

68-516.

000
REF. 3.2.7

123001

ABERFOYLE TIN N. L.

REPORT ON THE GIPPS CREEK DRILLING PROGRAMME

DECEMBER 1967 - MAY 1968.

CONTAINED

G. KRUMMEI
SENIOR GEOLOGIST.

CONTENTS

SUMMARY

INTRODUCTION

GEOLOGICAL

- (1) Lithology
- (2) Veining
- (3) Structure
- (4) Age relationships

INFERRED ORE RESERVES

CONCLUSIONS

RECOMMENDATIONS

APPENDIX

ILLUSTRATIONS

Regional Orientation	Fig. 1
Surface Geology - Fact	Fig. 2
Surface Geology - Interpretation	Fig. 3
D.D. Sections - Fact	Fig. 4
D.D. Sections - Interpretation	Fig. 5
Longitudinal Sections	Fig. 6
Stereographic plot Veining/jointing	Fig. 7

REF. 3.2.7

REPORT ON THE GIPPS CREEK DRILLING PROGRAMMEDECEMBER 1967 - MAY 1968SUMMARY.

Previous detailed geological surface mapping over greisenized Devonian granite at Gipps Creek outlined a target for further investigation consisting of 4 major quartz veins with tourmaline and irregular distributions of cassiterite and wolframite. The veins, designated "W", "X", "Y" and "Z" strike north north-west and dip at moderate angles to the east. The downdip extent, attitude width and grade of mineralisation of these veins over a strike length of approximately 400 feet was tested by 4 diamond drill holes totalling 1610 feet. The ore potential of the vein system was evaluated and results indicate that the veins form part of a low-grade ore system of limited lateral and downdip extent whose exploitation at present Sn/WO₃ prices would be uneconomic.

INTRODUCTION.

The Gipps Creek Prospect, also known as the Hayes Old Tungsten Prospect, is an endogranitic quartz vein-type tin/wolframite deposit of late Devonian age, situated within the east central part of A.T.N.L. Consolidated Lease 110M/67 in force until 1.7.1969 (Fig. 1). The access, mining history and previous geological work in the area are briefly described in a company report by Layden. In a programme of detailed surface geological mapping and examination of old workings at the prospect Layden outlined 4 major tin/wolframite-bearing quartz-tourmaline veins averaging 12" in width and extending over a maximum traceable strike length of 600 feet. These veins strike north north-^{west} ~~east~~ and dip at angles of 30-45° to the east. This strike, but not the dip, conforms to one of the major joint directions in the area (Fig. 7). Testing of the downdip extension of the major veins, their widths, grade and type of mineralisation and their structure over an approximate strike length of 400 feet were the primary objects of the present drilling programme. The possible presence of other mineralised bodies (quartz-pinite veins or lenses, greisen veins and mineralised quartz porphyry) was also investigated.

A total of 4 diamond drill holes were completed at the prospect between December 1967 and May 1968, using an F40 machine giving AXT and AMS core.

The drilling footage breaks down as follows :-

G.C.S1	350'
G.C.S2	350'
G.C.S3	500'
G.C.S4	400'
<u>Total</u>	1610'

GEOLOGICAL.

In addition to fulfilling the objectives outlined above the drilling programme provided detailed information on the granitic lithologies of the area and their effect on the development of veining.

1. Lithology :

(i) Several varieties of granite, mutually intrusive and genetically closely related were found to be present in the area. The most common variety is a medium to coarse grained, pale pink to creamy yellow porphyritic biotite granite which could be subdivided into felspar porphyritic and quartz porphyritic types. Subhedral to euhedral phenocrysts of orthoclase range from $\frac{1}{2}$ "-3" and have a random orientation. Quartz phenocrysts are anhedral and range from $\frac{1}{4}$ "-1". The phenocrysts are contained in a matrix of quartz-felspar material with accessory biotite and muscovite, traces of tourmaline and pyrite. Conversion of the sodic felspar to pinite is common and probably resulted from the action of alkaline solutions during the widespread pneumatolytic alteration of the granite associated with the phase of tin/wolframite mineralisation in the area.

This variety of granite forms the greater part of the rock mass intersected in G.C.S1, 2 and 4 and occurs also in the top portion of G.C.S3.

(ii) A coarse grained leucocratic variety of granite showing an increase in muscovite content and very minor biotite was intersected in G.C.S3; a similar rock type in the lower portion of G.C.S4 contains trace disseminations of marmatite and wolframite.

(iii) A conspicuous dark, medium-grained hornblendic and pyroxenic variety of granite with biotites, anhedral felspar, lesser quartz and accessory epidote and sulphides was intersected in G.C.S3 and is identified as a ?granodiorite. Several narrow bands of a similar material occur as intrusive bodies in G.C.S1. Associated with this rock type in G.C.S3 are several bands of white ? aplitic material up to 9 feet wide, containing pinite and trace disseminations of marmatite, chalcopryrite and ? cassiterite.

Good disseminations of molybdenite occur in a 1 foot zone at 140 feet at the top contact of the wide ?granodiorite body in G.C.S3.

(iv) Widespread alteration of the more acidic varieties of granite present resulted in the conversion of soda feldspar to green pinite and sericite while alteration of the matrix produced irregular patches or narrow zones or veinlets of pinite-quartz-muscovite material from less than 1" to 22". Pinitisation is frequently associated with faults, fracture zones and ? jointing of pre-mineralisation age, and is also found in granite along or near the contacts of mineralised quartz veins. Narrow veins and stringers of greisen become more frequent in depth. These veins consist predominantly of muscovite with an intimate association of varying amounts of quartz, pinite and chlorite.

2. Veining :

(a) The mineralogy of the veining may consist of one or more of the following : quartz, chalcedonic quartz, cassiterite, wolframite, black tourmaline, chalcopryite, pyrite, ? marcasite, ? tetrahedrite, marmatite, galena, molybdenite, fluorite, muscovite, pinite, chlorite, limonite, carbonate and amethystine quartz.

(b) Types : 4 major types of veining were recognised :

- (i) Vitreous quartz veins : Milky white or clear, glassy; mineralised with tourmaline, cassiterite, wolframite, sulphides etc. These veins are the main hosts of tin/wolfram mineralisation.
- (ii) Chalcedonic quartz veins : grey, greenish grey, bluish grey cryptocrystalline; with pyrite, ? marcasite, fluorite. These veins are younger than all other vein types and do not carry tin/wolfram.
- (iii) Pinite-quartz veins : yellowish-green; mineralised with cassiterite, wolframite, chalcopryite, Fe, Pb, Zn sulphides.
- (iv) Greisen veins : Mineralised with sulphides, cassiterite and gangue minerals.
- (v) Other : Trace disseminations of wolframite were noted in greisened granite near the base of D.D. G.C.S4. A scan survey by P.I.F. at regular intervals of the core of G.C.S3 revealed no significant disseminations of tin in any of the major lithological units intersected.

3. Structure :

Previous surface mapping at the prospect outlined four major and several minor veins, which vary in thickness along strike and narrow down progressively to the north and south. The average strike of the vein system is 340° magnetic and an average

005

statistical dip of 30° to the east (Fig. 7). The strike of the veins is subparallel to the major joint system in the area, the average dip of the latter structures being 50° NE. The veins are cut by steeply dipping jointing trending east north east and are affected by minor faulting.

Interpretation of surface and drill hole information suggests that the four major quartz veins form two distinct groups consisting of the W,X,Y veins in the east and the Z vein in the west (Fig. 3).

(i) WXY system : The Y vein, average width $10\frac{1}{2}$ " and traceable over a strike length of at least 400', is the most persistent vein of the system. The W and X veins converge on it in the north and in depth. Drilling indicates a minimum downdip extent of 220' for this system at an average of 30° in the north and 40° in the southern sector. The latter increase in dip could result from tilting of the southerly block due to faulting. The veins of the system tend to become more diffuse and narrower in depth. Numerous minor veins lie in the footwall and hanginwall of the system.

(ii) The Z vein system : The strike of the Z vein and associated minor veining is subparallel to the WXY system, but its dip is somewhat steeper, averaging 40° in the north and 50° in the south of the prospect. The average width of the Z vein is 11". A noteworthy restrictive effect on the width of this vein is exercised by the relatively fresh granodiorite intersected in G.C.S3. (Fig. 4).

(iii) The complex interrelationships between quartz-tourmaline, pinitic and greisen veins suggest that these structures are coeval. Veins of chalcedonic quartz, often lining joints, faults and infilling breccia zones, intersect veins of mineralised quartz and pinitic bodies and clearly post-date the latter structures. Chalcedonic quartz also lies along re-opened portions of mineralised veins.

4. Inferred Ore Reserves :

The ore reserve calculations take into account all known assay and width data obtained from core intersections and surface sampling of the 4 major veins at the prospect, namely the W, X, Y and Z veins. The X vein lies between the drill holes, but its presence in the area was confirmed by re-examination of surface outcrop. Its northern extremity merges with the Y vein and features as the "XY" portion of the latter vein.

Vein correlations, widths and grade adopted for the purposes of ore reserve calculations are listed in Tables I, II and III.

Interpolating between drill hole intersections and respective surface outcrops, extrapolating downdip and along strike, incorporating assay data derived from outcrop sampling, and considering the "Z" vein intersection in G.C.S3 as unmineable, measuring vein areas on longitudinal projections by planimeter and correcting for dip, assuming a nominal stoping width of 48" and using a tonnage factor of 13.5 cu.ft/ton. The following inferred ore reserves were computed for the Gipps Creek prospect -

<u>Vein</u>	<u>Tonnage</u>	<u>Grade over 48"</u> <u>% C.M.U.</u>
"W"	47,800	0.12%
"Y" & "XY"	72,000	0.37%
"Z"	71,500	0.23%
Sub-total	191,300	0.27% ^x
Incorporating X Vein	15,200	0.27% approx.
Total	<u>206,500</u>	<u>0.27% C.M.U.</u>

^xWeighted grade to the nearest 2nd decimal place.

Numerous minor veins and several pinitic zones containing cassiterite were intersected in the drill holes. The veins probably follow the general trend of diminishing vein width with depth, but could possibly assume economic importance near the surface for a limited distance along strike, thus increasing the above tonnage figure.

5. Conclusions :

(a) The most important tin/wolfram mineralisation at the prospect is confined to quartz and quartz-tourmaline veins in Devonian granite which may also contain varying amounts of sulphides, notably chalcopyrite.

(b) 3 major mineralised quartz veins can be identified in the drill core to a depth of 2-400 feet and along a strike length of at least 400 feet. A fourth vein is exposed at the surface of the prospect for a limited strike length of about 200 feet. Many additional narrow mineralised veins and stringers are present and are particularly numerous in greisenized, porphyritic granite.

(c) Structurally the major veining can be confined to two zones one of which consists of the W, X and Y veins in a fan-shaped arrangement converging to the north. The second zone comprises

007
the Z-vein. The veins dip at angles ranging from 35-45° to the east and tend to diminish in width along strike and in depth.

The granite lithologies may have a marked effect on the development of veining in the area.

(d) Narrow pinitic bodies associated with shears, joints or alteration products of granite, as well as greisen veins may contain small amounts of tin/wolfram mineralisation and chalcopyrite. Trace disseminations of wolframite in greisenised granite at the base of G.C.S4 may indicate the source of vein filling materials. Chalcedonic quartz veins are unmineralised.

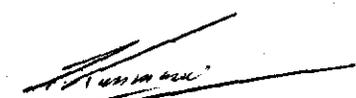
(e) The nature and hosts to mineralisation at Gipps Creek resemble other minor tin/wolfram deposits currently worked or abandoned in granite rocks in the Rossarden Area.

(f) The major veins at the Gipps Creek Prospect form a low-grade tin/wolfram deposit which would be unprofitable at metal prices obtaining at the time of writing and if a stoping width of 48" is considered. Expenditure on further extensive exploratory or development work is unwarranted at this stage.

6. Recommendations :

(a) Detailed geological mapping of the area should be completed, with a view of examining the structural relationship of the vein systems of the Gipps Creek prospect to contiguous areas of known tin/wolfram mineralisation such as Long Tunnel and the Ben Lomond Tungsten Mine.

(b) Samples of available granite core should be tested by geochemical means for Sn, W, As, Cu, Zn, Pb and Mo with a view to determine the primary dispersion patterns of these elements in the various granite lithologies intersected. Such information could profitably be employed in the search for areas of Sn/WO₃, copper or molybdenum mineralisation in geological environments similar to those at Gipps Creek.


~~G. Krummei~~

Senior Geologist.

008

APPENDIX - ASSAY DATA.

Grades and widths of minor and major veins intersected by drill holes :-

<u>D.D.Hole</u>	<u>Depth</u>	<u>True Width</u>	<u>% Sn</u>	<u>% WO₃</u>	<u>% C.M.</u>	<u>% C.M. Over 48"</u>
G.C.S1	81'	12"	0.27	0.29	0.56	0.14
	90½'	13"	0.04	1.08	1.12	0.30
	189'	10½"	0.22	0.03	0.25	0.06
	219'	1¼"	0.19	3.45	3.64	0.11
	269½'	7"	0.67	0.07	0.74	0.18
G.C.S2	50'	9½"	0.01	0.03	0.04	0.01
	62'	10"	0.16	0.01	0.17	0.03
	127¼"	9½"	1.10	0.06	1.16	0.24
	139¼'	2½"	0.04	0.18	0.22	0.01
	163½'	4"	0.54	0.39	0.93	0.08
	176'	11"	4.78	0.17	4.95	1.14
	184'	6½"	0.17	2.25	2.42	0.33
	185'	2"	0.06	0.94	1.00	0.04
	260¼'	3"	0.03	0.05	0.08	0.01
	278¼'	6½"	0.03	0.11	0.14	0.02
	313'	5½"	0.03	0.04	0.07	0.01
	320¼'	6"	0.03	0.06	0.09	0.01
G.C.S3	60½'	3"	0.01	0.04	0.05	0.01
	71'	7½"	0.09	0.02	0.11	0.02
	98'	9"	0.02	0.04	0.06	0.01
	100'	2½"	0.02	0.35	0.37	0.02
	112¾'	2¾"	0.03	0.04	0.07	0.01
	133½'	7"	0.04	0.03	0.07	0.01
	134'	12"	0.05	0.03	0.08	0.02
	135'	12"	0.31	0.04	0.35	0.09
	136'	12"	0.02	0.03	0.05	0.01
	137'	12"	0.03	0.01	0.04	0.01
	138'	12"	0.02	0.04	0.06	0.01
	139'	12"	0.03	0.17	0.02	0.05
	155¼"	1¾"	2.33	0.03	2.36	0.10
	242¾'	7½"	0.01	0.03	0.03	0.01
	267'	10"	0.45	0.05	0.50	0.10
	267'10"	12"	0.71	0.04	0.75	0.19
G.C.S4	106'	6"	0.03	0.03	0.06	0.01
	106½'	8½"	0.06	0.03	0.09	0.02
	113¾'	3¾"	0.42	0.04	0.46	0.04
	154¾'	1½"	0.54	0.02	0.56	0.02
	159¾'	4½"	0.06	0.60	0.66	0.06
	176'	2½"	0.25	4.52	4.77	0.25
	186½'	5½"	0.03	0.12	0.15	0.02
	226¾'	4½"	0.03	0.07	0.10	0.01
	256½'	4½"	0.02	0.51	0.53	0.05
	287½'	4"	0.04	0.65	0.69	0.06
	314'	2"	1.16	0.09	1.25	0.05
	316¾'	3½"	0.33	0.05	0.38	0.03
	319¾'	5"	0.04	0.18	0.22	0.02
356¾'	13"	0.04	0.34	0.38	0.13	

009

TABLE I

"W" VEIN :

<u>Sample</u>	<u>Depth</u> (ft)	<u>True Width</u>	<u>% Sn</u>	<u>% WO₃</u>	<u>% C.M.</u>	<u>% C.M.</u> <u>Over 48"</u>
G.C.S1	81	12"	0.27	0.29	0.56	0.14
G.C.S2	127	9 $\frac{1}{2}$ "	1.10	0.06	1.16	0.24
G.C.S3	155	1 $\frac{3}{4}$ "	2.33	0.05	2.38	0.10
G.C.S4	106	14 $\frac{1}{2}$ "	0.04	0.03	0.07	0.02
Surface	-	9"	0.41	0.30	0.71	0.13
"	-	8"	0.10	0.86	0.96	0.16
"	-	9"	0.92	-	0.92	0.17
"	-	13"	0.05	0.05	0.10	0.02
"	-	15"	0.88	-	0.88	0.28
"	-	10"	-	0.20	0.20	0.04
"	-	10"	0.12	0.10	0.22	0.05
"	-	7"	0.63	-	0.63	0.09
"	-	4"	0.78	0.40	1.18	0.10

TABLE II

"Y" and "XY" VEIN :

G.C.S1	90 $\frac{1}{2}$	13"	0.04	1.08	1.12	0.30
G.C.S2	176	11"	4.73	0.17	4.95	1.14
G.C.S3	242 $\frac{3}{4}$	7 $\frac{1}{2}$ "	0.01	0.03	0.04	0.01
G.C.S4	113 $\frac{3}{4}$	3 $\frac{3}{4}$ "	0.42	0.04	0.46	0.04
Surface	-	8"	0.05	1.75	1.80	0.30
"	-	9"	-	0.10	0.10	0.02
"	-	11"	-	0.96	0.96	0.22
"	-	24"	-	0.58	0.20	0.10

TABLE III

"Z" VEIN :

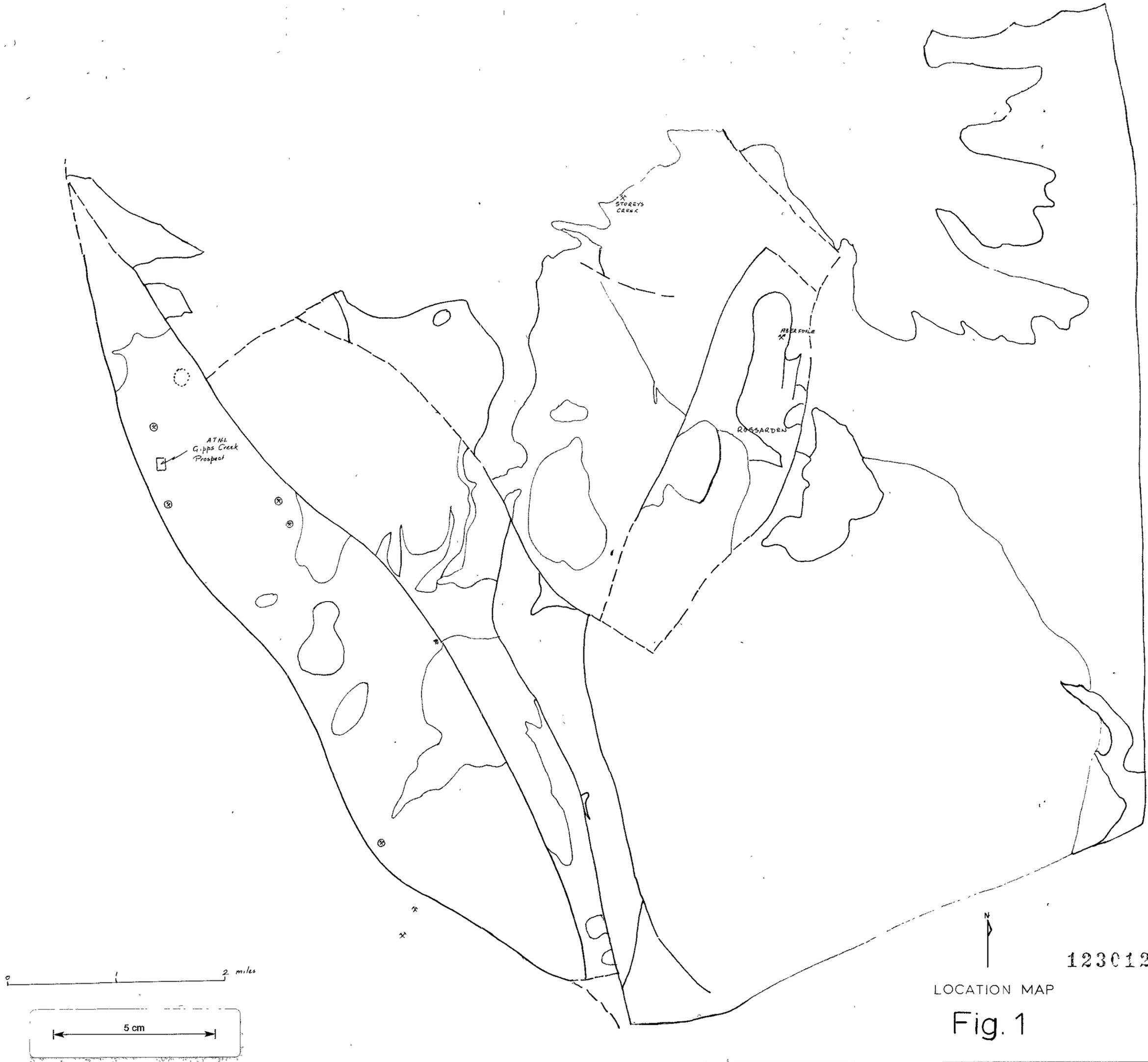
G.C.S1	189	10 $\frac{1}{2}$ "	0.22	0.03	0.25	0.06
G.C.S2	278	6 $\frac{1}{2}$ "	0.03	0.11	0.14	0.02
G.C.S3	411	1 $\frac{1}{4}$ "	-	-	-	- x
G.C.S4	256 $\frac{1}{2}$	4 $\frac{1}{2}$ "	0.02	0.51	0.53	0.05
Surface	-	8"	0.42	0.16	0.58	0.10
"	-	10"	-	0.10	0.10	0.02
"	-	12"	-	0.10	0.10	0.03
"	-	26"	0.12	2.11	2.33	1.16

x Unmineable.

REFERENCES

- Blissett, A. H., 1959 - The Geology of the Rossarden and Storeys Creek District. Geological Survey Bulletin No.46.
- Layden, C. E., 1966 - Report on Gipps Creek Exploration A. T. N. L. Company Report.

011



0 1 2 miles

5 cm



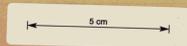
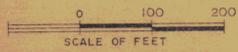
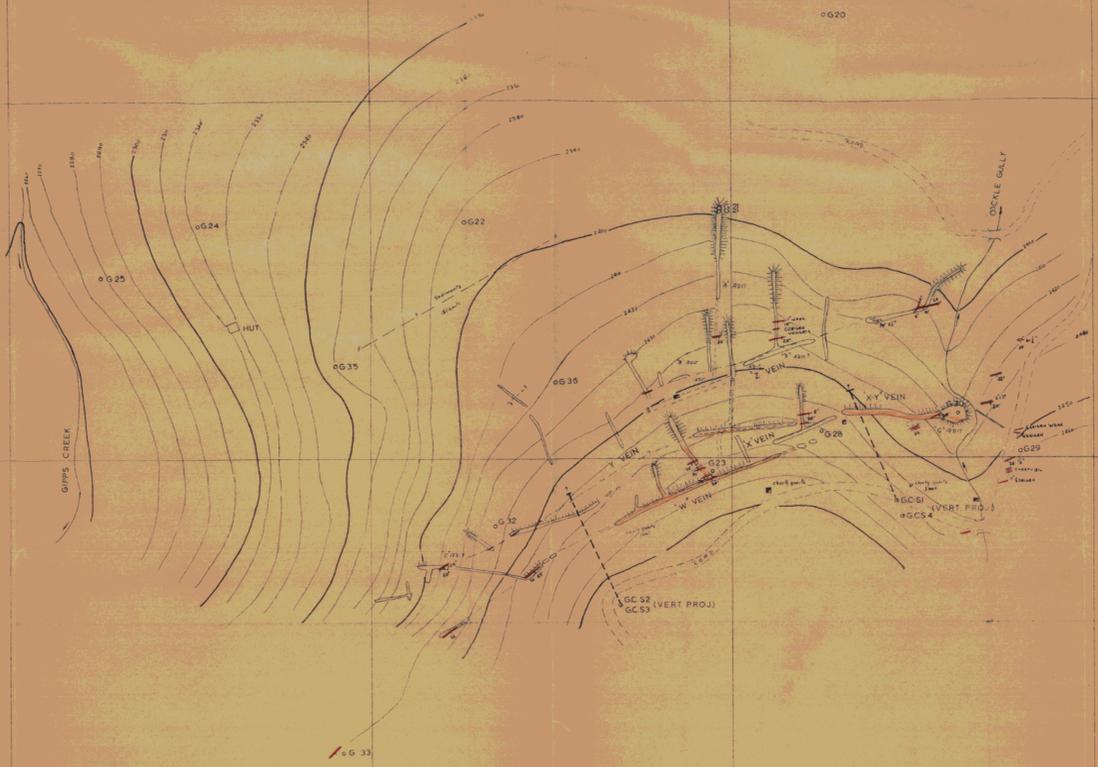
123012

LOCATION MAP

Fig. 1

BEN LOMOND TUNGSTEN MINE

o G 27 o G 25



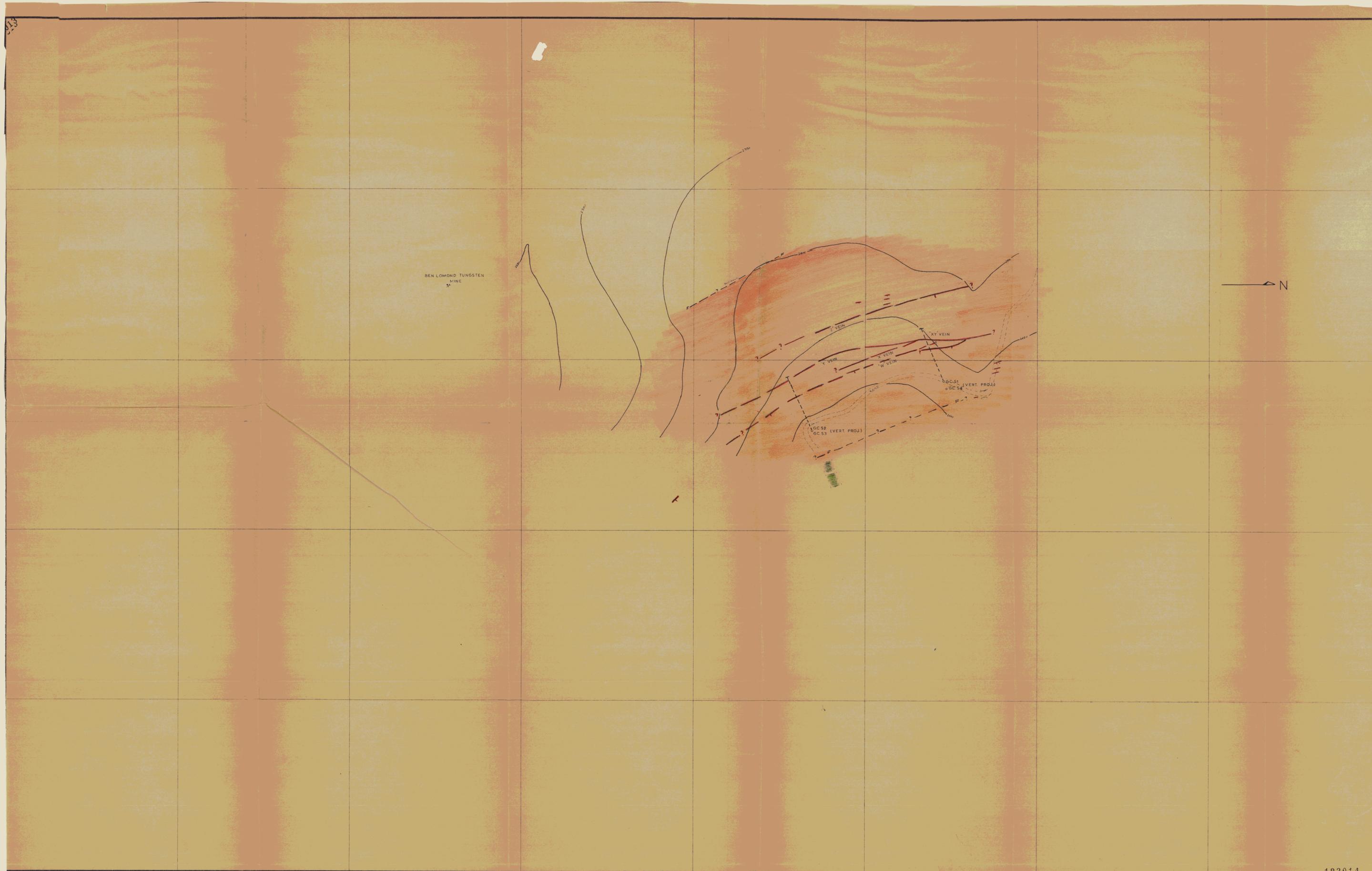
ABERFOYLE TIN N.L.
GIPPS CREEK AREA
SURFACE GEOLOGY
FACT

Fig 2

123013

SURVEY	-	-	-	-
GEOLOGY	-	CEL-GK	-	- / / 67-68
ENGINEERING	-	-	-	- / /
DRAWN	-	-	-	- / /
TRACED	-	GK	-	- / 6 / 68
REFERENCE	-	-	-	-
PRINT No.	-	-	-	-
DRAWING No.	-	-	-	-

DRAWER:

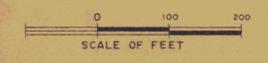


BEN LOMOND TUNGSTEN
MINE



ABERFOYLE TIN N.L.
GIPPS CREEK AREA
SURFACE GEOLOGY
INTERPRETATION

Fig. 3



123014

SURVEY	-	-	/ /
GEOLOGY	-	GK	/ / 68
ENGINEERING	-	-	/ /
DRAWN	-	GK	/ / 68
TRACED	-	GK	/ / 68
REFERENCE	-	-	-
PRINT No.	-	-	-
DRAWING No. -			

DRAWER:

014

S.W.

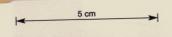
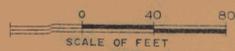
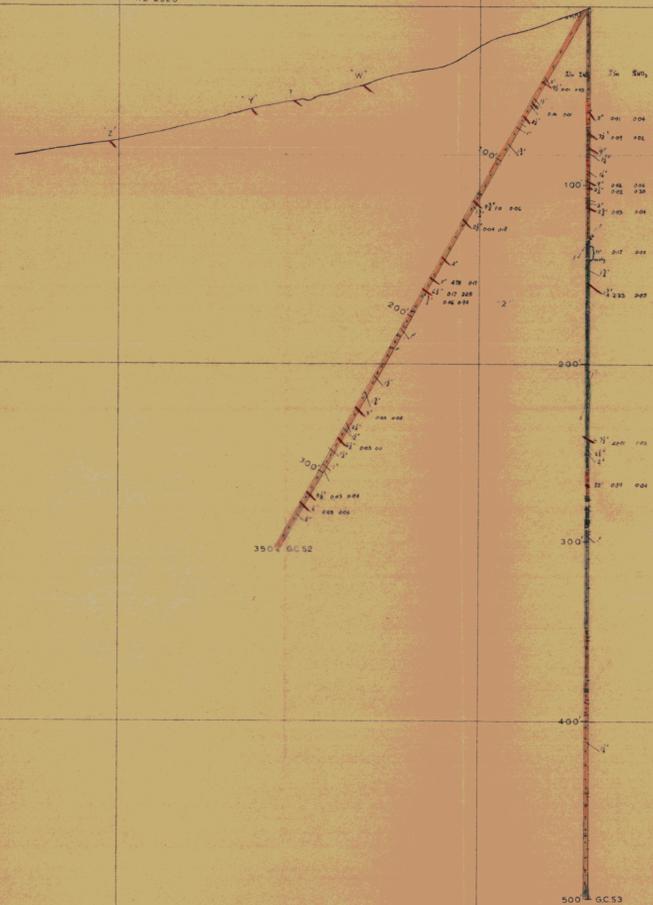
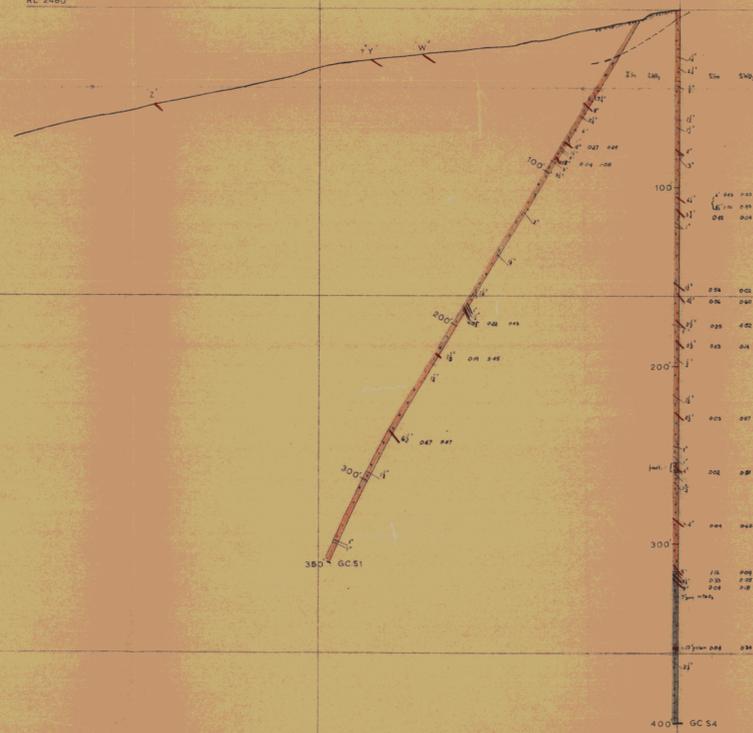
RL 2480

N.E.

S.W.

RL 2520

N.E.



- GRANITE HEAVILY PINITISED
- QUARTZ-FELSPAR-PORPHYRITIC, PINITIC
- LEUCOCRATIC, WITH MUSCOVITE
- FELSPAR-PORPHYRITIC
- FRACTURED
- GRANODIORITE

ABERFOYLE TIN N.L.
 GIPPS CREEK AREA
 DRILL HOLE SECTIONS- LOOKING N.W.
 FACT SECTIONS

Fig. 4

123015

SURVEY - - - / /
 GEOLOGY - G.K. - / 6 / 68
 ENGINEERING - - - / /
 DRAWN - G.K. - / 6 / 68
 TRACED - G.K. - / 6 / 68
 REFERENCE - - -
 PRINT No. - - -
DRAWING No. -

DRAWER:

SW

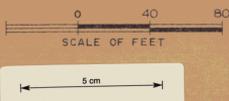
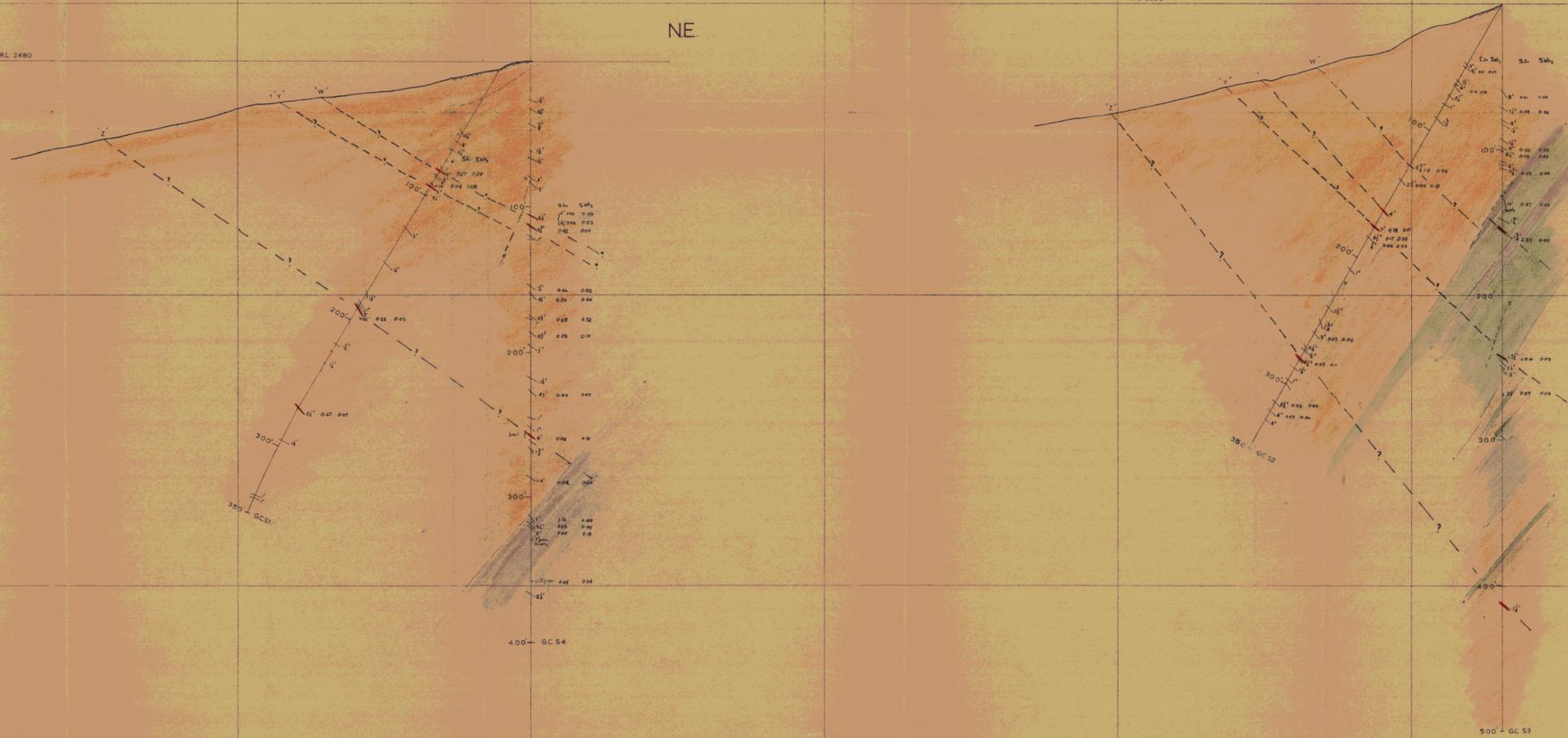
NE

SW

NE

RL 2480

RL 2520



- GRANITE QUARTZ-FELSPAR PORPHYRITIC
- LEUCOCRATIC
- GRANODIORITE
- MAJOR QUARTZ VEIN

ABERFOYLETIN N.L.
GIPPS CREEK AREA
DRILL HOLE SECTIONS - LOOKING N.W.
INTERPRETATION

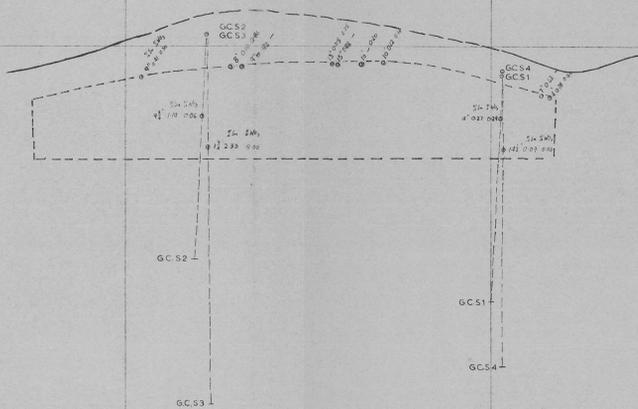
Fig 5

SURVEY	-	-	-	/ / /
GEOLOGY	-	GK	-	/ / /
ENGINEERING	-	-	-	/ / /
DRAWN	-	GK	-	/ / /
TRACED	-	GK	-	/ / /
REFERENCE	-	-	-	/ / /
PRINT No.	-	-	-	/ / /

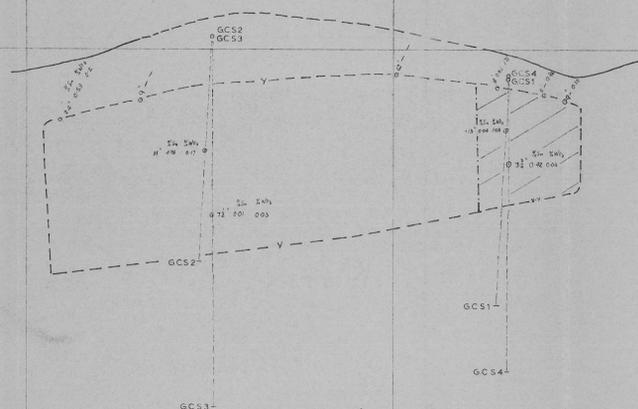
DRAWING No. -

RL 2500

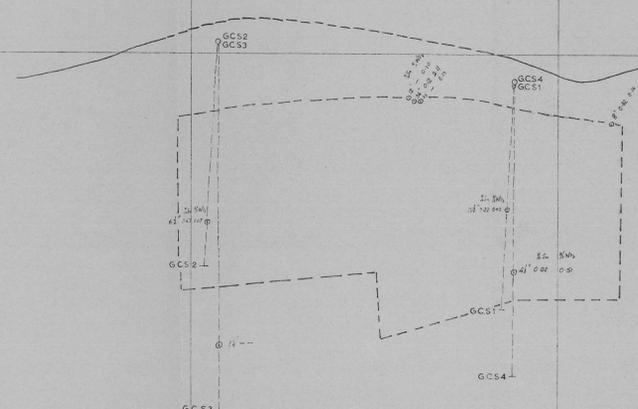
W VEIN



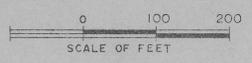
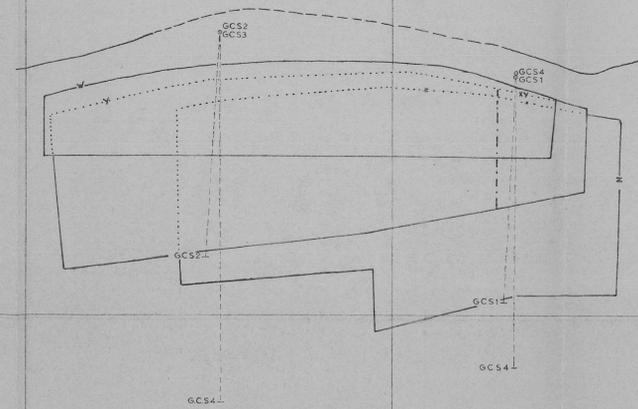
Y+X-Y VEIN



Z VEIN



COMPOSITE

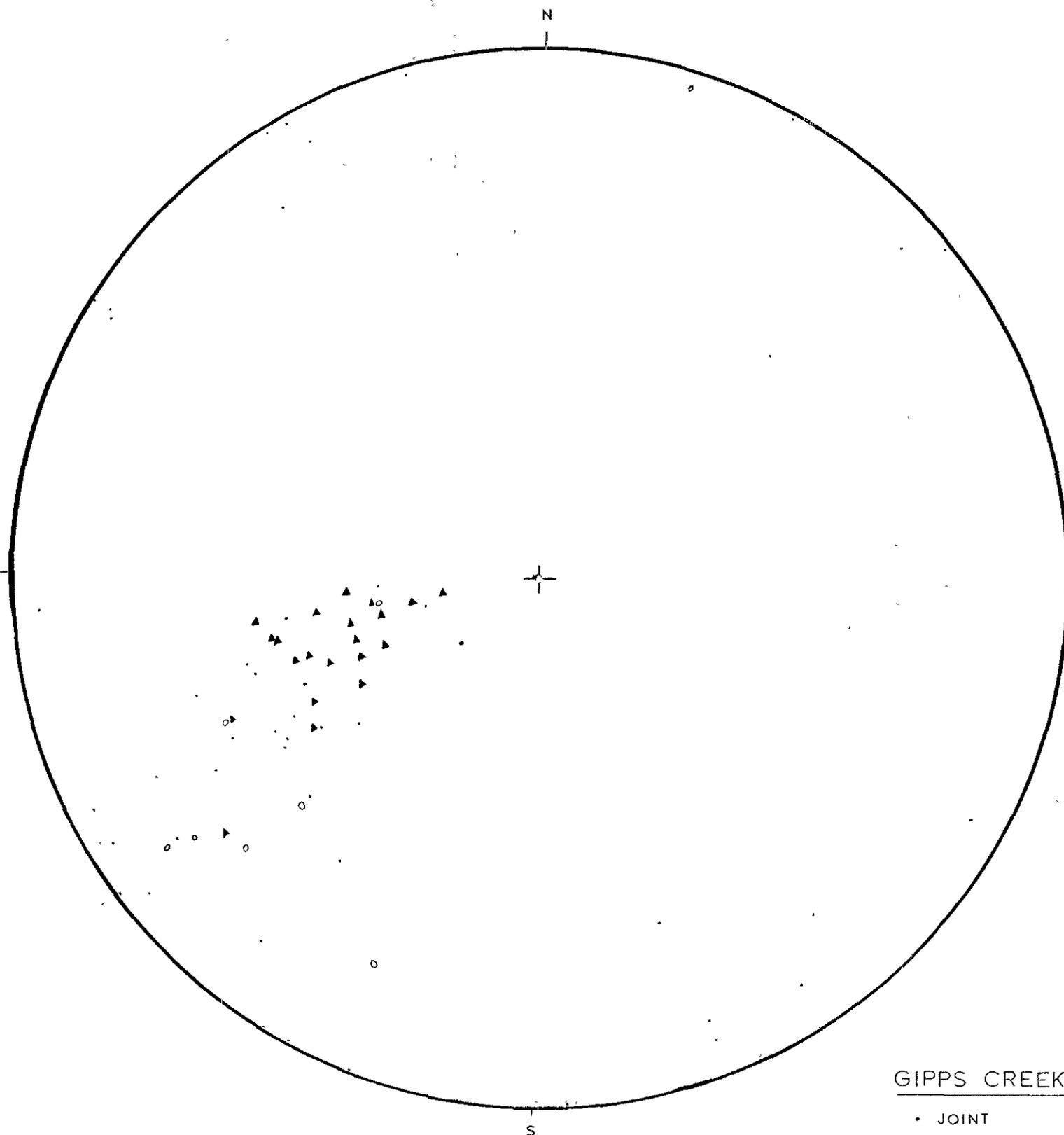


ABERFOYLE TIN NL.
GIPPS CREEK AREA
LONGITUDINAL SECTIONS

Fig. 6

SURVEY	-	-	/ /
GEOLOGY	-	GK	/ 6 / 68
ENGINEERING	-	-	/ /
DRAWN	-	GK	/ 6 / 68
TRACED	-	GK	/ 6 / 68
REFERENCE	-	-	-
PRINT No.	-	-	-
DRAWING No.	-	-	6510
DRAWER:	68-516	123017	

123018



GIPPS CREEK

- JOINT
- CHALCEDONIC VEIN
- ▲ QUARTZ &
QUARTZ TOURMALINE
VEIN

SCHMIDT EQUAL AREA NET
POLAR PROJECTIONS

Fig. 7

6511 ~~015~~