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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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PRELIMINARY REPORT ON THE GREISEN OREBODY, MOUNT BISCHOFF TIN MINE, TASMANIA.

by

C.L. Knight

DEPARTMENT OF SUPPLY & SHIPPING.

Mineral Resources Survey Branch.

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I. INTRODUCTION.

"Greisen Lode" is the name given locally to the footwall section of a wider mineralised zone, which will be referred to as the Greisen Orebody in this report.

Mining operations have been carried out by tributers in recent years on several portions of the orebody, namely, stoping from the Main Tunnel, stoping from an adit-crosscut driven from the No. 4 Gossan Bench, and some stoping operations from a level above the latter bench.

During the past three months a level has been driven for 260 feet westwards from the Main Tunnel to prospect the orebody at this level and develop it for mining.

Over the past few weeks a detailed geological examination of the orebody has been made and the area involved mapped on a scale of 20 feet to an inch by means of plane table and alidade. Sections were run across the orebody at 50-foot intervals and details of structure plotted on these as well as on plan.

The following plates have been prepared to accompany this report:-

Plate 1 - Plan of Main Tunnel Workings, R.L.1165' (Scale 1"=20').
" 2 - " " Orebody at R.L. 1236' " " "
" 3 - Sheet I - Sections A-A' and B-B'. " " "
" II - " C-C' " D-D'. " " "
" III- " E-E' " F-F'. " " "
" IV - " G-G' " H-H'. " " "

II. GEOLOGY.

1. General. All the evidence points to the conclusion that the Greisen Orebody is the result of selective replacement of a particular bed or a number of consecutive beds which formed part of a sedimentary series. The thickness of the beds involved in the Greisen Orebody mineralisation is 70 to 80 feet.

Stratigraphically below the orebody are grey indurated shales, some of which are thin bedded. The footwall of the orebody is conformable with the bedding of these shales.

Stratigraphically above the orebody is a zone 6 to 10 feet wide, comprised of thin-bedded shale, mineralised in part, and bands of talcose rock. This zone was traced with only a few gaps for a length of 450 feet. Strike and dip of the bedding within the shale bands are conformable with those of the zone itself. This hangingwall zone has been involved in the folding which affected the footwall rocks.

Within the orebody, there is a narrow bed of altered shale exposed over a length of 150 feet in the open cut about 10 feet stratigraphically above, and parallel to, the folded footwall shales. Moreover much of the orebody, in particular the footwall portion, is well banded and the banding conforms, in strike and dip, with the footwall and hangingwall of the orebody, wherever these walls are

exposed. It is apparent that the banding is a feature inherited from the host rock.

During the January-March field season a detailed survey was carried out of the Slaughter Yard benches and the Brown Face which extend northward from the top of the Greisen Orebody. This work will not be described in detail here. The survey showed that over an area with north-south dimension of 1,000 feet, and east-west dimension of 1,000 feet, mineralised material had been almost completely removed, exposing the underlying shales folded into a complex pattern of anticlines and synclines. With the exception of the south wall of the Brown Face which is in part, a shear, the footwall of the ore is a stratigraphic one. This footwall can be traced southerly through the Slaughter Yard benches to the Greisen Orebody. It appears, therefore, that the Greisen Orebody occupies the same stratigraphic horizon as the lower portion of the ore which has been removed from the Slaughter Yard benches and the Brown Face.

Mineralisation has extended to beds higher in the stratigraphic sequence than the hangingwall band of the Greisen Orebody. The ore removed from the No. 4 Gossan Bench (see sections) overlay the Greisen Orebody and the hangingwall band of the latter constitutes the northern wall of this bench.

2. <u>Structural Features.</u> In the Slaughter Yard benches, the footwall shales are very well exposed, and are seen to be folded into a somewhat complex pattern of synclines and anticlines, the synclines being much broader than the anticlines. The major axes of the folds strike east-northeast, but the folds are closed both to the east and west resulting in elongated basin-like depressions with narrow domes between them.

This folding conteinues into the Greisen Orebody sector. The Greisen Orebody, as far as it is exposed at present, strikes east-northeast and dips southward at an average angle of 50° to 55° (see plate 3, sheets I to IV). It is situated on the steeply dipping southerly limb of an asymmetric anticline which separates it from the Slaughter Yard benches. Exposures in the western drive from the Main Tunnel show that the footwall at this level maintains its southerly dip and that the footwall section of the orebody, therefore, extends below the tunnel level.

Where the footwall of the orebody was intersected in both branches of the Main Tunnel, it has a very low southerly to southwesterly dip. Between the branches there is a marked change in strike from east-northeast to southeast. The flattening of dip and swing in strike are due to the presence of a minor anticlinal cross fold. The same swing in strike and flattening of dip were observed in the hangingwall band in the open cut directly above this area.

In the Main Tunnel on, and near, this cross fold, the dips steepen and the orebody plunges underfoot. The hangingwall of the orebody, where exposed in the tunnel, has a dip to the south of 60°.

The hangingwall of the orebody is exposed along the northern wall of the No. 4 Gossan bench. In a few small pits on this bench mineralised shale is exposed dipping at a low angle to the north or south. The evidence suggests that dips flatten a short distance south from the north wall of this bench and that a broad syncline underlies much of the bench.

On the northwestern part of the face above the No. 4 Gossan Bench, a pre-ore low angle fault zone striking east-northeast and dipping to the south truncates the upward extension of the ore (see plate 3, sheets I and II).

At its western end, the orebody abuts abruptly onto a shale wall, which, at the surface, dips at 70° to the east. This wall was cut in the main tunnel drive at 260 feet and the western limit of the orebody has been reached.

3. Mineralogy. The orebody comprises a variety of types of mineralisation. The principal sulphide is pyrrhotite, and the presence of marcasite is indicated by the way in which much of the ore has 'burnt' since exposure in the open cut. The chief gangue minerals are talc (?), carbonates (coarse-grained) and quartz. The typical ore of the footwall section is a banded talc-pyrrhotite or talc-carbonate-pyrrhotite; in the hangingwall section the ore is more massive and talc not so conspicuous.

III. OREBODY (Greisen Lode).

That section of the orebody, known as the Greisen Lode, which is being developed at the present time, extends westwards from the Main Tunnel for 260 feet to the western shale wall. For 150 feet of this distance the average strike is 235° and for the next 100 feet swings round to 225°. Minor north-south crossfolding affects the strike locally. The average dip of the orebody down to Main Tunnel level is 55°. Such information as is available regarding the width and grade is given in Section V.

IV. WORKINGS.

A considerable thickness of gossan capping was removed by the company in the early days of the field exposing sulphide underneath. In recent years tributers put a rise up from the Main Tunnel, drove an intermediate level both east and west of the tunnel and stoped ore over a length of about 90 feet and a height ranging from 8 to 30 feet, holing through to the bench above at one point. At 190 feet west from the Main Tunnel an adit crosscut was driven from the No. 4 gossan bench (50 feet above Main Tunnel level) and a stope opened out, mainly in the footwall section, but stoping was carried across to the hangingwall in places. Altogether some 10,000 tons of ore were mined here. The average grade of this ore cannot be ascertained, but, judging from local reports and sampling, was of the order of 1% Sn.

In the central and eastern portion of the area concerned, a limited amount of driving and stoping on sulphide ore has been done by tributers.

During the past three months a level has been driven from the Main Tunnel westwards for 260 feet. A programme of stripping on the hangingwall side below the No. 4 bench adit and rising to that adit is about to commence.

V. ORE RESERVES AND GRADE.

Actually there is little blocked out ore and proved reserves are small.

Throughout the driving of the level from the Main Tunnel, grab samples were taken from every firing. The average of 50 samples from this drive was 0.90% tin, the highest individual assay being 2.48%. The average of 10 test holes drilled 5 feet into the footwall side of the drive was 0.64% Sn, and the average of 11 holes drilled into the hangingwall side 1.25% Sn. That is, an average grade of 0.9% Sn. over a width of 16 feet and a length of 240 feet is indicated at this level. Actual limits of the ore at this level are not known.

The adit crosscut fromthe No. 4 Bench passed through a horizontal thickness of 60 feet of hangingwall section and a footwall section 16 feet wide which was stoped to 6 feet below the level. A band 10 feet wide was left on the footwall. Systematic sampling by the management of the adit between mouth and stope gave an average grade of 0.62% Sn. for the 60 feet hangingwall section (see section B-B', plate 3, sheet I).

The length of the stope at this level in the footwall section is 90 feet; the width, west of the adit, varies between 13 to

30 feet. Above the adit level, stoping on the footwall section was carried up to the limits of mining considered as safe by the Inspector of Mines, and the stoping was extended well into the hangingwall section. Samples taken on the south wall of the open stope above the adit level in/the hangingwall section, averaged 2.0% over a stratigraphic width of 20 feet.

From 50 feet east of this adit to 200 east (i.e. to a point over the Main Tunnel) no definite information is available concerning grade. Near section line D-D' (plate 3, sheet II), a limited amount of stoping has been done on two bands of ore with a grade reported to be about 1% Sn.

To summarise, a grade of 0.9% Sn. over a width of 16 feet and a length of 240 feet is indicated by the driving at Main Tunnel level. 200 feet west from the Main Tunnel and on a level 50 feet higher, an adit crosscut passed through 60 feet of ore of average grade of 0.6% Sn. A footwall section here from 13 to 30 feet wide was stoped, the average grade being of the order of 1%. Directly above the Main Tunnel, ore of stoping grade continued to the surface 70 feet above at one point at least. Between this point and the No. 4 Bench adit the grade is largely unknown, but limited stoping has been carried out on two bands. From the foregoing it seems that a block of ore in the footwall section, 16 feet by 60 feet by 250 feet is reasonably assured, i.e., approximately 24,000 tons. At the western end, extension of ore into the hangingwall side is known to occur above No. 4 Bench level over a length of 120 feet. If it is assumed (and it is reasonably indicated) that on section E-E' the area within dotted lines (-.-.) carries ore of payable grade and further that such ore extends for 25 feet east and west of the section line, a further 24,000 tons would be added to possible reserves.

The total tonnage of Greisen Orebody within the limits defined above, i.e. length of 250 feet and above Main Tunnel level, and without considering the grade, is of the order of 250,000 tons. The 48,000 tons indicated above forms a part of this 250,000 tons.

VI. DIAMOND DRILLING.

At the request of Mr. G. Lindesay Clark, there is set out on the Sections A-A' to E-E', a scheme of diamond drilling to prove the grade and amount of ore.

This scheme is as follows:-

(1) Five holes from Main Tunnel Drive on section lines A to E inclusive into footwall side; inclined slightly upwards.

(2) Five holes from Main Tunnel drive on section lines A to E inclusive, into hangingwall side; inclined upwards 40°.

(3) Three holes from surface on lines C, D and E; depressed 40°.

Probable footage drilling involved.

Section Line	Hangingwall Hole	Footwall Hole	Surface Hole
A.	55 feet	30 feet	—
B.	52 "	35 "	—
C.	52 "	30 "	75 feet
D.	50 "	32 "	83 "
E.	52 "	45 "	65 "
	261 "	172 "	223 "

Total — 656 feet.

Underground drilling is advised in preference to surface drilling where possible because drilling from the Main Gossan Bench would involve casing for the first 20 to 30 feet. Also in the event of poor core recoveries, better sludge recoveries will be made.

WARATAH, 7th June, 1944. C.L.KNIGHT, Geologist.

MT. BISCHOFF TIN MINE
GREISEN OREBODY
MAIN TUNNEL WORKINGS
R.L. 1165'

SCALE 1 = 20FT.

Survey of Tunnel & Drive by A.S. Clark
Results of sampling of walls of Main Tunnel, Grab samples after firing in Western Drive and borings in test holes in walls of drive are taken from mine plans.

— Reference —

carb.	Coarsely crystalline carbonates; generally with sulphide
dol.	Fine-grained carbonate rock; not mineralised.
pyrrh.	Pyrrhotite
═══	Footwall shales
A-A	Section Line
0·56	0·56% Sn.
Tr.	Trace Sn.
— —	Geological boundary, known.
- - - -	" " inferred.

N

probable position of footwall of mineralised zone

Banded talc-pyrrh, carb-pyrrh, pyrrh and relics of dol. exposed in drive

WESTERN DRIVE

Structure line

Shale

Fault, with vein of carbonate-sphalerite-pyrite

talc-pyrrh overlying dol.

30° in back

carb-pyrrh

Trace

Shale

Footwall at +5'

Footwall at +10'

Footwall at +7'

Footwall at +6'

Thin banded dol

carb-pyrrh, some talc-pyrrh

Siliceous shale band

carb-pyrrh.

Hanging wall of mineralised zone

MAIN TUNNEL

dol

1800N 1000W

C.L. Knight
Geologist
Mineral Resources Survey
3.6.44

PLATE 2.

MOUNT BISCHOFF TIN MINE
GREISEN OREBODY
LEVEL PLAN AT R.L.1238'

20' 0' 20' 40'

FOR REFERENCE SEE PLATE I.

N

Possible position of Footwall of mineralised zone

Hard band pyrrh. etc.

Talc-pyrrh.

Talc-pyrrh., carb-pyrrh.

Talc-pyrrh., talc. carb-pyrrh., dol

Steep face of Talc-pyrrh-carb. partly oxidised

Dip flattens

Bench at R.L. 1238'

1238' Contour of open cut workings

Gossan

Soft decomposed mineralised rock

Pyrrh-talc Dol.

Carb & dol.

Massive pyrrh etc.

Soft oxidised talc-carb-pyrrh band

mineralised

Projected from R.L. 1226' in part

Stoped

Talc-pyrrh

Pillars

Floor only few feet above level

Talc-carb-pyrrh

Soft banded talc-pyrrh

Hangingwall

Shale

1238' Contour of open cut workings

Talc-pyrrh

Talc carb-pyrrh

Tip

Shale wall

1000N

1000W

A B C D E F G H

C.L. Knight
Geologist
Mineral Resources Survey
3.6.44

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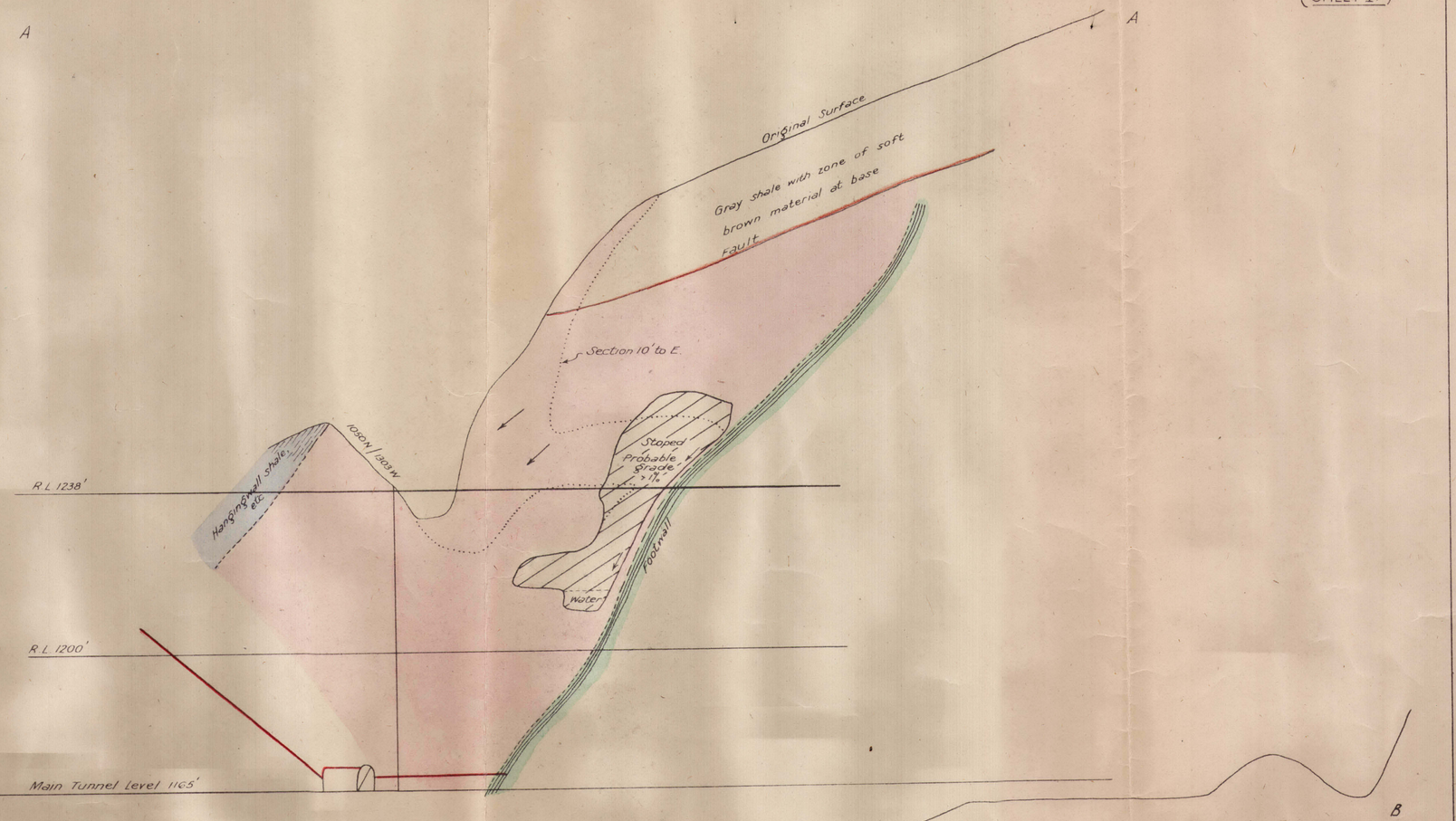
MOUNT BISCHOFF TIN MINE
GREISEN OREBODY
CROSS SECTIONS A-A, B-B.

SCALE 1"=20'

FOR REFERENCE SEE PLATE I.

NOTE:- Proposed Diamond Drillholes shown thus -
Greisen Orebody shown thus: ▭
Measured dips ↙



C.L. Knight
Geologist
Mineral Resources Survey
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PLATE 3
(SHEET II)

MOUNT BISCHOFF TIN MINE
GREISEN OREBODY
CROSS SECTIONS C-C, D-D

SCALE 1'=20"

FOR REFERENCE SEE PLATE I.

Note:- Proposed Diamond Drillholes shown thus:-
Greisen Orebody shown thus:-
Measured dips " " "

C.L. Knight
Geologist
Mineral Resources Survey
3 6 44

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PLATE 3.
SHEET III

MOUNT BISCHOFF TIN MINE
GREISEN OREBODY
CROSS SECTIONS E-E, F-F

SCALE 1" = 20'

FOR REFERENCE SEE PLATE 1.

Note. Proposed Diamond Drillholes shown thus:—
Greisen Orebody " "
Measured dips " "

C. L. Knight
Geologist
Mineral Resources Survey
3·6·44

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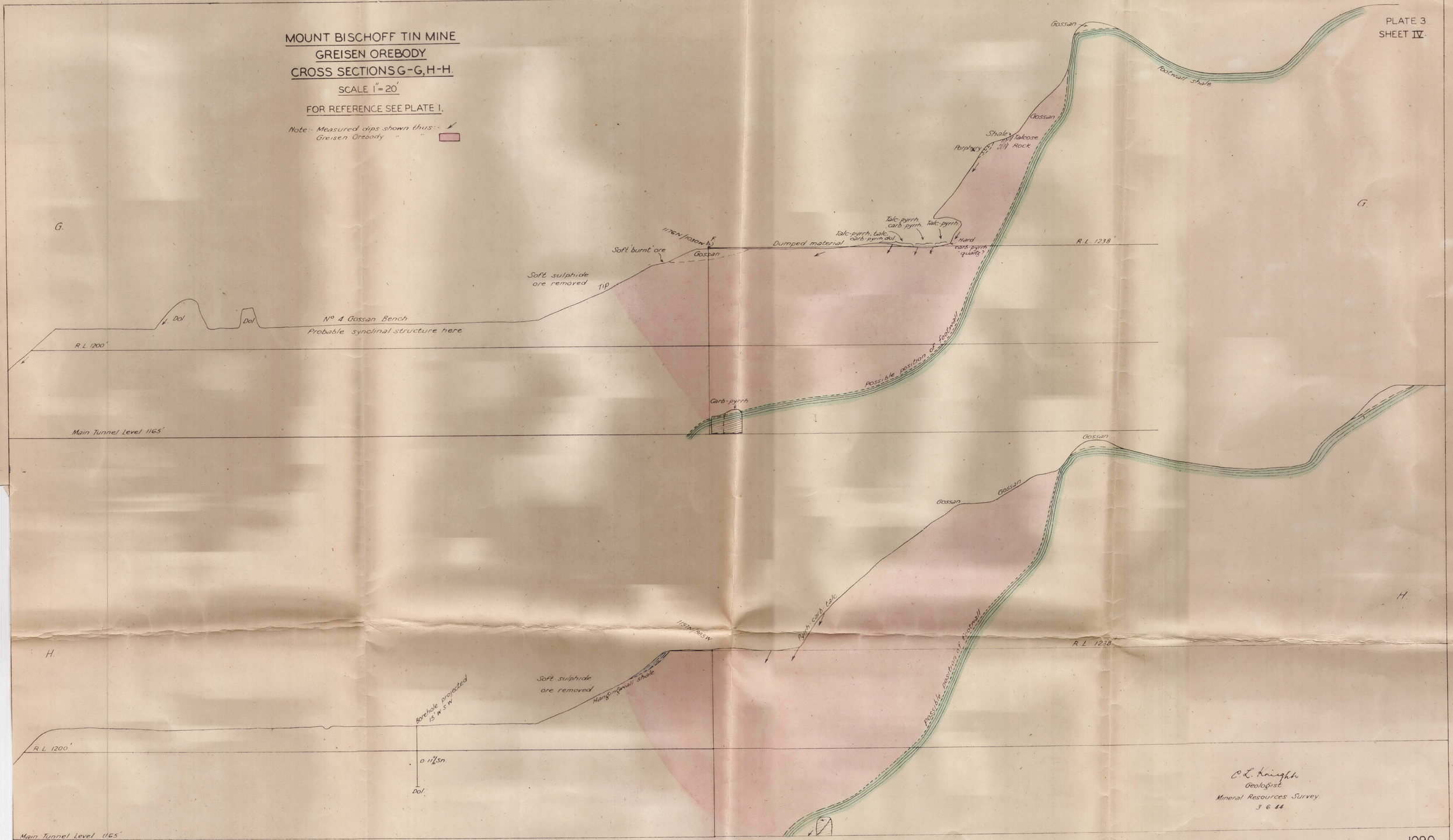
MOUNT BISCHOFF TIN MINE
GREISEN OREBODY
CROSS SECTIONS G-G, H-H.

SCALE 1" = 20'

FOR REFERENCE SEE PLATE 1.

Note:- Measured dips shown thus:- ↙
Greisen Orebody " "

PLATE 3
SHEET IV.



C. L. Knight
Geologist
Mineral Resources Survey
3 6 44

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