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RELINQUISHMENT REPORT ON
NORTHERN PORTION OF E.L. 11/76

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E.L. 11/76 is located on the West Coast of Tasmania, west of Zeehan. Geographically, it comprises open, button grass-covered plains in the west, next to the coast, and steeper, more heavily vegetated terrain in the east (the Heemskirk Range).

Since the licence was granted in 1976, the area has been explored for tin deposits within the Devonian Heemskirk Granite, which underlies the entire licence area. This work has highlighted the potential of the southern part of the Heemskirk Granite and downgraded exploration interest in the rest of the licence area. As a result the northern portion of E.L. 11/76 - an area of 55 sq. km. - was relinquished in April of this year.

This report describes all of the work that has been undertaken on the relinquished portion of E.L. 11/76 (Figure 1), since the licence was granted. In summary:

- (1) The entire licence area was flown with colour aerial photography in December, 1977 by A.A.M. Pty. Ltd. Five east-west lines and one north-south tie line were flown. Photograph scale is approximately 1:25,000.
- (2) A photogeological study was completed over the entire Heemskirk Granite by Loxton Hunting and Associates in February, 1978. This report is attached (Appendix 1), together with the photogeological interpretation map including the northern, relinquished section of the E.L. (Figure 2).
- (3) Some field checking was carried out following the completion of the photogeological study:
 - (a) By P. Stephenson in March, 1978, to check the tourmaline/quartz/hematite occurrence known as Longs Iron Blow (Appendix 2).

- (b) By the present author in early 1980. This work indicated that the photogeological study had been ineffective in distinguishing different phases within the Heemskirk Granite.
- (4) As a result of the field checking, a reconnaissance mapping program was carried out over two field seasons in 1981 and 1982 by contract geologist, R. Poltock. His report and maps are attached (Appendix 3 and Figures 3 and 4).
- (5) The most significant mineralized occurrence in the relinquished part of the E.L. occurs at the old Peripatetic Workings (Figure 5). These were examined by the present author in January, 1981 (Appendix 4).

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2. Notes on Longs Iron Blow, by P.R. Stephenson, May 1978.
3. Poltock, R., 1982: E.L. 11/76. Geological Mapping in the Heemskirk Granite, March-April 1981, January-March, 1983.
4. Extract from 1980-81 Annual Report for E.L. 11/76 and S.P.L. 129 describing the Peripatetic Mine, by P.A. Roberts.

FIGURES

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APPENDIX 1

Loxton, Hunting and Associates, 1978:

A Photogeological Study of the Heemskirk Granite and the Area
Surrounding Zeehan, Western Tasmania

G.A. 39/77 and GA/1/78, 17 pages

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**A PHOTOGEOLOGICAL STUDY OF THE HEEMSKIRK GRANITE AND
THE AREA SURROUNDING ZEEHAN, WESTERN TASMANIA.**

Undertaken on behalf of

RENISON LIMITED

May 1978

R. F. Loxton, Hunting and Associates
P.O. Box 25
Barker Centre
Canberra, A.C.T. 2603

GA. 39/77
GA. 11/78

A B S T R A C T

The photogeological study of the Heemskirk Granite and surrounding area using 1:25 000 scale colour aerial photographs has revealed new regional data and details of structure and stratigraphy that were not recognised during previous mapping. In particular, additional layered intrusions have been recognised in the essentially stratified Heemskirk Granite, especially in those parts of the granite that have not been subjected to peneplanation.

The older "red" granite that has been intruded by the younger "white" mineralising granite can now be divided into six recognisable layers, compared with the three layers that were recognised previously. No new information was revealed concerning the possible configuration of the "white" granite, but there are indications that it may exist at or near the surface in some of the higher parts of the "red" granite terrain in the east.

Whilst limited potential was revealed for the discovery of additional vein-type tin mineralisation, good potential has been recognised for the existence of large-tonnage low-grade tin deposits in possible large greisen zones within the "white" granite, and also in altered, limonite-stained Proterozoic slates and quartzites next to the eastern contact of the granite. This last-mentioned area is of considerable interest considering that cassiterite has been reported from quartz-tourmaline veins.

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I. INTRODUCTION

Following the submission of a proposal by R. F. Loxton, Hunting and Associates, to Renison Limited on 6th February, 1978, Loxton Hunting commenced a photogeological study of the Heemskirk Granite and a limited surrounding area on the west coast of Tasmania near the town of Zeehan. The study-area is 700 square kilometres, extending westwards from the Renison Bell Mine to the coast, and southwards to the Little Henty River. The total area is slightly less than that of the Zeehan 1:63 360 scale geological map-sheet (K 55-5-50). (See Figure 1).

The aim of the study was to map the Heemskirk Granite in as much detail as possible, and to demarcate areas of potential tin mineralisation, both of the fissure-vein type, and the low-grade and high-tonnage type. Particular attention was to be paid to the area surrounding the Cumberland Lake, which has been the centre of tin-mining operations in the past.

The study-area was mapped at the photoscale of 1:25 000 using seventy-seven (77) RC8 colour aerial photographs (see Figure 2 and the Appendix). Only the granitic terrain was mapped in detail, the stratigraphy of the surrounding area being annotated only in enough detail for geological continuity.

A number of workers have investigated the Heemskirk Granite; however the most significant mapping to date is by Klominsky (1972). A detailed description of the mineralisation within the southern part of the granite was given by Waterhouse (1915).

All previous workers recognised two main types of granite, namely the "red" and the "white" granite, and it is generally agreed that the former

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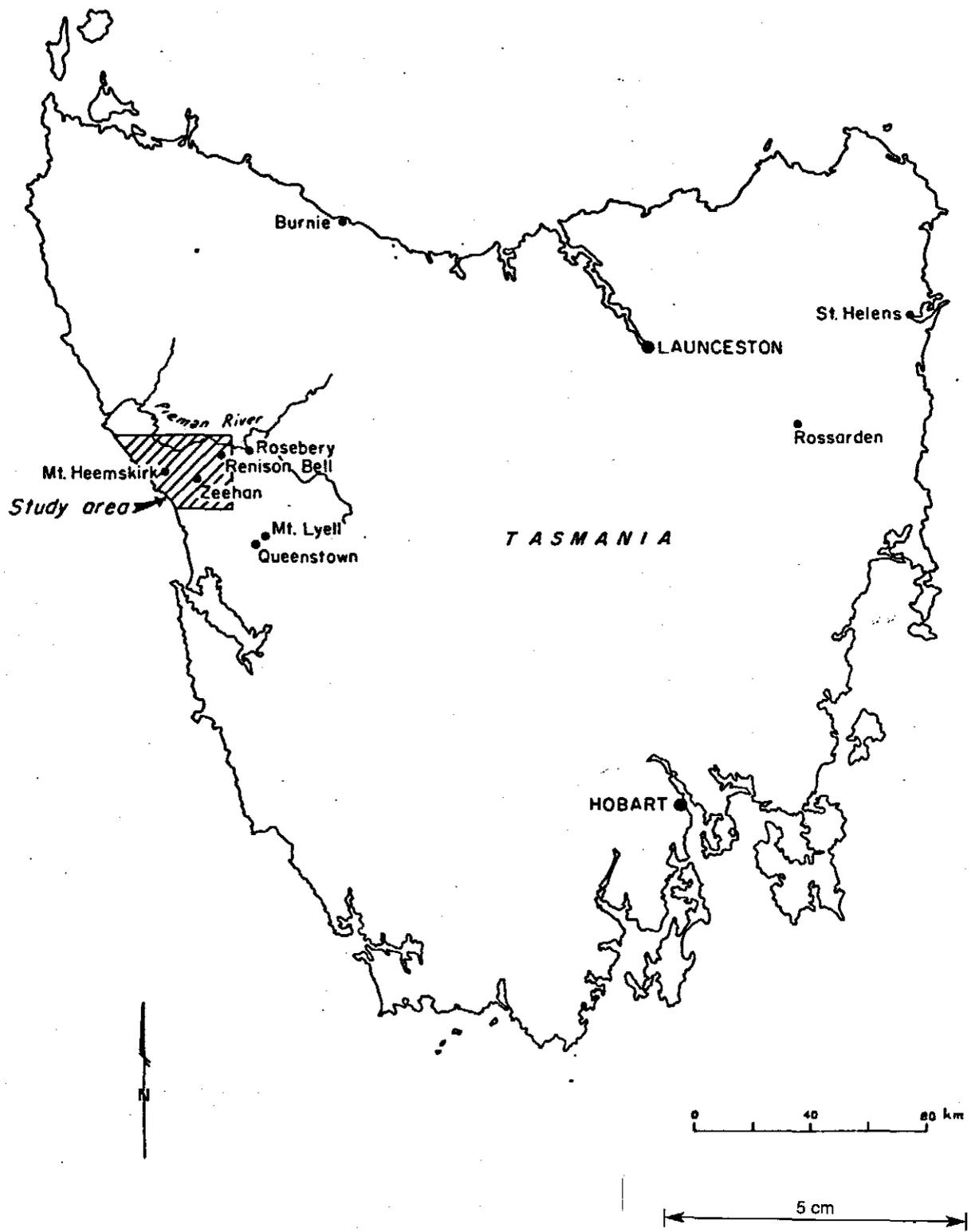
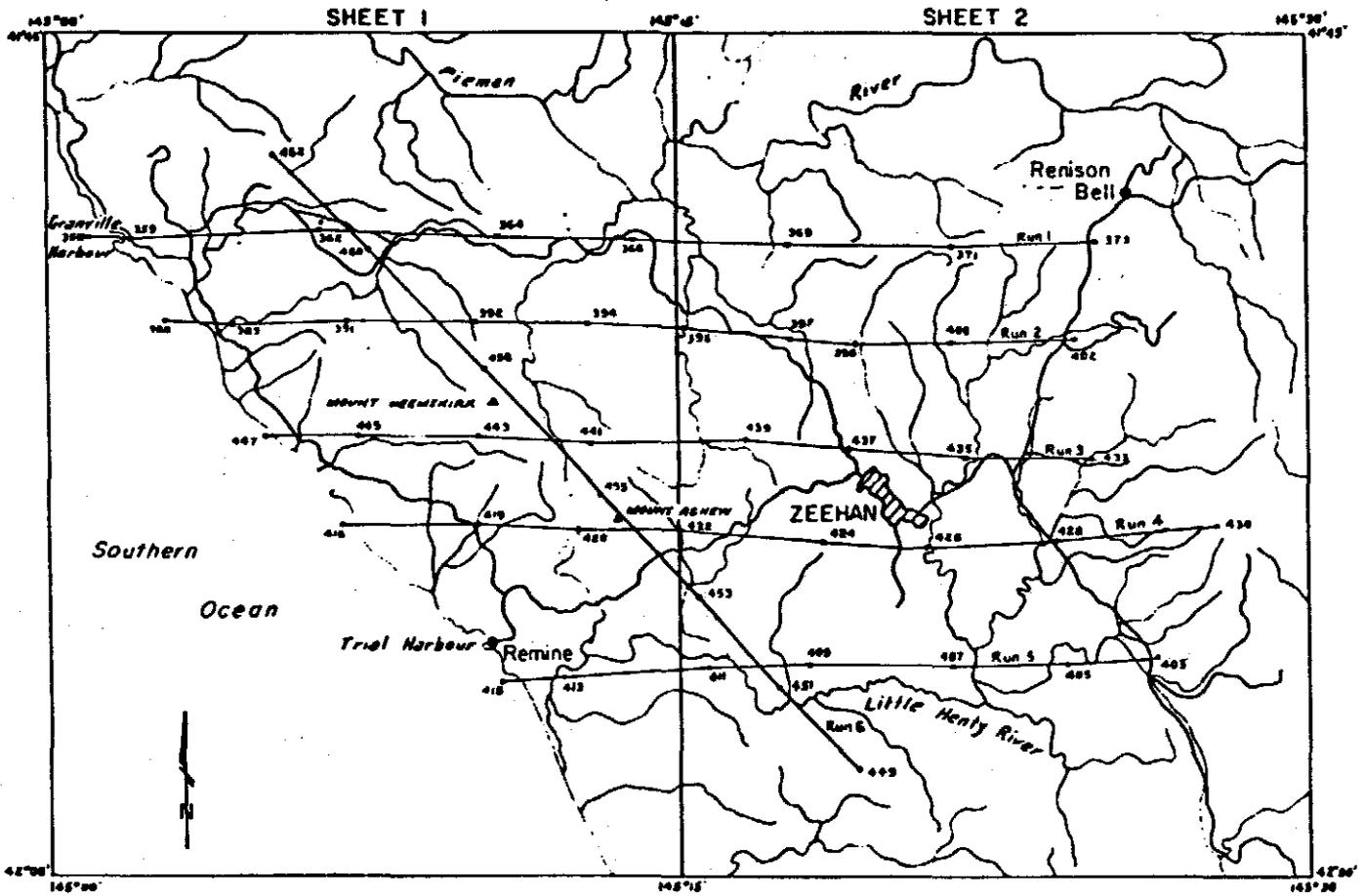


Fig. 1. LOCALITY DIAGRAM

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Scale 1:250 000

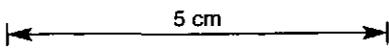


Diagram showing approximate position of flight lines in Heemskirk Area, Tasmania

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is intruded by the latter. The Heemskirk intrusion as a whole is broadly stratified and the "red" granite tends to rest above the younger "white" granite.

To date all deposits of tin minerals have been found to be associated with quartz-tourmaline veins and quartz-topaz veins; the latter being called "white dykes". The most favourable zone (for mineralisation) seems to be near the contact of the two main types of granite.

A period of five days was spent in the study-area at the end of the initial annotation phase, in order to confirm or investigate geological contacts and structure in certain "problem" areas.

II. PROCEDURE

Because the area covered by the aerial photography corresponds approximately with that of the Zeehan 1:63 360 geological sheet (K 55-5-50), it was decided to use this as a comparative guide during photogeological annotation. The sheet extends from $41^{\circ}45'S$ to $42^{\circ}00'S$, and from $145^{\circ}00'E$ to $145^{\circ}30'E$. Two 15-minute square transparent drainage bases were therefore prepared from the enlarged 1:50 000-scale topographic sheet. Geological and cultural information was annotated in ink directly onto the transparent drainage bases which were superimposed on the colour photographs (see Figure 2). All annotation was carried out using a Zeiss N2 mirror stereoscope fitted with a binocular head having a x3 magnification.

The scale of the photography was found to be exactly 1:25 000. While the photographs "fitted" the drainage bases well in the areas of low relief, a certain degree of distortion was evident in areas of high relief, particularly east of the Burnie-Queenstown road, and in the eastern part of the Heemskirk Granite. This distortion necessitated the moving of the photographs beneath the overlay in order to match the drainage. Thus geological and cultural information in these difficult areas has been generalised somewhat. This should be borne in mind, especially when evaluating the detail of geological contacts and fractures in the "red" granite.

On commencing stereo-work an attempt was made to recognise the "red" and "white" granites on the basis of colour, but it soon became apparent that the designations are misnomers; the "red" granite is not necessarily always red in colour and field evidence confirms this. Thus reliance on colour was wholly unsuccessful in differentiating the various granites under the stereoscope.

An attempt was then made to recognise and define the different granites by using combinations of joint-directions as the main criterion.

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This proved partially successful, but the combinations of vertical and shallow-dipping joints gave the impression that the contact-zones within the composite granite mass were vertical, to sub-vertical, rather than sub-horizontal, which they actually are.

Finally, once field-work was done by the writer, a number of areas were re-mapped in detail using both ground data and photogeological evidence. Information gained from these areas was then extrapolated to those not visited.

Klominsky's (1972) information was used as a basis for the naming of various granite types recognised on the aerial photographs. It was found that most of Klominsky's units could be verified, especially within the "red" granite; however some units could not be recognised in the "white" granite. Examples of the latter are the small units mapped by Klominsky in the northwest and also the thin outcrop of "red" granite mapped by him between South Gap Creek and Falconer Creek. On the other hand certain new subdivisions were recognised.

Total time expended on the photogeological project was two months. The work was the responsibility of P.R. Boshier.

III. GEOLOGY

A. Introduction

The Heemskirk Granite is a high level calc-alkaline granite of Devonian(?) -Carboniferous age (Brooks and Compston, 1965), that was intruded into folded, mainly sedimentary, Proterozoic and Cambrian rocks. Other rocks in the area mapped are sediments and volcanics ranging in age from Lower Proterozoic to Recent. Intruded into these rocks are Cambrian basic and ultrabasic intrusions and a dolerite cone-sheet of Jurassic age.

It is intended here to discuss only the geology of the granite and the immediate surrounding rocks. The stratigraphy and structure of the other rocks in the area are adequately described by Blissett (1962).

B. Heemskirk Granite

1. General

The granite is broadly layered and is intruded into the axis of a broad north-west-trending brachy-anticlinorium (Klominsky, 1972). The subsurface configuration of the granite superficially reflects this regional anticlinorial structure. The granite consists of "white" and "red" phases, and the former intrudes the latter. Each phase can be divided in turn into sub-phases which Klominsky (1972) based on grain-size and mineral content. Whilst this author agrees with Klominsky's divisions, he feels that the previous classification is an oversimplification, especially in the case of the "red" granite. This will be discussed in more detail below.

According to Klominsky, the granites can generally be distinguished in the field by their colour and grain-size. The "red" granite is supposed

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to be distinguishable from the "white" in that its feldspars are pink; it contains magnetite, sphene and allanite; does not contain muscovite and has a lower tourmaline content. Under the microscope their biotites have different pleochroism (Klominsky, 1972). Field evidence, noted by the author, suggests that colour, while important, should not be the ultimate criteria. If Klominsky's mapping is correct, then some of his "red" granites are very white in colour. Within the "red" granite areas colours ranging from pink through grey to white were recorded in the field.

Brooks and Compston (1965) found that the bulk geochemistry of the two granites was similar, but that the "white" was slightly more acidic and should be classified as an alaskite.

At the commencement of this project the author felt it would be relatively easy to distinguish between the supposed "red" and "white" granites on the colour aerial photographs, whilst realising that the direct recognition of differences in grain-size would be impossible. Results proved, however, that it was easier to confirm Klominsky's grain-size boundaries than it was to place any confidence in colour differences. Once field-work was undertaken the reason for this became apparent, especially in the case of the "red" granite where it was found, as mentioned above, that not all the "red" granites were red but varied from pink, through grey, to white. However granites of different grain-size tended to show up as recognisable geomorphological types, which this author suggests is due to two contributing factors.

Firstly the granite has been subjected to varying degrees of Pleistocene glacial activity which led to the preferential erosion of the more "susceptible" parts of the granite. Thus the coarse-grained and gneissified granites presented to the glaciers a surface that was more readily "plucked" by the ice, compared with the finer-textured granites. Secondly some of the coarser-grained granites appear in the field to be

more altered, either by greisenisation or by sub-aerial weathering, than the finer granites, leading also to preferential erosion. This theory could not be put to the test in the western portion of the granite where the "white" granite has been eroded to a peneplain surface which extends to as far east as South Gap Creek. However, in the east it was found that the coarser "red" granites tended to outcrop as negative topographic features when compared with the finer-textured varieties. They also exhibit a coarser surface texture on the aerial photographs. A feature of some note was that tree or scrub vegetation on the granite tended to be confined to the coarse-grained varieties, especially to those that had been altered or greisenised to any marked extent.

The non-peneplaned eastern portion of the Heemskirk granite exhibits varying intensities of jointing and fracturing. These joints are either flat dipping or vertical to sub-vertical. When little success was met when trying to distinguish granite types by their colour, an attempt was made to use jointing as a means of differentiating the granites. This proved to be partially successful, except that contacts between apparently different granites then commonly appear to be steep or vertical under the stereoscope. It was not until a field-visit was made, and selective detailed ground-mapping was undertaken on the aerial photographs, that the exact nature of the granite contacts could be recorded.

It was during this field-checking program that the difficulty in recognising meaningful colour differences was dramatised. A prime example of the problem can be seen near the contact between granite and slate and quartzite immediately north of the Tenth Legion Fault, in the eastern portion of the overall granite mass. Here the contact between the granite and the country rock is very clear. On the colour photographs the granite appears white, while the country rocks, being altered and containing considerable limonite, appear yellow. However, whilst this contact is very easily recognisable on the ground, the granite that appears to be white on the photographs is in fact dark pink on the ground and the

reason is the high apparent reflectivity of the granite surface. Approximately 100 metres west of the contact the "red" granite is seen to be intruded and "underlain" by a white-coloured tourmaline granite, which has a distinct chilled margin, and minor pegmatites in small cupolas. This contact between the granites is virtually impossible to recognise independently under the stereoscope. Only by knowing where it was on the ground could it be extrapolated to other areas, using the aerial photographs. This particular contact and area will be discussed in more detail below.

2. Detail

Klominsky (1972) recognised six different granite types, namely :

- contaminated porphyritic "red" granite (R1/Dgr-cp)*
- medium- to fine-grained "red" granite (R2/Dgr-mf)
- coarse-grained "red" granites (R3/Dgr-c)
- contaminated porphyritic "white" granite (W1/Dgw-cp)
- medium- to fine-grained "white" granite (W2/Dgw-mf)
- coarse-grained "white" granite (W3/Dgw-c)

From the top to the bottom of the sequence the correspondence is essentially that as seen in the field. Intruded into this pile are quartz-tourmaline-rich aplite bodies that probably represent the residuum of the "white" granite magma. It is probably this last intrusive phase that controlled the bulk of the tin mineralisation that is associated with the granite. As mentioned above nearly all the known tin mineralisation took place near the contact between "red" and "white" granite and all previous workers regard the "white" granite as being the mineralising granite.

The contaminated porphyritic granites are found at the tops of both granite phases and are regarded by Klominsky (1972) as being due to

* R1 = Klominsky (1972)
Dgr-cp = Loxton Hunting (1978)

incomplete assimilation of the roof-rocks by the intruding granite. Klominsky reported that xenoliths of country rocks are found near these contaminated granites. He also reported that the contacts between the medium- to fine- and coarse-grained granites is generally indistinct and transitional. This is partially confirmed by recent field evidence, but some contacts were seen to be very sharp, suggesting there may be more than one phase of "red" granite intrusion.

At the completion of this mapping program it was apparent that Klominsky's mapping of the eastern, more rugged part of the granite terrain was confirmed in general, but that modification was necessary in places, on the basis of photogeological data. However, the peneplained western and southern portions of the granite did not lend themselves well to air-photo interpretation, except in regard to the delineation of joints and fractures. Little new information was gained in respect of this part of the Heemskirk granite. This was especially true of the contact between granite and sediments in the north and south, where the only reliable method of mapping the contact was to follow it on the ground. Any future mapping in this western area would best be carried out on the ground using the aerial photographs for control.

Photogeological and ground evidence suggests that whilst Klominsky's breakdown of the "red" granite is basically correct, it tends to be an oversimplification. Photogeological evidence suggests that the "red" granite can be divided into at least five, and possibly six, units or "layers". These are, in descending order, as follows :

- contaminated porphyritic granite (Dgr-cp, Mt. Heemskirk)
- medium- to fine-granite (Dgr-mf¹)
- coarse granite (Dgr-c)
- medium- to fine-granite (Dgr-mf²)
- coarse granite (Dgr-c)
- medium- to fine-granite (Dgr-mf) (in the west)

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This last-mentioned granite is found in the western portion of the "red" granite mass, immediately above the "white" granite, in which case it could be argued to represent unit (mf³) except that there appears to be only one other medium- to fine-grained granite above it in this area instead of two as implied by the designation (mf³).

The author does not suggest that these layers are continuous across the "red" granite, but it would appear that, in places, they will be found to lense-out and/or to merge. Ground evidence suggests that the "red" granite units are not necessarily (always) in situ differentiates of one magma, but in some places are discrete intrusions. Evidence for this can be seen in the discontinuous pegmatite layers and chilled upper margins of the coarse, white-coloured so-called "red" granite north of the Tenth Legion Fault mentioned previously. Similar features were noted below the contaminated porphyritic granite that outcrops on the top, and to the north of Mt. Heemskirk.

The aforementioned white-coloured coarse-grained "red" granite, found below the medium- to fine-grained pink-coloured "red" granite north of the Tenth Legion Fault presented this author with a problem. Klominsky appeared to base his description and mapping-boundary on two petrological samples taken from the area which presumably exhibited the "right" mineralogical criteria, when examined under the microscope, leading to his classification of the granite as "red". However, as mentioned above, when observed in the field this granite is white in colour, has a chilled margin and contains many tourmaline nodules. This, plus the fact that the overlying pink-coloured "red" granite also contains tourmaline nodules suggests that the lower granite is a younger, very high level "white" granite. As the "white" granite is the mineralising granite the inference is that the contact zone may be highly prospective for tin. Evidence for this is discussed below in Section 4.

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The bedrock in the relatively large area that was previously left unmapped by Klominsky between photo-centres 3/0442 and 3/0441 (see map) in the east-central part of the Heemskirk granite, is suggested here to be coarse-grained "red" granite. The evidence for this is the negative topography, and the rugged, tree-covered outcrop pattern - the reasoning of which was discussed earlier. This author feels that "white" granite could conceivably be found to exist at a shallow depth below this area, and may actually outcrop in some of the lower parts. If this hypothesis is true then the underlying "white" granite could be greisenised and thus prospective for tin mineralisation.

Regarding the two other small areas left unmapped by Klominsky in the north-east and south-east, geological contacts were extrapolated into these areas under the stereoscope.

3. Structure

Klominsky (1972) suggests that the granite occupies the axis of a brachy-anticlinorium that plunges doubly; to the north-west and east-south-east respectively. The internal structure of the intrusion shows with depth a diminishing influence of the enclosing country rocks. Within the granite he recognised five major joint systems, namely, NNE-SSW, WNW-ESE, N-S, NE-SW and W-E; however the main sets can be summarised as being NE-SW and approximately E-W and N-S. The joints are mainly vertical or steeply-dipping. It was noted by this author that there is also a pervasive set of generally shallow- to moderately shallow dipping joints which generally incline northwards.

Klominsky reported that both of the main N-S and E-W fracture directions may be filled by veins of quartz-tourmaline and/or quartz-topaz. He regarded the north-south set as "contraction joints" associated with extensive greisenisation and hydrothermal alteration. A good example of

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this type of jointing can be seen extending north from near Cumberland Lake almost to the northern limit of exposed granite. The N-S joint direction is particularly strong in the large area that was left unmapped by Klominsky, and may lend weight to the suggestion by this author that it is an area of "red" granite underlain by strong greisenisation immediately above the "white" granite. The NE-SW trending joints are mainly confined to the "white" granite suggesting they may be the youngest in age. However, no definite evidence based on cross-cutting of the joints, was seen to confirm this suggestion.

The faulting within the granite area trends in three main general directions, namely N-S; NE-SW and E-W. Obviously they reflect the same overall constraints suffered by the major sets of joints, noted above. The east-west faults appear to post-date the north-south faults.

Two major northerly-trending faults were recognised on the aerial photographs. One is the South Gap Creek - St. Dizier Creek Fault. Based on air-photo evidence, movement appears to have been in the sense of "east block up and to the south". The apparent displacement, in plan, is approximately 1000 metres. The other major fault is that which passes through the settlement at Granville Harbour, and is sub-parallel to the coast-line. From Granville Harbour southwards the fault lies offshore and it appears to have controlled the shape of the coast-line in this region.

The major east-west fault is the Tenth Legion Fault. Photo-geological evidence, based on the alignment of drainage in the western portion of the Heemskirk granite, suggests that the influence of this fault extends for the entire width of the exposed granite mass, from east to west. There are other related(?) sub-parallel faults in the region. As mentioned above these east-west faults appear to post-date the north-south faults, as evidenced by the dislocation of the South Gap Creek - St. Dizier Creek Fault. Klominsky regards the east-west faults as thrust faults; however

there is no photogeological evidence to confirm this. Strike-slip movement is more likely, with the predominant movement being "north block west". Northeast-southwest faulting appears to be subordinate. The main example is the Tasman River Fault in the north-western portion of the granite terrain.

4. Mineral Exploration Potential

A complete description of the mineralisation that is associated with the southern portion of the Heemskirk granite and the neighbouring country rocks is given by Waterhouse (1915). Wells (1977) gives additional information concerning mineral exploration around the Federation Mine and Sweeney's Mine. He summarised the ore-types in these areas and their relation to the intrusive granite, and veins. Both authors described the known mineralisation in relative detail and the reader is referred to these reports for further information.

One requirement of the photo-interpretation program was to attempt to locate additional vein-type tin-ore similar to that which is associated with the veins of quartz-tourmaline and quartz-topaz ("white dykes") in the Federation area, and also further to the west in coarse "white" granite. These veins can be seen only with difficulty on the aerial photographs. They are only conspicuous if they have a scree slope which widens their surface expression on the aerial photographs. The only other area apart from Federation where they could be positively identified lies immediately north-west of photo-centre 3/0443 (see map).

A number of areas which conceivably are underlain by greisenised bedrock (based on criteria mentioned previously) are worthy of mention. By far the largest is the depressed area between photo-centres 3/0442 and 3/0441. This was the area left unmapped by Klominsky because dense vegetation made access difficult. As mentioned in Section 2 this area

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appears to be underlain by coarse-grained "red" granite, but with underlying coarse-grained "white" granite possibly being present at shallow depth. The possibility, and the configuration of the terrain, suggest that the area could coincide with a large cupola of intrusive "white" granite. If this hypothesis is correct the possibility exists for tin-mineralisation of "Sweeney's" type in argillised (greisenised?) granite. Other locations that may be underlain by greisenised granite are the coarse-grained "red" granite areas of Klominsky, next to the north-eastern and south-eastern contacts between granite and country rock. This postulation depends solely on the hypothesis noted on pages 6 and 7 in which grain-size and alteration were related to likely degrees of erosion. Alluvial tin and sulphide mineralisation is recorded from the southern location. One other possible site of greisenisation is the coarse-grained granite found on the western slopes of Mt. Heemskirk.

The Proterozoic slates and quartzites in the vicinity of photo-centre 3/0440 (coloured area of Puo marked with red "speckles" on map) present a very interesting tin-exploration target. In this area, approximately east-west-striking slates and quartzites form an embayment in the eastern boundary of the Heemskirk granite. The southern part of the embayment is bounded by the WNW-striking Tenth Legion Fault, whilst the northern boundary is marked by an apophysis of granite which protrudes into the slates and quartzites. The apophysis has a partially faulted southern boundary. The western boundary of the country-rock embayment is faulted and has been obliquely re-faulted (a faulted, faulted contact). Based on limited ground evidence the western faulted contact appears to dip steeply to the west.

A feature of this area is the strong yellow colour anomaly found over the slates and quartzites (compared with the white colouration of the granite), as seen on the aerial photographs. A ground traverse was made up the ridge of slates and quartzites extending from the Tenth Legion gossan to the granite contact. The yellow colouration of the slates and

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quartzites was found to be due to limonite staining. The slates and quartzites were moderately to strongly altered, and the degree of alteration decreases eastwards, with increasing distance from the granite. Minor boxworks after pyrite(?) were found in the altered slates and quartzites. This author would suggest that the slates and quartzites lie above and on the higher flanks of a cupola in the "white" granite the apex of which possibly lies in the area between photo-centres 3/0441 and 3/0442 (see Section 2). A feature that may help to explain why the alteration occurs only in this location is that it is essentially the only granite/slate-quartzite contact where the bedding and cleavage are perpendicular to the contact. The bedding and cleavages planes presumably presented a pathway along which hydrothermal fluids from the granite could penetrate. Effects of quartz- and tourmaline alteration are seen within the slates and quartzites, and also within the granite in this region. It is highly relevant that Klominsky reported "abundant" cassiterite from the slates and quartzites on the above-mentioned ridge ("Cassiterite was found in quartz-tourmaline veins on the ridge which is parallel to the latitude $41^{\circ}52'30''$ ". Klominsky, 1972, p.71).

One final feature that may be significant is that the aerial photographs suggest that streams which originally drained this particular area, flowed to the southeast, but because of recent glaciation the creeks appear to have been captured and now flow to the east and north-east. The old stream-courses to the south-east contain alluvial tin which may have come from the above-mentioned area in pre-glacial times.

This embayment is regarded as an important target for possible large-tonnage, low-grade tin mineralisation.

IV. CONCLUSIONS AND RECOMMENDATIONS

This project has shown that air photo-interpretation is a useful tool both for detailed mapping and also for assisting in the delineation of mineral exploration targets. Its use was limited in the western portion of the granite where it had been peneplained; however joints and fractures were recognised here that probably would not have been noticed by ground mapping. The non-granite portion of the area was mapped in only enough detail to provide geological continuity. Blissett's (1962) map has been slightly amended in certain areas, particularly regarding stratigraphy and structure in the south and east.

It is recommended that any future ground mapping in the area be done in conjunction with diligent air photo-interpretation, both in the field, and in the office. Bearing in mind the particular "stratigraphic" problems associated with the granite, the excellent scale and quality of the photographs lends itself ideally to this type of mapping, particularly in areas of limited access.

Whilst the writer feels that the potential for additional vein and "white dyke"-type tin mineralisation in the granite is limited, there appears to exist good potential for large-tonnage, low-grade tin-ore deposits in designated areas east of Mt. Heemskirk.

Notwithstanding the above, the dykes and veins located northwest of photo-centre 3/0443 should be investigated on the ground. The large areas of possible greisenised granite west of Mt. Heemskirk, and in the depression between photo-centres 3/0442 and 3/0441, and near the north-eastern and south-eastern boundaries of the granite, should all be investigated for evidence of tin mineralisation associated with greisenisation. Particular attention should be paid to the altered, limonite-stained

026

Proterozoic slates and quartzites contained in the embayment in the granite north of the Tenth Legion Fault ("speckled" area of Puo on map). The reported occurrence of cassiterite from this area must make it an important target for future exploration.

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- Wells, K., (1977) Progress Report, Federation Area, EL. 11/78. Unpublished Report: Renison Limited. 34pp, Appendices.

RENISON LIMITED : HEEMSKIRK PROJECT
DETAILS OF AERIAL PHOTOGRAPHY USED.

Contractor	Australian Aerial Mapping Pty. Ltd.
Project	Trial Harbour
Job No.	6500/3280
Date of Photography	12th December, 1977
Camera	RC8
Film No.	AAM1214c
Flying Height	3810 m
Approximate scale	1:25 000

All photographs are in colour, on semi-gloss "Estar" base prints. Photographs have approximately 60 per cent overlap forward and aft and from 20 to 30 per cent side-overlap. Runs were flown east-west. Quality was excellent and the colour-balance was selected by R. F. Loxton, Hunting and Associates to have a slight reddish bias in order (supposedly) to aid differentiation between various granites.

Note: Only Runs 1 to 5 were used for annotation. Run 6 was flown NE-SE for colour balance.

<u>Run No.</u>	<u>Photo Nos.</u>	<u>No. of Photos</u>
1	0358 - 0373	16
2	0388 - 0402	15
3	0431 - 0448	18
4	0416 - 0430	15
5	0403 - 0415	<u>13</u>
		77
6	0449 - 0462	<u>14</u>
	Total	<u>91</u>
		—

APPENDIX 2

Notes on Longs Iron Blow, by P.R. Stephenson, May 1978

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LONG'S IRON BLOW

NORTH HEEMSKIRK

INTRODUCTION

This formation was visited on the 15th of March 1978 by Pat Stephenson and Mike Phelan. Several grab samples were collected and a rough map drawn (attached). Two similar but smaller outcrops were sampled at the same time.

LOCATION

The position of Long's Iron Blow and the two smaller outcrops (called "small blow" and "quartz/tourmaline vein") are shown on the accompanying 1:10,000 plan. They lie on the northern slopes of Mt. Heemskirk, approximately 460m above sea level, in the catchment areas of the St. Dizier and 12 Mile Creeks.

PREVIOUS WORK

The only previous report on Long's Iron Blow was found in Waterhouse's 1916 report on the North Heemskirk Tin Field (enclosed). At that time the only workings consisted of an inaccessible shaft close to the outcrop. He described the "ore" in some detail, and had a large sample analysed for tin, the result being 0.29% Sn.

DESCRIPTION

Long's Iron Blow (3565950N, 347300E) is in the form of a large "blow", 7m high, striking 120° Mag., dipping probably vertically and approximately 50m x 25m. It consists of a complex banded tourmaline/quartz rock mixed with minor to abundant amounts of red haematite. 3 samples were collected from the outcrop, and the assays are listed below (ppm).

	Sol.									
	Sn	Sn	As	WO ₃	Pb	Zn	Bi	Ag	Cu	S
Qtz/tourm. rock (1)	160	80	35	240	20	20	10	2	20	
" " " (2)	260	10	30	1700	20	20	10	1	20	
" " " (3)	300	40	45	200	20	30	10	1	20	

The shaft was sunk just below and to the north-west of the outcrop, and is still inaccessible. The rocks on the shaft dump consist of quartz/tourmaline/haematite rock, very soft argillised white granite, and a light green soft argillised granite with lumps of tourmaline and/or haematite. 2 samples were collected, the assays being (ppm):-

	Sol.									
	Sn	Sn	As	WO ₃	Pb	Zn	Bi	Ag	Cu	S
Green argill./haem. granite	380	50	20	240	20	20	10	1	30	
Green argill. granite	550	50	45	450	10	20	10	1	40	

031

An adit has been driven eastwards for about 3 metres into the west side of the blow, and has stopped in very haematitic quartz/tourmaline material. I was informed later by Mr. Roy Laffa that this adit "went about 0.2% Sn". One sample was collected (ppm):-

	Sol.								
	<u>Sn</u>	<u>Sn</u>	<u>As</u>	<u>WO₃</u>	<u>Pb</u>	<u>Zn</u>	<u>Bi</u>	<u>Ag</u>	<u>Cu</u>
Haem. rock	380	150	15	1500	50	20	10	2	20

Generally the surrounding rocks are red granites of varying coarseness, and although no detailed mapping was carried out, it was noticed that immediately north of the Blow, and on the shaft dump the granite is fine grained and white. The association of a haematitic "lode" with white granite in a predominantly red granite area may be significant.

Small Blow (3566200N, 347700E.) This outcrop rises 3m above the ground, has a strike of 163° Mag., and dimensions of approximately 30m x 15m. It consists of banded quartz/tourmaline with no visible haematite and is surrounded by red granite with occasional tourmaline nodules. 2 samples were collected (ppm):-

		Sol.								
		<u>Sn</u>	<u>Sn</u>	<u>As</u>	<u>WO₃</u>	<u>Pb</u>	<u>Zn</u>	<u>Bi</u>	<u>Ag</u>	<u>Cu</u>
Small Blow	(1)	240	10	5	<50	10	10	<10	1	10
"	" (2)	360	190	10	<50	10	40	10	<1	10

Quartz/tourmaline Vein. (3566150N, 348650E.) This strikes 325° Mag., has a strike length of approx. 100m, and a width of approx. 3m. The surrounding rocks are tourmaline veined pink granites. 3 samples were collected (ppm):-

			Sol.								
			<u>Sn</u>	<u>Sn</u>	<u>As</u>	<u>WO₃</u>	<u>Pb</u>	<u>Zn</u>	<u>Bi</u>	<u>Ag</u>	<u>Cu</u>
Qtz./tourm. vein	(1)		650	290	45	200	30	160	30	2	30
"	"	" (2)	200	100	10	<50	10	10	<10	1	10
"	"	" (3)	240	40	35	<50	<10	20	<10	<1	10

DISCUSSION

The vein type represented by these three outcrops appears to be very common in this area, much more so than in the South Heemskirk. This, together with the fact that in every sample collected, appreciable tin was recorded, may help to explain the greater amount of alluvial workings on the North Heemskirk compared to the South Heemskirk.

The tin values of the samples taken from Long's Iron Blow were lower than expected in view of Waterhouse's report, and can only be described as geochemically anomalous. The only other element occurring in significant amounts is tungsten, which probably occurs as wolframite since no scheelite was observed under U.V. light.

032

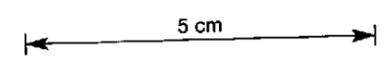
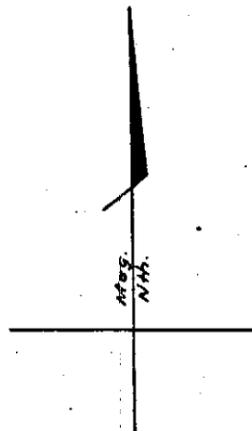
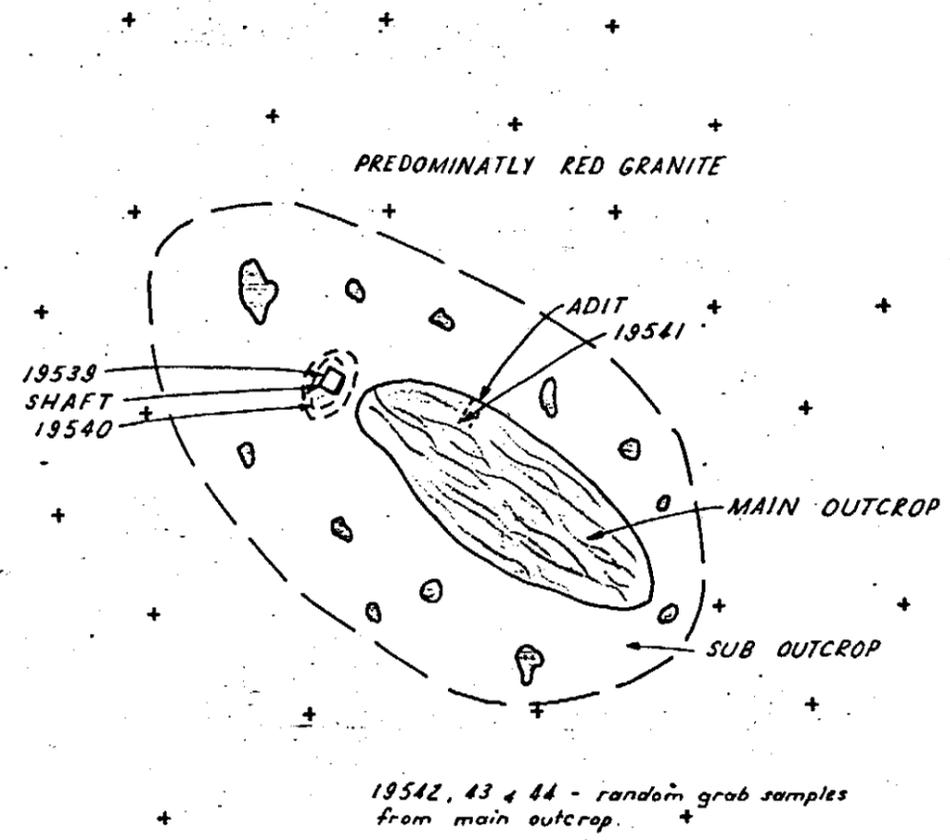
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It seems unlikely that Long's Iron Blow would be of any economic interest, however it appears genetically similar to the Cross Lode in West Federation. Grades reported from the Cross-Lode vary up to 0.75% Sn and up to several percent bismuth (as bismuthinite), and this lode may be associated with the argillaceous "pipe" worked in the Tributer's workings. Long's Iron Blow might be worth further investigation when more is understood about the Cross-Lode, and conversely any samples collected from the Cross-Lode or associated mineralisation should be checked for tungsten content.

P. Stephenson

P.R. Stephenson
GEOLOGIST

4th May, 1978



RENISON LTD.	
SCALE	1:500 (APPROX.)
DRAWN	P. R. STEPHENSON
DATE	17.3.78
TITLE	SKETCH MAP LONG'S IRON BLOW

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RENISON LIMITED

ASSAY REPORT

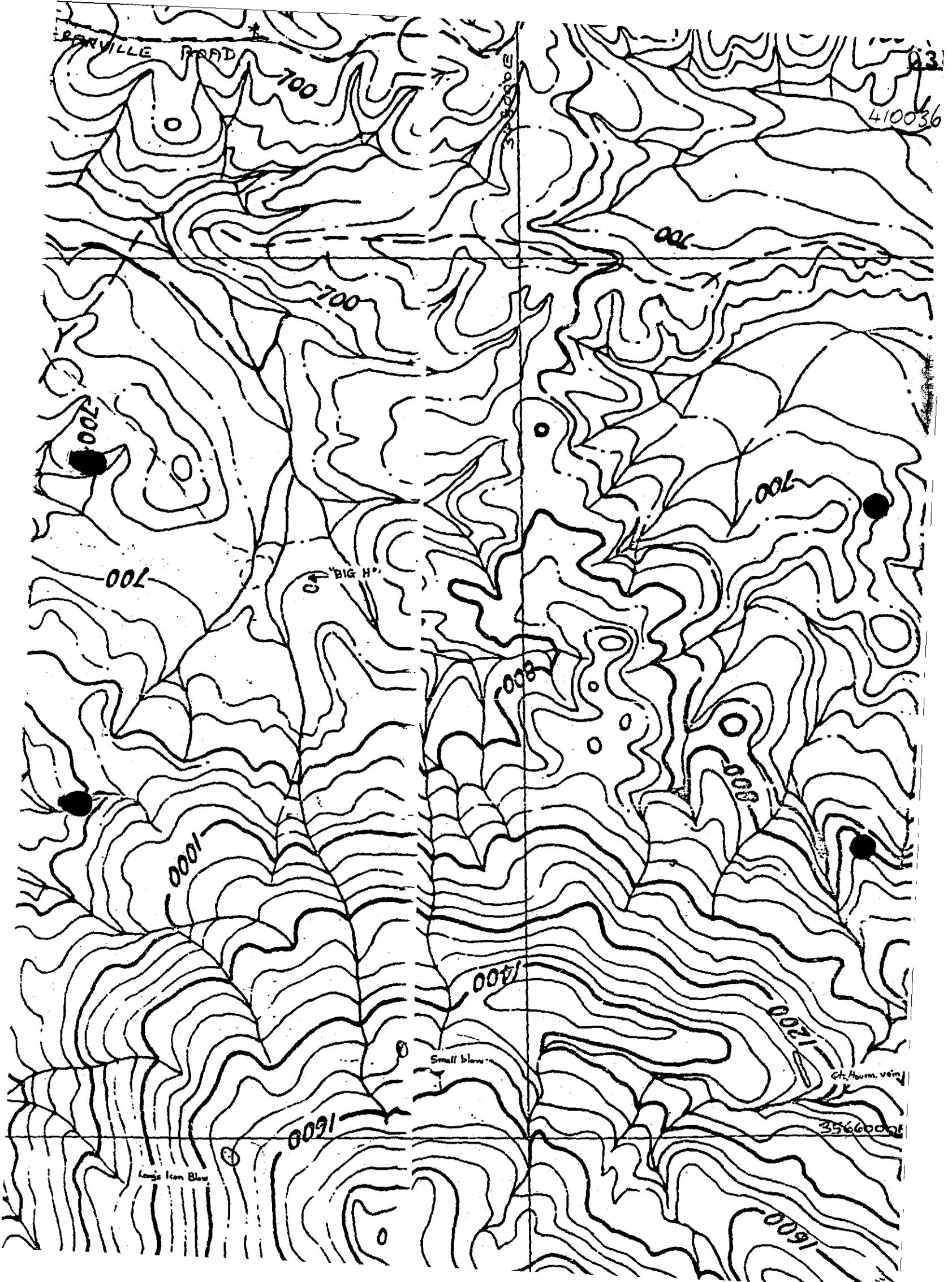
No 12389

Date	Sample No.	Description	% Sn	% S	% Fe	% As	% Cu
		Chip Samples					
		Small Blow (2)		0.19			
		NHTU (1)		0.22			
		19537 (2)		0.11			
		NHTU (3)		0.13			
		L1B (1)		0.12			
		L1B (2)		0.08			
		L1B (3)		0.09			
		L1B (4)		0.05			
		L1B (5) 15-3-78		0.27			
		L1B (6)		0.13			
		Small Blow (1)		0.12			

Assayer: A. H.

Chief Analyst: *[Signature]*

Date: 19-6-78



(5) *Long's Iron Blow.*

High up on the northern slopes of Mt. Heemskirk, and standing out so boldly as a black rocky outcrop that it is visible for miles from the surrounding plains, is the formation known in the district as "Long's Iron Blow." A hurried visit only was paid to the spot, and the general characters of the formation noted.

According to an aneroid reading taken, the outcrop is over 200 feet above the Heemskirk Tin Syndicate's Mine. The mountain side is covered with thick button-grass, with

scrub in the watercourses, and bold granite outcrops forming cliffs at different points. The surrounding country-rock is granite, with developments of granite-porphry and aplite in places.

Even when examined closely, the outcrop is seen to be very dark, and sometimes quite black in colour, due to the abundant haematite present. This mineral, with black tourmaline and quartz, form the bulk of the lode material.

The outcrop stands up boldly about 20 feet above the surface, which is here covered with button-grass. The length of the main outcrop is about 3 chains, and its width about 50 feet. No attempt seems to have been made to trace it along the line of strike, which in the main outcrop is about N. 50° W.

The ore varies somewhat in composition and texture from point to point, but consists essentially of haematite, tourmaline, and quartz in various proportions, with, at times, a small amount of a soft, greenish-grey mineral, apparently pinites. In some specimens there are crystalline aggregates of black tourmaline scattered through a groundmass of quartz and disseminated haematite. This groundmass is cut through by veinlets filled with crystalline black tourmaline and massive haematite, the latter occupying the central portion of the veinlets, which are about $\frac{1}{4}$ inch in width. Sometimes small cavities occur lined with minute prismatic crystals of quartz and of tourmaline. In certain portions of the outcrop tourmaline and haematite occur almost to the exclusion of quartz; from such localities specimens were obtained showing veinlets of massive haematite in a groundmass of tourmaline. One specimen shows a vein of haematite up to $1\frac{1}{2}$ inches in width, with tourmaline on either side, the vein enclosing radial aggregates of minute prismatic black tourmaline crystals. It is a striking fact that haematite occurs in definite crystals, up to $\frac{1}{2}$ -inch across, of a brilliant black colour, and showing combinations of the scalenohedron and rhombohedron. The mineral is slightly magnetic.

It is stated that in the early days of the field when the outcrop was discovered, it was taken for a wonderfully rich outcrop of tin ore, the haematite being mistaken for cassiterite. This is not altogether to be wondered at, for the outcrop occurs in granite, which is known to be tin-bearing in the locality; the mineral itself is black, with almost an adamantine lustre when crystallised, and occurs

037

with quartz and tourmaline, which are constant associates of tin oxide in the district. Deposits of alluvial tin ore, limited in extent, have been worked in the creeks at the foot of the spur (one of the heads of the St. Dizier Creek), and this would fully justify the search for the mineral on the hillside, and would strengthen the illusion. The occurrence of haematite in a quartz-tourmaline lode is not very common, particularly in such quantities as it occurs here; from its mode of occurrence it certainly seems to be a primary mineral.

To the west of the main outcrop, and about 20 feet lower down the hill, is an old shaft. This is quite inaccessible. The depth is not known, but judging from the material dumped round the collar of the shaft, it may be about 50 feet. It has been sunk partly in granite and partly in somewhat decomposed lode material, which appears to be pyritic. The shaft may be a good deal shallower than the estimate given, and a drive may have been put in eastwards to cut the main outcrop, but the writer was unable to gain any information on the point. It is difficult to understand why a shaft should have been sunk at all on such a steep hillside, with such excellent facilities for prospecting by means of crosscut drives of moderate length. In such a formation one would expect to find a certain tin content, and it would not be surprising to find it present in payable quantities. To try and get an idea as to whether the formation really is stanniferous, the writer broke a fairly large sample across the full width of the outcrop, and quartered down. This was submitted to Mr. W. D. Reid, Government Assayer, who reports—

Tin 0.29 per cent.

The actual value is low, but it proves that tin really is present, and indicates that the deposit belongs to the quartz-tourmaline-cassiterite vein type. In view of the above result, a little surface prospecting of the outcrop is recommended. Two or three trenches to prove the extension of the outcrop are merited. If surface samples systematically taken give any encouragement for further work, prospecting by means of crosscut drives can be arranged for, and carried out without great expense. From the size of the outcrop, and the facilities it affords for economic mining to a considerable depth, work on the lines suggested is strongly recommended.

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APPENDIX 3

Poltock, R., 1982

E.L. 11/76. Geological Mapping in the Heemskirk Granite,
March-April, 1981, January-March, 1982

E.L. 11/76

GEOLOGICAL MAPPING IN THE HEEMSKIRK
GRANITE

March April, 1981

January March, 1982

Roger Poltock.

CONTENTS

INTRODUCTION

GEOLOGY INTRODUCTION

REGIONAL FEATURES OF THE "RED" GRANITE

REGIONAL FEATURES OF THE "WHITE" GRANITE

MINOR ROCK TYPES

GRANITE CONTACT WITH SEDIMENTS

JOINTS AND OTHER LINEAMENTS

ALTERATION AND MINERALIZATION

PROSPECTS AND MINES

STREAM/ALLUVIAL TIN WORKINGS

RECOMMENDATIONS

REFERENCES

APPENDICES

i) Rock samples - descriptions & sheet No. / coordinate locations

ii) Rock chip samples - descriptions assays

iii) Field note books - NOT WITH THIS REPORT

DWG'S.

NB

NOT WITH THIS REPORT.

1. Geological fact.
Heemskirk Granite Area 1:5000
2. Geological interpretation
Heemskirk Granite Area 1:25,000
3. Interpretive geological sections 1:25,000
 - (a) 5364 375m N, E-W
 - (b) 351 000m E, N-S
4. Alteration - mineralization/alluvial tin distribution 1:25,000
Heemskirk Granite Area

INTRODUCTION.

This report covers both 1981 (16th March - 24th April) and 1982 (January 11th - March 3rd) field seasons, at this stage regional mapping of the Heemskirk granite has been completed.

Mapping in the 1981 season by vehicle - foot access, emphasis on readily accessible "white" granite on coastal plain and the main "Red-White" contact. Field work in the 1982 season was extended to inaccessible areas with helicopter support, initial emphasis placed on mapping contacts within the "Red" granite (difficult many contacts discontinuous - insignificant laterally) for regional coverage 600m spaced E.W. traverses used (compass and air photo control).

Emphasis in field work on:

- a) recognizing and mapping all granite types that could be consistently separated throughout the granite.
- b) shapes and inter relationships of different granites.
- c) location of alteration zones, mineralization, mines and prospects.
- d) locating granite - sediment contacts.

The proportion of time spent mapping in different areas in decreasing order - Heemskirk - Agnew Range in "Red" granite

- coastal plain "White" granite
- South Heemskirk - Federation/Agnew grid areas
- North of Tasman River and west of St. Dizier

Data collected in the field recorded on:-

- a) 1:25,000 color aerial photos Run 2 No. 0388-93
Run 3 No. 0440-45
Run 4 No. 0418-22
Run 5 No. 0413-14
- b) Field note books see appendices iii), locations at which geological notes were made numbered 1-620. At 255 of these locations rock samples were collected see appendices i). 87 of these samples of alteration/mineralization have been submitted for assay - Sn, WO₃, Sol.Sn. and Ag (all % except ppm. for Ag.)
- c) Plotted on 1:5000 and 1:25000 topographic plans both derived from Lands Dept. 1:15840 scale.
 - D'W'G. .1 Geological Fact 1:5000
Sheets No. A3/2 & 4, A4/1-4 & C2/1-4
 - D'W'G. .2 Geological Interpretation 1:25,000
 - D'W'G. .3 a & b Geological Interpretation
Sections 1:25000
 - D'W'G. .4 Distribution of alteration & mineralization 1:25000

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GEOLOGY-INTRODUCTION

For a comprehensive background on the geology of Heemskirk granite, descriptions of granite types (petrological and geochemical) relationships between them, styles of alteration - mineralization, regional structure refer to Klominsky 1972 and Wells 1978. The first a regional coverage the latter a detailed study of the South Heemskirk Tin field.

In the present mapping project the primary division of granites was made on the basis of grainsize:

- fine < 2mm average grainsize
- medium 2-5mm average grainsize
- coarse > 5 mm average grainsize

Grain size is reflected in the weathering pattern of granites, coarser grained with broad rounded exfoliation surfaces, resulting from wide spaced joints, whilst finer grained (particularly "White" granites) form more rugged outcrops with closer spaced jointing.

Color was used as secondary subdivision, this a more locally variable characteristic, dependent on feldspar coloration:

- R/W red K feldspar, white plagioclase
- R/R both K feldspar and plagioclase red
- W all feldspars white

Grain size and color combinations results in seven main subdivisions, in addition porphyries associated with "Red" and "White" granites.

Granite types have been differentiated on the basis of hand specimen descriptions, the resulting geological plan see Dwg. 2 is very similar to Klominsky's map indicating consistency between the above divisions and more detailed petrological and geochemical differentiation of Klominsky. According to Wells 1978 all granite types are compositionally similar ranging from true granites to adamellites.

As with previous mapping the granite has been divided into "Red" and "White" granites, the former possibly older overlying the "White".

RED GRANITES

- a) R/W, red K feldspar and white plagioclase, fine-coarse grained equigranular, biotite is the only recognisable mafic and mica. Fine-medium grained types containing tourmaline nodules.
- b) R/R all feldspars red, variable from fine-medium grained, commonly with quartz > feldspar phenocryst (max. 10mm) usually contains tourmaline nodules. This division is equivalent of "intermediate" of 1981 season.

c) Porphyry - typically with feldspar > quartz phenocrysts (Max. 20mm) in a fine-medium pink-dark grey biotite rich groundmass. Red "K" feldspar phenocrysts are dominant frequently with white plagioclase rim which kaolinizes accentuating the rims on weathered granite surface.

WHITE GRANITES

This is a less variable granite, all feldspars are white but K/plag differentiated, the latter kaolinizing more rapidly, ranges from fine-coarse grained, biotite is the only mafic and mica (some olive green-chloritized). Tourmaline nodules occurring in all grainsizes.

Both "Red" and "White" granites contain aplites (particularly coarse grained "R/W") and are assumed to be dykes of fine grained "White" granite, occurring in close proximity to the main "Red-White" contact. Aplites in the "White" granite have a more restricted distribution to the west of North Heemskirk Spur.

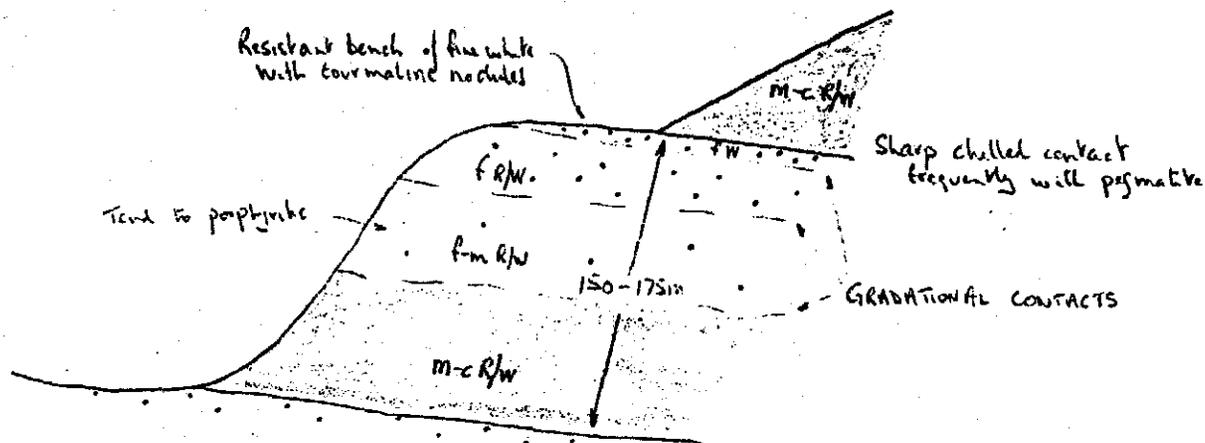
REGIONAL FEATURES OF THE "RED" GRANITE.

- a) All red granites are spacially associated outcropping east of the South Gap - St. Dizier Creeks lineament, forming the Agnew-Heemskirk range. Only four separate bodies of red granite have been located on or within the "White" granite, these characterized by:-
- having similar grainsize to enclosing "White" granite
 - lack chilled contacts, tourmaline nodule density changes and other features which typify the main "Red-White" contact.
- The largest of these bodies of "Red" granite is on Falconers Creek approx. 0.25km². Klominsky considered these to be large plate like xenoliths but they may be due to anomalous coloration of "White" granite.
- b) The "Red" granite forms a thin cap like layer overlying the "White" and is interpreted as being discontinuous
- contacts with "White" granite are nearly flat, dips less than granite/sediment contact.
 - "White" granite is in contact with sediments west of St. Dizier and south east of the Globe see Dwg. 3 a b
- c) Layering - mapping in the South Heemskirk area gives the false impression that coarse R/W is the dominant type in the Heemskirk "Red" granite, but in the north/central granite it is in most places only 20-150m thick. At least three layers of coarse R/W are exposed on the western scarp of Mt. Heemskirk see Dwg. 2, these are interlayered with fine-medium R/W - R/R.

Contacts are shallow dipping usually $< 5^{\circ}$ but locally up to 80° , dips towards the sediment contact. Layering is accentuated by

- finer grained granites are more resistant to weathering, forming bench like platforms.
- change density of tourmaline nodules, these are usually absent from coarse R/W granite.

Fig. 1 Generalized layered sequence.



Thinner layers of 5-50m thick also occur, predominantly in coarse R/W in the east and southeast, these are aplitic to slightly porphyritic, finer grained usually white with tourmaline nodules. All are shallow dipping, upper contacts chilled, lower tend to be gradational.

A mechanism for layering isn't forwarded (Klominsky discusses it briefly), the most interesting features are

- fine white granite with tourmaline nodules appears to be a chilled equivalent of the coarse R/W (gradational contact with it)
- each layer isn't a separable unit with a chilled top and base, but appears to be an integral part of the layer above and below.

d) Porphyries in the "Red" vary from fine-coarse grained, the latter appear to be lateral equivalents of coarse R/W, this relationship is best exposed at Mt. Heemskirk. Klominsky considered the porphyries to be contaminated granites in close proximity to country rocks this may be likely at Mt. Heemskirk and 200m west of Big H. but south and south west of Mt. Agnew porphyries appear to be a thick shallow N.E. dipping layer contained within coarse R/W.

REGIONAL FEATURES OF THE "WHITE" GRANITE

- a) Exposures confined to -
- coastal plain, North Heemskirk Spur and South Gap Peak
 - S.E. contact with sediments - vicinity of the Globe
 - Federation north to 1.2 km west of Mt. Agnew (highest level of "White" granite).

From this distribution the "White" granite is assumed to completely underly the "Red".

- b) Layering is absent except for an increase in grainsize away from contacts with "Red" granite (assuming contact shallow dipping). Contacts between different grain sizes are gradational, approximate thicknesses of layers see Dwg. 3 a, b

fine 75-100 metres
medium 75-100 metres
coarse + 200 metres

- c) Contacts with "Red" granite

- "White" granites underly "Red", contacts aren't obviously intrusive. In the South Heemskirk area fine "W" is in direct contact with coarse R/W (marked by aplite and pegmatite lenses). Further north it is more common for fine-medium R/W and R/R granites to overly the "W", contacts are accentuated by color change and nodule rich layers with only slight grainsize changes. Only the former type of contact may be intrusive.

- Contacts conform to layering in the "Red" granite, with the exception of narrow aplite dykes transgressive intrusive granite contacts haven't been mapped. The greatest departure from regional layering is the cupola of "white" N.E. of Federation see Dwg. 3b, this the highest level of "White" granite.

- d) Possible third granite phase.

It may be possible that coarse "White" is +200m. thick forming the major part of the batholith at depth. Alternatively a third phase may exist which doesn't outcrop. Basis for this

- aplites/microgranites in the white confined to the area west of North Heemskirk Spur, this localization indicating the possible presence of a finer phase at shallow depth in this area.

- greezenization of "White" is ubiquitous, when compared to alteration "dykes" in the "Red" localized above the "Red-White" contact, may suggest a third phase generating "White dykes" in the white granite.

e) Contact of "White" with sediments is more extensive than "Red" granites see Dwg. 2,3 a.b.

MINOR ROCK TYPES

a) Aplites - fine grained equigranular, 2-4m thick, usually flat lying, (steeper dipping dykes < 1m thick) occur predominantly in coarse "R/W" particularly immediately above "Red-White" contact. In the "White" restricted to the area west of North Heemskirk Spur, this supported by Klominsky's mapping.

Aplite sills in the "Red" granite > 2m thick frequently contain tourmaline nodules.

b) Pegmatites - coarse (< 15cm) aggregates of quartz, K feldspar (red-brown) with minor tourmaline and muscovite occur as concordant lenses < 0.5m thick on contacts between coarse R/W and finer "Red" and "White" granites.

- micro pegmatites, usually < 5mm grainsize, forming irregular clots of quartz feldspar tourmaline in fine-medium white granites, often forming a large proportion of the rock.

c) Xenoliths - all have sharp contacts with the enclosing granite, the pervasive type common to both granites is fine grained, dark, granitic frequently with feldspar phenocrysts and is usually associated with porphyries. Xenoliths of country rock are rare;
- single gneissic block approx. 30cm, foliated biotite rich in fine "White" granite located 900m NNW of Allison's Workings.

- quartzite xenolith/roof pendant approx. 25m long located 100m. from the granite/Oonah contact at location 619 in the N.E. The xenolith is contained in medium - coarse R/W.

d) Basic dykes - none located except by Klominsky approx. 1.6km north of Trial Harbour.

GRANITE CONTACT WITH SEDIMENTS

This the only feature easily defined by air photo interpretation. The dominant contact is with PreCambrian Oonah Formation, these fine quartzose hornfels which have been locally tourmalinized and quartz veined.

Only in the S.E. between Mayne's/Kelvin's Workings and the Tenth Legion is the granite contact with possible Cambrian sediments. Hornfels here are fine grained, black, possibly tuffaceous, weathering to a brown clay soil, these sediments are most likely Crimson Creek Formation or Dundas Group. Due to the overlying basic - ultrabasics they are

interpreted as Crimson Creek Formation, stratigraphically comparable to the Grand Prize and T.L.E./Stonehenge areas, see Poltock 1981.

Nearly all granite - sediment contacts are marked by fine white - pink chilled granites which frequently contain tourmaline nodules.

Dip estimates of granite/sediment contacts:

a) eastern contact 10-20° on the basis topography and location of contact see Dwg. 3a.

b) northern contact shallow dipping < 5°, indicated by irregular shaped contact in plan (independent of steep irregular topography)

- Klominsky mapped three small bodies of granite in Conah Formation 100-400m north of Big "H" prospect. Granite intrusions or exposures within the hornfels haven't been located elsewhere

- fine grained dykes and sills would be difficult to recognize in quartzose Conah hornfels.

- in present mapping program sediments were only traversed at contact.

c) South and South Eastern contact, dips moderate 30-40°, only evidence - straight regular contact

- width of hornfels aureole approx 3km. between the granite and T.L.E./Stonehenge area.

JOINTS AND OTHER LINEAMENTS

These are of fundamental importance to hydrothermal alteration/mineralization within the granite. For a plan of joint patterns see Loxton Hunting/Boshier 1978, detail from photo interpretation.

In the course of mapping no major fault displacements located, if these were present should be apparent in "R-W" granite and granite sediment contacts. Small displacements within the granite would be difficult to detect at the present scale of mapping due to locally irregular and diffuse nature of most contacts.

Although displacements were not recognized many lineaments marked by negative topography are evident, most of these are joints many with non resistant alteration types.

Two main lineaments have been recognized, both considered by previous workers to be faults with considerable displacement.

a) South Gap - St. Dizier Creeks - main effect of this N-S feature has been to produce fracturing/jointing within the granite, which has facilitated weathering, resulting in the "Red" granite scarp west of Mt. Heemskirk.

b) Tenth Legion - Granite Creek - this feature more or less continuous across the granite from E-W. Apparent displacement of the eastern granite - sediment contact I feel is due to a combination of the easterly dipping contact and topography shape. A similar apparent displacement occurs 400m further north see DWG. 2.

This lineament - joint system has caused an erosional weakness, resulting in an indentation in the "R-W" contact 400m south of Mt. Heemskirk.

ALTERATION AND MINERALIZATION

Tin mineralization within the granite is associated with hydrothermal alteration, the dominant components are quartz, tourmaline, topaz, muscovite/sericite and hematite. Quartz topaz tourmaline "White dykes" are the most prominent alteration type forming resistant outcrops.

Characteristics of alteration/mineralization

- a) hydrothermal - griesen alteration centred on joint sets, frequently with remnant granitic textures.
- b) tension gash - quartz veins absent from the granite and aren't abundant in the hornfels.
- c) contact griesens within the granite haven't been recognized, but an increase in joint griesenization occurs in the granite on the northern shallow dipping contact with Onah hornfels.
- d) hematite, magnetite containing alteration appears to be confined to the "Red" granites.

Main types of alteration differentiated in mapping components listed in order of abundance.

- 1. tourmaline, quartz, topaz) "White dykes" usually 5m wide
- 2. quartz topaz tourmaline } occasionally with minor
- 3. quartz sericite/muscovite) pyrite and arsenopyrite
- 4. sericite quartz, specular hematite
- 5. magnetite hematite tourmaline pyrite
- 6. griesenized/tourmalinized aplites, surrounding granite unaltered
- 7. minor types include minor molybdenite in unaltered granite location 373, and partial feldspar replacement by hematite location 447.

"White dyke" style alteration is located throughout the "White" granite, but in the "Red" appears to be confined to granites immediately above the "Red-White" contact. The eastern part of the Heemskirk-Agnew range is completely lacking in exposed alteration see DWG. 2 with the exception of quartz tourmaline veins < 2 cm wide. In this area many strong lineaments occur with outcrop lacking for 5-50m, these may coincide with non resistant sericitic/argillic alteration.

Part of this unaltered area at the head of the Heemskirk River was considered by Boshier 1978 to be thin "Red" granite overlying "White", a potential contact greezen tin target, with the absence of outcropping alteration and stream tin workings this seems unlikely.

PROSPECTS AND MINES

Alteration types 1-3 have been the most consistently prospected and mined in the past, types 4-7 rarely prospected with the exception of sericitic alteration at Allison's Workings and the Peripatetic.

In the area outside the South Heemskirk Field and St. Dizier the most extensive prospecting has been carried out in the "White" granite, prospects in the "Red" are completely lacking or restricted to shallow pits and trenches on "White dykes".

Prospects in the mapped area have been subdivided on the basis of extent of workings (assumed to be related to amount of tin present) see DWG.4, and are grouped from most extensive to least:

- shafts trenches (> 6m deep), adits - these mines with possible production i.e. Prince George, Peripatetic, Empress.
- pits, trenches < 6m deep locations 128, 228, 249, (Longs Iron Blow), 347-8, 364-5 and 565, 357.
- pits, trenches < 2m deep.

STREAM/ALLUVIAL TIN WORKINGS

These workings would be more extensive than shown on DWGS. 1 & 2, most are confined to narrow stream channels except in the St. Dizier - Tasman River and south of the Globe-Sweeneys areas where more extensive workings exist.

No attempt was made to trace the extent of workings or locate a possible source for the detrital tin. All coarse wash associated with the deposits is of quartz, topaz, tourmaline cobbles. This is the only resistant detritus from the granite and doesn't necessarily indicate that the "White dykes" are the source for the tin.

The main areas of alluvial tin workings are

- a) South Heemskirk draining the Federation, Globe, Sweeney's, Montague and Allison's mineralization.
- b) scattered stream workings on the coastal plain west of Allison's Workings.
- c) scattered stream workings in vicinity of the Peripatetic
- d) Tasman R. - St. Dizier - tin in these workings may be locally derived from the granite but is more likely to be reworked concentrations from Tertiary gravels which formed an extensive cover in the area - the remnants of which can be seen east of the Tasman River mine. (The primary source for tin probably being the northern granite - Oonah contact)

Evidence of Tertiary gravels elsewhere in the mapped area is confined to scattered well rounded pebbles on the coastal plain.

RECOMMENDATIONS

Following regional coverage of the Heemskirk Granite it is apparent that areas of present exploration interest i.e. South Heemskirk-Federation and St. Dizier areas-associated with the most extensive alluvial tin workings.

Away from the above areas alluvial workings are totally confined to the "White" granite on the coastal plain. Despite relatively poor outcrop numerous alteration zones are exposed, several of them with extensive deep pitting and trenching. This area is at present considered to be the most prospective for tin mineralization associated with "White dyke" and sericitic alteration outside the South Heemskirk and St. Dizier areas. Exploration methods in this area would be confined initially to stream geochemistry (and location of stream alluvial workings) followed by bedrock soil sampling. Gravel cover in the area is absent except for scattered rounded pebbles - remnants of Tertiary gravels.

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APPEND (1)

ROCK SAMPLES, DESCRIPTIONS, SHEET NO.
AND COORDINATE LOCATIONS.

053

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APPENDICES (i) ROCK SAMPLES - SHEET N°/COORDS, DESCRIPTIONS.

NO.	SHEET N°/COORD	
HSK.1	C2/3 349,600.E 5,358,450.N	R/W M-C, equi.
HSK.2	C2/3 349,600E 5,358,525.N	Micro granite/aplite Coarse R/W equi.
HSK.3	C2/3 349,575.E 5358,450.N	coarse R/W equi. Alt'n. see appendices (ii)
HSK.4	C2/3 349,500.E 5,358,550.N	fine W with scattered 2-3 mm. qtz. felds. coarse R/W
HSK.5	C2/3 349,420.E 5,358,500.N	fine W biot' prom'
HSK.19	C2/3 348,940.E 5,358,185.N	7-10mm, pale pink, equigran, 2 felds < 2mm pale pink - white
HSK.28	C2/3 348,920.E 5,357,670.N	fine 1 mm pale pink 10 mm R/W
HSK.29	C2/3 348,860.E 5357,690.N	see append (ii)
HSK.30	C2/3 348,685.E 5,357,500.N	Aplite 327.90° 5-10 mm R/W
HSK.31	C2/3 348,675.E 5357,525.N	W 3-5mm
HSK.32	C2/3 348,625.E 5,357,690.N	R/W 3-5 mm
HSK.33	C2/3 348,475.E 5,357,725.N	W 1-2mm biotites < chloritized see append (ii)
HSK.35	C2/3 348,160.E 5,357,650.N	W 8-10mm
HSK.38	C2/3 347,725.E 5,357.510.N	porph feld 7mm biot 2mm in fine g'mass W 6mm equi 7-10mm R/W

HSK.41	C2/3 Coast 500m South 42	W med. grained
HSK.42	C2/3 346,575.E 5,358,180.N	W med. see append (ii)
HSK.43	C2/3 347,500.E 5,358,310.N	see append (ii) W fine, feldspars to 5mm.
HSK.44	C2/3 348,150.E 5,358,220.N	W fine with qtz. tourm, biot chloritized
HSK.46	C2/1 348,475.E 5360.210.N	W, 1-3mm, chl. biot.
HSK.47	C2/1 348,675.E 5,360,275.N	Pale pink - brn, 2-3mm
HSK.48	C2/1 348,940.E 5,360,325.N	append ii) fine 2-3mm, W, tourm. sig'n - veins
HSK.50	C2/1 349,070.E 5,360,600.N	W 3-4mm
HSK.51	C2/1 348,830.E 5360,610.N	append (ii)
HSK.54	C2/1 348,650.E 5,361,300.N	Contact - fine W scattered < porph qtz. felds. - 5mm R/W
HSK.57	C2/1 348,000.E 5,361,880.N	3mm some felds to 12mm R/W
HSK.58	C2/1 347,860.E 5,362.075.N	append (ii)
HSK.60	C2/1 347,850.E 5,361,800.N	Contact - 6mm R/W - < 1mm pale pink
HSK.63	C2/1 347,220.E 5,361,720.N	2-4mm R/W qtz. tourm nodules 2mm W.
HSK.64	C2/1 347,300.E 5,361,775.N	2-3 mm all felds red

HSK.65	C2/1 347,390E 5,361,860.N	2-3mm all felds pink
HSK.67	C2/1 347,660.E 5,361,990.N	Contact - 6mm equi R/W - 2mm pink all felds
HSK.68	C2/1 347,700.E 5,362,030.N	Contact - m-coarse R/W - 1mm, W-pink, chl micas
HSK.74	C2/1 347,800.E 5,362,370.N	Contact - 5mm R/W - 2-3mm pale pink, minor tourm segreg'ns.
HSK.78	C2/1 347,140.E 5,362,425.N	see append (ii) 2mm all feld red.
HSK.81	A4/3 347,980.E 5,362,910.N	Contact - 5mm R/W - 2mm all feld red, tourm nodules 4 cm - contact with peg' lenses
HSK.83	A4/3 348,040.E 5,363,210.N	Contact - 3 mm R/W with aplite 40m thick - < 3mm W
HSK.84	A4/3 348,010.E 5,363,360.N	append (ii) 3mm pink W felds, biot prominent
HSK.86	A4/3 348,010.E 5,363,450.N	Contact - 3-5mm pink - 1-2mm pink - 1mm W + see append (ii)
HSK.88	A4/3 347,575.E 5,363,630.N	see append (ii)
HSK.89	A4/3 347,630.E 5,363,750.N	see append (ii)
HSK.91	A4/3 347,840.E 5,363,735.N	see append (ii)
HSK.93	A4/3 347,550.E 5,364,775.N	see append (ii)
HSK.95	A4/3 346,925.E 5,363,090.N	see append (ii)
HSK.97	C2/1 349,265.E 5,360,520.N	-4mm W - pale pink -minor peg' on contact - 1 mm W

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NO. SHEET N°/COORD

NO.	SHEET N°/COORD	
HSK.100	C2/2 349,825.E 5,360,590.N	2-3 mm R/W
HSK.101	C2/2 349,900.E 5360,675.N	2mm pink/W felds, qtz. tourm seg'n. 15mm
HSK.103	C2/2 350,065.E 5,360,830.N	1mm W with felds phenos 5-10mm 2-3mm R/W phenos 10mm
HSK.107	C2/2 350,300.E 5,360.725.N	1mm pale pink, biot prom, scattered qtz. field phenos. see append (ii)
HSK.109	C2/2 350,380.E 5360,425.N	3mm R/W some qtz. to 5 mm. 2mm W.
HSK.114	C2/2 351,000.E 5,359,840.N	fine W with qtz 5mm, feld 10mm phenos < 1mm aplitic W, contact dip 087.25°.
HSK.124	C2/2 350,700.E 5,360,850.N	1mm pink/white, tend porph qtz. 5mm
HSK.125	A4/1 344,760.E 5,367,150.N	3mm W
HSK.127	A4/1 344,890.E 5,366,800.N	5 mm W 1mm pink-orange, felds phenos < 20mm qtz 5mm
HSK.128	A4/1 344,650.E 5,366,250.N	see append (ii)
HSK.129	A4/3 344,560.E 5,365,710.N	-porph W 1mm g'mass, feld 10mm, qtz 5mm phenos -aplite -qtz. tourm nods 3 cm.
HSK.130	A4/1 345,200.E 5,366,400.N	-porph W -W 5mm equigran
HSK.131	A4/1 345,100.E 5,366,250.N	porph g'mass < 1mm, phenos 5-10mm

NO.	SHEET N°/COORD	
HSK.132	A4/3 344,870.E 5,365,525.N	see append (ii)
HSK.133	A4/3 344,510.E 5,365.260,N	4mm W with tourm seg'ns. porph W.
HSK.134	A4/3 344,380.E 5,365,320.N	5mm W with tourm. seg'ns.
HSK.135	A4/3 344,600.E 5,365,100.N	porph g'mass fine, phenos 8-10 mm white aplitic see append (ii)
HSK.136	A4/3 345,660.E 5364,170.N	see append (ii) 1mm W, minor tourm
HSK.137	A4/3 345,680.E 5,363,900.N	see append (ii)
HSK.138	A4/3 345,625.E 5,363,625.N	see append (ii) < 1mm W, tourm nods < 3cm
HSK.140	A4/3 346,065E 5,364,140.N	fine W 3.5mmW, chl mica 2-3mm dom red felds with minor white feld
HSK.141	A4/3 346,100.E 5,364,325.N	see append (ii)
HSK.142	A4/3 346,325.E 5,364,175.N	see append (ii)
HSK.144	A4/1 347,320.E 5,367,120.N	2-7mm, tend porph, W
HSK.145	A4/1 347,260.E 5,367,025.N	10-15mm W minor py aplite 067.35 < 1m
HSK.146	A4/1 347,250.E 5,366,900.N	7-8mm R/W 5mm pink/brn.
HSK.147	A4/1 347,120.E 5,366,450.N	-1mm R/W some qtz. 4mm -2mm W -all felds red scattered qtz feld phenos -R/W fine with pheno's

J50

HSK.152	A4/3 347,525.E 5,365,960.N	felds pink fine, < qtz. porph 3mm W < 1mm with qtz feld. phenos. 1-2mm equi
HSK.155	A4/3 347,100.E 5,365,850.N	5mm R/W 1 mm all pink felds.
HSK.156	A4/3 346.965.E 5365,750.N	1-2mm pale pink/cream, tourm nods
HSK.161	A4/1 346,650.E 5,367,250.N	pink-orange brn < 1mm, qtz. phenos < 8mm g'mass mm with R/W felds to 5mm laminated siltstone (puo)
HSK.165	A4/1 346,830.E 5366,625.N	Contact-fine pink aplitic -5mm R/W, contact 092° 30-40°?
HSK.167	A4/1 346,800.E 5,366,050.N	-0.5mm W -2mm W - pink with tourm. segn's.
HSK.168	A4/1 346,625.E 5,366,650.N	Gravels - cobbles brecciated qtz. tourm. o/c 1mm W with griesen veins < 20 cm
HSK.169	A4/1 346,630.E 5,366,760.N	see append (ii)
HSK.170	A4/1 346,375.E 5,366,900.N	see sppend (ii) fine pale pink-cream scattered qtz, biot phenos
HSK.171	A4/1 346,460.E 5,367,010.N	see append (ii)
HSK.172	A4/1 346,420.E 5,367,310.N	W-orange-brn, g'mass 1-2mm, qtz felds to 10mm.
HSK.173	A4/1 345,475.E 5367,475.N	-W < porph in fine g'mass -pink/W g'mass 2mm, feld 15mm qtz. 5mm -fine W equi
HSK.176	A3/2 343,775.E 5367,025.N	W 5mm, biot prom
HSK.177	A3/2 343,325.E 5,366,840.N	W 5mm equi
HSK.178	A3/2 343,540.E 5,366,310.N	W porph to 10 mm, g'mass 1.2mm W 3-5mm equi

J59

NO.	SHEET N°/COORD	
HSK.179	A3/4 343,325.E 5,365,550.N	5mm W some qtz feld to 10mm, chl biot, tourm.
HSK.180	A3/4 342,425.E 5,364,750.N	W aplitic with muscovite (possibly alt'n)
HSK.181	A3/4 342,475.E 5,364,520.N	W 5-10mm equi W < 1mm, biot prom, qtz tourm nodules
HSK.182	A3/4 342,490.E 5,364,350.N	see append (ii)
HSK.187	A3/4 341,260.E 5,363,600.N	W 5-7mm equi W aplitic
HSK.189	A3/4 340,690.E 5364,300.N	porph feld 15mm, g'mass biot rich 1-2mm
HSK.201	A3/4 339,925.E 5365,200.N	see append
HSK.204	A3/2 339,625.E 5,366,500.N	see append W 2-5mm biot prom, < porph W 1mm equi
HSK.205	A3/2 339,715.E 5,366,450.N	orange/red, gmass 1mm, phenos 5-10mm xenolith very fine, dark with biot & felds phenos
HSK.209	A4/1 347,675.E 5,366,810.N	pale pink < 1mm, felds (W. & R) pink/W phenos < 7mm
HSK.212	A4/1 348,125.E 5,366,600.N	-pale orange br'n < 1mm g'mass, phenos to 10mm -W < 1mm qtz phenos to 5 mm
HSK.214	A4/1 348,055.E 5,366,255.N	all feds red, g'mass 1mm, qtz felds phenos 3-5mm pale pink 1mm, phenos feld 10mm, qtz 5mm
HSK.215	A4/1 348,050.E 5,366,125.N	pink-white, 1mm, equi all felds pink 1mm with qtz feld phenos to 5mm pink/W felds, 1-4mm, < porph

HSK.217	A4/3 348,060.E 5,365,670.N	R/W, g'mass 2mm, felds phenos < 15mm 087.10 compositional layering
HSK.218	A4/3 347,920.E 5,365,215.N	Xenolith, pink-yellow/green felds phenos < 5 mm pink/W g'mass 1mm, tend porph 10mm
HSK.219	A4/3 347,920.E 5,365,140.N	pale pink 1-4mm
HSK.220	A4/3 347,930.E 5,365,075.N	Xenolith dark, fine with minor sulphides 1mm pale pink, some phenos 5mm porph. g'mass R/W fine phenos to 20mm
HSK.221	A4/3 348,175.E 5,364,650.N	pink 2-5mm
HSK.222	A4/3 347,900.E 5,364.600N	1-5mm qtz. feld porph R/W pink aplite 059.80, 10cm wide
HSK.223	A4/3 347,675.E 5,364,550.N	-1mm pink/W equi -7mm pink/W
HSK.224	A4/3 347,620E 5,364,575.N	1mm pink/W with tourm seg'n
HSK.225	A4/3 347,400.E 5,364,750.N	all felds pink, 1-2mm, equigran
HSK.226	A4/3 347,400.E 5364,750.N	pink/W, 3-5mm equigran
HSK.227	A4/3 347,140. E 5,364,940.N	all felds red, 1-2mm, some qtz to 5mm
HSK.228	A4/3 346,940.E 5,365,275.N	see append (ii) pink 1-2mm
HSK.229	A4/3 345,125.E 5,365,890.N	W 5mm, biot chloritized, nodules
HSK.231	A4/3 345,400.E 5365,400.N	porph, g'mass 1mm pink-grey, qtz 3mm, felds 15mm, biot 3mm
HSK.233	A4/3 345,800.E 5,364,990.N	see append W 3mm equigran, < chl biot
HSK.236	A4/3 346,790.E	R/W 1-2mm all pink 1mm, some ctz 5mm

HSK.237	A4/3 347,250.E 5,364,025.N	see append (ii) R/W 2-3 mm equi
HSK.242	A4/3 347,140.E 5,364,325.N	see append (ii) pink/W 1-2mm equi all pink felds 5mm, qtz tourm seg'n.
HSK.244	A4/3 347,140.E 5,364,745.N	W/pink 2mm R/W 5mm all felds pink-orange 5mm, aplite
HSK.246	A4/3 347,180.E 5,365,330.N	red felds dom, 5-7mm pale pink, 1-mm, nodules
HSK.247	A4/3 347,275.E 5,365,525.N	<1mm pink - white all pink < 1mm 5mm R/W equigran
HSK.248	A4/3 347,175E 5,365,670.N	Contact - all pink 1-2mm - dom red 10 mm - hem/mag?
HSK.250	A4/1 345,200.E 5367,550.N	Black chiastolite? siltstone, St. Dizier
HSK.251	C2/2 352,910.E 5,360,425.N	M-C R/W, fine W aplitic with scattered qtz phenos 5mm fine R/W - qtz (5mm) & feld (15mm) phenos
HSK.252	C2/2 352,600.E 5360,475.N	fine R/W with feld (15mm) and qtz phenos, tourm nods/segn's
HSK.253	C2/2 352,435.E 5,361,100.N	M-C R/W pale brown/cream, fine with felds 10mm (weathered rims) fine equi W
HSK.254	C2/2 351,915.E 5,361,190.N	f-m (tend coarse with >phenos, brown-W
HSK.255	C2/2 351,725.E 5,361,275.N	fine W with fine peg segn's see append (ii)
HSK.256	C2/2 351,640.E 5,361,375.N	see append (ii)
HSK.260	C2/2 351,640.E 5,360,925.N	M-C R/W fine pink, biot prom < porph, qtz felds phenos to 5mm porph felds red with white rims < 15mm

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NO.	SHEET N°	COORD	
HSK.262	C2/2		fine pink, biot prom, felds (20mm) > qtz (5mm) phenos
	351,815.E		fine pink-br'n aplitic
	5,361,165.N		
HSK.263	C2/2		fine pink aplitic with scattered feld > qtz phenos
	351,175.E		fine R/W, feld qtz phenos.
	5,360,470.N		
HSK.266	C2/2		fine equi W aplitic with tourm segn's.
	352,375.E		porph fine W with feld > qtz phenos
	5,361,040.N		
HSK.268	C2/2		porph fine pink with prom' biot' feld phenos red with rims
	351,975.E		
	5361,050.N		
HSK.271	C2/2		M-C R/W
	351,595.E		pale br'n fine equi, with micro-peg segn's
	5361,005.N		
HSK.273	C2/2		f-m R/W, <tend F > Q porph
	351,365.E		f-m W <tend F > Q porph
	5,361,010.N		
HSK.274	C2/2		f-m W with micro-peg segn's associated with minor tourm.
	351,190.E		chloritic-actinolite
	5,361,020.N		
HSK.275	C2/2		Pink/W fine see append (ii)
	350,860.E		
	5361,100.N		
HSK.276	C2/2		see append (ii)
	350,775.E		fine W < qtz. feld porph
	5,361,175.N		
HSK.278	C2/2		R/W f-m with scattered qtz. field phenos to 12 mm
	350,130.E		W fine aplitic, with fine pegmatite
	5,361,005.N		
HSK.281	C2/2		R/W med equi
	349,850.E		pink, fine tourm segn's.
	5,361,010.N		W med < porph qtz. dom to 8mm
HSK.282	C2/2		R/W med
	349,665.E		
	5361,040.N		

063

410064

NO.	SHEET N°	COORD	
HSK.283	C2/1	349,250.E 5,360,900.N	Med W-pale pink
HSK.284	C2/2	352,210.E 5361,625.N	porph, g'mass f-m biot rich W feld phenos < 20mm
HSK.292	C2/2	351,210.E 5,361,550.N	M-C R/W very fine, biot chloritized, tourm nods.
HSK.293	C2/2	351,250.E 5,361,400.N	very fine W chloritized med W - pale pink
HSK.301	C2/1	349,325.E 5,361,525.N	f-med pink/W M-C R/W fine W/pink felds with scattered qtz phenos (5mm)
HSK.302	C2/2	354,290.E 5,360,790.N	porph-fine pink, felds phenos to 15mm fine pink/W, biot chloritized fine all feld pink, micropeg & qtz tourm segn's.
HSK.303	C2/2	354,050.E 5,361,160.N	porph fine red g'mass with felds to 15mm, qtz. 5mm pale pink fine aplitic, minor tourm
HSK.304	C2/2	354,380.E 5,361,175.N	porph f-m g'mass, R/W, feld phenos 20mm (white rims)
HSK.306	C2/2	354,725.E 5,361,525.N	see append (ii) f-m W equi with tourm segn's
HSK.306(a)	C2/2	354,710.E 5,361,400.N	homfels pink-pale green, siliceous, fine
HSK.308	C2/2	353,750.E 5,361,750.N	M-C R/W
HSK.309	C2/2	353,825.E 5,360,700.N	fine felds dom pink fine felds dom pink with red felds phenos to 15mm
HSK.315	C2/2	351,965.E 5362,100.N	Qtz. sericite alt'n
HSK.317	C2/2	352,560.E 5,361,900.N	fine, felds pink/W with m-c contact f-m to m-c (latter tendency to porph-felds 20mm qtz 10mm)

NO. SHEET N° COORD

NO.	SHEET N°	COORD	
HSK. 320	C2/2	350,820.E 5,361,975.N	f-m W <tend qtz feld porph porph fine pink g'mass, F > Q phenos f-m R/W and fine W-pale pink
HSK. 322	C2/2	349,570.E 5,362,150.N	fine equi W/pink, minor tourm W f-m with tourm, f with micro peg's some assoc with tourm, and m-c R/W
HSK. 323	C2/1	349,320.E 5,362,040.N	porph, f-m pink g'mas with biot prom, red felds phenos 20mm
HSK. 324	C2/1	349,250.E 5,361,730.N	see append (ii) m-c W with blebs of specular hematite
HSK. 325	A4/4	352,840.E 5362,700.N	fine quartzose hornfels with qtz veining fine W equi minor tourm med R/W and < porph fine R/W with qtz felds phenos 5mm
HSK. 326	A4/4	352,000.E 5,362,640.N	fine equi pink - R/W m-c R/W
HSK. 327	A4/4	351,300.E 5,362,800.N	m-c R/W
HSK. 328	A4/4	350,390.E 5,362,750.N	see append (ii)
HSK. 330	A4/3	349,325.E 5362,750.N	porph, grey-pink fine biot rich g'mass, F > Q phenos
HSK. 331	A4/3	348,725.E 5363,190.N	see append (ii)
HSK. 332	A4/3	348,690.E 5,363,275.N	fine pale pink equigran, med W equigran f-m W/pink with red felds phenos to 15mm
HSK. 333	A4/3	348,375.E 5,363,300.N	see append (ii) fine R/W
HSK. 334	A4/3	348,500.E 5,363,525.N	see append (ii) fine equi weathered pale cream-pink

065

NO.

SHEET N° COORD

410066

HSK. 337	A4/3 348,350.E 5,363,050.N	f-m felds all red, minor tourm fine W equigran with micro peg
HSK. 338	A4/3 347,750.E 5,363,175.N	see append (ii)
HSK. 339	A4/3 348,340.E 5,362,875.N	see append (ii)
HSK. 344	C2/1 347,940.E 5,361,900.N	see append (ii)
HSK. 347	C2/1 346,050.E 5,361,625.N	see append (ii) f-m W, micro-peg and tourm segn's.
HSK. 348	C2/1 345,950.E 5,361,625.N	see append (ii) med W equigran, biot < chlorit' and minor tourm
HSK. 354	A4/3 347,120.E 5,363,375.N	med all felds red W-pale pink, fine with tourm med pink/W
HSK. 357	A4/3 346,275.E 5,363,400.N	fine W with scattered qtz phenos to 5mm see append (ii)
HSK. 358	A4/3 346,075.E 5,363,400.N	see append (ii) f-m W, biot prom, minor tourm
HSK. 360	A4/3 345,225.E 5,363,450.N	see append (ii) fine W. with scattered qtz. phenos to 5mm
HSK. 361	A4/3 345,300.E 5,363,725.N	pale brn-W, fine with qtz. felds phenos to 7 mm.
HSK. 362	A4/3 344,425.E 5,363,650.N	med W with small tourm segn's see append (ii)
HSK. 363	A4/3 344,450.E 5,363,725.N	see append (ii)
HSK. 364	A4/3 344,475.E 5,363,940.N	see append (ii)

066

NO.

SHEET N° COORD

410067

HSK. 365	A4/3 344,540.E 5,363,950.N	see append (ii)
HSK. 369(a)	C2/1 348,500.E 5,361,300.N	Xenolith, biot' rich slightly foliated - gneissic? in fine W
HSK. 372	C2/1 347,840.E 5,361,160.N	med W - pale pink, biot prominent
HSK. 373	C2/1 347,700.E 5361,100.N	see append (ii)
HSK. 374	C2/1 346,200.E 5,360,850.N	see append (ii)
HSK. 375	C2/1 345,525.E 5,360,650.N	see append (ii) med W with felds tourm pegmatite segn's
HSK. 379	C2/1 346,400.E 5360,090.N	f-m W tend qtz. porph, biotite prom'
HSK. 380	C2/1 346,825E 5360,040.N	m-c R/W
HSK. 386	A4/4 351,700.E 5363,175.N	fine pale pink with scattered qtz phenos 5mm, biot chloritized
HSK. 391	A4/3 348,750.E 5,364,300.N	fine pink with minor red felds phenos to 10mm v fine pink, some felds seriatized, biot chloritized f-m W minor tourm
HSK. 394	A4/3 348,540.E 5,364,600.N	fine pink see append (ii)
HSK. 395	A4/3 348,575.E 5,364,675.N	see append (ii) fine W
HSK. 397	A4/3 348,600.E 5,365,090N	porph fine pale pink g'mass felds (13mm) >qtz (7mm)
HSK. 398	A4/3 349,150.E 5,364,920.N	m-c R/W fine R/W scattered qtz's to 4mm

067

NO.

SHEET NO. COORD

410068

NO.	SHEET NO. COORD	
HSK.399	A4/3 349,100E 5,365,190N	see append (ii)
HSK.400	A4/3 349,100E 5,365,150N	see append (ii)
HSK.410	A4/4 350,875.E 5,365,025N	m-c R/W fine all felds red, scattered qtz. phenos to 5mm.
HSK.426	A4/4 352,590.E 5,363,675.N	fine W some micro-peg, minor tourm med all felds red, tend to Q>F porph
HSK.434	A4/4 352,700E 5,364,575.N	fine W/pink, qtz 5mm, felds 15mm m-c R/W
HSK.438	A4/4 352,275.E 5,364,780.N	fine all felds red scattered qtz field phenos fine W scattered qtz field phenos
HSK.441	A4/4 353,525.E 5,364,700.N	fine q'zose sediment with qtz tourm veining porph fine W with felds 15mm & qtz 5mm
HSK.444	A4/2 351240.E 5366,540.N	fine W scattered qtz felds pheno's <10mm
HSK.447	A4/2 350,965.E 5,366,300.N	see append (ii)
HSK.448	A4/4 350,800.E 5,365,975.N	fine W med all field red < qtz porph 8mm porph fine pink, biot rich g'mass, felds phenos red (plag rims)
HSK.453	A4/4 350,325.E 5,366,000.N	fine all felds red, < qtz. porph 5mm see append (ii)
HSK.454	A4/4 350,290.E 5,365,950.N	see append (ii) fine all felds red, < qtz. porph
HSK.459	A4/3 347,830.E 5364,950.N	f-m R/W scattered qtz phenos to 10mm f-m W/br'n
HSK.460	A4/3 347,840.E 5,364,725.N	med R/W f-m red felds dom

068

NO.

SHEET N^o. COORD

410069

HSK.466	A4/3 348,425.E 5,365,480.N	fine R/W see append (ii)
HSK.467	A4/3 348,525.E 5,365,525.N	see append (ii) med all felds red
HSK.468	A4/3 348,605.E 5,365,615.N	fine red, scattered felds >qtz. phenos
HSK.471	A4/1 348,950.E 5,366,425.N	fine pink/white with minor feld qtz. phenos to 5mm. med R/W
HSK.473	A4/2 349,475.E 5,366,850.N	fine all felds red, scattered feld qtz. phenos, with minor py.
HSK.486	C2/2 352,640.E 5,360,100.N	fine R/W scattered qtz felds phenos porph, fine biot rich g'mas, feld > qtz phenos, felds red with plag rims
HSK.489	C2/2 352,550.E 5,359,990.N	porph, fine biot rich g'mas, feld qtz phenos, felds red
HSK.491	C2/2 352,840.E 5,359,715.N	porph, fine biot rich g'mas, feld qtz phenos, felds red
HSK.492	C2/2 352,950.E 5,359,500.N	fine W with tourm veining <1cm med pink
HSK.493	C2/2 353,065.E 5,359,270.N	see append (ii) med W.
HSK.498	C2/2 352,350.E 5,359,425.N	fine W f-m W < porph with qtz > felds
HSK.501	C2/4 352,630.E 5,358,095.N	f-m W m-c W
HSK.502	C2/4 352,700.E 5358,880.N	m-c W
HSK.503	C2/4 352,840.E 5,358,610.N	fine W with scattered qtz felds phenos <10mm, minor tourm

069

NO.

SHEET N°. COORD

410070

HSK.504	C2/4 353,025.E 5,358,260.N	fine W, micro peg' with tourm
HSK.505	C2/4 353,125.E 5,358,075.N	porph m-c W, g'mass minor, felds phenos to 20mm dom.
HSK.506	C2/4 352,870.E 5,358,700.N	porph pale pink/brn, felds > (red 10mm) qtz.
HSK.512	C2/2 351,390.E 5,360,850.N	med W. med R/W see append (ii)
HSK.517	A3/4 344,100.E 5,365,200.N	see append (ii) med W with tourm
HSK.518	A3/4 343,785.E 5,365,575.N	porph fine W g'mas, biot prom, F > Q with nodules
HSK.519	A3/4 342,525.E 5,365,650.N	coarse W see append (ii)
HSK.520	A3/4 342,160.E 5365,675.N	see append (ii)
HSK.529	A4/3 344,875.E 5,364,750.N	porph fine W g'mas, F > Q
HSK.535	A4/4 349,650.E 5,365,100.N	see append (ii)
HSK.539	C2/2 349,995.E 5,362,160.N	see append (ii) m-c R/W
HSK.546	C2/1 349,400.E 5,361,500.N	med R/W, minor qtz. felds phenos
HSK.547	C2/1 349,475.E 5,361,325.N	med-C R/W fine W scattered qtz felds phenos < 15mm
HSK.554	C2/3 347,960.E 5,358,670	med-c W < chlorit' biot' see append (ii)

HSK.556	C2/3 347,615.E 5,358,605.N	see append (ii) med-W
HSK.557	C2/3 347,450.E 5,358,500.N	f-m W scattered felds pheno's, biot' and possibly musc. see append (ii)
HSK.559	C2/3 347,020.E 5,358,525.N	see append (ii)
HSK.565	C2/1 346,240.E 5,359,325.N	see append (ii) fine W.
HSK.568	C2/1 346,910.E 5,359,110.N	see append (ii) fine W contact with med W
HSK.570	C2/3 347,325.E 5,358,960.N	med W-pink see append (ii)
HSK.572	C2/1 348,350.E 5,359,350.N	see append (ii) med W biot < chloritized
HSK.580	A4/3 347,875.E 5,365,925.N	porph, fine biot rich g'mas, qtz. felds phenos to 15mm fine all felds red, < qtz porph
HSK.581	A4/1 347,640.E 5,366,180.N	med all felds red, qtz porph, with tourm. see append (ii)
HSK.587	C2/2 353,325.N 5359,460.E	-c R/W, tourm qtz py, Globe
HSK.588	C2/2 353,300.E 5,359,560.N	Tourm py alteration Globe
HSK.589	C2/4 353,770.E 5,358,700.N	Soft weathered fine tuffaceous? sediments Crimson Ck?
HSK.597	C2/2 353,660.E 5,360,300.N	fine all felds red porph fine g'mas, W-pink br'n, felds> qtz. phenos
HSK.600	C2/2 354,280.E 5,360,100.N	f-m W f W homfels, fine siliceous, pale - dk pink brn

071

NO.	SHEET N° COORD	
HSK.619	A4/4 351,795.E 5,365,760.N	homfels quartzite
HSK.620	A4/4 351,820.E 5,365,800.N	fine all felds red, qtz. > felds phenot m-c R/W - m-c W.

APPEND (ii)

ROCK CHIP SAMPLES - DESCRIPTIONS
- ASSAYS

No.	Description	Sn %	WO3 %	Sol Sn%	Ag ppm
HSK 3	Qtz. topaz tourmaline 062.90° up to 5m wide	0.01	0.01	0.01	1
29	Qtz. topaz 192.90°, 1 metre wide, short drive	0.01	0.01	0.01	1
33	Fine grained griesen with minor sulphides 102.90°, shafting 30m west	0.23	0.01	0.01	1
42	Griesen veinlets to 3cm 057.90°	0.08	0.01	0.01	1
43	Qtz. topaz tourmaline	0.01	0.01	0.01	1
48	Gossan, shallow pitting	0.01	0.05	0.01	41
51	Qtz. topaz minor tourmaline and sulphides, prospect pits	0.01	0.04	0.01	1
58	Qtz. tourmaline 022.90, 1-2m wide	0.16	0.05	0.01	1
78	Qtz. tourmaline topaz 022.90	0.01	0.05	0.01	1
84	Qtz. tourmaline - hematite 022.90 2-3m wide	0.03	0.11	0.02	2
88	Siliceous alteration with minor tourmaline, flecks of specularite 0.1-0.3m thick	0.01	0.04	0.01	1
89	Siliceous alteration, some specular hematite, 022.90	0.01	0.05	0.01	1
91	Tourmalinization with minor pyrite 280°	0.01	0.05	0.01	1
93	Qtz. topaz - sericite 252.80 shallow pit	0.19	0.06	0.01	1
95	Tourmaline nodules with iron staining	0.01	0.04	0.01	1
107	Siliceous alteration with pyrite 10cm wide, 007.90	0.03	0.04	0.01	1
128	Quartz tourmaline and argillized granite? 270° 1-2m wide, shafts 10 metres deep.	0.01	0.01	0.01	1
132	Tourmaline segregations with min. staining?	0.01	0.01	0.01	1
135	Qtz. tourmaline 0.2m wide 067°	0.01	0.01	0.01	1
136	Qtz. tourmaline 2m wide 054°	0.17	0.01	0.01	1
137	Qtz. tourmaline topaz float only	0.01	0.01	0.01	1
138	Qtz. tourmaline 1m thick, 357°	0.01	0.01	0.01	1
141	Qtz. tourmaline topaz with minor pyrite, arsenopyrite and/or bismuth 232.90 2 metres wide, shallow pit	0.03	0.09	0.01	1
142	Qtz. tourmaline, chlorite 2m wide 027° shallow pits	0.08	0.01	0.01	1
169	Qtz. tourmaline - pyrite 082.90 several narrow veinlets over 1m width, pits 2m deep	0.13	0.01	0.01	1

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410075

No.	Description	Sn %	WO3 %	Sol Sn%	Ag ppm
170	Qtz. topaz muscovite 080.90 1-2m wide shallow trenching	0.01	0.01	0.01	1
171	Minor alteration with pyrite arsenopyrite and/or bismuth shallow pit	0.01	0.06	0.01	9
172	Qtz. tourmaline 2-3m wide 112° shallow pit	0.71	0.01	0.01	1
182	Qtz. minor tourmaline 062°	0.02	0.01	0.01	1
201	Qtz. muscovite - qtz. tourmaline core 0.1-0.2m wide 132.90	0.01	0.01	0.01	1
204	Qtz. tourmaline 334°	0.01	0.01	0.01	1
228	Qtz. tourmaline 2m thick - major drive into this approx 100m west	0.01	0.01	0.01	1
233	Sericitization - minor tourmaline 024.90°	0.06	0.01	0.01	1
237	Qtz. tourmaline sericite minor hematite - magnetite	0.01	0.03	0.01	1
242	Qtz. sericite - hematite, magnetite selvedge	0.01	0.02	0.01	1
248	Hematite - magnetite minor loose blocks close to outdrop	0.03	0.02	0.01	1
255	Qtz. tourm. veins 109.90 minor Fe stain				
256	Musc/sericite minor tourm with pyrite, 1m wide 002.80°				
275	Gossanous crust - spring deposit				
276	Qtz. tourm 252.90 3m wide				
306	Pyritic horizon in black chert (may be fine tourmalinization) 287.90 approx strike, 10m from white granite contact.				
324	Sericite with specular hem', 180° approx trend 1-2m wide				
328	Qtz. sericite, outcrop poor				
331	Sericite and qtz. tourm. float				
332	Qtz. tourm sericite blocks difficult to see orientation. Qtz. tourm veins 360.80 with minor sericite spec' hem'.				
333	Qtz. tourm 344.90 0.5m, 347.90 0.5m, 120.90 3m with pit 4m deep 137.90				
334	Qtz. sericite				
338	Qtz. py minor tourm, 027.90 pit				
339	Qtz. tourm sericite, veins - irreg. blobs 1-2m wide trenching				

No.	Description	Sn %	WO3 %	Sol Sn%	Ag ppm
344	Qtz. minor tourm, < 2m wide with py-Aspy core.				
347	Qtz. py tourm, 3m wide, 270.90 drive (3m long) & trenching				
348	Qtz. py tourm, 3 wide, 270.90, with 2 pits 3-4m deep, minor py, As				
357	Qtz. minor tourm 090°, trench/ slope? 000° 6m deep x 15m long				
358	Tourm nodules in diffuse zone, pit				
360	Qtz. tourm, chlorite 297-312° trench 0.5m deep Qtz. sericite 354.90, 2-3m wide Qtz. minor sericite & tourm 022.90 Qtz. with chl-actinolite, tourm 002.90				
362	Qtz. minor sericite/musc with fine tourm segregations 032°, 3-4m wide				
363	Aplite, griesenized 310°, 2m wide in medium grained white Aplite griesenized 215.90 trenching				
364	Aplite - tourmalinized - griesenized 027.80° pit > 3m deep Qtz. tourm 022.80 1m wide, pit 1m deep				
365	Qtz. tourm. actino/chl, 007.90° pit 3m deep, 5m long Qtz. tourm. actino/chl with py 007.90, pit > 3m deep				
373	Small outcrop (xenolith) of m-c R/W in med W with disseminated MoS2				
374	Sericite minor py 197° approx trend, 5m wide				
375	Qtz. musc minor py, 212°, pit 1.5m deep				
394	Sericite with spec' hem' 352.80 & 267.70 two main joint sets in f-m granite < sericitized				
395	Qtz. tourm. sericite, 337.80, 1metre wide				
399	Sericite with patchy spec' hem', minor silicification, 137° approx trend, 5m wide				
400	Sericite qtz. tourm spec hem 180°				
447	Partial replacement of felds by hematite in M-C R/W, near contact with fine white				

No.	Description	Sn %	WO3 %	Sol Sn%	Ag ppm
453	Hem/mag, qtz tourm 022° approx trend, 5m wide				
454	Hem/mag, minor tourm & py irreg podg 10m x 3m approx trend 342°				
466	Sericite minor spec' hem' 187.90				
467	Sericite, qtz, minor spec' hem', zone 50m wide, within this intense alteration 347.80°				
493	Siliceous alt'n with py				
512	Fine qtz tourm chl. 197° approx trend				
517	Griezenized aplite & qtz. tourm float				
519	Griezenized aplite				
520	Qtz. sericite/muscovite, minor tourm, 302° 1m wide, single flake MoS2				
535	Hem/mag pyrite 1-2m wide				
539	Qtz. musc 155° approx trend, & qtz. sericite spec hem				
554	Qtz. top tourm 142° strike, trenching				
556	Qtz. musc veins 372° Qtz. musc with py 232.90 pit 1.5m deep. Qtz. minor tourm veins (set of four in 20m)				
557	Qtz. musc 020°, 25m wide				
559	Qtz. musc minor py 067° 5m wide				
565	Qtz. top minor tourm, py, 012° pit 3 m deep, Qtz top minor qtz. sericite 202°, alteration 10m wide pit 4m deep				
568	Qtz. tourm 222°, 0.5m & blocks of qtz. sericite minor py.				
570	Fe gossan-laterite crust.				
572	Qtz. minor tourm 130.90 1m wide, open stope/ crusher				
581	Tourm qtz. pod 5 x 10m				

APPENDIX 4

Extract from 1980-81 Annual Report for E.L. 11/76 and
S.P.L. 129 describing the Peripatetic Mine, by P.A. Roberts.

4.1.5 Peripatetic Mine

This mine is located approximately 9km north-west of Federation (Plan 2a) in an area mapped as coarse grained "white" granite (Klominsky, 1972). It was abandoned at the turn of the century after five adits and several shafts and winzes had been driven through the lodes.

The workings were described in some detail by Waller (1902) and more briefly by Waterhouse (1915). In 1969-70 Geophoto Resources Consultants carried out a three hole diamond drilling program for Texins Development P/L. The holes were all drilled from the west side of the lodes, angled south-east, normal to their strike (Figure 1). The core from these holes is stored at the Mines Department in Hobart and was briefly examined by the writer in August 1980. Brief drill logs together with two Geophoto Reports and Waller's mine description are appended (Appendix 3).

In late 1980, Renison was approached by Messrs. Bennett of Rosebery who hold two leases covering the mine (see Section 3.1, this report). In January 1981, the workings were examined with a view to taking out an option over the leases. The following observations were made (Figure 1):

(1) Tin mineralization apparently occurs in thin (<3m wide), steeply dipping, north-east trending lodes which consist of a grey-green, partly vesicular, partly siliceous sericite(?) -clay rock. High grade ore (e.g. sample 12) contains abundant euhedral black cassiterite (average grainsize 0.5mm) but is only present in patches within the lodes.

(2) The host rock is a strongly argillized coarse grained granite which contains geochemically anomalous amounts of tin (0.02 - 0.08%) near the mineralization. Waller (1902) claimed that the host rock in adit No.3 is an argillized aplite containing 0.93% Sn (exclusive of the lodes) in a bulk sample over 10m of adit length. The first several

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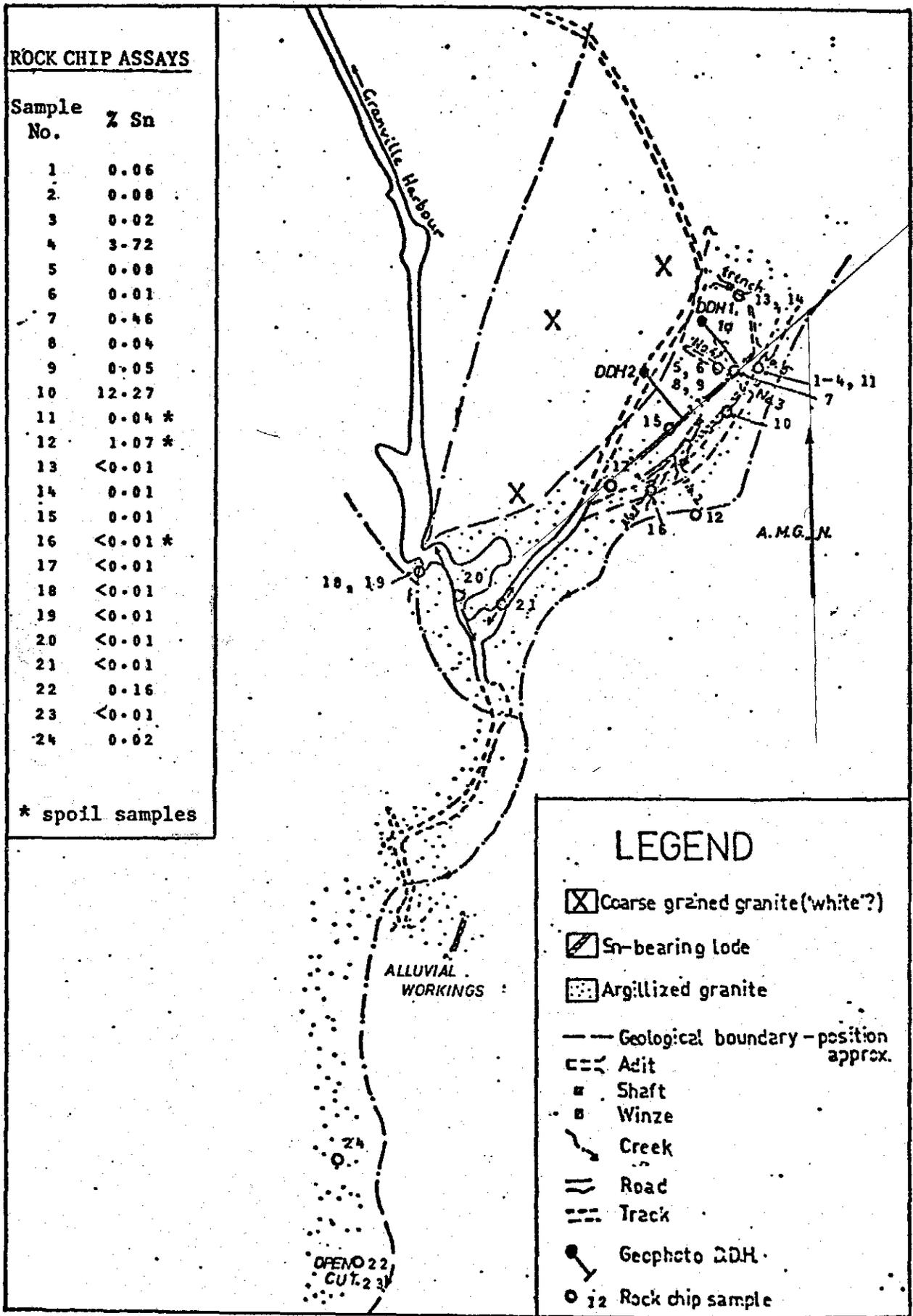
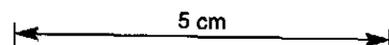
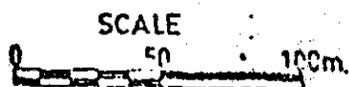


FIGURE 1: PERIPATETIC MINE, E.L. 11/76



410081

metres of the adit have been removed but the rest of the granite (which is coarse grained and carries tourmaline nodules) was sampled (samples 5,6,8) for a maximum assay of 0.08% Sn. Waller also claimed that the tourmaline nodules assayed 0.4% Sn. A sample of nodules obtained by the writer (sample 9) contained 0.05% Sn.

The Geophoto drillholes were apparently unsuccessful in intersecting tin mineralization. All of the core was split but only two assays are recorded: 0.05% Sn at 65.8 - 67.4m and 0.011% Mo at 108.5 - 111.6m in DDH 1. Examination of the core, however, revealed pyrite-bearing sericitic greisen at 39.9 - 40.1m in DDH1a and 68.6 - 71.6, 74.1 - 75.0m in DDH2. These are probably the depth extension of the lode(s). Section views are appended with the logs (Appendix 3).

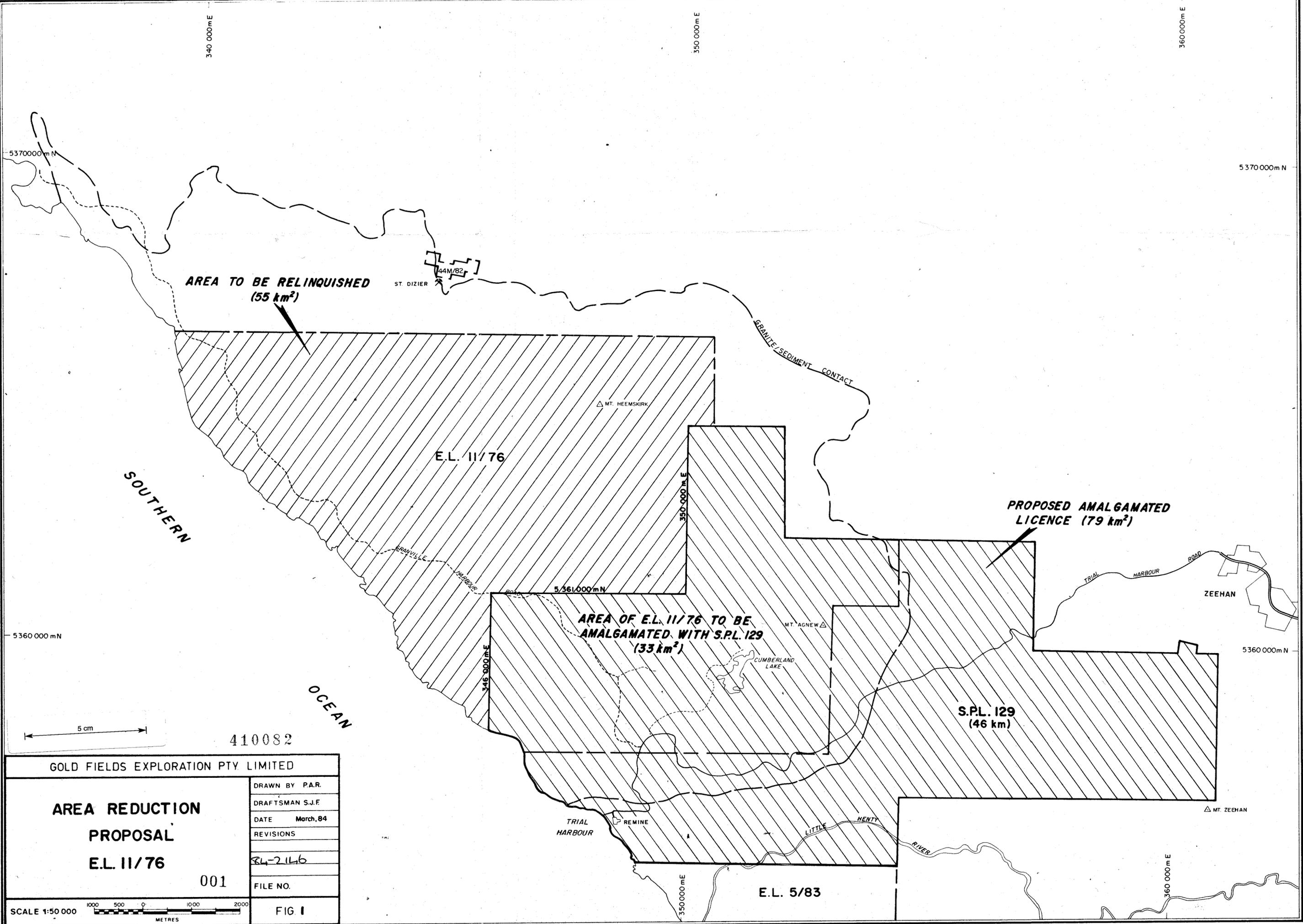
In summary:

- (1) Economically interesting tin mineralization is confined to thin (<3m wide) lodes which contain ore grade shoots no longer than 50m.
- (2) Almost 1% Sn as disseminated cassiterite within argillized aplite has been reported, (Waller, 1902) but that report is considered unreliable after ground inspection.
- (3) Diamond drilling by Geophoto strongly suggests that the tin content of the lodes is no more persistent with depth than it is along strike.

It was concluded that the potential for a major Sn orebody at the Peripatetic Mine is poor. Consequently the leases were not taken up under option.

4.1.6 Heemskirk Granite - Geological Mapping

Following the recommendation of the 1979-80 Annual Report, reconnaissance geological mapping of the Heemskirk Granite was commenced in 1980-81. R. Poltock, a contract geologist, was engaged to do this work and carried out four weeks of mapping in March-April, 1981.



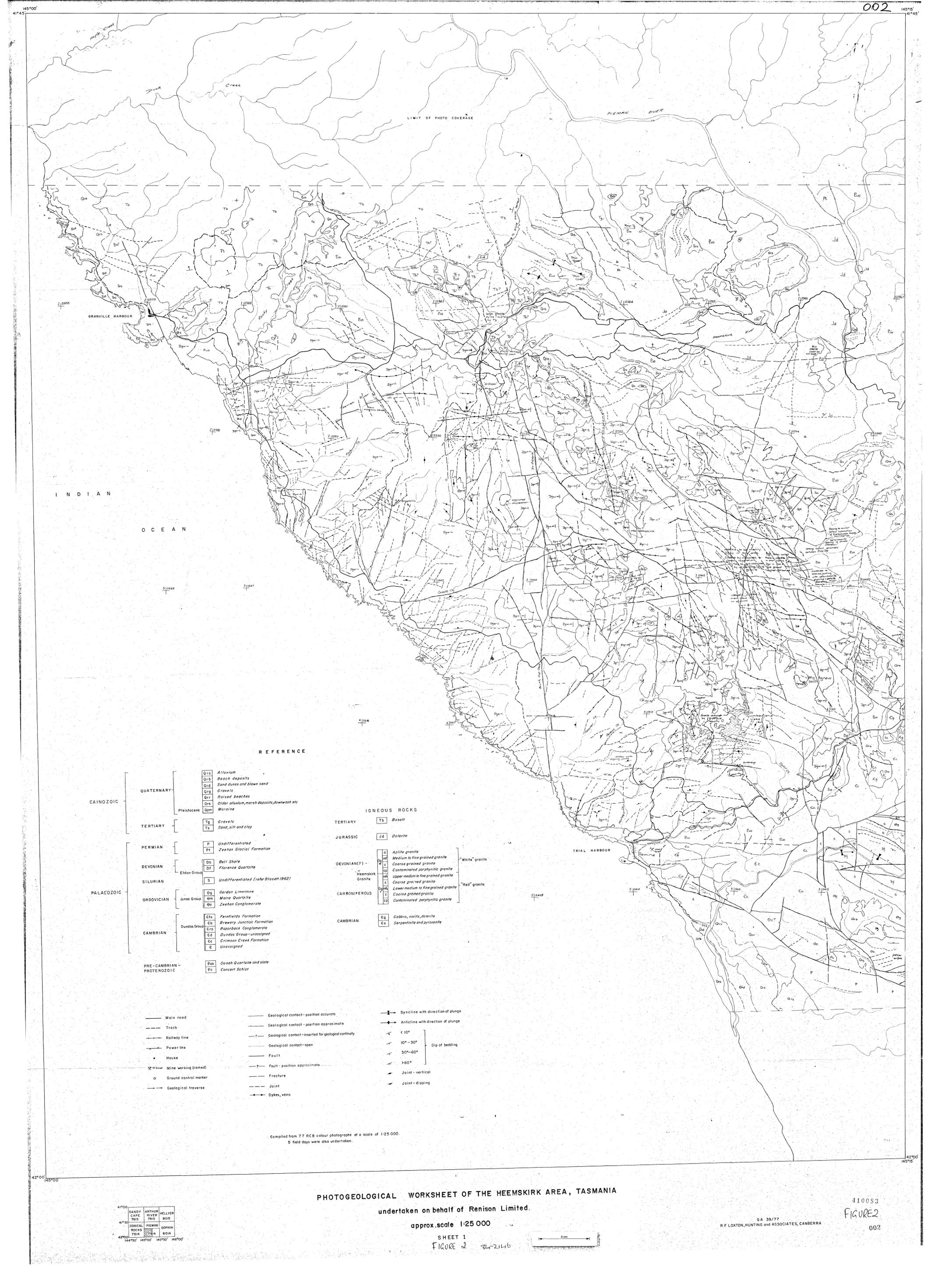
410082

GOLD FIELDS EXPLORATION PTY. LIMITED

AREA REDUCTION PROPOSAL E.L. 11/76 001	DRAWN BY P.A.R.
	DRAFTSMAN S.J.F.
	DATE March, 84
	REVISIONS
	RL-2146
FILE NO.	FIG. I

SCALE 1:50 000

1000 500 0 1000 2000 METRES



REFERENCE

CAINOZOIC	QUATERNARY	Q1a Alluvium Q1b Beach deposits Q1c Sand dunes and blown sand Q1d Gravels Q1e Raised beaches Q1f Older alluvium, marsh deposits, downwash etc Q1g Moraine
	TERTIARY	Tg Gravels Ts Sand, silt and clay
	PLEISTOCENE	
PALAEOZOIC	PERMIAN	P Undifferentiated P1 Zeehan Glacial Formation
	DEVONIAN	Db Bell Shale Df Florence Quartzite
	SILURIAN	S Undifferentiated (refer Bissett 1962)
	ORDOVICIAN	June Group Og Gordon Limestone Om Moira Quartzite Oz Zeehan Conglomerate
	CAMBRIAN	Dundas Group Cfa Farfields Formation Cfb Brewery Junction Formation Cfc Razorback Conglomerate Cfd Dundas Group - unassigned Cfe Crimson Creek Formation Cf Unassigned
PRE-CAMBRIAN - PROTEROZOIC	Eua Oonah Quartzite and slate Ec Concert Schist	

IGNEOUS ROCKS	TERTIARY	Tb Basalt
	JURASSIC	Jd Dolerite
	DEVONIAN(?)	W White granite Df Coarse grained granite Dm Contaminated porphyritic granite Dp Upper medium to fine grained granite Dc Coarse grained granite Dr Lower medium to fine grained granite Dc Coarse grained granite Dp Contaminated porphyritic granite
	CARBONIFEROUS	R Red granite
CAMBRIAN	Ca Gabbro, norite, dolerite Cs Serpentine and pyroxenite	

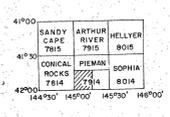
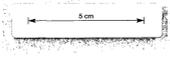
- Main road
- - - Track
- Railway line
- Power line
- House
- ⊗ Mine working (romed)
- Ground control marker
- Geological traverse
- Geological contact - position accurate
- - - Geological contact - position approximate
- - - Geological contact - inserted for geological continuity
- - - Geological contact - open
- Fault
- - - Fault - position approximate
- Fracture
- - - Joint
- Dykes, veins
- ↔ Syncline with direction of plunge
- ↔ Anticline with direction of plunge
- < 10° Dip of bedding
- 10° - 30°
- 30° - 60°
- > 60°
- Joint - vertical
- ↘ Joint - dipping

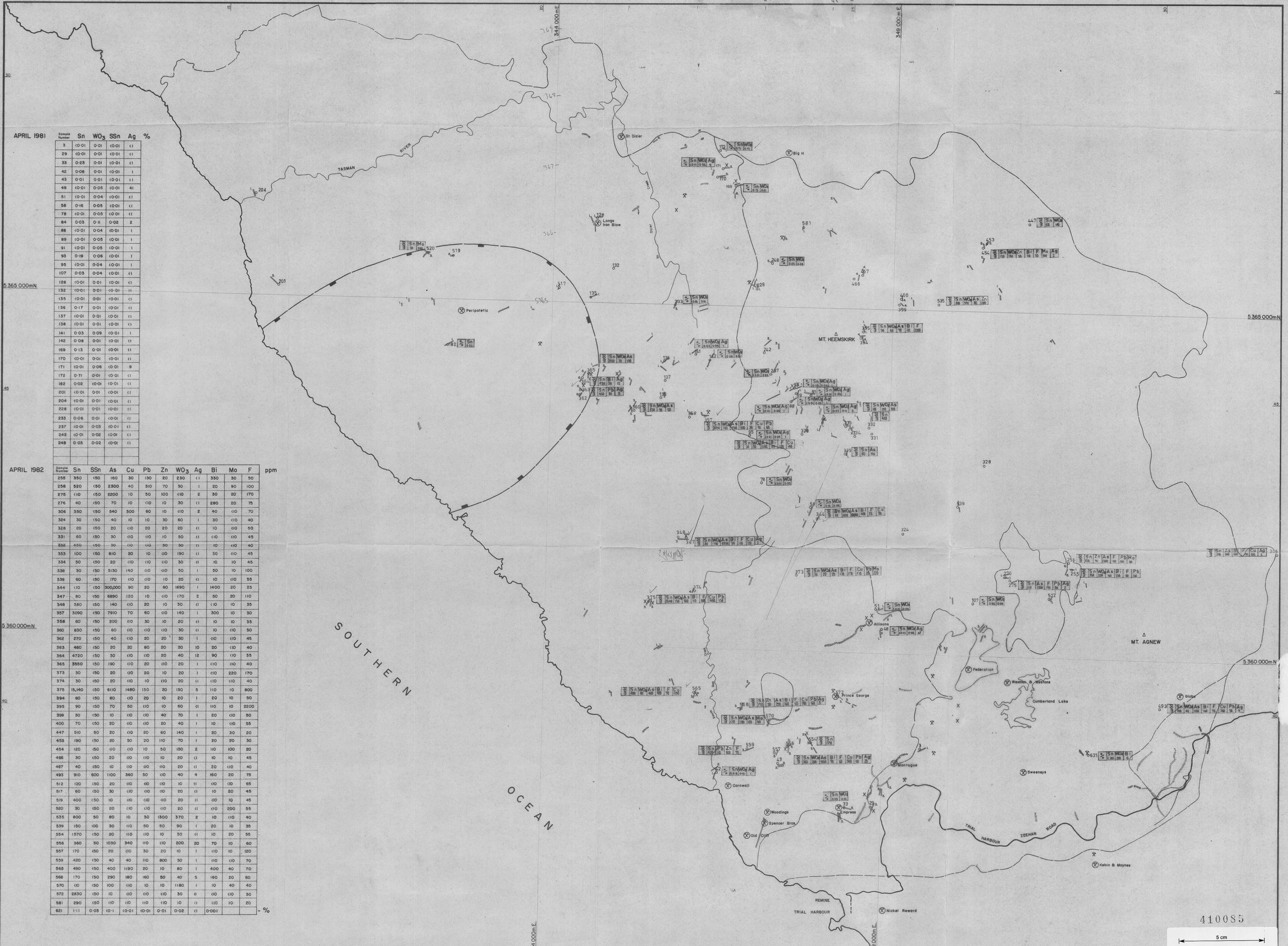
Compiled from 77 RC8 colour photographs at a scale of 1:25 000.
5 field days were also undertaken.

PHOTOLOGICAL WORKSHEET OF THE HEEMSKIRK AREA, TASMANIA
undertaken on behalf of Renison Limited.

approx scale 1:25 000

SHEET 1
FIGURE 2 84-2146





APRIL 1981

Sample Number	Sn	WO ₃	SSn	Ag	%
3	0.01	0.01	0.01	0.01	0.1
29	0.01	0.01	0.01	0.01	0.1
33	0.23	0.01	0.01	0.01	0.1
42	0.08	0.01	0.01	0.01	0.1
43	0.01	0.01	0.01	0.01	0.1
48	0.01	0.05	0.01	0.01	0.1
51	0.01	0.04	0.01	0.01	0.1
56	0.16	0.05	0.01	0.01	0.1
78	0.01	0.05	0.01	0.01	0.1
84	0.03	0.11	0.02	0.02	0.2
88	0.01	0.04	0.01	0.01	0.1
89	0.01	0.05	0.01	0.01	0.1
91	0.01	0.05	0.01	0.01	0.1
93	0.19	0.06	0.01	0.01	0.1
95	0.01	0.04	0.01	0.01	0.1
107	0.03	0.04	0.01	0.01	0.1
128	0.01	0.01	0.01	0.01	0.1
132	0.01	0.01	0.01	0.01	0.1
135	0.01	0.01	0.01	0.01	0.1
136	0.17	0.01	0.01	0.01	0.1
137	0.01	0.01	0.01	0.01	0.1
138	0.01	0.01	0.01	0.01	0.1
141	0.03	0.09	0.01	0.01	0.1
142	0.08	0.01	0.01	0.01	0.1
169	0.13	0.01	0.01	0.01	0.1
170	0.01	0.01	0.01	0.01	0.1
171	0.01	0.06	0.01	0.01	0.1
172	0.71	0.01	0.01	0.01	0.1
182	0.02	0.01	0.01	0.01	0.1
201	0.01	0.01	0.01	0.01	0.1
204	0.01	0.01	0.01	0.01	0.1
228	0.01	0.01	0.01	0.01	0.1
233	0.06	0.01	0.01	0.01	0.1
237	0.01	0.03	0.01	0.01	0.1
242	0.01	0.02	0.01	0.01	0.1
248	0.03	0.02	0.01	0.01	0.1

APRIL 1982

Sample Number	Sn	SSn	As	Cu	Pb	Zn	WO ₃	Ag	Bi	Mo	F	ppm
255	350	450	160	30	130	20	230	0.1	330	30	50	
256	520	450	2300	40	310	70	30	1	20	90	100	
275	110	450	2200	10	50	100	0.10	2	30	20	170	
276	40	450	70	10	0.10	10	30	0.1	280	20	75	
306	350	450	540	500	80	10	0.10	2	40	0.10	70	
324	30	450	40	10	10	30	60	1	30	0.10	40	
328	20	450	20	0.10	20	20	20	0.1	10	0.10	50	
331	60	450	30	0.10	0.10	10	50	0.1	0.10	0.10	45	
332	450	450	30	0.10	0.10	30	30	0.1	10	0.10	40	
333	100	450	810	20	10	0.10	190	0.1	30	0.10	45	
334	50	450	20	0.10	0.10	30	0.1	0.1	10	0.10	45	
338	30	450	5130	140	0.10	0.10	50	1	50	10	100	
339	60	450	170	0.10	0.10	10	20	0.1	10	0.10	55	
344	0.10	450	300,000	90	20	60	1690	1	1400	20	25	
347	80	450	6890	120	10	0.10	170	2	50	20	110	
348	580	450	140	0.10	20	10	30	0.1	0.10	10	35	
357	3090	450	7910	70	60	0.10	140	1	300	10	30	
358	60	450	200	0.10	30	10	20	0.1	10	10	35	
360	830	450	60	0.10	0.10	10	30	0.1	10	0.10	50	
362	270	450	40	0.10	20	20	30	1	0.10	0.10	45	
363	460	450	20	20	80	20	20	10	20	0.10	40	
364	4720	450	30	0.10	0.10	20	40	12	90	0.10	35	
365	3560	450	190	0.10	20	0.10	20	1	0.10	0.10	40	
373	30	450	20	0.10	20	10	20	1	0.10	220	170	
374	30	450	20	0.10	10	0.10	20	0.1	0.10	0.10	40	
375	15,140	450	6110	1480	130	20	130	5	110	10	800	
394	60	450	80	0.10	20	10	20	1	20	10	50	
395	90	450	70	50	0.10	10	60	0.1	110	10	2200	
399	30	450	10	0.10	0.10	40	70	1	20	0.10	50	
400	70	450	20	0.10	0.10	20	40	1	10	0.10	55	
447	510	450	20	0.10	20	60	140	1	20	30	20	
455	190	450	20	50	20	110	70	1	20	20	30	
454	120	450	0.10	0.10	10	50	150	2	110	100	20	
466	30	450	20	0.10	0.10	10	20	0.1	10	10	45	
487	40	450	10	0.10	0.10	0.10	20	0.1	20	0.10	40	
493	910	600	1100	360	50	0.10	40	4	160	20	75	
512	120	450	20	0.10	0.10	0.10	10	0.1	0.10	0.10	65	
517	60	450	30	0.10	0.10	0.10	20	0.1	10	20	45	
519	400	450	10	0.10	0.10	0.10	20	0.1	0.10	10	45	
520	30	450	20	0.10	0.10	0.10	20	0.1	0.10	200	55	
535	800	50	80	10	30	1300	370	2	10	0.10	40	
539	150	100	30	0.10	50	50	90	1	20	10	35	
554	1570	450	20	0.10	0.10	10	30	0.1	10	20	55	
556	360	50	1030	340	110	0.10	200	20	70	10	60	
557	170	450	20	0.10	30	20	10	1	0.10	10	120	
559	420	450	40	40	110	800	30	1	0.10	0.10	70	
566	490	450	400	1190	20	10	80	1	400	40	70	
568	170	450	290	180	160	60	40	5	160	20	60	
570	0.10	450	100	0.10	10	10	1180	1	10	40	40	
572	2830	450	10	0.10	0.10	0.10	30	0.1	0.10	0.10	30	
581	290	450	0.10	0.10	0.10	10	10	0.1	0.10	10	20	
621	1.11	0.03	0.01	0.01	0.01	0.01	0.02	0.1	0.001			

SOUTHERN OCEAN

LEGEND

Devonian Heemskirk Granite	Precambrian-Cambrian	Prospects and Mines	Stream and Alluvial Tin Workings	Alteration and Granitic Dykes
White Granite	Hornfelsed sediments	Shalls and trenches 36m deep Pits, trenches etc. 0.6m deep Pits and trenches 0.2m deep	Located by Pollock and most cases Kilminsky Located by Kilminsky only	type 1 & 2 tourmaline, quartz, topaz and quartz type 3 quartz sericite/muscovite type 4 sericite, quartz specular hematite type 5 magnetite hematite tourmaline pyrite type 6 greisenised/tourmalinised opites, surrounding granite unaltered
Red Granite	Boundary of possible hidden "Third Granite Phase"			"white dykes" usually 4.5 wide, occasionally with minor pyrite and arsenopyrite.

410085

5 cm

RENISON LIMITED
HEEMSKIRK GRANITE AREA
MINERALISATION AND ROCK CHIP ASSAYS

SCALE: 1:25 000 METRES

DRAWN P.K.
TRACED T.G.O.S.
DATE May 1982
SCALE 1:25 000
DRAWING No. FIGURE 4

005

5368 000 N

5366 000 N

5364 000 N

SOUTHERN

OCEAN

E.L. 47/71
GIPPSLAND MINERALS N.L.

E.L. 11/76
RENISON LIMITED

32M/78	25 ha
M. J. BENNETT	
Perpetual (S)	
35M/78	25 ha
L. BENNETT	

336 000 E

338 000 E

340 000 E

342 000 E

344 000 E

410 086

RENISON LIMITED

ZEEHAN A-3 005

LAND TENURE AND LOCATION
OF OLD WORKINGS

GEOLOGIST	: P.A.R.	SCALE	1:1000 METRES
DRAUGHTSMAN	: T.G.D.S.		
DATE	: JUNE 1988	REVISIONS	
		DRAWING No. 10URE 5	

