A's of stringers is 45°-60°							
		- quite a bit of pyrite noted too							
		- evidence of minor displacement of the stringers							
		488-489							
		Rock has numerous randomly oriented carbonate stringers up to 2 cm. thick							
		- pyrite cubes up to 2mm. noted							
		493 - pyrite noted along seams as elongate blebs							

RIO TITANIUM CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		495' - pyrite belbs noted in distorted area of rock							
		498-499' - highly irregular carbonate blebs and stringers C/A 50° up to 1 cm. thick							
		490-500 1.5 ft. core lost							
		500' End of hole - still in disseminated pyrite							
		all casing pulled							
		2' H. casing and casing shoe lost in original 45° DDH #1							
		END OF HOLE							
		DRILLED BY CANADIAN LONGYEAR LIMITED							

DDH 2

R' TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

LOCATION: 1 & 70 N
 1 & 70 W
 AZIMUTH:
 DIP: - 45°
 STARTED: August 1970
 COMPLETED: September 1970

PROPERTY:
 CLAIM No:
 SECTION:
 LOGGED BY:

LENGTH: 461 ELEVATION: 3500'

CORE SIZE: NQ DATE LOGGED:

DIP TESTS: NONE

PURPOSE:

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH		
from	to			from	to			
0	42	Casing - 8' of core, 7½' recovered						
42	44	Fine grained altered green colored rock, it appears to be heavily altered and bleached. It has prominent joints with a C/A = 30° and possibly layering with C/A = 30° but the opposite side. It appears to be mostly feldspars with chloritized mafics and possibly some carbonate. - only minor pyrite was noted - possibly this is the leached version of the rock below it.						
44		Dark grain fine grained rock - probably with a sedimentary origin. It appears to be mostly feldspars and completely chloritized mafics. It has numerous joints with random orientations. - the rock seems to have a higher specific gravity than other rocks - carbonate and chlorite are common along the joints and slips.						
		51-55' Crushed and broken rock but the recovery seems to be OK.						

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		Tiny 3 mm wide siliceous stringers with C/A 45° are seen every 15 cm. or so. 50 to 60 - 8½' of core recovered							
		59' Calicte band 2 cm. thick with C/A 15° The rock around it appears to be quite calcitic. From 60 - 70 9.7' recovered.							
		64' - 1" quartz band with chloritized mafics along its boundaries. The rock around this seems bleached and more siliceous. C/A = 45°							
		65' - 1" quartz band as before. C/A = 30°							
		66' - Siliceous area with rusty fracture plains and possibly temerite along them?							
		67.5' - Large quartz areas with chloritized mafics up to 2 cm. across. The rock appears to be bleached where the chloritized mafics occur in the quartz areas.							
		69' - .5 cm. chloritic slip C/A = 20°							
		71' - 2" black siliceous band C/A = 45°							
		There are still numerous black tiny (probably siliceous) stringers in the rock with random orientations.							

RIO Tinto CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		74' Quartz areas are very irregular but a rough C/A = 45° prominent.							
		75' The rock is essentially chlorite with a bright green color. It is very heavily sheared with most of the orientations being 45°. Lots of disseminated pyrite.							
		70 - 80 7' of core recovered							
		80 - 90 7.5' of core recovered							
		90 - 100 8' of core recovered							
		100 - 110 9' of core recovered							
		86 - 87.5' Fault gouge chloritic with pyritized pyrite disseminated throughout.							
			C 22676	95	100	5'	TR		
			C 22677	100	102.5	2.5'	3.80		
89.5	92.0	Bleached siliceous area with quartz bands up to 2 cm. with an C/A = 45°	C 22678	102.5	110	7.5'	.16		
92.0		Fine grained chloritic rock with numerous slips. Average C/A = 45°							
98.0		C/A = 90° on a fault slip							
98.0	100.0	Siliceous band with disseminated pyrite							
100.0	102.5	Massive sulfides - appears to be 1/2 chalcopyrite and 1/2 pyrite. The C/A = 45°							
		103.0 - 103.5 is massive pyrite.							
102.5		Siliceous pyritic rock extremely fine grained. The siliceous stuff appears to be on either side of the mineralization. Minor chalcopyrite							

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		109 - Slip C/A = 30° 1 cm. wide							
		114.5 - 6" chalcopryite blebs appear to be closely associated with 1" C/A 45° fault.							
		115' - 6" fault with pyrite							
116		116' - 6" of chalcopryite blebs. Disseminated chalcopryite and pyrite is common.	C 22679	110	115	5'	.54		
			C 22680	115	120	5'	.12		
			C 22681	120	125	5'	.31		
		126-128 Crushed and broken rock with quite a bit of gouge.	C 22682	125	130	5'	.53		
		130 Good seams of chalcopryite							
		134-168 Fault zone - poor recovery, crushed and broken rock and gouge. Pyrite and chalcopryite in the quartz rich rock - extremely poor recovery.	C 22683	130	140	10	.19		
			C 22684	140	150	10	.58		
		110-120 7' of core recovered							
		120-130 6.5' of core recovered							
		130-140 4' of core recovered							
		140-150 4' of core recovered							
		150-160 4' of core recovered	C 22685	150	160	10	.47		
		160-170 3' of core recovered							
		170-180 9' of core recovered							
168		Very fined grained rock which appears to have been a siltstone. It is dark green in color and contains much disseminated pyrite and pyrite also occurs along irregular seams.	C 22686	172	177	5	.11		

160' → 160' to 160'

RIO TITANIUM CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		175 - 176 Core is 15% pyrite in seams and disseminated.							
		178 - 182 Crushed and broken core with lots of small gouge zones with C/A = 30°	C 22687	180	190	10	.05		
		184.5 5% pyrite seams							
		185.0 Chalcopryrite and pyrite	C 22688	190	200	10	.09		
		186.5 Gouge and shear zone							
		180 - 190 8' of core recovered							
		190 - 200 7.5' of core recovered							
		200 - 210 9.2' of core recovered	C 22689	200	210	10	.20		
		210 - 220 9.8' of core recovered							
		220 - 230 9.5' of core recovered	C 22690	210	220	10	.13		
		230 - 240 9.5' of core recovered							
187.0		Light green colored extremely fine grained siltstone. Disseminated pyrite and chalcopryrite.	C 22691	220	230	10	.14		
		191.5' Lots of pyrite and possibly chalcopryrite.							
		196.5' Black banding C/A = 30°	C 22692	230	240	10	.10		
		203.0' Blebs of chalcopryrite (?) and pyrite.							
		204.5' Lots of chalcopryrite							
		207.5 Lots of chalcopryrite							
		210.0' Fault with C/A = 20° ½" wide Lots of gouge.							
		213.0' Chalcopryrite seams C/A = 40° Still lots of disseminated pyrite. Still numerous sulfide seams mostly with C/A = 45° but the strike of the C/A is constantly changing.							

RIO TI. J CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		229 - ½" fault zone C/A = 15°							
		234 - 234.5 Crushed and broken rock							
		238 - Thin 1 mm. bands black and white which are contorted and have a C/A approx- imately 45°.							
		240 - Lots of pyrite							
		241 - Contorted black and white bands 1 mm. thick. Lots of pyrite.							
241	249	Lighter colored very fine grained rock. Possibly a siltstone.							
249		Dark green siltstone - disseminated pyrite is extremely fine grained.	C 22693	240	250	10	.10		
		256' ½" chalcopyrite and pyrite seam C/A =35°	C 22694	250	260	10	.14		
		From 240 - 250 7.5' of core recovered	C 22695	260	270	10	.04		
		From 250 - 260 8' of core recovered							
		From 260 - 270 9.5' of core recovered							
		From 270 - 280 9.0' of core recovered							
		From 280 - 290 6.5' of core recovered							
		From 290 - 300 5.0' of core recovered							
		From 300 - 310 2.5' of core recovered	C 22696	295	305	10	.04'		
		From 310 - 320 2.5' of core recovered							
		From 320 - 330 1.0' of core recovered							
		From 330 - 340 2.5' of core recovered							
260	276	Black and white bands C/A = 45°. Distorted bands appear to be more siliceous. Bands 1 mm. thick, still lots of disseminated pyrite, minor chlorite slips.							

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE NO	FOOTAGE		LENGTH			
from	to			from	to				
		270-276 Crushed and broken core with gouge							
		275 Minor chalcopryrite with lots of pyrite							
276		Siliceous light green extremely fine grained rock with disseminated pyrite. Numerous pyrite seams too. - Still probably a siltstone though.							
		283-285.5 Fault C/A = $0^{\circ} \frac{1}{2}$ " wide							
		290.5 2" of gouge							
		291.0 Series of slips C/A 30°							
294	333	Broken and crushed rock as from 276 on but extremely poor recovery. Rock that can be seen is as before with occasional layered bands. - lots of gouge too, perhaps slightly more siliceous than before.							
		311 Pyrite seams C/A = 35°							
		311-320 What core there is is gouge and heavily mylonitized.							
		333.5 1 cm. slip C/A = 45°							
		335-337.5 Crushed and broken rock - extremely poor recovery. Relatively siliceous bleached chloritic rock with clusters of disseminated pyrite grains.							
		340-347 8" of crushed and broken core - siliceous rock.							
		340 Tiny pyrite grains along irregular fractures.							
		347 Possible bedding fractures in bedding							

RIO TI. J CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		features in core with C/A = 45°							
		From 340-350 3' of core recovered							
		From 350-360 4' of core recovered							
		Starting at 340' siliceous pale green rock with many irregular and randomly oriented fractures. The rock might well be a chert occasional areas up to 1 cm. across of chloritized mafic material (?) The rock can be heavily fractured.	C 22697	350	360	10'	.03		
		358 Chalcopyrite blebs noted closely associated with chloritic areas in the quartz. Possibly run this for gold.							
		358.5-361 Crushed and broken core and much gouge - possibly a fault zone.							
		366 1½" slip C/A = 30°							
		369 6" fault zone							
		From 360-370 8' of core recovered.							
		From 370-380 9.8' of core recovered.							
		From 380-390 7.8' of core recovered.							
		From 390-400 9.0' of core recovered.							
371		Pale pinkish green rock with siliceous areas and areas of chloritic mafics. Most of the joints have a C/A = 45°. The rock is very fine grained and has the crystal matt texture common in DDH #1. There are numerous small gouge fault zones.							

RIO TI J CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH			
from	to			from	to				
		The feldspars are mainly with minor mafics.							
		374 Lots of chloritic layers with C/A = 60°							
		The rock still has lots of randomly oriented carbonate stringers.							
381		The rock contains more chloritic stringers but is essentially the same as before at 381'.							
		388.5-391 Mainly sand, poor recovery. Minor pyrite noted in some quartz areas.							
		395 ½" chloritic slip.							
		395.5-397 Fault gouge.							
		400 Fair amount of pyrite in quartz areas in core.							
		400.5-401 Fault gouge.							
		402.3-402.8 Fault gouge.							
		405 Tiny seams of chalcopyrite and pyrite closely associated with quartz and chloritic stringers.							
		407 Lots of quartz and chloritic stringers and patches, carbonate areas too.							
		From 400-410 9.5' of core recovered.							
		From 410-420 9.8' of core recovered.							
		From 420-430 9.5' of core recovered.							

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE N ^o	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
409		Light colored green rock with lots of disseminated pyrite and numerous randomly oriented carbonate stringers. The feldspars appear to be chloritized as are the fine grain mafics. It has the crystal matt texture similar to that in DDH #1.	C 22698	403	409	16'	.02		
		411 Matt 6" fault zone							
		416 Rock is very fractured and has irregular carbonate stringers cementing the pieces, numerous irregular chlorite stringers as well.							
		423 6" fault zone C/A = 30°.							
		424 ½" pyrite bleb with odd shape.	C 22699	426	430	4'	.02		
425	426	Green area - light green color. Disseminated pyrite and chloritic contacts: C/A = 30°							
		428 Trace of chalcopyrite and lots of pyrite.							
426		Back in 409 rock.							
		431 Lots of pyrite in seams up to 0.5 cm wide							
		436-438 Crushed and broken core.							
		439 More pyrite in seams with quartz.							

RIO TI O CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE Nº	FOOTAGE		LENGTH			
from	to			from	to				
		430-440 9.3' of core recovered.							
		440-450 9.5' of core recovered.							
		450-460 8.0' of core recovered.							
		460-461 1.0' of core recovered.							
		445 Siliceous area 6" wide with large 1 cm. plagioclase crystals (?) which show up poorly.							
		448 Offsetting of veins common.							
		450 1" chloritic carbonate stringers.							
		451 1" quartz stringer C/A = 20°. Shows 1" offsets.							
		456 6" crushed and broken core.							
		459.5 3" of gouge.							
		461 End of hole.							
		17' H casing and shoe pulled.							
		50' N casing and shoe pulled.							
		Nothing was left in the hole.							
		DRILLED BY CANADIAN LONGYEAR LIMITED							

DDH 3

RINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

LOCATION: 2S 2 + 50W

AZIMUTH: 90°

PROPERTY:

DIP: 50°

LENGTH: 541

ELEVATION:

CLAIM No:

STARTED: September 4, 1970

CORE SIZE: NQ

DATE LOGGED: Sept. 4-11/70 SECTION:

COMPLETED: September 11, 1970

DIP TESTS: -

LOGGED BY:

PURPOSE:

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH		
from	to			from	to			
0	83	Overburden						
83	247	Grey-green altered rock (possibly a volc. such as andesite). It has a soft grey-green matrix with clusters of a darker mineral giving a spotted appearance.						
		Many stringers and bands of the black mineral, quartz, chlorite, and some calcite. Most cut core at 45° but they are frequent and irregular and occur at just about all angles. They intermix and all types cut all types.						
		Only mineralization seen is disseminated pyrite which occurs as tiny pinhead size specks in the core. Generally less than .1% pyrite with areas up to .5%.						
		104-136 The greenstone appears much darker here and does not appear spotted although it is probably a different phase of the same rock type. Alteration and mineralization is the same as above throughout.						
		135-135½ About 1% pyrite on fracture surface at 45° and disseminated.						
		No other sulphide seen.						
		The light grey-green and dark green greenstones appear to be intermixed.						

RIO T' O CANADIAN EXPLORATION LIMITED

KEL-GLEN

DIAMOND DRILL RECORD

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		150-164							
		Much more altered, just like clay							
		162-164							
		1' core lost							
247	251	Similar to 83-247 only lighter in colour, less chlorite, softer (about 4) probably same or similar rock type - variation of same greenstone.							
251	256	Dark green greenstone, increase in chlorite							
256	261	As 247-251 light grey-green; a few spots are less altered but quartz stringers and chlorite clusters are still present. The fractures are generally at 45° with more at 30° but fractures are present at many angles.							
261	269	As 251 to 256 although it appears to be more altered.							
269	270.5	As 247-251. More altered.							
		270.5 Breccia of fragments of dark greenstone in matrix of light greenstone							
270.5	271	As 251 to 256							
271	273.5	As 247 to 251 Breccia at 273.5							
273.5	281	As 251 to 256 very altered							
		279 - 281 Specks of pyrite - tiny pin- head size disseminations of sulphides (<0.2%)							
281	296	Breccia - very hard black fragments in a fine-grained soft (3) black matrix. Still contains quartz veins cutting the rock contact at 45°	C 22672	281	291	10'	.01'		
		288.5 Band of same material, lighter in colour at 45° (2 feet wide)							
		287-295 1' core lost							

RIO T O CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

KEL-GLEN

FOOTAGE		DESCRIPTION	SAMPLE No	FOOTAGE		LENGTH	% Cu		
from	to			from	to				
		Specks pyrite scattered throughout (<0.3%)							
296	312	Greenstone breccia - soft (4), light grey-green, spotted, with darker fragments							
		296 Pyrite - .5%, also some extended areas of fine disseminations of pyrite (good example at 300.5)							
312	327	Greenstone, less altered and more pyrite both disseminated and on fracture planes, possibly up to 1% in some sections. Dark spots are probably chlorite.	C 22673	312	322	10'	.TR		
327	331	As 296 - 312 - lots of quartz stringers Pyrite is about 0.1%							
331	352	As 312 - 327 - quartz veins at 45° and 60° mainly .3% pyrite in splashes, associated with the dark chlorite ? spots and with quartz as fracture filling							
		350 More altered, softer (4) also chlorite ? and hematite ?? filled fractures at 30°							
		* The quartz in some large fractures has caused a breccia with fragments of greenstone in a quartz matrix							
352	536	As 331 - 352 but less altered and greener in colour - has areas of intense chloritization - generally < 0.1% py							
		At 388 0.5 → 1% Py on fracture planes (1 foot section)							
		415 - 416 1/2' core lost							
		422 - 424 1-1/2' core lost							
		407-411) Core more altered - very broken.							
		414-416) like mud in sections							
		422-424)							

