

Alteration Investigation

of

Hole K-14 (1000' - 1730')

Kim Claims, Kimberley B.C.

841865

Peter Price

April 1978

**PETER PRICE**  
CONSULTING GEOLOGIST  
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April 12, 1978

Mr. Earl D. Dodson  
Regional Geologist  
Chevron Standard Limited  
401 Marine Building  
355 Burrard Street  
Vancouver, B.C.  
V6C 2G8

Dear Earl,

Re: Alteration Investigation of Hole K-14  
(1000'-1730') Kim Claims, Kimberley, B.C.

The following relates to an examination of 121 thin sections from 61 specimens taken from this hole. The specimens covered footage 1155' to 1730'. No specimens were received from 1000' to 1155'.

Note: Two thin sections were cut from each specimen for closer identification of rocks and alteration.

The detail of each thin section is given in the accompanying notes and tables. Further, a section is included showing the various rocks and alteration types for the hole from 1155' to 1730'. I have also included a Legend showing the various numbers and colors used. There are no changes from previous reports.

Since all the above is self explanatory, the following remarks merely list my views resulting from this study.

OPINION

I find myself in a state of what might be termed "guarded optimism" regarding the latest results from deepening Hole K-14. The reasons for this opinion can be summarized as follows :-

- (1) On pages 4 and 5 in my report dated December 7, 1973 I stated, after reviewing the current ideas about the origin of the Sullivan orebody :

- (a) (bottom of page 4) "There may be, in other areas, no strict adherence to the 'favourable horizon'. In fact, it is entirely possible the ore bodies might occur at any horizon - even in the Creston! I realize that this statement would be classed as heretical in some quarters, but I believe it to be true."

Mr. Earl D. Dodson

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and (b) "whereas the dominant alterations in the hanging wall of the Sullivan are albite and chlorite (up to a height of 800 feet above the orebody), little is known about whether alteration of interest persists further up into the hanging wall. Therefore any alteration that is unusual and known to be located near known ore is worth further investigation. It is also true that if any of the above is valid, then future work should be based on these features, rather than a strict dependence on the assumed location of the 'favourable contact'".

(Some objection might be raised re the inclusion of the term "near known ore" but in a district sense it is not invalid).

Then at the bottom of page 7 there appears :

"At present I favour drilling deeper in, and also to the west of, the North Area."

- (2) The key term in all the above is "any alteration which is unusual." The lower part of K-14 certainly fits this description. From footage 1255' to 1730' the rock types and alteration effects are "unusual". Nowhere in the other holes drilled on the Kim claims is there such a concentration of pleochroic haloes and bands. I am becoming more and more convinced from all my other work in the Pre-Cambrian that the presence of these pleochroics is definitive. Moreover the increase in the geochem. Zinc results is, I believe, significant. There are other indications too numerous to mention here.

So that I am back to my original statement, listed above, about drilling to the west.

If you have some affection for the "favourable contact" theory, the following could be used as a basis for further exploration. The presence of so much argillite in K-14 would indicate that the hole did not reach the Lower Aldridge and is probably still in the Middle Aldridge. If this is true then the "favourable contact" should occur at shallower horizons to the west. The unusually steep bedding shown in the core also supports this idea.

I am sorry that it was not possible to demonstrate all the above to you "in the flesh" in Toronto, but I will be in Vancouver during May 17 to May 20 and would like to discuss it with you at that time.

Sincerely,



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# Legend

- 
- 1 Zn.
  - 2 Pb.
  - 3 Cu.
  - 4 Low Biref. Biotite (Higher Magnesium)
  - 5 Chlorite ① (Higher Magnesium)
  - 6 "Mixed"
  - 7 Pleochroics
  - 8 Muscovite
  - 9 Tourmaline
  - 10 "Spots"
  - 11 High Biref. Biotite (Higher Iron)
  - 12 Chlorite ② (Higher Iron)
  - 13 "Heavy" Sericite
  - 14 "Well to heavy" Carbonates
  - 15 Clinzoisite
  - 16 Epidote
  - 17 Secondary Amphibole

1000

1100

1200

1300

1400

1500

1600

1700

No specimens

Average Geochem  
pp.m.

Zn Pb

29 9



T.S. 395-417

Chloritized and sericitic  
Zone 1 quartzite + qtz. carb. veins?

1155'-1255'

T.S. 419-453

60 24

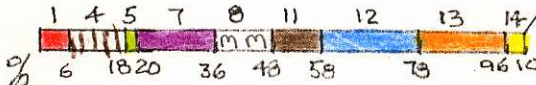


Zone 2 Sericitic + biotitic  
argillite (some f.g. quartzite)

1255'-1435'

T.S. 455-481

64 12

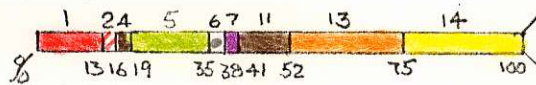


Zone 3 Sericitic + biotitic  
f.g. quartzite (some argillite)

1435'-1575'

T.S. 483-507

172 59



Zone 4 Biotitic + sericitic argillite  
with much carbonates

1575'-1695'

T.S. 509-515

74 11



Zone 5 Biotitic + sericitic argillite

1695'-1730'

1763

Hole K-14  
(1000'-1763')  
Scale 1" = 50 ft  
(\* pleochroics  
p. porphyroblasts)

HOLE K - 14

T.S.K.395 @ 1155'

Rating 1 - good section to show a fine grained quartzite in which sericite is the dominant alteration. This rock has been veined by high bi-ref. Chlorite 2 accompanied by moderate bi-ref. green biotite. Note that the biotite is often replaced by the chlorite (see 80.5-9.7).

T.S.K.397 @ 1156'

Rating 1 - good section to show a fine grained quartzite cut by quartz-carbonate-feldspar veins. There is disseminated pyrite in the veins. Note - no biotite or chlorite.

T.S.K.399 @ 1160'

Rating 0 - Rock is a sericitic quartzite which is very fine grained. High bi-ref. Chlorite 2 is disseminated throughout section and sometimes forms minute veinlets.

T.S.K.401 @ 1170'

Rating 1 - good section to show a bedded finegrained quartzite in which some beds show extremely heavy sericite (see northwest corner). There is less sericite in the other beds but these show low bi-ref. biotite and high bi-ref. Chlorite 2 - the latter sometimes replacing the biotite (see 66.1 - 11.0). There is also a trace of tourmaline (see 76.4 - 3.4).

T.S.K.403 @ 1180'

Rating 1 - good section to show a quartz vein. Disseminated throughout the background quartz mosaic are carbonates, muscovite and moderate bi-ref. Chlorite 1.

T.S.K.405 @ 1190'

Rating 2 - very good section to show a fine grained bedded quartzite, heavily altered to sericite and moderate bi-ref. biotite. Disseminated through this rock are porphyroblasts of moderate bi-ref. Chlorite 1, some of which show pleochroic haloes (see 80.4 and 5.6). Cutting the southern half of the section is a veinlet of high bi-ref. Chlorite 1.

T.S.K. 407 @ 1200'

Rating 0 - This rock is a quartz vein and resembles T.S.403 closely.

T.S.K.409 @ 1210'

Rating 1 - good section to show a change to a much coarser grained quartzite and which also contains large fragments of a fine grained quartzite. Dominant alterations are (1) high bi-ref. biotite (2) veinlets and disseminations of carbonates and (3) high bi-ref. Chlorite 1 often with carbonates and pyrrhotite? There is a trace of tourmaline and sphene.

T.S.K.411 @ 1220'

Rating 0 - Rock resembles T.S.409 in most respects except that there are no fragments and no chlorite.

T.S.K.413 @ 1230'

Rating 0 - Rock is the same quartz-carbonate vein type seen in T.S.403 and 407. It shows the same alteration.

T.S.K.415 @ 1240'

Rating 0 - Rock is the same coarse grained quartz mosaic as in T.S.413. It does however, show less carbonates, more background feldspar and more high bi-ref. Chlorite 1. Question - Is this a vein?

T.S.K.417 @ 1250'

Rating 1 - good section to show a change to an extremely fine grained sericitic argillite. There is one veinlet of pyrite with a trace of low bi-ref. Chlorite 1.

T.S.K.419 @ 1260'

Rating 1 - good section to show yet another coarse grained quartz mosaic but with more feldspar than in previous sections of this type. There is more carbonates also - generally as veinlets, but there is no chlorite.

T.S.K.421 @ 1270'

Rating 1 - good section to show a change to a biotitic and sericitic fine grained quartzite. Biotite is very fine grained but shows high bi-ref. Sericite and muscovite are disseminated throughout section. There is no chlorite.

T.S.K.423 @ 1280'

Rating 1 - good section to show a finely bedded argillite in which some beds show heavy moderate bi-ref. biotite with much disseminated pyrrhotite? Other beds show only sericite. There is a trace of moderate bi-ref. Chlorite 2 with the sulphide (see 73.3 and 15.7).

T.S.K.425 @ 1290'

Rating 0 - Rock is slightly different from T.S.423 being a fine grained biotitic quartzite. Pyrrhotite occurs in disseminations and veinlets accompanied by moderate bi-ref. Chlorite 2. There is also much sericite and muscovite.

T.S.K.427 @ 1300'

Rating 2 - very good section to show an argillite similar to T.S.423 but with many porphyroblasts of high bi-ref. Chlorite 2 with pleochroic haloes (see 82.0 and 25.4).

T.S.K.429 @ 1310'

Rating 1 - good section to show an argillite similar to T.S.423 and 427 but not only are there many Chlorite 2 porphyroblasts with pleochroic haloes but also many Chlorite 2 veinlets with some carbonates (see 71.0 and 6.6).

T.S.K.431 @ 1320'

Rating 1 - good section to show a change in rock and alteration. Rock is a fine grained biotitic quartzite. Alteration shows only slight sericite but many veinlets of two types :- (1) carbonates with Chlorite 2 rims and (2) only Chlorite 2 (see 67.2 and 13.0).

T.S.K.433 @ 1330'

Rating 1 - good section to show a change to a coarser grained quartzite. There is no biotite and only weak sericite. Carbonates are dominant and occur in veinlets with sulphides and in patches.



T.S.K.435 @ 1340'

Rating 1 - good section to show the same fine grained quartzite but with some changes in alteration. Sericite is only slight to well, and there is only a trace of carbonates. Dominant alteration is high bi-ref. Chlorite 2 as disseminations, in veinlets and associated with sulphides (see 77.5 and 15.3). Note that sulphides occur in quartz veinlets with the chlorite.

T.S.K.437 @ 1350'

Rating 0 - Rock is a slightly coarser grained quartzite cut by two types of veinlets : (1) carbonates and (2) pyrite and quartz - the latter often "dog-toothed." There is only a trace of Chlorite 2 and sparse sericite.

T.S.K.439 @ 1360'

Rating 1 - good section to show a change to a highly sericitic and biotitic argillite with high bi-ref. Chlorite 2 porphyroblasts with pleochroic haloes (see 73.0 and 22.2).

T.S.K.441 @ 1370'

Rating 1 - good section to show a rock and alteration that resemble that in T.S.439 in all respects, the only exception being that there is more py and Chlorite 2.

T.S.K.443 @ 1380'

Rating 1 - good section to show a change to a biotitic fine grained quartzite. High bi-ref. biotite is disseminated throughout section. Sericite is slight and there is no chlorite.

T.S.K.445 @ 1390'

Rating 1 - good section to show a return to a sericitic and biotitic argillite as in T.S.439 and 441. Again, there are numerous high bi-ref. Chlorite 2 porphyroblasts with pleochroic haloes (see 81.8 and 20.9).

T.S.K.447 @ 1400'

Rating 1 - good section to show a change back to sericitic pyritic fine grained quartzite. Note : no biotite or chlorite.

T.S.K.449 @ 1410'

Rating 0 - Rock resembles T.S.447 closely, the only exceptions being that there is disseminated high bi-ref. Chlorite 2 and some carbonates.

T.S.K.451 @ 1420'

Rating 1 - good section to show the same fine grained quartzite but in which the dominant alteration has changed to fine grained carbonates.

T.S.K.453 @ 1430'

Rating 1 - good section to show the same fine grained quartzite but in which carbonate veins carry pyrite, pyrrhotite and a trace of chalcopyrite (see specimen). Sericite and muscovite are sparse and there is no chlorite.

T.S.K.455 @ 1440'

Rating 0 - Rock is a fine grained quartzite. The only alteration of note is disseminated high bi-ref. Chlorite 2.

T.S.K.457 @ 1450'

Rating 1 - good section to show a change in alteration. Dominant is sericite which in some areas is extremely heavy and carries disseminated Chlorite 2 porphyroblasts (see 68.9 and 28.9). There are also bands of high bi-ref. biotite. Note : some sericite areas have sharp boundaries and appear to be late (see T.S.458 northeast corner).

T.S.K.459 @ 1460'

Rating 2 - very good section to show an extremely fine grained quartzite with much disseminated low bi-ref. biotite. This rock is cut by veinlets and patches of moderate bi-ref. Chlorite 2 with pleochroic haloes (see 70.8 and 22.4). There is one minute carbonate veinlet carrying a trace of sphalerite.

T.S.K.461 @ 1470'

Rating 1 - good section, the same rock as in T.S.459 but with some changes in alteration. There is much disseminated moderate bi-ref. Chlorite 2 with pleochroic haloes (see 81.9 and 10.1). Also, there is fairly heavy carbonates in veinlets and disseminations.

T.S.K.463 @ 1480'

Rating 1 - good section to show the same rock as in T.S.459 and 461 but no carbonates. There is, however, a zone in the southeast corner of extremely heavy sericite with the usual Chlorite 2 porphyroblasts with pleochroic haloes (see 65.5 and 23.9).

T.S.K.465 @ 1490'

Rating 2 - very good section to show a highly sericitic and biotitic argillite? It shows very good porphyroblasts of moderate bi-ref. Chlorite 2 with pleochroic haloes (see 74.2 and 16.5). It also shows a trace of ZnS (See 70.6 and 12.7) Note - this section could be used as a demonstrator.

T.S.K.467 @ 1500'

Rating 0 - Rock is a sericitic and biotitic fine grained quartzite. Note - no chlorite.

T.S.K.469 @ 1510'

Rating 1 - good section to show a sericitic quartzite, with less biotite, but many Chlorite 2 porphyroblasts. There is one minute carbonate veinlet.

T.S.K.471 @ 1520'

Rating 2 - very good section to show a sericitic and biotitic quartzite (argillite) with many low bi-ref. Chlorite 2 porphyroblasts. One unusual feature is a sulphide veinlet also containing carbonates and Chlorite 2 (see 75.1 and 12.3).

T.S.K.473 @ 1530'

Rating 2 - very good section to show a highly sericitic argillite with a definite change in chlorite. There are a large number of low bi-ref. Chlorite 1 porphyroblasts with the usual pleochroic haloes but also some "mixed" Chlorite 2 (see 70.9 and 14.2). Also there are some Chlorite 1 "spots" (see 67.7 and 5.9).

T.S.K.475 @ 1540'

Rating 1 - good section to show a highly sericitic and biotitic argillite with fewer Chlorite 2 porphyroblasts than usual. However, some contain sulphides (Tr.ZnS) (see 81.0 and 19.7).

T.S.K.477 @ 1550'

Rating 1 - good section to show a change in rock and alteration. The rock is a fine grained quartzite. Dominant alterations are : (1) heavy sericite with many muscovite crystals, and (2) heavy carbonates in veinlets and disseminations. Note - no chlorite or biotite.

T.S.K.479@ 1560'

Rating 0 - Rock and alteration resemble T.S.477 in all respects.

T.S.K.481 @ 1570'

Rating 1 - good section to show a biotitic quartzite cut by a network of veinlets consisting of low bi-ref. Chlorite 2 and some pyrite (see 70.9 and 10.0). Sericite is rather sparse.

T.S.K.483 @ 1580'

Rating 1 - good section to show a highly sericitic argillite cut by a network of carbonate veinlets. Pyrite occurs in the veinlets with the carbonates. Note - there are some porphyroblasts but these are high bi-ref. Chlorite 1 (see 76.0 and 12.0).

T.S.K.485 @ 1586'

Rating 1 - good section to show a fine grained quartzite cut by a carbonate vein which also shows heavy sulphides - mainly pyrite but possibly a trace of chalcopyrite. Sericite varies from negative to heavy, also in veinlets. Note - no chlorite or biotite.

T.S.K.489 @ 1601'

Rating 1 - good section to show a sericitic argillite which has been heavily altered by carbonates. Besides the usual veinlets there are a number of "spots" of carbonates generally "rimmed" with gunk. There are also rounded patches of quartz, some of which contain traces of sphalerite.

T.S.K.491 @ 1610'

Rating 1 - good section to show a change to a biotitic and sericitic argillite. There is also much carbonates, with which is associated high bi-ref. Chlorite 1 (see 78.3 and 5.6). The Chlorite also attacks biotite.

T.S.K.493 @ 1620'

Rating 2 - very good section to a banded argillite. This section is notable for successive bands of heavy biotite separated by bands of heavy carbonates with sulphides and Chlorite 1 that show some pleochroic haloes (see 75.3 and 28.7).

T.S.K.495 @ 1630'

Rating 2 - very good section to show an extremely fine grained argillite. Dominant alterations are sericite and low bi-ref. biotite. There are, however, veinlets containing pyrite and moderate bi-ref. Chlorite 1 (see 74.2 and 24.6). Also there are many porphyroblasts of Chlorite 1.

T.S.K.497 @ 1640'

Rating 0 - Rock resembles T.S.495 closely. There are some Chlorite 1 porphyroblasts but none with pyrite. There is one heavy pyrite band.

T.S.K.499 @ 1650'

Rating 0 - Rock resembles preceding two sections - the only difference being that there is a pyrite veinlet with low bi-ref. Chlorite 1 and in T.S.495.

T.S.K.501 @ 1660'

Rating 1 - good section to show a definite change to a coarser grained quartzite with feldspar grains in background. There are minor quartz veinlets but NO sulphides, chlorite, biotite or sericite - the only alteration of note being disseminated carbonates.

T.S.K.503 @ 1670'

Rating 1 - good to show a change back to an argillite. Dominant alterations are (1) heavy disseminated carbonates often with pyrite and a trace of sphalerite (see 65.7 and 15.1), and (2) low bi-ref. biotite. There are some porphyroblasts of Chlorite 1 but sericite is sparse.

T.S.K.505 @ 1680'

Rating 1 - good section to show a change to a coarse grained quartz feldspar vein? Only other minerals present are disseminated carbonates. Note it resembles T.S.403 - 415 except there is no Chlorite 1.

T.S.K.507 @ 1690'

Rating 1 - good section to show a change to a fine grained quartzite in which the dominant alteration is heavy carbonates. They occur both disseminated and as a vein with pyrite.

T.S.K.509 @ 1700'

Rating 1 - good section to show a banded fine grained biotitic and sericitic argillite. Banding is narrow and depending on the amount of biotitic is distinctive.

T.S.K.511 @ 1710'

Rating 2 - very good section to show the same banded fine grained biotitic and sericitic argillite as in T.S.509. This rock is cut by pyrite and chlorite veinlets. The latter is composed of pyrite, sphalerite and moderate bi-ref. Chlorite 2 with "mixed" Chlorite 1 R.P. and pleochroic haloes (see 84.4 and 24.5 for start of this vein).

T.S.K.513 @ 1720'

Rating 2 - very good section to show the same rock and general alteration as in T.S.511 but with much more pyrite in veinlets and disseminations. The latter often occur in carbonates. The veinlets contain moderate bi-ref. Chlorite 1 with "mixed" Chlorite 2 (see 74.5 and 25.7). There are some Chlorite 1 porphyroblasts also.

T.S.K.515 @ 1730'

Rating 1 - good section to show the same rock and alteration, the only difference being the presence of many Chlorite 1 porphyroblasts with pleochroic haloes (see 80.5 and 10.0). Pyrite occurs mainly as veinlets.

T.S. No. K	Hole No.	Footage	Rating	Logged as:-	Rock shown by Thin Section:-
395	K-14	1155	1		Chloritized sericitic quartzite
397	"	1156	1		Quartzite veined by quartz-carb.
399	"	1160	0		" sericitic with Chlorite(2)
401	"	1170	1		" " " " " + biotite
403	"	1180	1		Quartz carbonate vein with Chlorite(1)
405	"	1190	2		Quartzite veined by Chl(1) and with Chl(1) porphyroblasts
407	"	1200	0		Quartz carbonate vein with Chl(1)
409	"	1210	1		Coarse grained quartzite with fragments f.g.
411	"	1220	0		" " " " "
413	"	1230	0		Quartz carbonate vein with Chl(1)
415	"	1240	0		" " " with increase in Chl(1)
417	"	1250	1		Highly sericitic argillite with sulphide vein.
419	"	1260	1		Quartz vein? with carbs and much feldspar
421	"	1270	1		Biotitic & sericitic fine grained quartzite
423	"	1280	1		Heavily biotitic and mineralized argillite?
425	"	1290	0		" " fine grained quartzite
427	"	1300	2		" " " " argillite with Chl(2) porph.
429	"	1310	1		" " " " " " Chl(2) & porph.
431	"	1320	1		" " " " quartzite " carb. and Chl 2 veinlets
433	"	1330	1		Carbonated quartzite
435	"	1340	1		Chloritic fine grained quartzite
437	"	1350	0		Quartzite with carb. and py veinlets

T.S. No. V	Hole No.	Footage	Rating	Chlorite		"Mixed" Chlorite		Pleochroic Haloes in Chlorite	
				1 deg.	2 deg.	1 deg.	2 deg.	1(deg.)	2(deg.)
395	K-14	1155	1	—	and replacing bio. 7.4 V patches	—	—	—	?
397	"	1156	1	—	—	—	—	—	—
399	"	1160	0	—	5.9 well kg. diss + V	—	—	—	—
401	"	1170	1	—	7.7 sli V + after bio	—	—	—	—
403	"	1180	1	5.4 sli diss with carb	—	—	—	—	—
405	"	1190	2	5.2 hea in vein 6.0 well porphyroblasts	—	—	—	9.7 H. sli in porph	—
407	"	1200	0	5.0 sli diss with carb	—	—	—	—	?
409	"	1210	1	Tr 8.7 with carb + sulph	—	—	—	—	—
411	"	1220	0	—	—	—	—	—	—
413	"	1230	0	3.5 sli with carb	—	—	—	—	—
415	"	1240	0	and well V, 7.9 sli with carb	—	—	—	—	—
417	"	1250	1	3.6 Tr with sulph	—	—	—	—	—
419	"	1260	1	—	—	—	—	—	—
421	"	1270	1	—	—	—	—	—	—
423	"	1280	1	—	5.3 sli with sulph	—	—	—	—
425	"	1290	0	—	4.8 sli " " mV	—	—	—	—
427	"	1300	2	—	8.0 well in porphyroblasts	—	—	—	10.0 H in porph
429	"	1310	1	—	6.7 well in vein " "	—	—	—	9.6 H in porph.
431	"	1320	1	—	5.6 well V.	—	—	—	—
433	"	1330	1	—	4.2 Tr V.	—	—	—	—
435	"	1340	1	—	and with sulph 8.0 well diss + V	—	—	—	—
437	"	1350	0	—	4.7 Tr	—	—	—	—



T.S. No. K	Hole No.	Footage	Rating	Amph.	Epidote	Biotite	Sericite	Quartz	Feldspar	Carbs.	Sulphides	'Gunk' (Sphene)
395	K-14	1155	1	—	—	Well with CW V 21.0 col-L.G.	Ser. exthea Bk.	Hea BK	—	—	Py in V.	Gunk Tr
397	"	1156	1	—	—	—	Ser sli Bk	Hea BK PV	Well V	Well V	Py inqtz carb	" hea V.
399	"	1160	0	—	—	—	Ser neg to hea diss	Hea BK	Bk sli	Tr diss	Py Tr diss	" Tr diss
401	"	1170	1	—	—	sli diss 17.3 col-B.	Ser neg to exthea	Hea BK	Bk sli	—	—	Tourmaline Tr Gunk Tr diss
403	"	1180	1	—	—	—	Musc. sli diss	Bk ext hea c.g.	Tr BK	Neg to hea diss	Py? Tr in carb	—
405	"	1190	2	—	—	Hea diss fig 21.0 col-B	Ser ext hea Bk	Bk " "	—	—	—	Gunk in vein
407	"	1200	0	—	—	—	Musc sli diss	Bk ext hea c.g.	Tr BK	Neg to hea diss	—	—
409	"	1210	1	—	—	Hea diss fig 26.8 LY-DB	Ser neg to st	Bk grains c.g.	Tr grains	Well to hea diss + V	Py? Tr with carb	Tourmaline Tr Sphene Tr
411	"	1220	0	—	—	Hea diss fig 18.7 col-LB	ditto	ditto	—	sli V + diss	—	—
413	"	1230	0	—	—	—	Musc sli	Bk ext hea c.g.	—	Neg to well diss	—	—
415	"	1240	0	—	—	—	Musc sli	ditto	sli BK	Neg to sli diss	—	—
417	"	1250	1	—	—	—	Ser. ext. hea fig.	Bk sli + V	—	—	Py? sli V	Gunk near sulph
419	"	1260	1	—	—	—	Ser + musc well V?	Bk ext hea c.g.	Bk well	Well V	—	—
421	"	1270	1	—	—	Hea diss fig 26.3 LY-DB	Ser + musc well to hea	Bk ext hea fig.	—	—	Py? sli diss	Gunk sli diss
423	"	1280	1	—	—	Ext hea 21.0 col-B	ditto bank	ditto	—	—	Py? sli hinds Py? neg to hea	ditto
425	"	1290	0	—	—	Hea 18.9 col-B	Ser + Musc hea diss	ditto	—	—	Py sli V. diss	ditto
427	"	1300	2	—	—	Hea 22.4 col-B	Ser + Musc hea bands	ditto	—	Tr in V with ch(?)	Py sli diss	ditto
429	"	1310	1	—	—	Hea diss 23.2 col-LB	Ser sli to hea bands	ditto	—	ditto	Py sli diss	ditto
431	"	1320	1	—	—	Hea diss 20.2 col-LB	Ser sli diss	ditto	—	Well V + diss with ch(?)	Py + Py neg to hea	ditto
433	"	1330	1	—	—	—	Ser sli diss	ditto	Bk Tr	Hea V with sulph	Py + Py in V. diss	ditto
435	"	1340	1	—	—	—	Ser sli to well diss	and in V with sulph Bk ext hea fig	Bk Tr	sli V	Py + Py in V. diss	ditto
437	"	1350	0	—	—	—	Ser sli diss	" " " c.g.	Bk sli	Well V	Py V with qtz	ditto

T.S. No. K	Hole No.	Footage	Rating	Amph.	Epidote	Biotite	Sericite	Quartz	Feldspar	Carbs.	Sulphides	'Gunk' (Sphene)
439	K-14	1360	1	—	—	Hea diss f.g 16.2 col-LB	Ser ext. hea	BK?	—	—	—	—
441	"	1370	1	—	—	Hea diss f.g 21.5 col-B	ditto	BK well	—	—	P <sub>4</sub> hea V	—
443	"	1380	1	—	—	Hea diss 25.2 LY-DB	Ser neg to well	BK hea	BK sli	—	—	Tourmaline Tr
445	"	1390	2	—	—	Well diss 24.3 LY-DB	Ser ext hea	BK well	—	—	P <sub>4</sub> sli V?	—
447	"	1400	1	—	—	—	ditto	BK hea	BK sli	—	P <sub>4</sub> hea drs	Gunk sli V.
449	"	1410	0	—	—	—	Ser sli to well Musc sli	BK hea	BK sli	diss & V Neg to well	P <sub>4</sub> Tr	ditto
451	"	1420	1	—	—	—	Ser sli	BK hea	BK sli	Well to hea diss	P <sub>4</sub> Tr	Gunk hea with sulph
453	"	1430	1	—	—	—	Ser sli Musc sli	BK hea	BK sli	Hea V & diss, with sulph	Tr Cp P <sub>4</sub> P <sub>4</sub> sli V	—
455	"	1440	0	—	—	—	Ser sli to well	BK hea	BK sli	—	P <sub>4</sub> Tr diss	Tourmaline Tr
457	"	1450	1	—	—	Neg to hea diss bands 26.7 LY-DB	Ser sli to ext hea Musc well	BK hea	BK sli	—	P <sub>4</sub> well diss	Tourmaline Tr
459	"	1460	2	—	—	Well diss 18.3 col-LB	Ser sli	BK hea f.g	BK Tr	Tr V	ZnS, Tr in V P <sub>4</sub> Tr	—
461	"	1470	1	—	—	Well diss 20.7 col-B	Ser sli Musc Tr	BK hea f.g	BK Tr	Well to hea V & diss	P <sub>4</sub> sli hea	—
463	"	1480	1	—	—	Well to hea diss 25.6 LY-DB	Ser well to ext hea	BK hea	BK Tr	—	P <sub>4</sub> well V & diss	—
465	"	1490	2	—	—	Well diss to hea 20.0 col-B	Ser ext hea	BK well	—	—	P <sub>4</sub> , ZnS, Tr diss	—
467	"	1500	0	—	—	Hea diss 27.3 LY-DB	Ser well to hea	BK hea	BK Tr	—	P <sub>4</sub> Tr	Gunk sli
469	"	1510	1	—	—	Hea diss 28.7 LY-DB	Ser neg f.g & Musc sli	BK very hea	—	Tr V	P <sub>4</sub> Tr diss	Tourm. Tr
471	"	1520	2	—	—	Very hea diss. 26.0 LY-DB	Ser. ext hea & Musc sli	BK hea	—	Tr V	chlc carb P <sub>4</sub> sli V with	—
473	"	1530	2	—	—	Sli diss 20.7 col-B	Ser ext hea	BK sli	—	Sli V & diss	P <sub>4</sub> Tr V with chlc	—
475	"	1540	1	—	—	Hea diss 18.3 col-B	Ser. ext hea	BK sli	—	Tr with min Hea V and diss	P <sub>4</sub> ZnS Tr	—
477	"	1550	1	—	—	—	Ser very hea Musc x's	BK hea	—	—	P <sub>4</sub> diss & V	—
479	"	1560	0	—	—	—	ditto	ditto	—	ditto	P <sub>4</sub> Tr V with chlc	Gunk hea V
481	"	1570	1	—	—	Hea diss 16.7 col-LB	Ser neg to well	ditto	—	—	P <sub>4</sub> Tr V	—

T.S. No. W	Hole No.	Foot-age	Rating	Logged as:—	Rock shown by Thin Section:—
439	K-14	1360	1		Sericitic + biotitic argillite with Chl(2) porph.
441	"	1370	1		" " " " " " " py.
443	"	1380	1		Biotitic fine grained quartzite
445	"	1390	1		Sericitic + biotitic argillite with Chl(2) porph
447	"	1400	1		Sericitic fine grained pyritic quartzite
449	"	1410	0		" " " chloritic "
451	"	1420	1		Fine grained quartzite with carbonates
453	"	1430	1		Mineralized in carb. vems cutting f.g. quartzite
455	"	1440	0		Fine grained quartzite with Chl(2)
457	"	1450	1		Mineralized f.g. qtzite with ext. hea. sericite and Chl(2) porph
459	"	1460	2		Chloritized biotitic f.g. quartzite
461	"	1470	1		" " " " " with hea. carbs
463	"	1480	1		Biotitic + sericitic " " " with Chl(2) porph
465	"	1490	2		Sericitic and biotitic argillite with Chl(2) porph and ZnS
467	"	1500	0		" " " f.g. quartzite
469	"	1510	1		Sericitic quartzite with Chl(2) porph
471	"	1520	2		" + biotitic qtzite? with solph vems + Chl(2) porph
473	"	1530	2		" argillite with Chl(1) porph + spots.
475	"	1540	1		" + biotitic argillite with Chl(2) porph + ZnS.
477	"	1550	1		" + carbonated f.g. quartzite
479	"	1560	0		" " " " "
481	"	1570	1		Biotitic quartzite with Chl(2) vemslets

T.S. No. K	Hole No.	Foot-age	Rating	Chlorite		"Mixed" Chlorite		Pleochroic Haloes in Chlorite	
				1 deg.	2 deg.	1 deg.	2 deg.	1(deg.)	2(deg.)
439	K-14	1360	1	—	7.2 sli diss porph	—	—	—	10.0 <sup>+</sup> H.T.F.
441	"	1370	1	—	collo porph. 5.2 hea diss & V	—	—	—	9.2 H.T.F.
443	"	1380	1	—	—	—	—	—	—
445	"	1390	1	—	8.1 well diss porph	—	—	—	10.0 <sup>+</sup> H.T.F.
447	"	1400	1	—	—	—	—	—	—
449	"	1410	0	—	6.6 sli to well	—	—	—	—
451	"	1420	1	—	—	—	—	—	—
453	"	1430	1	—	—	—	—	—	—
455	"	1440	0	—	6.1 neg to well diss	—	—	—	—
457	"	1450	1	—	and with sulph 3.7 sli diss porph	—	—	—	6.8 H.T.F.
459	"	1460	2	—	and patches 4.3 sli to hea V	—	—	—	8.5 H.T.F.
461	"	1470	1	—	4.5 neg to well diss	—	—	—	7.9 H.T.F.
463	"	1480	1	—	6.5 sli to well porph	—	—	—	10.0 <sup>+</sup> H.T.F.
465	"	1490	2	—	5.1 well porph & V	—	—	—	9.3 H.T.F.
467	"	1500	0	—	—	—	—	—	—
469	"	1510	1	—	4.6 sli diss porph	—	—	—	7.8 H.T.F.
471	"	1520	2	—	and V with sulph 3.8 well diss porph.	—	—	—	6.5 H.T.F.
473	"	1530	2	2 spots 3.9 well diss porph	—	—	5.8 sli V P	—	7.3 H.T.F.
475	"	1540	1	—	with min. 4.8 sli diss porph	—	—	—	—
477	"	1550	1	—	—	—	—	—	—
479	"	1560	0	—	—	—	—	—	—
481	"	1570	1	—	2.8 hea V	—	—	—	—

T.S. No. K	Hole No.	Footage	Rating	Logged as:—	Rock shown by Thin Section:—
483	K-14	1580	1		Sericitic argillite cut by carb. veinlets
485	"	1586	1		Quartzite cut by carb vein with hea sulph.
487	"	1590	2		Heavily sericitic argillite with hea. carbs with py & ZnS
489	"	1601	1		" " " with carb. V. and "spots"
491	"	1610	1		" biotitic " " " and Chl(D)
493	"	1620	2		" " " with carb. bands
495	"	1630	2		" " and sericitic argillite (Py V & Chl(D))
497	"	1640	0		" " " " "
499	"	1650	0		" " " " " (Py V & Chl(D))
501	"	1660	1		Carbonated quartzite
503	"	1670	1		" & biotitic argillite.
505	"	1680	1		Quartz (feldspar) vein with carbs.
507	"	1690	1		Heavily carbonated f.g. quartzite
509	"	1700	1		Biotitic and sericitic argillite
511	"	1710	2		" " " " (Py & ZnS in V with Chl(D))
513	"	1720	2		" " " " (Py diss + V with Chl(D))
515	"	1730	1		" " " " (ditto)



T.S. No.	Hole No.	Footage	Rating	Amph.	Epidote	Biotite	Sericite	Quartz	Feldspar	Carbs.	Sulphides	'Gunk' (Sphene)
483	K-1A	1580	1	—	—	Tr	Ser. ext. hea	BK hea	—	hea V with sulph.	V with carbs Py sli to well	Gunk sli
485	"	1586	1	—	—	—	Ser neg to hea V	BK ext hea V.	—	ditto	Py neg to hea	ditto
487	"	1590	2	—	—	—	Ser very hea neg. V	BK hea	—	V & carbos hea ditto	with carbs Py & ZnS sli	ditto
489	"	1601	1	—	—	—	ditto	BK hea	—	Well to hea V & diss spots	Py + 20 Tr	ditto rims
491	"	1610	1	—	—	Hea diss half 28.4 col -B	ditto	BK hea	BK sli	Well to hea V & diss	Py with BK Py neg to hea	—
493	"	1620	2	—	—	ditto bands	ditto	BK hea	—	Hea bands with sulph	Py bands with chl.	—
495	"	1630	2	—	—	Ext hea diss fig 17.3 col L.B	ditto	BK well fig	—	—	Py V neg to well	—
497	"	1640	0	—	—	Well diss 23.2 col -B	ditto	ditto	—	Zi diss V	Py band	Tourmaline Tr
499	"	1650	0	—	—	Hea diss 24.72 Y -B	ditto	ditto	—	Well diss V	Py V with Chl	ditto
501	"	1660	1	—	—	—	—	BK very hea c.g	BK sli	Sli to hea diss	—	—
503	"	1670	1	—	—	Well diss 19.2 col B	Ser sli diss	BK hea fig	—	Hea diss with sulph	diss with carbs Py ZnS Tr.	—
505	"	1680	1	—	—	—	—	BK hea c.g	BK well c.g	Well diss	—	—
507	"	1690	1	—	—	—	—	BK hea fig.	—	Hea diss + V with sulph	Py sli V & diss	—
509	"	1700	1	—	—	Hea diss fig 21.9 col B	Ser hea BK	" " " "	—	—	Py Tr diss and mchl V Py ZnS sli V	Gunk in bands
511	"	1710	2	—	—	ditto	ditto	ditto	—	—	—	—
513	"	1720	2	—	—	ditto	ditto	ditto	—	Well diss with sulph	Py hea V & diss.	Gunk in bands
515	"	1730	1	—	—	diss + V 17.3 col B	ditto	ditto	—	Sli V with sulph	Py well V & carbos	ditto