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**MICROFILMED**

Progress reports on exploration on S.P.L. 56,  
Arthur River district, north-western Tasmania  
during 1970

P.B. Nye and T.D. Hughes

1970

Mineral Holdings Aust. Pty Ltd

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PART 1

Report on mineral prospect on Special  
Prospecting Licence 56, Arthur River region,  
north-western Tasmania

P.B. Nye

March, 1970

Mineral Holdings Aust. Pty Ltd.

ARTHUR RIVER REGION, NORTH-WESTERN TASMANIA

MINERAL HOLDINGS AUSTRALIA PTY. LTD.

INTRODUCTION

A visit was paid to this Prospect on 23rd March in company with Messrs. N.M. Thomas and W. St.C. Manson. Mr. B.A. Farquhar, the former holder of the Licence made the necessary arrangements for the visit and conducted the party over the Prospect.

LOCATION

The Prospect is situated about 24 miles by air-line south-west from Wynyard on the northern coast of Tasmania.

Licence 56 is situated on the south-western side of the Arthur River, and embraces the greater parts of the valleys of the Keith and Lyons Rivers which are north-flowing tributaries of the Arthur River (actually the Lyons River is a tributary of the Wedge River which enters the Arthur River). The extreme north-eastern *part of side of the Arthur River, the licence is situated on the north-eastern side of the Arthur River* The Prospect is situated in the north-western portion of the Licence. Its south-western end is situated on the divide between the Lyons and Keith Rivers, but its north-eastern end is close to the Keith River.

ACCESS

Access is gained by road from Burnie or Wynyard. From Burnie, the route leaves the Burnie-Wynyard road a few miles west from Burnie, and is along the Waratah road to Yolla. A short distance south of Yolla, the route leaves the Waratah Road and follows the Takone and West Takone road. The roads are bitumen to near Takone, and beyond that the road is macadam to within four miles of the Arthur River. The last four miles were formed and metalled by Mr. Farquhar. Beyond the Arthur River, the only access is by track bull-dozed by Mr. Farquhar; this track extends to five miles south from the Arthur River.

MINING TENEMENT

The tenement including the Prospect is Special Prospecting Licence 56 of 25 square miles charted in the name of B.A. Farquhar. It expired on 10/2/70 but it is stated that it has been extended for six months.

*(Negotiations only & a deposit paid)*

The Licence was purchased recently by Mineral Holdings Australia Pty. Ltd. and Tomic Exploration Pty. Ltd. with managing rights to the latter.

TOPOGRAPHY

The area is probably a dissected plateau and is of high relief. The more elevated land rises probably to heights of 1200 to 1500 feet above sea-level, and the bed of the Arthur River is probably at elevations of 400 to 500 feet above sea-level.

The plateau is probably the northern extension of that forming the Magnet Range, situated about 16 miles to the south.

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▲ TOPOGRAPHY (Cont.)

The Arthur River flows in a general north-westerly direction through the north-eastern part of the area. The Keith and Lyons Rivers flow in general northerly directions, and many of their tributaries are sub-parallel to them. This general northerly direction has probably resulted because the streams follow the bedding and schistosity in the country rocks.

PREVIOUS LITERATURE

Previous reports on the area in, and adjacent to, S.P.L. 56 include the following.

- Waller, G.A., The New Victory Copper Mine, 1901. (This is part of a larger report, the title of which is not available at present), Tas. Dept. of Mines.
- Nye, P.B., Geological Report on the Hydro-Electric Water Conservation Scheme on the Arthur River, 21st Nov., 1924 (typewritten). Tas. Dept. of Mines.
- Nye, P.B., Geological Report on the Upper Portion of the Arthur River Hydro-Electric Water Conservation Scheme, April, 1925 (typewritten). Tas. Dept. of Mines.
- Nye, P.B., Dolomite and Magnesite Deposit near the Victory Mine, Arthur River, 14th April, 1925 (typewritten). Tas. Dept. of Mines.
- McNeil, R.D., Geological Reconnaissance of Part of the Arthur River Area, 1960 (included in Technical Report No. 5, Tas. Dept. of Mines.

In addition to the above, there is another report entitled Arthur River District. It appears to be part of a larger report, but at present, I do not know the title of the reports, its author and date. The reports describe several gold diggings on the Arthur River and could have been written about 1900 or earlier.

GEOLOGY

Only the northern part of S.P.L. 56 has been geologically mapped. This was mapped in 1960 as part of a regional survey of part of the Arthur River district. The mapping was carried out by R.D. McNeil of the Tasmanian Geological Survey and is the only extensive and detailed mapping within the district. As indicated by the literature listed earlier in this report, short reports were prepared by other investigators upon small portions of the district. The account given below is based mainly on the mapping and report by R.D. McNeil.

The oldest rocks are of Pre-Cambrian age. They are intruded by a few amphibolite dykes as reported by McNeil, and as reported by Waller and Nye, by a pyroxenite dyke at the Victory mine. Permian sedimentary rocks are present in the north-western part of S.P.L. 56 and extend north-easterly and easterly across the Arthur River.

McNeil divided the Pre-Cambrian rocks into five units, but only the lowest unit (Keith Beds) is present on S.P.L. 56. This unit consists of mica schists, chlorite schists, quartz-mica schists, phyllitic quartzites and quartzites. The mica schists and the quartz-mica schists are the most common types. In the small area visited in the present investigation, mica-schists and quartzites were the most common types.

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GEOLOGY (Cont.)

McNeil reported that the bedding had been largely obliterated by the schistosity, and that the latter had strikes ranging from 0° to 70°, and dips both to the east and west at 50° to 90°. The present investigation indicated that the track through S.P.L. 56 was situated approximately along a contact between quartzites on the east and schists on the west, and that the general trend of the contact (probably bedding) was north-north-westerly.

The Permian sediments overlie the Pre-Cambrian rocks with a marked unconformity, but are in places down-faulted against them. The Permian strata are either bedded horizontally or dip at low angles, except in places near the major fault. McNeil divided the rocks into five formations, but these need not be considered here.

The major fault traverses the northern part of S.P.L. 56 in a general north-westerly direction and crosses the Arthur River a short distance to the north-west of the old Victory mine.

ECONOMIC GEOLOGY

In Tasmania, mineralisation is common and widely distributed in Pre-Cambrian rocks, and is generally considered to be genetically associated with granitic intrusives. Mineralisation occurs in the Permian rocks at only one place in Tasmania. This scarcity is correlated with the absence of any granitic intrusives in the Permian rocks.

In S.P.L. 56, prospecting should therefore be restricted to the Pre-Cambrian rocks. The greater part of S.P.L. 56 is occupied by the Pre-Cambrian Keith Beds.

THE MINERAL PROSPECT

The prospect was discovered by Mr. Farquhar's parties presumably in 1969. Outcrops have been broken and sampled in at least ten places, and a bull-dozed track runs along the formation either on it or on the south-eastern side of it. The first sample was taken from the south-western end from a place where a tree had been blown down. The sample contained pyrite and it is stated that an assay revealed 25% of iron pyrite and 12.1% sulphur. Another sample was taken from what is now the No. 4 Sample area and it is stated that it contained 38% of magnetic iron ore: On 14th Feb. samples were taken from about 10 different places but complete results are not yet available.

At this stage, it appeared from a map supplied by Mr. Farquhar that the prospect extended from the Keith River south-westerly for about 1.25 to 1.5 miles. It was stated however, that the mineralised area was two miles long, 1500 feet wide and occurred at places differing in height by 500 feet.

During the visit on 23rd March, the formation was examined at 8 places from which the samples were taken on 14th February. The places will be referred to as Sample Areas for purposes of description.

THE MINERAL PROSPECT (Cont.)

Near Keith River - A short distance above the west bank, loose pieces of oxidised iron formations composed of limonite occur. One loose piece showed some unoxidised material consisting of a fine-grained formation of quartz with pyrite and a very light coloured or whitish sulphide mineral resembling arsenopyrite.

Sample Area No. 8 - The sample was apparently taken from one small outcrop or boulder, but it is stated that other similar occurrences are present. The material was mainly limonite with some hematite (possibly primary). Sample Area No. 8 is at least 800 feet from the Keith River.

Sample Area No. 7 - is about 1800 feet south-westerly from No. 8. Exposures were the typical limonite - hematite material and were non-magnetic.

Sample Area No. 6 - is about 850 feet south-westerly from No. 7. Typical iron formation was present.

Sample Areas Nos. 5 & 4 - are close together and about 900 feet south-westerly from No. 6. The No. 4 Area contained more extensive outcrops of the oxidised iron formation than the other Areas visited. The formation contained much limonite. Some outcrops and specimens were highly magnetic, and magnetite was present; Hematite was present in many specimens and some seemed to be of secondary origin. Pyrite was present in some parts and seemed to represent unoxidised remnants of primary pyrite. There was little or no quartz present and the association of minerals indicated that the primary ore was composed possibly of magnetite/pyrite and perhaps some hematite.

Sample Area No. 3 - is about 600 feet south-westerly from No. 4. There was a small exposure on the side of the track of typical oxidised iron formation. The material was non-magnetic.

Sample Area No. 2 - is about 600 feet south-westerly from No. 3. The formation consisted of brown and yellow limonite with much hematite, some of which is probably primary.

Sample Area No. 1 - is about 800 feet from No. 2. It is on a track branching to the west from the main one. Between the main track & the No. 1 Sample site, there were a few pieces of the oxidised iron formation and one of a narrow vein of primary hematite in silicified schist.

At the No. 1 sample site, there was a small exposure where a tree had blown down. Some soft oxidised iron formation was present. The more or less unoxidised material contains some pyrite and dark iron minerals. Some specimens were slightly magnetic and some magnetite is probably present. Hematite is probably also present but cannot be definitely identified in all specimens. Fine quartz is also present. One piece of sulphide was identified doubtfully as chalcopyrite.

The above Areas were along the track and this ran for most of its course along a ridge. Mr. Farquhar stated when at Areas 4 & 3, that the iron formation occurred in the creeks on both sides of the ridge and that these occurrences gave a width of 15 chains within which the oxidised iron formation occurred. It has not however, been proved that the formation is continuous across that width.

THE MINERAL PROSPECT (Cont.)

In examining the above areas, it was found that the exposures of iron formation occurred where the country rocks were schists. In travelling along the track it was noted that, when the track trended to the east or south-east, the country rocks were quartzites. It would appear therefore, that the iron formation occurs near the south-eastern boundary of a zone of schists adjacent to a zone of quartzites.

SUMMARY OF INFORMATION ABOUT THE MINERAL PROSPECT

The evidence available to date indicates that oxidised iron formations occur at some 10 or more places within a tract extending at least 1.5 miles south-westerly from the crossing of the track over the Keith River. The general trend is south-westerly. The width of the tract is undetermined, but Mr. Farquhar states that it is 15 chains in some places. It has not been proved that one formation extends over the above length and width. It is more likely that there are a number of separate and parallel formations within the tract.

At the surface, the material is an oxidised iron formation consisting mainly of limonite. Hematite, magnetite, pyrite and fine-grained quartz are present in some places. There are no indications of any other mineral or metal being present in amounts of economic importance. Advance information about the assays of the ten samples taken on 14th February is to the effect that the iron content ranged from 40 to 60 per cent.

The nature of the primary mineralisation from which the above oxidised iron formations were derived, is problematical. The primary material would contain quartz and pyrite. Primary hematite is present in some places. Magnetite is present in a few places. All that can be assumed at present is that the primary material consists of quartz, pyrite, hematite and magnetite but not necessarily in that order of abundance. It is possible that the quartz content is not large. The range of 40 to 60 per cent iron in the oxidised material may mean that the oxidised material with 40% iron is derived from primary material with most pyrite and the oxidised material with the 60% iron from primary material with most hematite and magnetite.

The largest outcrop is in Sample Area No. 4.

TESTING

The main objectives to which the testing should be directed are:

- 1) to determine what lode formations crop out at the surface and to determine their extent, and to map them
- 2) utilising the information resulting from the surface testing, to test the lode formations in several places at depth in order to determine the general nature of the formations in the primary zone
- 3) if the lode material in the primary zone is proved to be of economic importance, to determine the quantity and grade of ore in a selected area or areas within the mineralised zone.

SURFACE TESTING

- The testing should include
  - Surface prospecting
  - Bull-dozing of trenches across the area
  - Geological survey
  - Ground magnetic surveys
  - Cutting and surveying of a base line & traverses

The testing should be done over the general area in which the known outcrops occur. The area should be one extending 1.5 to 2 miles south-westerly from the Keith River, and having a width of 15 to 20 chains. It could, with advantage, be started at Sample Area No. 4 and be extended from that Area.

The surface prospecting should be directed to searching for, and marking, outcrops of the oxidised iron formation. It should be carried out by prospectors and directed by the geologist in charge of the geological survey.

The bull-dozing could start after the prospecting but should be in operation during the latter part of the prospecting and geological survey. It would include the excavation of trenches in places with no rock outcrops, the trenches being sited in suitable places, and be between outcrops and also more or less across the full width of the area. It could perhaps excavate to shallow depth any soft lode formations exposed at the surface or by the trenching.

The geological survey should start at the same time as the prospecting and be continuous through at least the surface prospecting. It would be devoted to mapping the rocks and determining the geological structure of the area, and to mapping the outcropping oxidised iron formations and to obtaining all possible information about them including dimensions, strike and dip and minerals present.

The ground magnetic survey should start as soon as the geological survey has obtained sufficient information about the area. If time is an important factor, the magnetic survey could start as early as the other operations even though it may not be possible to select a starting place as satisfactorily as it would if started later.

The magnetic survey will detect only those parts of the lode formations that are magnetic, and in the present state of our knowledge, this will mean those parts that contain magnetite. The survey will indicate magnetic bodies that crop out at the surface and also bodies that exist at depth and do not extend to the surface. The results of the survey will therefore assist the surface testing and also the testing at depth.

If the ground magnetic survey is to be carried out, it will be necessary to clear and survey a base-line with traverses at right angles to it. It would be advantageous for the base-line to make the most use of the track and the clearing along it. In the beginning, the traverses could be spaced at intervals of say, 20 chains and intermediate ones put in later, if required. Pegs should be put in at 100 feet intervals along the traverses. The base-line and traverses should be surveyed by theodolite and levels measured along them.

SURFACE TESTING (Cont.)

If the base-line and traverses are to be put in, they should be put in as early as possible as they would greatly assist the mapping of the area and of the outcrops of oxidised iron formations, etc.

PRELIMINARY TESTING OF LODGE FORMATIONS AT DEPTH

This would include the drilling of holes from the surface at five to ten places and the obtaining of cores from the holes. The lode formations should be cut at depths of 200 to 300 feet, but the depths would be adjusted in accordance with the experience gained during the drilling.

The sites for the holes would be selected in accordance with the results of the surface testing. If it is essential to obtain some of the desired information at an early date, no more than one or two holes should be drilled for this purpose; the first hole could be drilled in the Sample Area No. 4.

TESTING OF THE LODGE FORMATIONS

Further testing of the lodges to determine the quantity and grade of the lode material should be based entirely on the results of the surface testing and the preliminary testing at depth.

CONCLUSIONS

Prospecting operations by Mr. Farquhar and his parties have revealed a zone in which an oxidised iron formation crops out in about 10 places. Pyrite is present in some of the outcrops.

The zone has a general north-easterly strike and extends for at least 1.5 miles to the south-west from the Keith River. Mr. Farquhar considers the zone to be 15 chains wide in places, but the oxidised iron formation has not been proved continuously across that width.

Minerals present in the oxidised iron formation include limonite, hematite, magnetite, pyrite and quartz. The primary ore below the oxidised zone will probably consist of pyrite, hematite, magnetite and quartz, but no estimate can be made of the proportions of each mineral present.

A programme of testing has been suggested and it includes three stages, namely

- 1) Determination of the geological structure and the obtaining of as much information as possible about the outcrops of the oxidised iron formation and the number, distribution and dimensions of lode formations that they may represent
- 2) Drilling of five to ten holes to obtain preliminary information about the minerals present in the lode formations in the primary zone
- 3) Testing by drilling of the amount and grade of the lode formations or any parts of them containing material of possible economic importance.

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30/3/70.

*Note Random samples taken from outcrop at approx. Sample 7 position Hobart Labs. Samples were taken from 5' apex.*

P.B. NYE

	ppm	ppm
Zn	31	37
Pb	3950	50
Cu	94	84

AMENDMENTS

to

REPORT ON MINERAL PROSPECT ON SPECIAL PROSPECTING LICENCE 56ARTHUR RIVER REGION, NORTH-WESTERN TASMANIA.

by P.B. Nye.

Page 1.LOCATION

Second paragraph, last sentence should now read as follows:

"The extreme north-eastern part of the Licence is situated on the north-eastern side of the Arthur River. "

ACCESS

Second last line. Please hyphenate "bull-dozed".

Page 2.PREVIOUS LITERATURE

Third and second last lines.

Please alter in both cases "reports" to read "report".

GEOLOGY

Second paragraph, fourth line.

Please alter Pyroxenite to a small "p", pyroxenite.

Third paragraph, fourth line.

Please alter "phyllitu" to read "phyllitic".

Page 3.GEOLOGY

First paragraph, second line.

Please alter "schistositg" to read "schistosity".

THE MINERAL PROSPECT

First paragraph, eighth line.

Please alter "states" to read "stated".

Page 4.Sample Areas Nos. 5 & 4

Second last line.

Please alter "magnetite/pyrite" to read "magnetite & pyrite".

Sample Area No. 1

First paragraph, third line.

Please alter to read "& the No. 1 Sample site,"

Second paragraph, first line.

Please alter to read "At the No. 1 sample site,"

--oOo--

ALTERATION TO THE MAP OF S.P.L. 56

On the northern section of the map, there is a line running diagonally from S.W. to N.E. The colour differs on each side of this line.

Please mark in the word "fault" on the bottom left hand corner of this line.

Report on the New Victory mine and  
the adjacent magnesite-dolomite body,  
Arthur River district, north-western Tasmania

P.B. Nye

June, 1970

Mineral Holdings Aust. Pty Ltd

REPORT ON THE NEW VICTORY MINE AND  
THE ADJACENT MAGNESITE-DOLOMITE BODY,

ARTHUR RIVER DISTRICT, NORTH-WESTERN TASMANIA

INTRODUCTION

Some copper ore was found at this mine about 1900 and three short adits were the only mining work done. The body of copper ore was very small.

Dolomite was found on the western side of the copper formation and was stated to be 50 to 60 feet wide, but that further north, the belt was many hundreds of feet wide. In 1925, the dolomite belt was found to contain magnesite in addition to dolomite.

There has not been any production from the mine or from the belt of dolomite and magnesite.

LOCATION

The New Victory mine is situated on the eastern bank of the Arthur River in north-western Tasmania. It is about 25 miles by air-line from the town and port of Burnie on the north-western coast.

ACCESS

Access is gained by road from Burnie or Wynyard. From Burnie, the route leaves the Burnie-Wynyard road a few miles west from Burnie, and is along the Waratah road. A few miles south of the township of Yolla, the route leaves the Waratah road and is along the road to Takone and West Takone. The roads are bitumen to near Takone, and then macadam to within four miles of the Arthur River. The last four miles were made and metalled by Mr. B.A. Farquhar.

The road passes close to the New Victory mine and reaches a bridge on the Arthur River about 20 chains south of the mine.

MINING TENEMENT

The mine workings are situated near the northern boundary of S.P.L. 56 of 25 square miles in the name of B.A. Farquhar. The S.P.L. has been purchased by Mineral Holdings Australia Pty. Ltd. and Tomic Exploration Pty. Ltd. with managing rights to the latter.

PREVIOUS LITERATURE

Previous reports that referred to the mine and/or its vicinity are -

Montgomery, A. 1986. Mineral Fields of the Gawler River, Penguin, Deal Range, Mt. Housetop, Table Cape, Cam River and portion of the Arthur River District, Ann. Dept. Sec. Mines Tas. for 1895-96.

Waller, G.A., 1902. Recent discovery of Cannel Coal in the Parish of Preolenna and upon the New Victory Copper Mine near the Arthur River. Ann. Dept. Sec. Mines Tas. for 1901-2.

PREVIOUS LITERATURE (Cont.)

Nye, P.B., 1925. Geological Report on Upper Portion of the Arthur River Hydro-electric Water Conversation Scheme. April, 1925, Dept. Mines Tas. (typewritten).

Nye, P.B., Dolomite and Magnesite Deposit near the Victory Mine, Arthur River, 14th April, 1925. Dept. Mines Tas. (typewritten).

McNeil, R.D., 1961. Geological Reconnaissance of the Arthur River Area, Tas. Dept. Mines Tech. Dept. No. 5 (for 1960).

GEOLOGY (See Plate 1.)

The oldest rocks in the area are the Keith Beds of Pre-Cambrian age. Upstream from the mine, these Beds consist of mica and quartz-mica schists.

At the mine and to the west of the schists, a narrow belt of dolomite occurs. On the western side of the dolomite, there is a body of pyroxenite.

To the west, the Pre-Cambrian rocks and the pyroxenite are in faulted relation with Permian sedimentary rocks, the fault trending north-easterly, and the Permian rocks being on the downthrown side and to the north-west of the fault. To the north-east and east of the mine the Permian rocks rest unconformably on the Keith Beds and the magnesite-dolomite body.

At the mine, the belt of white crystalline dolomite is about 50 feet wide, but in the small creeks to the north, the body is hundreds of feet wide and contains magnesite as well as dolomite. At the mine there is dolomitized pyroxenite, and the origin of the crystalline dolomite would appear to be by alteration of the pyroxenite by mineralising solutions as at the Magnet mine, some 16 miles to the south, and at other places in Western Tasmania. At the Magnet mine, an ultrabasic rock was altered by mineralising solutions and white crystalline ankerite (ferriferous dolomite) formed, while manganese-siderite accompanied the ore as a gangue mineral, the ankerite being later than the ore.

Detailed geological mapping has not been carried out to prove if the body of dolomite and magnesite in the creeks to the north, is an extension of the dolomite at the mine, but they are probably parts of one and the same body. The larger amount of dolomite and magnesite in comparison with a small amount of mineralisation raises difficulties as to the origin of the magnesite-dolomite body by mineralising solutions and alteration of pyroxenite. However, such an origin seems to be the most likely one, and is accepted until a detailed geological survey is made and determines the origin.

NEW VICTORY COPPER DEPOSIT (See Plate 2)

This deposit had apparently not been discovered when A. Montgomery in 1896, visited the Arthur River district because he did not report on it. It must have been discovered not long afterwards, because by 1902 when G.A. Waller visited it, three adits had been driven. The workings were open and available for examination when Waller visited the mine but closed when the writer was in the area in 1925, so that most of the information about the rocks and formations in the workings has to be taken from Waller's report. The attached sketch plan (Plate 2) is based on Waller's report and shows the different features referred to, by him.

NEW VICTORY COPPER DEPOSIT (Cont.)

One adit was driven on the copper formation, and though the direction was not reported, it is assumed that it was at 30°, the strike of the dolomite. It was driven at the contact between dolomite on the west and schists on the east. The length of the copper body was very short and all the ore was removed in the entrance to the adit. At this point, the rocks to the east of the dolomite were very broken and the adit was driven in them for 30 feet rather than in the harder dolomite. The adit was then turned to the west as a crosscut, and entered the dolomite and cut seams of crystalline hematite. Seams of hematite had been associated with the formation at the entrance to the adit. Instead of following the hematite, the crosscut was continued across the dolomite, and a drive was put in to the north-north-east along a vugh. It is probable that the hematite was not followed because there were no copper minerals with it, but, nevertheless, it represented the formation and should have been followed. No other attempt even on the surface appears to have been made at that time to locate the copper formation to the north-north-east of the adit.

Waller reported that the schists to the east of the formation were heavily charged with minerals, and that some large gossan formations occurred at the surface but had not been tested.

About 5 to 7 chains north-north-west from the adit a mineralised formation has been exposed recently in a cutting made by a bull-dozer. It is a limonitic formation and may contain some weathered dolomite but no copper minerals are visible. The schists to the east are stained greenish and some contain pyrite and are veined with quartz containing a pale sulphide resembling arsenopyrite but which may be pyrite. This formation could be on the line of the Victory formation or be a parallel one a short distance to the east. A sample was taken and assayed but did not reveal any gold content.

About 2 chains north-east of the bridge over the Arthur River, the road cutting exposes a formation in graphitic schists. The formation contains quartz veins and a little pyrite and has a green staining. It is parallel, or sub-parallel, to the Victory formation.

Although little or no work was done, apart from the adit, to trace the Victory copper formation, it is not surprising because the formation was present over such a short distance, and there was little incentive for further search. The hematite, if it continued, would have greatly facilitated the search.

The formation discovered about 5 to 7 chains north of the adit may be the continuation of the Victory formation (or a closely spaced parallel one), but as it does not contain any minerals or metals of economic importance, it rather reduces the incentive to search for the Victory formation. Any such search should have a very low order of priority.

According to Waller, the pyroxenite immediately west of the dolomite at the Victory mine, was very decomposed and consisted of kaolin and clayey matter with much oxide of iron and a white powdery substance thought to be amorphous silica. The pyroxenite was in places heavily charged with pyrite, and Waller referred to a lode about 14 feet in width consisting of bands of pyrite and country rock. It was reported to Waller that assays of samples of the pyrite gave results up to 12 dwt. of gold per ton, but an assay of Waller's sample gave only a trace of gold.

NEW VICTORY COPPER DEPOSIT (Cont.)

Two adits were driven from the west through the decomposed pyroxenite to test the pyrite formation but neither was driven far enough to achieve this. The lode appears to have no economic importance. Even if it continued to the north-north-east, it would soon be cut off by the large fault. Testing is not recommended.

THE MAGNESITE-DOLOMITE BODY (See Plate 1)

In 1896, A. Montgomery crossed the Campbell Range from the junction of Grays Creek and Arthur River to the Campbell Hydraulic Co's. gold workings further downstream, and was informed by A. McQuiggan that large outcrops of limestone occurred not far from the track. This limestone may have been the magnesite-dolomite body.

In <sup>1962</sup>1892, G.A. Waller visited the New Victory mine and reported that the most striking feature of the mine was a massive belt of white crystalline dolomite striking about 30° east of north. He reported that at the mine, the belt was 50 or 60 feet thick, but that half a mile to the north, the belt widened out to a body many hundreds of feet thick. He referred to associations of dolomite with basic and ultrabasic rocks in other parts of western Tasmania and particularly as a gangue in mineral deposits in that region.

In 1925, the writer examined the dolomite body as part of the geological examination of the upper portion of a proposed Arthur River hydro-electric scheme. It was found that the body contained two types of material which analyses proved to be dolomite and magnesite.

R.D. McNeil made a survey of the Arthur River area in 1960, but reported that the dolomite was not seen by him.

The following information and statements are based mainly upon my 1925 reports, but some information (geological) was obtained from McNeil's 1961 report, and some (topographical) from the Forestry Commission Sheet of Trowutta and some road information from Mr. A.B. Farquhar. A recent examination of the deposit was not made by the writer.

The main body of dolomite and magnesite occurs in a system of small creeks to the north-east of the Victory mine. The main creek enters Arthur River several chains downstream from the Victory mine. The creek has three main branches and the magnesite-dolomite body is present in the middle and south-eastern branches which have general west-south-westerly courses.

The north-western boundary of the body is the large fault mapped by McNeil and which down-faulted Permian rocks against the magnesite-dolomite body. On its north-eastern and eastern sides, the body is overlain by Permian rocks and would continue beneath these rocks. On the southern side, the body is probably in contact with schists, as is the case at the Victory mine.

The maximum possible extent of the body is shown on plate 1 but the limits at the surface are only approximate and should not be used in any estimates. A detailed geological survey should be made to determine the extent and other factors associated with the body.

The body crops out in the eastern branches of the creek as huge irregular masses with tortuous passages, caverns and caves. If the body is connected with that at the mine, it should extend in depth and possibly more or less vertically.

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THE MAGNESITE-DOLOMITE BODY (Cont.)

As already stated above, the body contains both dolomite and magnesite. The presence of these minerals was proved by the analyses of seven "grab" samples taken in 1925, the results of which are shown in Appendix I. The dolomite is a coarsely crystalline type, the crystals being pure white and clear with a pearly lustre. The magnesite is a dense, fine-grained, chert-like type which has a considerable variation in appearance. A brief, general survey of the body suggested that the magnesite appeared to be more abundant than the dolomite.

The analyses of four pieces of dolomite showed that the dolomite content ranged from 84.95 to 93.57% and the impurities from 6.96 to 15.54%. The analyses of three pieces of magnesite showed that the magnesite content ranged from 94.48 to 96.70% and the impurities from 2.44 to 5.40%. The magnesite appears therefore to contain less impurities than the dolomite. The impurities in both were silica, ferric oxide and alumina, but pyrite was present in one of the dolomite samples.

In order to determine the commercial importance of the magnesite-dolomite body, a detailed geological survey and sampling campaign would be necessary. In this connection, the following is an extract from the writer's 1925 report.

"In the first place, if either or both of these minerals were required separately, it would be necessary to ascertain their distribution in the deposit. As a result of a general survey, it would appear, however, that large bodies of the magnesite occur with little or no associated dolomite. If a mixed product could be satisfactorily used this factor would not be so important.

Secondly, sulphides might be present in sufficient quantity to affect the utilization of the material. "

The latest available statistics of Australian production, imports and exports are given in Appendix II. The annual production of magnesite is slightly more than 23,000 tons most of which comes from New South Wales. Imports of calcined magnesite are about 24,000 tons; and exports of magnesite are about 2000 tons. The annual mine production of dolomite in Australia is about 300,000 tons.

Magnesite is used mainly for refractory purposes. In the 1940's, it began to be used for the production of metallic magnesium. The only magnesium produced in Australia was during World War II and magnesite was used as the raw material. A detailed investigation would be needed to ascertain to what extent magnesite is at present used for the production of magnesium throughout the world.

Dolomite is used for similar purposes to magnesite. It is more plentiful and cheaper and has thus had, in the past, preference over magnesite. Similarly to magnesite, its use for the production of magnesium began in the 1940's, but as stated above an inquiry would be necessary to determine the position at present. In the early 1930's, a private investigator in Hobart conducted laboratory tests to produce metallic magnesium from Smithton dolomite; but at that time Australia consumed very little magnesium, and though a Commonwealth investigation of the proposal was made, no industry was established.

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THE MAGNESITE-DOLOMITE BODY (Cont.)

It has been stated above that an investigation would be necessary to determine the extent to which magnesite is at present being used in the production of metallic magnesium. Such an investigation will be made as soon as possible; but in the meantime, quotations from two Reviews will be given below as they deal with the amount of world production and the raw materials that will be used in contemplated additional production. The Reviews are the publication Australian Mineral Industry issued by the Commonwealth Bureau of Mineral Resources.

1967 Review Magnesium Overseas Review.

The world output of 204,591 tons in 1967 was approximately 15 percent higher than in 1966. The major producers were the United States, 97,406 tons; Communist countries 46,000 tons; Norway 34,700 tons. Dow officials forecast a growth rate for magnesium of 5 to 7 percent annually over the next five years; major areas of future growth are expected to be in chemical and metallurgical uses and in applications for dye castings.

1968 Review Magnesium Overseas Review.

The world output of primary magnesium was 206,000 tons, slightly higher than in 1967. Throughout the world, magnesium was in short supply, mainly as a result of the growth in consumption of aluminium alloys, the manufacture of which accounts for about 40 percent of the total usage of magnesium.

In the United States, major producers plan to increase the capacity of primary magnesium plants by 105,000 tons annually in the next few years. National Lead Co. plans to extract magnesium from the brines of Great Salt Lake in Utah, and its plant will have an annual capacity of 45,000 tons; production should commence towards the end of 1971. Dow Chemical Co. is expanding its magnesium plant at Freeport, Texas by 30,000 tons from its present level of 95,000 tons. The American Magnesium Co. has started construction of a 30,000 tons per year plant in Texas and initial production of 10,000 tons per year should commence in 1969; local brines are to be used as the raw material base.

Future growth areas for magnesium are in the automotive industry as dycasting, in the communications industry as batteries, and in powder metallurgy. "

It will be seen from the 1968 Review that the raw materials to be used for additional production in the United States were brines.

It was stated above that magnesite was used largely for refractory purposes. Actually, magnesite itself has little commercial use, but is used mainly for its content of magnesia or magnesium oxide (MgO). The magnesite is heated to drive off the carbon dioxide and leave the magnesia. By heating to about 650° C, most of the carbon dioxide is driven off, and caustic magnesite formed. This product is used in many industries, the main use being in the manufacture of Sorrell or Sorel cement which itself is used in many manufacturing industries.

By heating magnesite to between 1500° and 1800° C, all the carbon dioxide is driven off and dead-burned magnesite is formed. Dead-burned magnesite is used for refractory purposes and should contain a minimum of 87 percent of magnesia and be as free as possible from volatile metallic impurities.

THE MAGNESITE-DOLOMITE BODY (Cont.)

One specification for magnesium production prescribes a maximum total of silica (SiO<sub>2</sub>) and lime (CaO) of 1.5 percent in the crude magnesite.

The uses of dolomite depend mainly on its magnesia (MgO) content and are similar to those of magnesite. Dead-burned dolomite is obtained by calcining dolomite at 1500°C and is used extensively for refractory purposes in furnaces and converters. Specifications for dolomite for refractory purposes are that the dolomite should contain not more than 1 percent silica (SiO<sub>2</sub>), 1.5 percent combined alumina (Al<sub>2</sub>O<sub>3</sub>) and ferric oxide (Fe<sub>2</sub>O<sub>3</sub>), and at least 38 to 40 percent of magnesium carbonate (MgCO<sub>3</sub>).

Existing analyses of magnesite and dolomite quoted in this report are from small, and not representative samples. The use of them to determine the quality of the magnesite and dolomite would be of no practical importance. Determination of the quality of the two minerals will have to await the taking of large and representative samples of the two minerals in the body.

The body occurs in the basin of a creek system with three branches, and crops out in the form of irregular crags separated by passages (solution channels). The body could be mined by open cut to shallow depths at least, but the actual depth to which it could be mined by open cut could be determined only after a detailed geological and topographical survey of the outcropping body and the surrounding parts of the basin of the creek.

Two of the branches of the creek cross the outcropping body and one of them (the middle branch) flows underground for the whole of the distance across the body. Water will present difficulties in the mining of the body. In the first place, the water from at least the middle and eastern branches will have to be collected and conducted by channels around the body and any open cut that is developed. In the second place, the body will contain large quantities of water and adequate pumping plant will have to be provided to keep the open cut free from water.

CONCLUSIONS AND RECOMMENDATIONS

Victory Mine. The size of the body of copper ore must have been very small (probably only a few feet in length and depth) because Waller reported that all the ore was removed in the entrance to the adit. No more ore was found in the adit workings although they were not satisfactorily sited to test more than a short length of the continuation of the formation. A formation has been found recently about 5 to 7 chains north-north-east of the adit and apparently on the line of that in the adit, but it does not contain any visible copper minerals.

There is no incentive to carry out further prospecting on the formation, and further work is not recommended.

Magnesite-Dolomite Body. This body is situated in a system of creeks to the north-east of the Victory mine. It probably represents the continuation of the dolomite in the Victory mine but is much wider than the 50 feet at the mine. The body contains both dolomite and magnesite; the magnesite appearing to be more abundant than the dolomite. The actual distribution of the two minerals in the body is not known, although it would appear that in some parts of it, magnesite occurs with little or no dolomite; this statement is based solely on a visual inspection of outcropping parts of the body.

CONCLUSIONS AND RECOMMENDATIONS (Cont.)

Magnesite-Dolomite Body (Cont.)

No detailed surveys, testing by trenches, etc., and representative and systematic sampling have been conducted, and until they have been done, the commercial importance of the body cannot be determined.

It is recommended that the following work should be carried out:

1. A detailed topographical and geological survey of the body. This would determine the extent of the body at the surface, and help to determine its dip or attitude, and the distribution of magnesite and dolomite within the body.
2. A systematic and representative sampling and assaying campaign to assist, if necessary, in determining the distribution of the two minerals, and also to determine the actual contents of the body and of separate parts of it.
3. After (1) & (2) had been completed, a detailed investigation by geologists, mining engineers and metallurgists to determine (a) whether magnesite and dolomite could be mined separately from the body or (b) whether the whole or parts of the body would have to be mined and treated to separate the two minerals (c) any possible method of separating the two minerals (d) whether the appropriate operations could be carried out economically.
4. If the investigations under (3) proved that the whole or part of the body could be mined, and, if necessary, the two minerals separated, it would be advisable to decide for what uses the two minerals would be suitable, and to have tests made to produce products such as dead-burned magnesite, etc., and to determine the quality of those products.

*P.B. Nye*  
P.B. NYE.

Melbourne  
29th June, 1970.

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APPENDIX IANALYSES OF GRAB SAMPLES OF DOLOMITE AND MAGNESITE

(Analyses made in Mines Department Laboratory, Launceston,  
Tasmania, 1925).

All determinations are expressed as percentages

Constituent	Sample Numbers						
	1	2	3	4	5	6	7
Silica (SiO <sub>2</sub> )	3.08	6.04	6.96	3.40	3.40	0.16	0.36
Ferric oxide (Fe <sub>2</sub> O <sub>3</sub> )	3.00	0.80	4.57	3.57	1.57	Trace	1.43
Alumina (Al <sub>2</sub> O <sub>3</sub> )	0.88	1.10	0.32	0.20	0.43	2.28	1.37
Lime (CaO)	30.50	26.80	25.75	28.20	0.90	1.25	0.88
Magnesia (MgO)	20.27	19.15	20.60	20.60	45.48	47.58	46.30
Carbonate (CO <sub>2</sub> )	42.80	39.00	41.80	44.16	49.00	48.60	50.40
Iron sulphide (FeS <sub>2</sub> )	-	7.60	Trace	Trace	-	-	-
	100.53	100.49	100.00	100.13	100.78	99.87	100.74

MgO → MgCO<sub>3</sub>  
× 209.5.

APPENDIX II

	YEARS		QUARTERS ENDING			
	1967	1968	1968 Dec.	1969 March	1969 June	1969 Sept.
<u>MAGNESITE</u>						
<u>PRODUCTION</u>						
Mine production ton	23,653	23,146	6,606	4,461	6,300	6,536
New South Wales "	22,207	22,661	6,596	4,461	6,300	6,463
South Australia "	188	319	-	-	-	73
Western Australia "	1,258	166	11	-	-	-
Value, ex-mine \$'000	256	229				
<u>IMPORTS</u>						
Magnesite calcined, dead burned ton	23,657	24,308	455	1,084	6,747	2,104
Value \$'000	1,241	1,260	29	83	283	93
Magnesite, calcined, other ton	168	141	20	26	27	41
Value \$'000	47	61	8	7	10	17
Magnesite, other ton	3	2	1	-	-	-
Value \$'000	1	1	-	-	-	-
<u>EXPORTS</u>						
Magnesite ton	2,185	1,571	720	547	432	391
Value \$'000	163	126	62	46	37	38
<u>DOLOMITE</u>						
Mine production ton	290,659	312,853	72,949	70,532	60,600	77,000
Queensland "	9,344	3,865				
New South Wales "	8,237	7,822				
Tasmania "	2,143	2,534				
South Australia "	270,935	298,632				
Western Australia "	-	-				
Value ex mine \$'000	674	727				



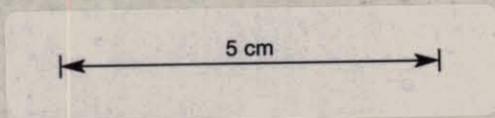
### SKETCH PLAN.

(TOPOGRAPHY BASED ON FORESTRY COMMISSION SHEET TROWUTTA)

(ROAD BY MR FAROUHAR (INDIAN))

(GEOLOGY FROM REPORTS BY McNEIL (1961) AND NYE (1925))

- PERMIAN SEDIMENTS
- MAGNESITE - DOLOMITE BODY.
- PYROXENITE
- PRE-CAMBRIAN (SCHISTS, ETC)
- PROSPECTS
- VICTORY MINE
- GEOLOGICAL BOUNDARIES
- FAULT



### SCALE

1 INCH = 30 CHAINS

*APNye*  
29/6/70

LYONITIC  
FORMATION  
SCHISTS WITH  
QUARTZ VEINS  
WITH SULPHIDE  
(PROBABLY PYRITE)

MAGNETIC  
NORTH

ARTHUR  
RIVER.

(POSITIONS OF  
THESE ADITS  
VERY APPROXIMATE)

ADIT

ADIT PYROXENITE  
(VERY DECOMPOSED)

PYRITE LODE

DOLOMITE

CROSS CUT

DRIVE ALONG VUGH

HEMATITE

QUARTZ MICA SCHISTS

ADIT  
COPPER  
FORMATION

→ 25° to 40°

SKETCH PLAN ONLY

ALL POSITIONS APPROXIMATE  
ADOPTED MAINLY FROM WALLER (1902)  
SCALE . ABOUT 1 INCH TO 40 FEET.

LEGEND . AS FOR PLATE 1.

5 cm

pschlye  
29/6/70.

Report on S.P.L. 56 in the name of  
B.A. Farquhar, vicinity of Arthur River  
north-western Tasmania

T.D. Hughes

June, 1970

Tomic Exploration Pty Ltd  
Mineral Holdings Aust. Pty Ltd

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REPORT ON S.P.L. 56 IN THE NAME OF B.A. FARQUHAR, VICINITY OF ARTHUR RIVER  
NORTH WESTERN TASMANIA.

This Report has been prepared for **TOMIC EXPLORATION** and  
**MINERAL HOLDINGS AUSTRALIA.**

INTRODUCTION.

On 31st. May 1970, I visited portion of this S.P.L. in company with Mr. W. Manson. The purpose of this visit was to examine certain iron ore occurrences in the vicinity of the Keith River. This area has been dealt with in detail in a report by P.B.Nye on 30/3/70. Since that time, some tracks have been cut by bulldozer, but little in the way of outcrop has been exposed.

Of the eight locations mentioned in the above report, it is recommended that, initially, only that at No. 7 be investigated. If this should prove favourable, then others may be further tested. Apart from the cutting of the country rock, which shows outcrop in some of the tracks, the only new evidence is revealed at Area 1. At Area 6., a good section of 17 feet depth can be seen in a small cliff.

Samples, on this visit, were taken only at Areas 6 and 7.

THE IRON DEPOSITS

It would appear, from the limited outcrop, that there are two or possibly three varieties of iron ore in this district.

1. A series of north-east trending lodes containing pyrite and magnetite; and, at the surface, oxidising to hematite and limonite. These appear to vary in width from five to fifteen feet and are too narrow to consider, by themselves, as an economic source of iron ore.

2. Favourable beds, mainly siltstones in the Precambrian sequence containing disseminated iron oxide, which becomes enriched near the surface to give the impression of larger iron ore bodies. Although larger in area than type 1., the iron mineralization at depth would probably be too sparse to give a sensible iron content.

3. At areas 7. and 7A. are more extensive occurrences. Here the ground is covered with red earth containing floaters of high grade iron oxide. Because of lack of outcrop, it is not possible to determine the type of iron ore, but, because of the surface dimensions, it is worth further investigation.

A brief description of the various localities, as listed by Nye, is as follows, starting from the Southern end.

1. A bulldozer cut has revealed a small face of siltstone containing a pyrite formation, 6 inches wide, in a shear zone, which strikes to the north-east and dips north-westerly at 70 degrees. On the hanging wall of this, is a limonite-magnetite formation, several feet in width. The pyrite is partly oxidised to limonite in the top two feet.

2. On top of a small hill on the track is a hematite-limonite zone with a little magnetite, five to fifteen feet in width in soft siltstone. This again strikes North-east and is probably, below the surface, similar to Number 1.

3. Between 2. and 4., but east of the track are two (and possibly more ) small outcrops containing iron. The more southerly,

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of hematite and limonite in soft siltstone, corresponds to 1. and 2. and may even be a continuation of the mineralised shear at 2. ; but the other is more like the larger outcrop at 6. of siltstone impregnated with iron oxide.

4. and 5. are really part of the same area, which before was considered the most promising. True, very good specimens of magnetite and hematite with some pyrite can be obtained on the surface and the occurrence extends over several hundred feet. However the iron is not continuous and the specimens come from small lodes similar to that seen at locality 1.

6. Here may be seen the best outcrop yet; a small cliff, 17 feet in height, just to the west of the track. Siltstone impregnated with iron oxide is enriched near the surface. The iron is probably associated with a north east trending zone but the spread of iron mineralization is probably larger and sparser than in the type shown in area 1. The iron mineralization may be traced several hundred feet to the south-west. Samples taken across the face from the surface down to indicate the surface enrichment and the diminution of values at depth showed :-

Feet from Surface	% HCl Sol. Fe
0' to 9'	52.7
9' to 11'9"	39.0
11'9" to 17'	23.9

7. An area of about 500 feet by 500 feet is covered by red iron soil containing floaters of hematite. One or two small outcrops of hematite occur on the hillside. The soil itself is largely iron oxide and samples taken showed

Red Soil	45.2% HCl Sol. Fe
Chip Samples	56.5%

It is not known if the red soil is continuous over the whole area and, even if it is, if the hematite is continuous beneath the red soil. Several hundred feet North and probably 300 feet lower in elevation is a second area of red soil, similar to that at 7.

Recommendations.

The principal occurrences of iron containing some high grade magnetite specimens are not considered, in themselves, of sufficient magnitude to warrant further prospecting at this time.

The red soil areas, which presumably overlie hematite, appear to be of sufficient size to justify further investigation. This could probably be done initially by bulldozer and would consist of :-

1. Clearing a track round the limits of the red soil to clarify the size of the areas.
2. Digging trenches across each area into the bedrock so that channel samples could be taken.
3. If the results of 1. and 2. proved favourable, then a drilling program could be carried out.

However, because of the inaccessability of the area, the nature of the terrain and the known climatic conditions of the West Coast in winter, it is not considered reasonable that any major work should be undertaken before next summer.

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OTHER PROSPECTS.

From what I know of the rock types occurring in this area covered by the S.P.L., I am not hopeful of the presence of economic deposits of base metals. However, the S.P.L. has not been thoroughly investigated to the South and it could well be that favourable host rocks of the Cambrian occur here. Pyrite will doubtless be found in many places in the S.P.L., particularly occurring in black slates.

Some attempts have been made in the past in this general locality to obtain alluvial gold, but have met with indifferent success.

Between the Arthur and the Keith, where present logging operations are being carried out, are alluvial beds containing large wash stones. These beds should be bottomed in a few test holes and tried for alluvial metallic deposits, particularly for alluvial tin.

*Terence D. Hughes*  
CONSULTING GEOLOGIST.

5 Lambert Av.  
Sandy Bay  
Hobart

24th. June 1970.

2nd. June 1970.

S.P.L. 56

Mr. N.M. Thomas,  
Melbourne.  
Dear Neil,

As arranged with yourself and Perc Nye, consulting geologist, Mr. T.D. Hughes was engaged to inspect the clearings made across the track across the Keith river by bull-dozer and to arrange for samplings of the exposures if thought necessary. On the 31st. of May Mr. Hughes, Mr. L. Morris and myself visited the prospect together with the four prospectors, Messrs. Pinner and Goninon. Transport for the last section of the journey was arranged by dozer but as the steering controls of the dozer failed it was necessary to attempt the journey by tractor. This attempt was successful with the greatest difficulty and could have ended in tragedy as the tractor skidded down a hill partly out of control. Luckily the passengers managed to jump off the tractor without injury.

Mr. Hughes's ~~REPORT~~ will not be available until such time as assays of several samples have been made, however he has supplied the following precis to give a pre-view of his opinion of the indications of the exposures of iron minerals as a potential deposit of an iron ore of commercial interest.

" There are two or possibly three variations of iron ore at the Keith River.

1. Pyrite-magnetite lodes in shear zones which have a general N.E. strike. At the surface most of the pyrite is weathered to limonite or hematite. These lodes are not wide enough ( 5-15 ft.) and by themselves cannot be considered as economic sources of Iron ore, although high grade samples can be obtained at the surface. A good example has been exposed by bulldozer at Area No. 1.

2. Disseminated iron oxide in the country rock ( siltstone) which is enriched by re-precipitation near the surface. This may be seen in a small cliff -face at area 6 and samples were taken. The country rock itself is not of sufficient grade for an iron ore and the surface enrichment is only a few feet thick.

3. At areas 7 & 7 A are fairly extensive ( 500 ft. X 400 ft.) areas of red soil containing floaters of hematite. As the dozer has not exposed any real outcrop it is not known what is the source of the iron. Samples of the red soil and small outcrop have been taken. If these show a reasonable grade ( and it is expected that they will ) then it is recommended that more work be done here. This would consist of:

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2. to N.M.T. 2/6/70.

1. Clearing a track right around the areas and carefully measuring.
2. Digging trenches to a depth of a few feet- either by a scraper or a dozer or other means.

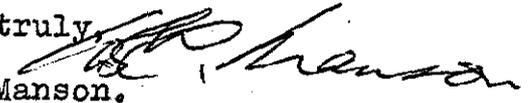
Because of weather conditions, however, it is doubtful if much useful work could be done before next summer."

N

Re. application for extension of the area adjacent to S.P.L.56 and your letter of the 26/5/70 with attached plan prepared by Perc Nye I would suggest that you advise the Director of Mines, in writing, at earliest that you propose to peg and apply for the recommended area and forward him a sketch of the proposed application. This will warn him of your interest in the area and he may give this consideration if Mr.Hood negotiates for renewal of his total area prior to expiry date which is 19/6/70.

In reference to the actual pegging I could do this but it would be a lot cheaper to get somebody in the area to do it for you. The N.E. or S.E. corners appear to be convenient for pegging. ~~It~~ It is suggested that you discuss this letter with Perc Nye before final decision of the area to be applied for. A copy of this letter has been forwarded to Perc. I intend to tell Bert Farquhar of the work undertaken recently and of Mr. Hughes' visit as it is his responsibility to supply reports to the Director of Mines.  
Enclosed your copy of chart shewing the proposed area.

yours truly

  
W.StC.Manson.



Investigation of aeromagnetic anomalies on  
S.P.L. 56 and vicinity, Arthur River district,  
north-western Tasmania

P.B. Nye

October, 1970

Mineral Holdings Aust. Pty Ltd

INVESTIGATION OF AERO-MAGNETIC ANOMALIES ON S.P.L. 56 AND  
VICINITY, ARTHUR RIVER DISTRICT,  
NORTH-WESTERN TASMANIA.

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A preliminary report to assist investigation was issued on 31st August about one of these aero-magnetic anomalies. The anomaly referred to, is situated on the Arthur River about  $1\frac{1}{2}$  miles west from the Victory mine.

A magnetic anomaly occurs where anomalous magnetic values are present. The anomalous values may be high or low compared with those over adjacent territory, but, in general, in the search for mineral deposits, it is the high anomalous values that are important and are investigated. As stated in the report of 31/8/70, such high values are caused by magnetic minerals, the most important of which are magnetite, pyrrhotite, ilmenite, etc. Such minerals occur in some mineral deposits and also in some rocks.

The results of an aero-magnetic survey are shown on a contour map of the magnetic values. This map shows the flight lines along which the survey was made, but shows no topographical details. The anomalies are shown by crowding together of the contours and the presence of numerous closed contours.

In order to facilitate the investigation of the anomalies, they are transferred to a topographical (and geological) map prepared from aerial photographs or by other methods. For the purpose of the present investigation, the anomalies have been transferred to the Forestry Commission Sheet Trowutta, as this represents the most complete and accurate topographical map available. A copy of this map will accompany this report.

A preliminary report of the 5th August described the anomalies from an earlier aero-magnetic map that was supplied. Six anomalies were referred to in that report, and the same numbers will be used in this report. The magnetic contour map revealed a seventh anomaly of no great importance, but it has been included in this report as the Seventh Anomaly.

The anomalies are listed below, with a description of the position of each. They are shown on the accompanying map.

1. First Anomaly. This corresponds in position with the iron formation on the track south of the Keith River.
2. Second Anomaly. This is situated at the northern end of the last supposed position of the old Atlas leases in the south-eastern corner of S.P.L. 56.
3. Third Anomaly is the one referred to in the preliminary report of 31st August, and situated on the Arthur River about  $1\frac{1}{2}$  miles west from the Victory mine.
4. Fourth Anomaly. On the contour plan, this appears as a sinuous or S-shaped anomaly. It is proposed to consider this anomaly as having two parts, namely A and B. The Fourth A anomaly is situated about 2 miles south-west from the First anomaly. The Fourth B anomaly is situated about 2 miles south-west from the Third anomaly.
5. Fifth Anomaly is situated about  $1\frac{1}{2}$  miles south-west from Fourth A anomaly, and is just outside the western boundary of S.P.L. 56.

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- 6. Sixth Anomaly is about 3 miles south-west from the Fourth B anomaly, and is some distance west from the western boundary of S.P.L. 56.
- 7. Seventh Anomaly is situated at the southern end of the last supposed position of the old Atlas leases in the south-eastern corner of S.P.L. 56.

As stated earlier in this report, the high anomalous values are caused by magnetic minerals in mineralised formations and in rocks. The anomalies are not intense in comparison with those obtained over bodies of magnetite such as occur at Savage River to the south-west. The lower intensity of the anomalies on S.P.L. 56 mean that

- a) the magnetic bodies, if composed mainly of magnetite or of pyrrhotite, are small ones or
- b) the magnetic bodies, if large, have only a small content of magnetite or pyrrhotite or
- c) the magnetic minerals are not as strongly magnetic as magnetite and pyrrhotite.

The only available information about the magnetic bodies at the sites of the seven anomalies is

- 1. First Anomaly. This corresponds in position with the iron formation along the track south of the Keith River. This formation contains magnetite and also the non-magnetic minerals limonite, hematite and pyrite. Moreover, according to the geological report of Mr. T.D. Hughes (24/6/70), the bodies containing magnetite are comparatively narrow (up to 15 feet). Thus the magnetite bodies are narrow, and the magnetite content of the total area containing the iron formations is relatively small.
- 2. Third Anomaly. McNeil's geological report (1960) states that an amphibolite dyke containing ilmenite occurs at the site of this anomaly. It appeared likely, therefore, that this dyke gave rise to the anomaly. A small amount of prospecting, based on the report of 31/8/70, revealed what is probably the dyke on the south side of the river, but not on the north side. However, the rock has been mineralised and the eastern side of the outcrop is very magnetic and contains much magnetite(?) and also some carbonate, quartz and pyrite. Six feet to the west, there is a mineralised formation containing carbonate, quartz, chalcopyrite and malachite. It is now considered more probable that the anomaly arises from the magnetic mineralised formation rather than from the dyke.
- 3. Nothing is known at present about the formations at the sites of the other anomalies. However, the Fourth B anomaly is on the south-westerly extension from the Third anomaly, and the Sixth anomaly is still further to the south-west. Similarly the Fourth A anomaly and the more distant Fifth anomaly are on the south-western extension from the First anomaly. However, the anomalies on the south-western extensions of both lines of anomalies are much less intense than the Third and First anomalies respectively.
- 4. No information is available about the sites of the Second and Seventh anomalies which may possibly be on a north-north-east trending line. Second anomaly may be associated with any formation on the old Atlas leases.

037

In general, it would appear that the magnetic highs on S.P.L. 56 probably arise from mineralised formations containing magnetite.

The area covered by each anomaly should be prospected in an order of priority that will be indicated at the end of this report. The prospecting should be devoted firstly, to the location of mineralised formations and or rocks containing magnetite in particular and other magnetic minerals in general. The prospecting should be devoted also to the search for mineralised formations whether associated with the magnetic formations or not.

The order of prospecting the sites of the anomalies should be as follows, excluding Sixth as outside S.P.L. 56.

1. First Anomaly.
2. Third Anomaly.
3. Fourth A Anomaly.
4. Fourth B Anomaly.
5. Fifth Anomaly.
6. Second Anomaly.
7. Seventh Anomaly.

Enlarged maps will be supplied for each area covered by the respective anomaly.

P.B. NYE.

Melbourne

8th October, 1970.

038

PRELIMINARY NOTES ON THE AERO-MAGNETIC ANOMALIES

ON S.P.L.56, ARTHUR RIVER DISTRICT, TASMANIA

The anomalies appear on a magnetic contour map based on an aero-magnetic survey with, it is stated, flight lines two miles apart.

The contours appear on a topographical map with a scale of 1 inch to 1 mile and apparently prepared from aerial photographs. The map is also a geological one.

Five anomalous area occur within S.P.L.56 or on its boundaries. These are referred to separately below.

1. The First anomaly with the steepest gradient occurs centrally in the northern part of the S.P.L. and is about 1½ miles south from the northern boundary. It has a maximum value of 5100.gammas. This anomaly agrees closely in position with the iron formation or formations found by Mr. B.A. Farquhar and being investigated by Mineral Holdings Australia and Tomic Exploration companies. The length of the anomaly (down to 4800) also agrees closely with the length of the formations as known on the surface at present. The anomaly arises from the high content of magnetite in the formations.

2. Another anomaly occurs on the eastern boundary of the S.P.L. and is centred about 2 miles north of the south-eastern corner. Its maximum value is 5000 and the gradient is not quite as steep as that of the First anomaly. Its centre is about 1 mile north of the centre of current assumed position of the old Atlas group of leases. It is tempting to assume that the search for the Atlas leases (and the formation and workings on them) should be shifted to a locality one mile to the north. This assumption has no real foundation but the possibility should not be overlooked.

There is no information available as to the formation on the Atlas leases, beyond that it was referred to as a silver-lead one.

It is not possible to state definitely what gives rise to the Second anomaly. It could arise from a formation that gives rise to the First anomaly, namely, a magnetite-pyrite one with a smaller magnetite content than the First. It could arise also from an amphibolite body (probably a dyke) containing magnetite and/or ilmenite, such as gives rise to the Third anomaly to be discussed below.

The Atlas formation would have to contain magnetite (or ilmenite) for it to be the one giving rise to the Second anomaly.

An examination of the locality corresponding to the anomaly will be necessary to determine what formation or rock gives rise to the anomaly.

3. Third anomaly. This anomaly is situated near the centre of the northern boundary of the S.P.L. This anomaly has a maximum value of 5100, but its gradient is much less steep than is that of the First anomaly.

McNeil (1960), describes two amphibolite dykes in the vicinity of the anomaly. One is situated on the Arthur River 1½ miles downstream from the old Victory mine, and the other 2½ miles downstream from the mine. The first dyke contains ilmenite and pyrite and the second dyke contains magnetite.

039

The anomaly agrees in position with the first dyke, and there is no anomaly associated with the second dyke. This is surprising because it would be expected that the magnetite-bearing dyke would give rise to a larger anomaly than the ilmenite-bearing one. If the localities of the two dykes were exchanged, the anomaly would agree in position with the second and magnetite-bearing dyke. An examination on the ground will be necessary to ascertain the formation or rock that gives rise to the anomaly.

4. Fourth anomaly. This anomaly is centrally situated in the western part of the S.P.L. Its shape is sinuous and the anomaly is within  $\frac{1}{4}$  to  $1\frac{1}{4}$  miles of the western boundary.

As for the three anomalies described above, it is shown as a "high", but its gradient is very flat and the "high" is indicated by the 5000 contour.

It is possible that this anomaly really consists of two anomalies, incorrectly joined together. If this is the case, the southern part (Fourth A) could be another high on the south-westerly extension of the line of the First anomaly and distant about two miles therefrom. The northern part is on the south-western line of extension from the Third anomaly and distant about 2 miles therefrom (centre to centre).

If the above assumption is correct, then the Fourth A anomaly could arise from a magnetite-pyrite body but with a smaller magnetite content than that giving rise to the First anomaly, or from a non-outcropping magnetite body. The Fourth B anomaly could arise from an amphibolite dyke similar to that giving rise to the Third anomaly.

In any case, but especially if the above assumption is wrong, an examination on the ground would be necessary.

5. Fifth anomaly. A high is marked on the western boundary of the S.P.L., about one mile north of the south-western corner. The high is within the 4900 contour and is really an extension of the Fourth A anomaly (within the 5000 contour). It might arise from a formation similar to that giving rise to Fourth A anomaly, perhaps with a smaller magnetite content or at greater depth.

6. Sixth Anomaly. Outside the S.P.L. and about  $2\frac{1}{2}$  miles north-westerly from the south-west corner of the S.P.L., there is a small high in what is probably the 4900 contour. It is on the south-western extension of the line from the Third to the Fourth B anomaly, but does not necessarily arise from a continuation of the same formation dyke. The trend of this anomaly is east-west and so is probably not caused by a north-westerly striking formation as are the other two anomalies.

CONCLUSIONS

There are five anomalies within, or on the boundary of the S.P.L. The Second anomaly has a northerly trend, but the other four have north-easterly trends. First, Second and Third are the most intense anomalies.

Conclusions (Cont.)

The First anomaly agrees in plan position with the magnetite-pyrite formation found by Farquhar. Fourth A and Fifth anomalies occur to the south-west of the First anomaly and on the same general north-easterly trending line.

The Third anomaly probably corresponds to an amphibolite dyke. The Fourth B anomaly is situated to the south-west and is on the same general line.

The Second anomaly has, as stated above, a different trend from the others, and may have arisen from a different type of formation than a magnetite body or a dyke. It could possibly have arisen from the mineral formation present on the Atlas leases, the nature of which is not known. A search in the vicinity of the anomaly may enable the Atlas leases and workings to be found.

Apart from the First anomaly, the regions of the anomalies should be searched to ascertain what gave rise to the anomalies, that is, whether a mineral formation, an amphibolite dyke, or other formation or dyke or rock.

*P.B. Nye*  
P.B. NYE.

PRELIMINARY INVESTIGATION OF AERO-MAGNETIC ANOMALY  
ON ARTHUR RIVER, S.P.L. 56, TASMANIA

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The maps and plans showing the anomalies obtained by aeromagnetic surveys over the country on, and adjacent to, S.P.L. 56 have been made available to Mineral Holdings Australia and Tomic Exploration.

The anomalies on S.P.L. 56 have been considered in a preliminary way and subsequently a report and map dealing with them will be prepared. In the meantime, it may be possible to examine the site of one anomaly (high) on the Arthur River.

As will be seen from the attached map (2 copies attached), the anomaly is situated on a bend of the Arthur River about  $1\frac{1}{2}$  miles west from the Victory mine. The strike of the axis of the anomaly is north-north-easterly and the axis extends in both directions from the bend in the river.

A high magnetic anomaly is caused by magnetic minerals, (magnetite, pyrrhotite, ilmenite, etc.) either in mineralised formations or in rocks.

The intensity of this anomaly is not great, and any magnetite formation causing it would either be a small one or would not contain much magnetite. The anomaly is more likely to have arisen from a rock containing a disseminated magnetic mineral.

Mapping by McNeil in 1960 shows an amphibolite dyke along the stretch of the river northerly from the bend over which the anomaly extends. As mapped, the dyke is at a small angle to the axis of the anomaly. This amphibolite is described as "Medium to fine-grained, somewhat sheared, greenish, grey rock with disseminated pyrites. The specimen sparkles with the cleavage faces of innumerable felspar crystals. Lamination is shown by acicular hornblende and elongated opaque white grains. In thin section xxx ilmenite is fairly common, but there is much more opaque white leucoxene in irregular, elongated grains, and brown limonite xxx. Much of the green hornblende xxx has been altered to fine granular carbonate."

Ilmenite is a magnetic mineral but not so strongly magnetic as magnetite. This ilmenite-bearing amphibolite could have given rise to the anomaly.

Another, and parallel, amphibolite dyke is shown in a bend about 1 mile downstream from the first dyke. It is described as follows:

"The specimen is a fine to medium grained, greenish, granular rock with strong shearing. Elongated aggregates of hornblende, felspar and epidote are visible in hand specimen together with occasional octohedra of magnetite".

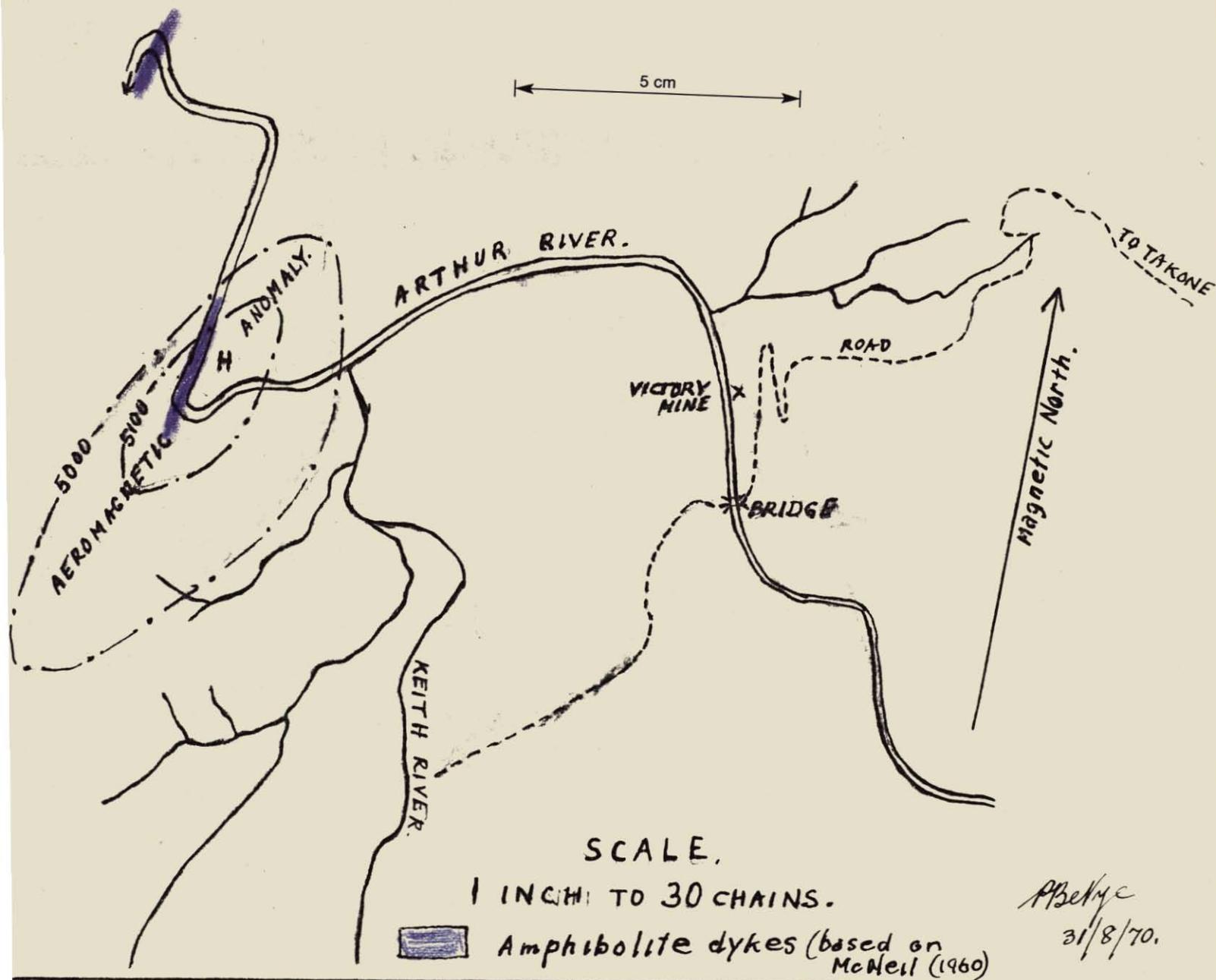
As this dyke contains magnetite, it might be expected that there would be an anomaly over it, but such is not the case.

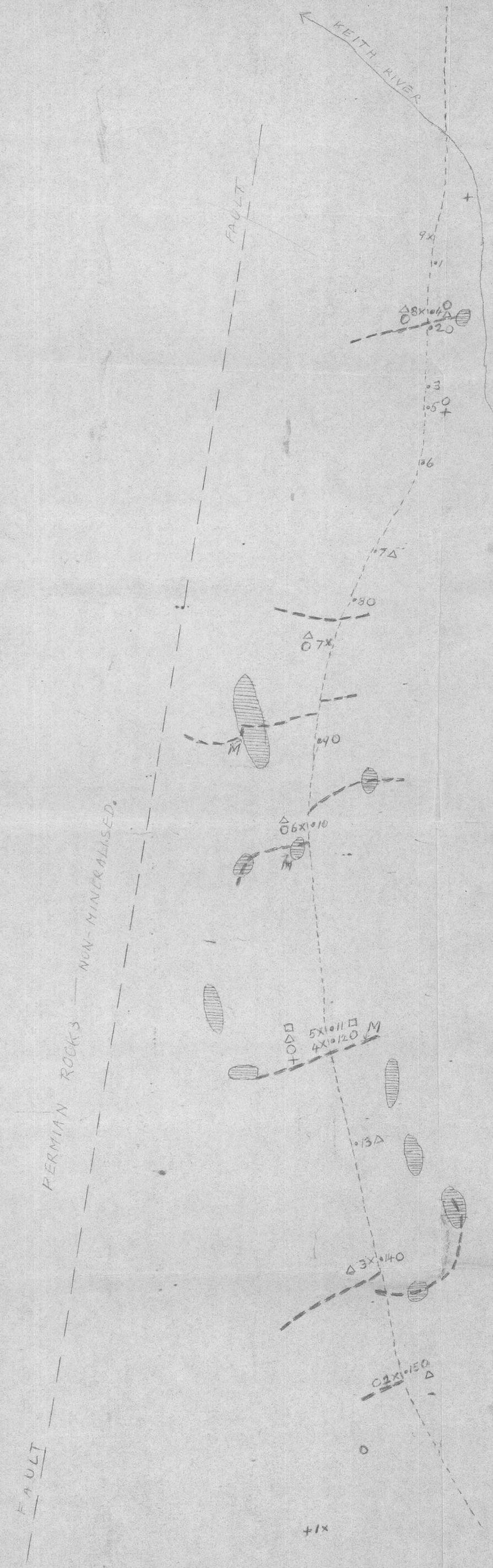
QA  
Suggested prospecting would include a search of the area over which the anomaly extends, to

- 1) locate and obtain specimens from the two dykes.
- 2) ascertain if there are any magnetite formations within the area.
- 3) obtain specimens of any other magnetic rocks or minerals within the area.
- 4) mark on the map, any discoveries made during the search.
- 5) correct positions of dykes, if necessary.

31/8/70

*ABN.*  
P.B. NYE.

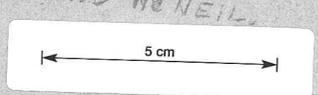




SKETCH PLAN  
S.P.L. 56  
ARTHUR RIVER  
NORTH WEST TASMANIA

- TRACK -----
- FAULT - - - - -
- TRENCH - - - - -
- OUTCROPS OF IRON FORMATION - - - - -
- SAMPLE AREAS (BY FARQUHAR) - - - - - 7x (marked to west of track)
- SPECIMEN AREAS (BY THOMAS & LIGHTFOOT) - - - - - 14 (marked to east of track)
- MINERALS IN SAMPLE AND SPECIMEN AREAS
  - LIMONITE - - - - - Δ
  - HEMATITE - - - - - ○
  - MAGNETITE - - - - - □
  - PYRITE - - - - - +
  - MAGNETIC - - - - - M Identification by K PINNER

NOTE. TRACK WAS MARKED BY MR. B.A. FARQUHAR ON FORESTRY COMMISSION SHEET TRONVUTTA, AND WAS ENLARGED TO PRODUCE THIS CHART. SAMPLE AREAS WERE MARKED FROM INFORMATION OBTAINED IN THE AREA. SPECIMEN AREAS ARE BASED ON INFORMATION SUPPLIED BY MR. N.M. THOMAS. TRENCHES, OUTCROPS AND MAGNETIC PLACES WERE MARKED ON A CHART BY MR. K. PINNER. THE FAULT WAS MARKED ON CHART FROM A SMALL SCALE GEOLOGICAL MAP BY MR. R.D. McNEIL.



SCALE  
1 INCH EQUALS 5 CHAINS

008012

23/5/70



RELAYSE CREEK.

ARTHUR RIVER.

VICTORY MINE (APPROX.)

BRIDGE.

TO TAKONE

LEGEND.

-  PERMIAN SEDIMENTS.
-  MAGNESITE-DOLOMITE BODY. *SEE MAXIMUM POSSIBLE EXTENT BELOW*
-  PYROXENITE.
-  PRE-CAMBRIAN (SCHISTS, ETC.).

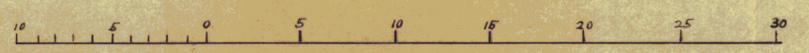
-  GEOLOGICAL BOUNDARIES.
-  FAULT.

ALL LINE WORK IN RED REPRESENTS ADDITIONS TO, OR CORRECTIONS OF, EARLIER MAPPING

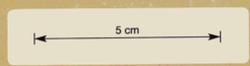
-  MAGNESITE (MAINLY).
  -  DOLOMITE (MAINLY).
  -  MAGNESITE-DOLOMITE.
- OUTCROPS*

Magnetic North.

SKETCH PLAN  
 (TOPOGRAPHY BASED ON  
 FORESTRY COMMISSION SHEET  
 TROWUTTA)  
 (GEOLOGY FROM REPORTS BY  
 McNEIL (1961) AND NYE (1925))



SCALE 1 INCH TO 5 CHAINS.



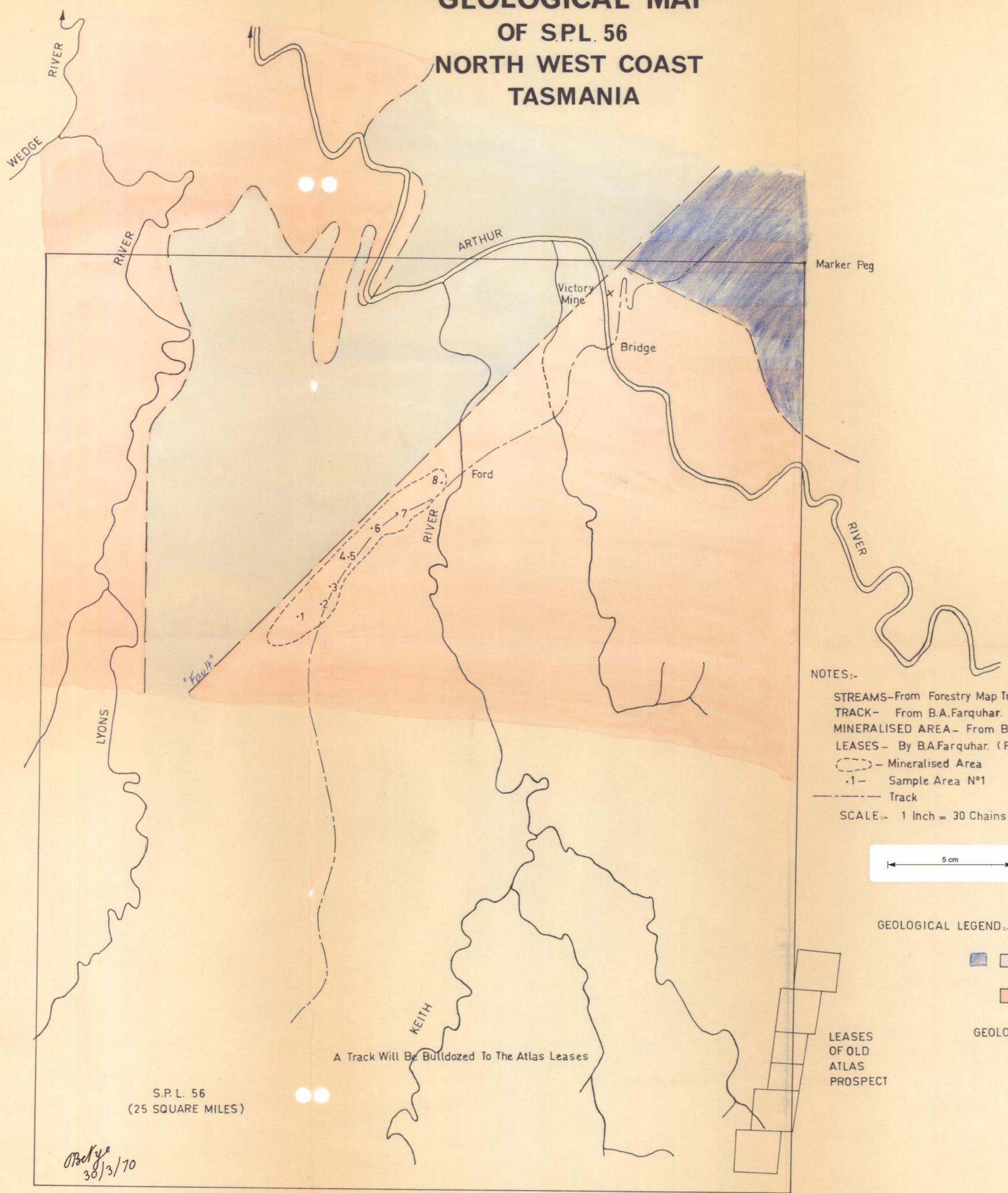
008044

*Additions and Corrections AB Nye*  
*22/10/70*  
*AB Nye*

*24/8/70*  
*70-632*

DIRECTOR OF MINE

# GEOLOGICAL MAP OF S.P.L. 56 NORTH WEST COAST TASMANIA



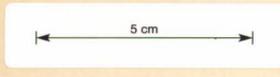
S.P.L. 56  
(25 SQUARE MILES)

*Obelye*  
30/3/70

A Track Will Be Bulldozed To The Atlas Leases

### NOTES:-

- STREAMS-From Forestry Map Trowutta. 27/12 & 16
- TRACK- From B.A.Farquhar.
- MINERALISED AREA- From B.A.Farquhar.
- LEASES- By B.A.Farquhar. (From Lands Department).
- - Mineralised Area
- .1- Sample Area N°1
- Track
- SCALE:- 1 Inch = 30 Chains



### GEOLOGICAL LEGEND:-

- PERMIAN.
- PRECAMBRIAN.  
(KEITH BEDS)

GEOLOGY- from R.D.M<sup>e</sup> Neil. (1960)

LEASES  
OF OLD  
ATLAS  
PROSPECT

ZN 60  
31 90  
P 3950  
Z 37  
H 50  
CV 84

Drawn By -  
ENGINEERING SURVEYS. (AUSTRALIA) PTY. LTD.  
166 ALBERT ROAD, SOUTH MELBOURNE. 3205.

Date:- 3/4/70.

DRG N° 121/1.

008045

012

70-632

045

008016

PART 5

Supplementary report on the magnesite/dolomite  
deposit, Arthur River district, north-western  
Tasmania

P.B. Nye

November, 1970

Mineral Holdings Aust. Pty Ltd

SUPPLEMENTARY REPORT ON THE MAGNESITE/DOLomite DEPOSITARTHUR RIVER DISTRICT, NORTH-WESTERN TASMANIA.1. INTRODUCTION

Under the date of 29th June, 1970, a report was issued with the title of Report on the New Victory Mine and the Adjacent Magnesite-Dolomite Body, Arthur River District, North-Western Tasmania.

That report dealt with the following factors in connection with the Victory Mine and the Magnesite-Dolomite deposit.

- Introduction
- Location
- Access
- Mining Tenement
- Previous Literature
- Geology
- New Victory Copper Deposit
- The Magnesite-Dolomite Body
- Conclusions and Recommendations

Most of the information, and particularly the general information, will not be repeated in the present report. The present report will describe the information obtained since 29th June by such investigations as detailed mapping and sampling of the deposit and by a geological visit to the deposit. Information on the magnesite-dolomite deposit will thus be brought up-to-date, and the information in the report of 29th June amended and supplemented as may be necessary.

2. ACTIONS SINCE 29TH JUNE, 1970.

The following actions have been taken

- a) Instructions for the guidance of the prospectors were prepared, together with an enlargement of Plate 1 of the report of 29th June.
- b) In accordance with (a), the maximum possible area over which the magnesite-dolomite deposit might crop out, was searched by the prospectors.
- c) The boundaries of the outcrops of magnesite-dolomite were determined and marked on the map referred to in (a). Other geological boundaries were corrected where necessary.
- d) Visit to the deposit by Messrs. N.M. Thomas, Director, and P.B. Nye, Consulting Geologist, paid on 30th September and sampling arranged and important features examined.
- e) Chip sampling of the largest outcrop and of the small bodies of magnesite and dolomite in it, was carried out during October.
- f) Eighteen samples were sent for analysis in October.
- g) The results of the analyses were received in November.
- h) Directors Thomas and Freeman visited the deposit early in November.

3. RESULTS ARISING FROM INVESTIGATIONS SINCE 29TH JUNE.

The main results were

- a) The prospecting proved that the magnesite-dolomite deposit did not crop out over the maximum possible area shown on Plate 1 of report of 29th June, 1970.
- b) The outcrops of the deposit were determined and mapped, one large and two small outcrops being present.
- c) Visual examination suggested that the largest outcrop consisted of nearly equal parts of magnesite and dolomite.
- d) The analyses indicated that there was less dolomite present than expected from the visual examination.
- e) The general composition of the material along a central line across the largest outcrop was determined.

4. GEOLOGY

The salient geological features are as described in the earlier report. The boundaries between different rock formations were amended slightly as a result of the prospecting.

The formation of the magnesite-dolomite deposit by alteration of a pyroxenite by mineralising solutions appears still to be the most likely mode of origin. The finding of very narrow and erratic veins of chalcopyrite, pyrite and perhaps, galena (see Section 6) tends to confirm that the magnesite-dolomite deposit was formed by mineralising solutions.

It now appears that not the whole of the pyroxenite was altered to magnesite-dolomite. As already stated in Section 3, there were only large and two small outcrops. A considerable amount of bulldozing had been done to the east of the Arthur River in an attempt to trace any northerly or north-easterly extension of the small magnesite body near the Victory mine. The bedrock, where exposed, was weathered pyroxenite; so that there is not, at the surface, any connection between the above magnesite body and the largest outcrop farther to the north-east.

There is one small outcrop to the east of the largest outcrop. It is difficult, mainly because of lack of outcrops, to determine the rocks immediately to the east of the largest outcrop of magnesite-dolomite.

5. THE MAGNESITE-DOLOMITE DEPOSIT

The magnesite-dolomite deposit consists of three outcropping bodies. The bodies consist almost entirely of the two minerals magnesite and dolomite.

One of the bodies occurs on the eastern bank of the Arthur River and adjacent to the old Victory mine and will be termed the Victory Outcrop. This body appears in the outcrop to consist almost entirely of magnesite. In Waller's 1902 report, the carbonate mineral in the mine workings was referred to as dolomite, but the workings have collapsed and cannot be entered. It seems likely that the mineral was magnesite as that mineral forms the adjacent outcrop. The very small body of copper ore and the associated hematite vein apparently occurred between the "dolomite" on the west and schists on the east.

5. THE MAGNESITE-DOLOMITE DEPOSIT (Cont.)

The largest body will be referred to as the Main Outcrop. It consists essentially of a mixture of magnesite and dolomite, and in different places it appears that one or other of the two minerals predominate. One small body consisting almost entirely of magnesite and a similar small body of dolomite, are present in the south-eastern part of the Main outcrop. The magnesite body occurs along the Southern Creek about one chain upstream from its junction with the Central Creek. The dolomite body occurs in the creek immediately below the junction of the Central and Southern Creeks.

The third outcropping body will be termed the Eastern Outcrop. It is situated on the northern side of Southern Creek and about 10 chains east from the Main Outcrop. It resembles the Main outcrop in so far as it consists of mixed magnesite and dolomite.

6. MINERALOGY

The deposit was probably known in the 1890's, but was referred to as limestone; this reference is from Montgomery's report of 1896.

Waller reported on the New Victory mine in 1902 and described dolomite at the mine as being 100 feet wide, with a much wider belt half a mile to the north.

In 1925, the writer made a short examination of the deposit and particularly of that part now known as the Main Outcrop. Two minerals were recognised and specimens were analysed and the minerals determined to be magnesite and dolomite respectively. The magnesite was the dense, fine-grained, chert-like type having a considerable variation in appearance. The dolomite was the coarsely crystalline type, the crystals being pure white and clear with a pearly lustre. The outcrop consisted of both minerals, but some portions appeared to consist more or less wholly of one of the two minerals.

In the current 1970 investigations, the deposit has been referred to as a magnesite-dolomite one, the two minerals being as described above. A few other minerals occur in very small amounts, and will be described below.

In some specimens collected by N.M. Thomas in November, 1970, from the Main outcrop, some of the carbonate appeared to be brownish in colour. It could represent stained magnesite or dolomite, or be siderite (iron carbonate), but an analysis has not yet been arranged.

A detailed examination of part of the north-eastern face of the Main Outcrop between the Central and Southern Creeks, revealed that high spots on the face were small crystals up to 0.5 inches in length and up to about 0.06 inches in diameter. The crystals were quartz and they occupied the high spots because the carbonate minerals had been weathered away from around them.

Some specimens of the carbonate minerals have minute dark spots up to about 0.02 inch in size. Examination under a hand lens indicates that these are sulphides and almost certainly iron pyrite with associated dark staining.

6. MINERALOGY (Cont.)

In the Central Creek just upstream from the junction with Southern Creek, small quantities of chalcopyrite and pyrite are present in the magnesite-dolomite body. They appear to represent separate occurrences along a narrow vein or formation in the magnesite-dolomite body.

In November, 1970, some specimens of the magnesite-dolomite body from the creek downstream from the junction of Central and Southern Creeks were found to contain galena (or a mineral resembling galena) in small quantities. The occurrence is probably similar to that of the chalcopyrite and pyrite described immediately above.

The 1925 analyses of specimens of the magnesite and dolomite showed the presence of appreciable amounts of silica, ferric oxide and alumina and also of pyrite in one specimen of dolomite. The quartz would be accounted for, at least partly, by the quartz crystals present in the magnesite-dolomite body. The iron oxide could be derived partly from pyrite and partly from the magnesite and dolomite, being present in their compositions. The alumina could be derived at least partly from unreplaced pyroxenite as could also some of the quartz and iron and perhaps magnesia.

In the 1970 samples, the silica, ferric oxide and alumina were not determined. However, the insoluble matter was determined, and ranged from 1.8 to 13.7 percent. This insoluble matter would contain the silica and probably most, if not all, of the ferric oxide and alumina, and thus, in general, confirm the results of the 1925 analyses.

7. SAMPLING AND SAMPLING RESULTS

The 1925 and early 1970 analyses were of specimens and "grab" samples (pieces from one small spot).

Systematic and representative sampling later in 1970 included

- 1) Fifteen chip samples each across 20 feet along the central traverse (No.2) across the Main outcrop. These samples represent 300 feet out of the probable width of 400 feet of the magnesite-dolomite body along that traverse.
- 2) Two chip samples each across 30 feet of the small magnesite body in the Main outcrop.
- 3) One 20 foot sample across the small dolomite body in the Main outcrop.

It is estimated by the sampler, that in the above chip sampling, that chips were taken from approximately 80 percent of the total width of each sample.

Victory Body. The results of the three samples taken from 3 places, 20 feet apart in the Victory body, are given below:

<u>Reg. No.</u>	<u>Sample No.</u>	<u>Result</u> MgCO <sub>3</sub> %	<u>Calculated</u> MgO %
702098	1	97.8	46.84
702099	2	98.9	47.31
702100	3	98.9	47.31

7. SAMPLING AND SAMPLING RESULTS (Cont.)

The only determinations were for magnesia and the results were expressed as MgCO<sub>3</sub>. It must be pointed out that the results represent the total magnesium carbonate in the samples and not the magnesite content. They would contain the magnesium carbonate in the magnesite together with that in any dolomite present. Each 1% of dolomite would reduce the magnesite content by 0.5% approximately, but as there can be a maximum of only 1 to 2% of dolomite in the samples, the largest reduction in magnesite content could be only 0.5 to 1%.

An earlier "grab" sample from the Victory outcrop was analysed with the following results

	<u>percent</u>
Magnesia (MgO)	47.4
Lime (CaO)	0.35
Insoluble	0.51
Total	<u>100.19</u>
<u>Magnesium carbonate</u>	
calculated from MgO	99.06
Dolomite calculated from CaO	1.15
Magnesium carbonate in 1.15% of dolomite	0.52
Probable magnesite content	98.54

Magnesite body in Main Outcrop

The results of the two samples (each 30 feet long) are shown as registered numbers 703291 and 703292 in the attached Table. It will be seen from the calculations in the Table that the composition of the samples could be

	<u>703291</u>	<u>703292</u>
Magnesite %	94.15	91.57
Dolomite %	2.96	4.20
Insoluble %	2.10	2.9
Total	<u>99.21</u>	<u>98.67</u>

Dolomite body in Main Outcrop

The results of the sample across 20 feet is shown as registered number 703290 in the attached Table. It will be seen from the calculation in the Table that the composition of the sample could be

Dolomite %	80.60
Magnesite %	9.41
Insoluble %	6.5
Total	<u>96.51</u>

Main Outcrop (less the Magnesite body and the Dolomite body in it.)

This includes only the mixed magnesite-dolomite portion of the Main Outcrop. Fifteen samples each across 20 feet, were taken along the No.2 or Central traverse. The outcrop along this traverse has a width of 400 feet, but only 300 feet could be sampled because of gaps in the outcrop.

U51

Main Outcrop (Cont.)

The analyses of the fifteen samples are shown in the attached Table as registered numbers 703275 to 703289. It will be seen from the calculations in the table that the compositions of the sample could be as shown below

<u>Reg. No.</u>	<u>Magnesite</u> %	<u>Dolomite</u> %	<u>Insoluble</u> %	<u>Total</u> %
703275	75.93	16.78	6.7	99.42
703276	58.97	34.54	2.9	96.41
703277	80.41	11.51	4.9	96.82
703278	88.84	3.62	5.7	98.18
703279	90.10	1.32	7.1	99.13
703280	75.97	8.40	11.3	95.67
703281	82.35	2.30	13.7	98.35
703282	95.69	0.99	3.1	99.75
703283	85.06	2.30	11.8	99.16
703284	89.23	2.30	7.2	98.73
703285	84.35	4.28	12.2	100.83
703286	80.90	5.90	10.7	97.50
703287	72.12	20.99	3.9	97.01
703288	90.93	5.90	1.8	98.63
703289	89.27	7.24	2.0	98.41

The above figures indicate that the insoluble material is generally high. In the fifteen samples, six have insoluble contents less than 5%, four have contents between 5 and 10%, and five have contents over 10%

As stated earlier, the dolomite content was lower than expected from a visual examination of the magnesite-dolomite. Of the fifteen samples, seven had dolomite contents of less than 5%, four had contents between 5 and 10%, and four had contents of more than 10%.

The magnesite content ranged from 58.97 to 95.69% but excepting sample 703276, it ranged from 72.12%. Only three samples had a magnesite content of more than 90%.

Resources

Because insufficient sampling has been carried out and because detailed surveys (including levelling) of the bodies have not been made, there is insufficient data on which to base the calculation of reserves. Some measurements being currently undertaken will improve the position somewhat as regards the Main Outcrop.

However, some idea of the extent of the outcrops can be given, and such figures are included in the following table together with the tons per vertical foot for each body (based on its extent of outcrop), all materials being assumed to measure 14 cubic feet per ton.

<u>Material</u>	<u>Body</u>	<u>Area</u> sq. ft.	<u>Tons per</u> <u>vertical foot</u>
Magnesite-Dolomite	Main outcrop less magnesite & dolomite bodies.	258,000	18,400
	Eastern Outcrop	12,000	900
	Total	<u>270,000</u>	<u>19,300</u>
Magnesite	Body in Main outcrop	9,800	700
	Victory Body	4,600	330
	Total	<u>14,400</u>	<u>1,030</u>
Dolomite	Body in Main Outcrop	2,400	170

052

RESOURCES (Cont.)

If the Main Outcrop were considered as a whole, its area would be 282,000 sq. ft. and the tons per vertical foot would be 20,000.

The Main Outcrop contains crags and cliffs and rises to considerable heights above creek level especially towards its north-western side. However, the configuration of the surface of the outcrop has not been determined, and no reliable estimates can be made. Guesses at heights could be made but the resulting calculated figures for quantities would have little significance.

The bodies that outcrop ~~which~~<sup>would</sup> extend to some depth at least. The largest body (the Main Outcrop) would be expected to extend to greater depths than the smaller Victory and Eastern outcrops. No significant estimates of extent in depth can, however, be made, and drilling would be necessary to enable estimates to be made.

The question arises also, as whether there may be a connection between the three outcrops (Victory, Main and Eastern) beneath the surface. This question could only be settled by drilling. Unfortunately, geological considerations can give no assistance neither as regards connection between outcrops nor as regards extensions at depth, because of the mode of origin of the deposit. It is considered that the deposit was formed by the alteration of pyroxenite by mineralising solutions. The extent and shape of deposits formed in this way are irregular and cannot be forecast.

CONCLUSIONS

Since June, 1970, investigations have given more detailed information about the magnesite-dolomite deposit. It has been shown that there are three outcrops, two of which are small and the other much larger (282,200 square feet). The Main outcrop has been systematically sampled along a line situated about centrally across the outcrop. About 300 feet of the total width of 400 feet were sampled by 15 samples. A general indication of the composition of the deposit has been obtained. The lime (CaO) contents were generally low, thus indicating the dolomite content of the deposit is small and the magnesite content higher than expected. The content of insoluble matter is high.

The question arises as to whether the Main Outcrop could be selectively mined in order to produce magnesite from those portions with less insoluble material and less dolomite. At present there is insufficient information available to decide the question, and much more surface sampling and some drilling would be necessary to enable a decision to be made.

*P. B. Nye*  
P. B. NYE.

Melbourne  
26th November, 1970.

053

008054

## ANALYSIS AND CALCULATIONS OF MAGNESITE &amp; DOLOMITE INDICATED

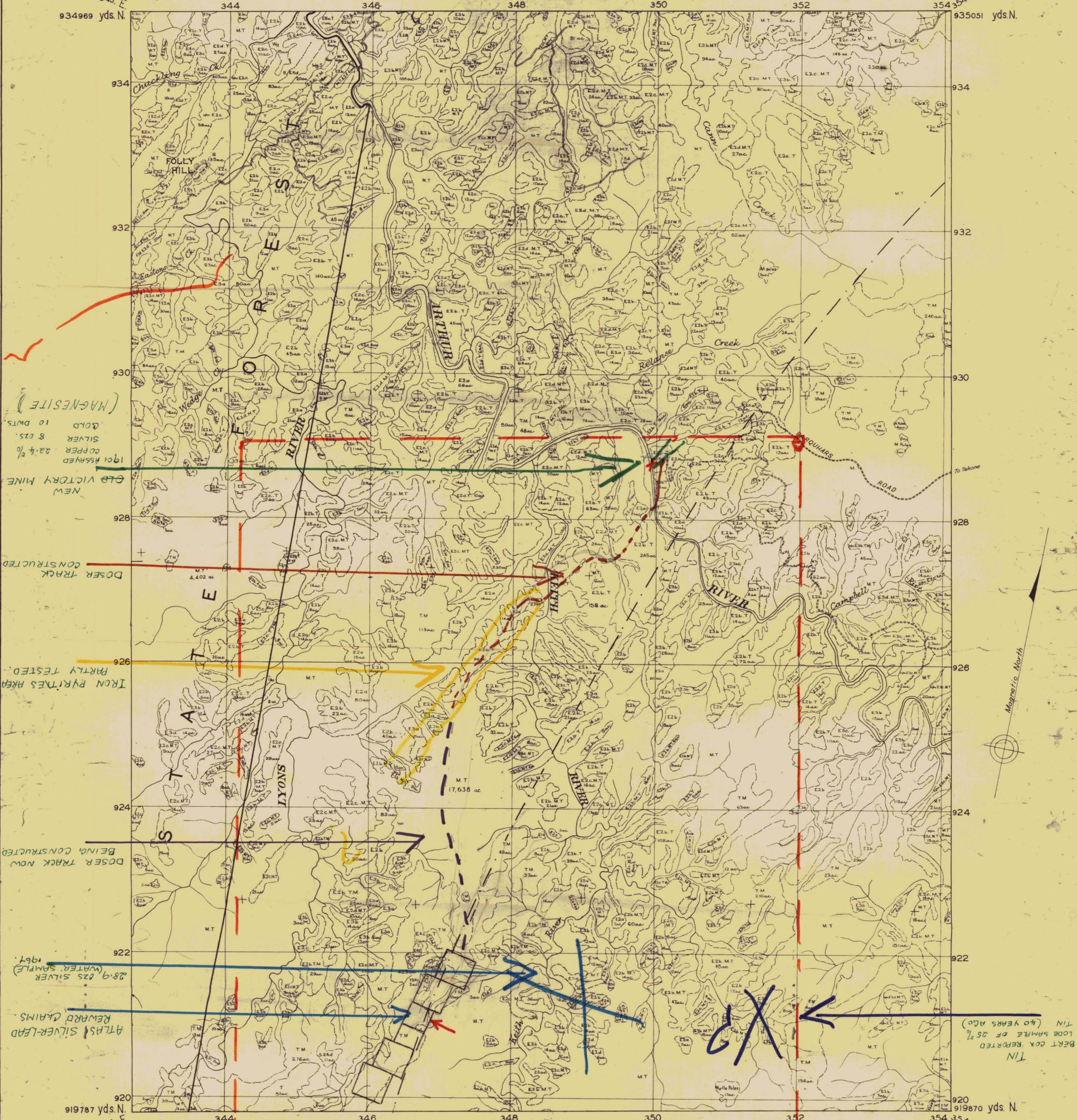
Reg.No.	Sample No.	CaO %	MgO %	Insol. %	CaCO <sub>3</sub> calculated from CaO in col.1	CaCO <sub>3</sub> MgCO <sub>3</sub> (dolomite) calculated from CaO in col.1	MgCO <sub>3</sub> in dolomite calculated from col.5 - Col.4	Total MgCO <sub>3</sub> calculated from MgO in col.2	MgCO <sub>3</sub> in magnesite calculated from col.7 - col.6	Total calculated from col.5+ col.8+col.3
		1	2	3	4	5	6	7	8	9
		%	%	%	%	%	%	%	%	%
703275	1	4.8	39.8	6.7	8.54	16.79	7.25	83.18	75.93	99.42
703276	2	10.5	35.8	2.9	18.69	34.54	15.85	74.82	58.97	96.41
703277	3	3.5	41.0	4.9	6.23	11.51	5.28	85.69	80.41	96.82
703278	4	1.1	43.3	5.7	1.96	3.62	1.66	90.50	88.84	98.18
703279	5	0.4	43.4	7.1	0.71	1.32	0.61	90.71	90.10	99.13
703280	6	2.4	38.8	11.3	4.27	8.40	4.13	80.10	75.97	95.67
703281	7	0.7	39.9	13.7	1.25	2.30	1.05	83.40	82.35	98.35
703282	8	0.3	46.1	3.1	0.53	0.99	0.46	96.15	95.69	99.75
703283	9	0.7	41.2	11.8	1.25	2.30	1.05	86.11	85.06	99.16
703284	10	0.7	43.2	7.2	1.25	2.30	1.06	90.29	89.23	98.73
703285	11	1.3	41.3	12.2	2.31	4.28	1.97	86.32	84.35	100.83
703286	12	1.8	40.0	10.7	3.20	5.90	2.70	83.60	80.90	97.50
703287	13	6.4	39.1	3.9	11.39	20.99	9.60	81.72	72.12	97.01
703288	14	1.8	44.8	1.8	3.20	5.90	2.70	93.63	90.93	98.63
703289	15	2.2	44.3	2.0	3.92	7.24	3.32	92.59	89.27	98.41
703290	D1	24.5	22.2	6.5	43.61	80.60	36.99	46.40	9.41	96.51
703291	M1	0.9	45.7	2.1	1.60	2.96	1.36	95.51	94.15	99.21
703292	M2	1.2	44.8	2.9	2.14	4.20	2.06	93.63	91.57	98.67

# TROWUTTA

FEB. 1970

342598 yds. E.  
934969 yds. N.  
R.F. 1/23,760

354354079 yds. E.  
935051 yds. N.



(MAGNESITE)  
1901 ASSAYED  
GOLD 10 DWTS.  
SILVER 8 OZS.  
COPPER 22.4%  
NEW VICTORY MINE  
6th VICTORY MINE

DOZER TRACK CONSTRUCTED

IRON PYRITES AREA  
PARTLY TESTED

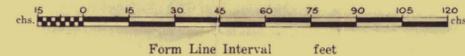
DOZER TRACK NOW  
BEING CONSTRUCTED

28.9 OZS SILVER  
(WATER SAMPLE)  
1967

ATLAS SILVER-LEAD  
REWARD CLAIMS

TIN  
BERT COX REPORTED  
LODE SAMPLE OF 25%  
TIN (40 YEARS AGO)

Scale: 30 Chains to an Inch.



- OTHER FOREST TYPES**
- M - Myrtle
  - T - Secondary species
  - V - Cultivation and pasture
  - Vo - Orchard
  - Vz - Rough grazing
  - S - Scrub
  - K - Bracken
  - W - Wasteland
  - Wg - Button grass, or healthy plain
  - Wm - Mountain moor
  - Wr - Bare ground, or rock
  - ld - Fire damaged
  - O/m - Over mature
  - C/o - Cut over

- EUCALYPT TYPES**
- E - Eucalypt Forest
  - E1 - Mature Eucalypt Forest average height of dominants above 180 ft.
  - E2 - " " " " from 135-180 ft.
  - E3 - " " " " from 90-135 ft.
  - E4 - " " " " from 50-90 ft.
  - E5 - " " " " less than 50 ft.
  - ER - Eucalypt Regrowth
  - ERg - Eucalypt Seedling and Sapling Regrowth
  - ERp - Eucalypt Pole Regrowth

- DENSITY CLASSES (Mature Eucalypts only)**
- CROWN COVER**
- a - 70-100 per cent eucalypt crown cover
  - b - 40-70
  - c - 20-40
  - d - 5-20
  - f - less than 5

- CONVENTIONAL SIGNS**
- All weather roads
  - Summer roads
  - Tracks
  - Trams
  - Private property boundaries
  - State forest boundaries
  - APPM Concession boundary
  - Sawmills
  - Old mill sites
  - Fire lookout stations
  - Forestry Comm. trig. stations
  - Other trig. stations

DATE OF PHOTOGRAPHY: MARCH 1952, 1953

DATE OF PRODUCTION: FEBRUARY 1956

**KEY TO PHOTOGRAPHS**

43793 - ROW 41 43797  
43750 - ROW 24 43754  
48946 - ROW 2A 48950  
47822 - ROW 1 47828

**KEY TO ADJOINING SHEETS**

47881	47887	47890	47896
47885	47891	47894	47900

**SMITHTON**

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

**BLUFF PT.**      **BURNIE**

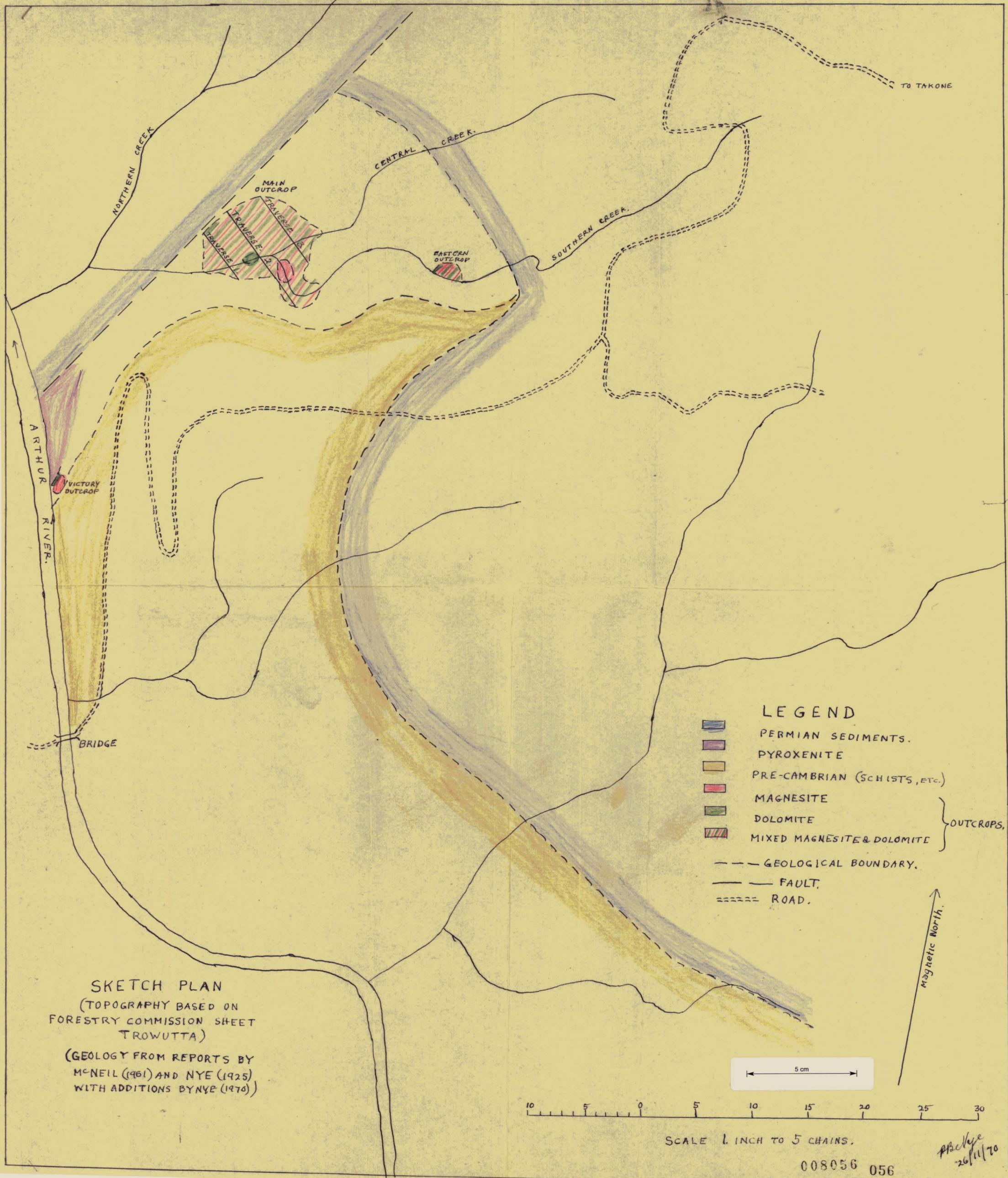
**MAGNET**

**NOTE**

The figure shown beneath the type classification denotes the Forest Potential of the area. The Potential is based on the remnants of the previous mature stand and is classified in the same manner as Mature Eucalypt Forest. The symbol X indicates that the Forest Potential is not apparent.

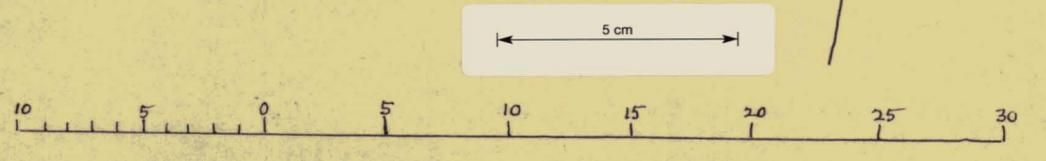
Compiled from Air Photographs by Mapping Branch Forestry Commission Tasmania

008055 70-632  
011 27/12 & 16



SKETCH PLAN  
 (TOPOGRAPHY BASED ON  
 FORESTRY COMMISSION SHEET  
 TROWUTTA)  
 (GEOLOGY FROM REPORTS BY  
 MCNEIL (1961) AND NYE (1925)  
 WITH ADDITIONS BY NYE (1970))

- LEGEND**
- PERMIAN SEDIMENTS.
  - PYROXENITE
  - PRE-CAMBRIAN (SCHISTS, ETC.)
  - MAGNESITE
  - DOLOMITE
  - MIXED MAGNESITE & DOLOMITE
- } OUTCROPS.
- GEOLOGICAL BOUNDARY.
  - FAULT.
  - ROAD.



SCALE 1 INCH TO 5 CHAINS.

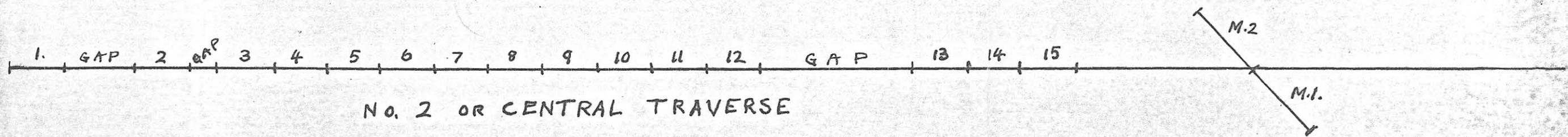
008056 056

70-632

*ABN*  
 26/11/70

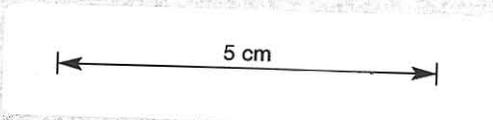
054

PLAN OF SAMPLING  
 ALONG No 2 TRAVERSE  
 MAIN OUTCROP  
 MAGNESITE-DOLOMITE BODY  
 ARTHUR RIVER DISTRICT.



1 INCH TO 40 FEET.

D.I.



MAGNETIC NORTH

008057

ASch/ye  
11/2/70

057

008058

PART 6

Report on operations on Special Prospecting

Licence 56 during November

P.B. Nye

December, 1970

Mineral Holdings Aust. Pty Ltd

REPORT ON OPERATIONS ON SPECIAL PROSPECTING LICENCE56 DURING NOVEMBER

As indicated in the reports for September and October, the prospects on this S.P.L. include an Iron formation, aero-magnetic anomalies and the magnesite-dolomite deposit.

MAGNESITE-DOLOMITE DEPOSIT

This deposit occurs partly on S.P.L. 56 but mainly on E.L. 43/70. The operations associated with the Main outcrop are described in the report on the latter licence (43/70), but it must be realised that part of the operations refer to S.P.L. 56.

AERO-MAGNETIC ANOMALIES

Operations on these anomalies were restricted to Anomalies 1 and 3.

Anomaly 1

This anomaly arises from part of the iron formations referred to in previous reports. The investigation of it is part of that of the iron formations and will be described in the report on operations on those formations. As far as the anomaly is concerned, the investigation consists of searching the area covered by the anomaly and adjacent country for outcrops of iron minerals.

Anomaly 3

The operations include

- 1) Visit by Directors N.M. Thomas & P. Freeman and prospector K. Pinner, and examination of that part of the area covered by the anomaly on the south side of the Arthur River. A short distance south from the river, the Pre-Cambrian rocks and the feature giving rise to the anomaly are overlain by Permian rocks and cannot be investigated in that direction.

The amphibolite dyke was located and examined, as were also the quartz-carbonate formation and the vein of magnetite. Specimens were collected for examination and testing. The amphibolite was slightly magnetic, but in being crushed some pieces were more strongly magnetic.

- 2) Arrangements are being made to have analyses of the amphibolite and the magnetic mineral in it.

IRON FORMATIONS

In previous reports, two prospects have been referred to, namely, the formation along the track and the "red soil area" at its northern end. Early in November, another area of iron outcrops (limonite) was found towards the northern end of, but east of, the track. The three formations will be referred to as the Track formation, the Red Soil area and the Keith area.

IRON FORMATIONS (Cont.)

The approximate position of the Red Soil area and a sketch position and extent of the Keith Area are shown on the attached map. The Track formation is not delineated as yet, but it includes the outcrops of iron minerals and particularly those of magnetic, along, and generally to the west of, the southern part of the Main track. As prospecting yields further information on the Keith Area, it may possibly be found that it represents a formation or group of formations that has a south-westerly extension along the southern part of the Main track.

The operations included

- 1) Visit by Directors N.M. Thomas & P. Freeman, and with prospector K. Pinner, examination of the tracks and trenches on the Track formation and the Red Soil area.
- 2) Construction of a log bridge across the Keith River by Farquhar's organisation.
- 3) Search of the area of Anomaly 1 for outcrops of iron minerals. This resulted in the discovery of the Keith area.
- 4) Mapping of tracks and trenches on the Track formation and Red Soil area by prospector K. Pinner.
- 5) Bulldozing Red Soil area.
- 6) Marking track into Keith area.
- 7) Cutting tracks and bulldozing on Keith area.
- 8) Visit by Director N.M. Thomas and P.B. Nye and examination of the three prospects with prospector K. Pinner and party.
- 9) Surveying of Main track by P.B. Nye and K. Pinner. During the survey, three additional outcrops were found to the south of the Track formation. Two were limonite and the third was magnetic.
- 10) Mapping track into Keith area.
- 11) Drafting of map of the Main track and the trenches and tracks starting from it. Connection of the survey to the topographical features (streams) of the Trowutta Sheet of the Forestry Commission and fixing of the track and formations on that sheet. A copy of the map showing track, trenches, and outcrops of iron minerals and a copy of a map showing rock outcrops are attached.
- 12) Correspondence by Director N.M. Thomas with Australian and overseas companies with the object of getting them interested and associated with the testing and development of the prospects.

Melbourne

P.B. NYE.

18th December, 1970.

008061

KEITH RIVER  
BRIDGE

060

PROVISIONAL  
PLAN  
IRON FORMATIONS.  
S.P.L. 56.

## NOTE

THE DETAILS OF THE  
"RED SOIL AREA" AND  
THE TRENCHES ON IT  
MAY HAVE TO BE  
AMENDED.

APPROXIMATE POSITION AND EXTENT  
OF ZONE CONTAINING NUMEROUS OUTCROPS  
OF LIMONITE (KEITH AREA)

TRACK TO KEITH AREA.

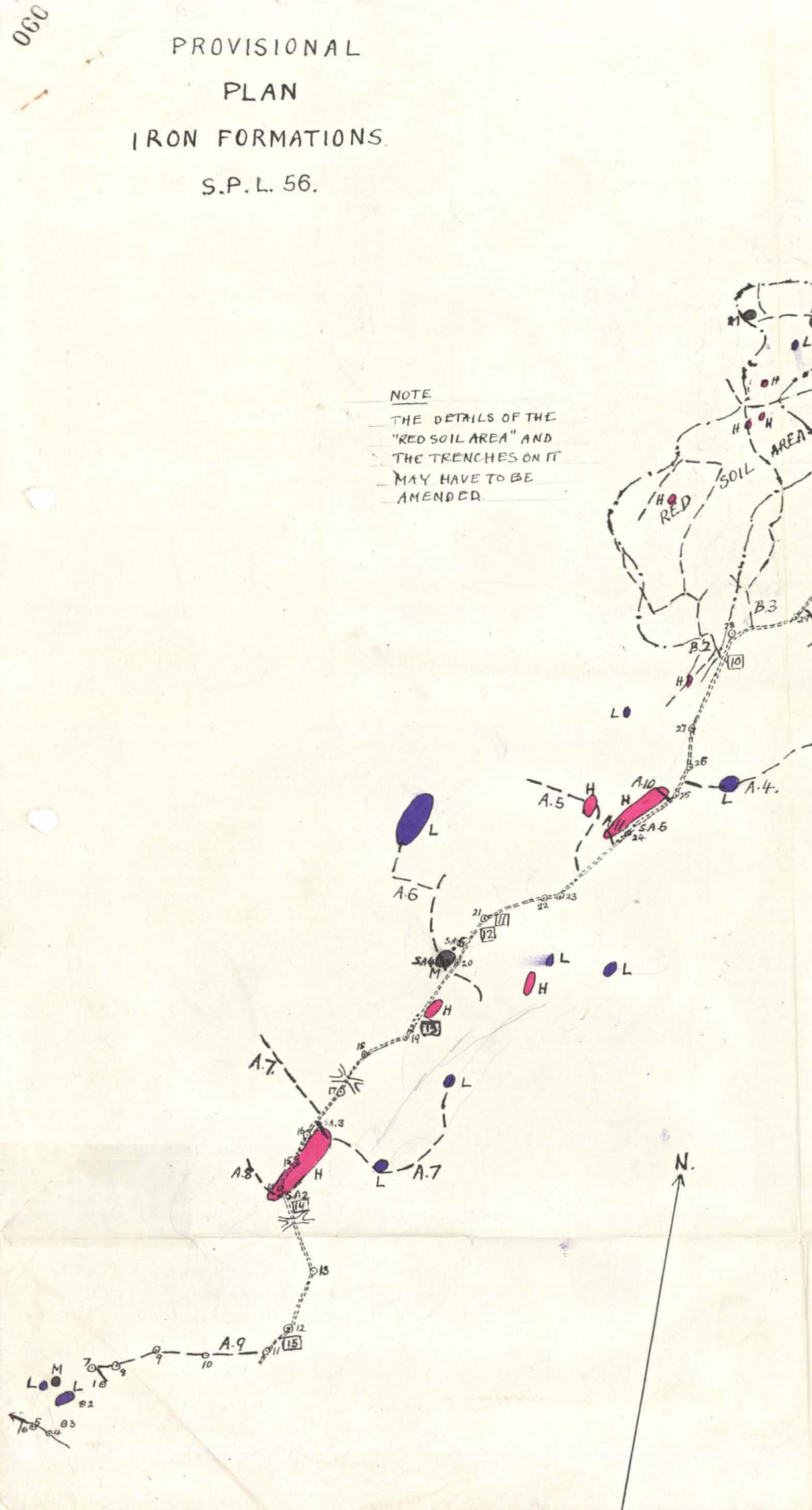
5 cm

## LEGEND

MAIN TRACK	====
SURVEY STATIONS	○ 30
SADDLE	∩
SAMPLE AREAS (FAROUHAR)	SA.6 SA.6
" " (THOMAS)	□
OUTCROPS	○
MAGNETITE	M
HEMATITE	H
LIMONITE	L
BULL-DOZED TRACKS & TRENCHES	--- A1 to A11 C1 B1 to B3
BOUNDARIES MINERALISED AREAS	- - - -

## SCALE

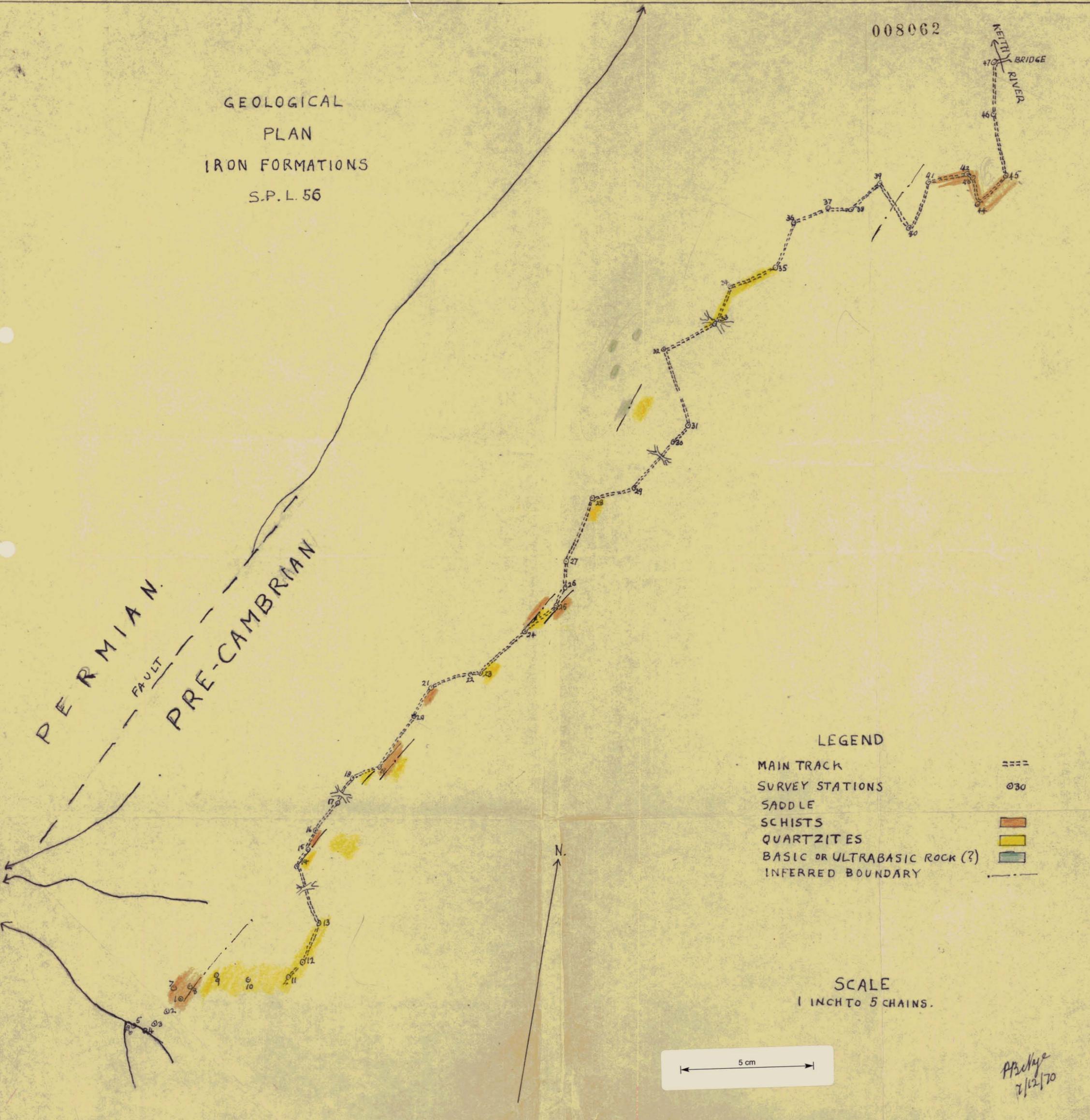
1 INCH TO 5 CHAINS.



061

008062

GEOLOGICAL  
 PLAN  
 IRON FORMATIONS  
 S.P.L. 56

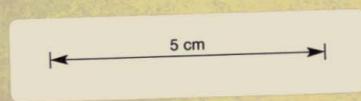


PERMIAN  
 FAULT  
 PRE-CAMBRIAN

LEGEND

- MAIN TRACK ----
- SURVEY STATIONS ○30
- SADDLE ⊗
- SCHISTS ■
- QUARTZITES ■
- BASIC OR ULTRABASIC ROCK (?) ■
- INFERRED BOUNDARY ----

SCALE  
 1 INCH TO 5 CHAINS.



*P. Schuyler*  
 2/12/70

062

008063

PART 7

Preliminary report on the Keith body,  
its relation to other formations, and the  
relation of all formations to the geological  
setting, SPL 56 Arthur River district,  
north-west Tasmania

P.B. Nye

December, 1970

Mineral Holdings Aust. Pty Ltd

PRELIMINARY REPORT ON THE KEITH BODY,  
ITS RELATION TO OTHER FORMATIONS, AND THE RELATION  
OF ALL FORMATIONS TO THE GEOLOGICAL STRUCTURE, S.P.L.56  
ARTHUR RIVER DISTRICT, NORTH-WEST TASMANIA.

I INTRODUCTION

When the area containing the iron formations and covered by aeromagnetic anomaly No. 1 became accessible in late September, one of the tasks assigned to prospectors, Messrs. K. and C. Pinner, was to search the area for outcrops of iron minerals. The carrying out of this task was nearing completion, but on 6th November the prospectors found several outcrops of limonite between the Main track on the west and the Keith River on the east, and situated about twenty-five chains south-west from the Keith bridge. Further search indicated that the area or zone containing the limonite outcrops had a general north-easterly trend and was about twenty to twenty-five chains long and five chains wide. From near Station 31 on the Main track, there is a fall of about 580 feet to the Keith River. This Zone has been termed the Keith Body.

A track has been bull-dozed into part of the Keith Body, and a base-line cut through the zone to facilitate the surveys to map the outcrops and the zone. Some additional outcrops have been found, but detailed surveys have not yet been made. Arrangements have been made for sampling the main outcrops.

II RELATION TO OTHER FORMATIONS  
(See Plate 1)

The most prominent formations before the discovery of the Keith Body were the Track formation and the Red Soil Area.

1. The Track formation extends generally between Trenches A.8. on the south-west and A.10 on the north-east; and has a general north-north-easterly strike. In this section it occurs mainly along or to the west of the track. There may be other parallel formations close to it. The formations extend to the south-west at least as far as Trench A.9. and a short distance at least south-west from its western end. To the north the formations probably extend into the southern part of the Red Soil Area.

The outcrops between trenches A.8. and A.16. contain either magnetite, hematite and limonite or of two or all three of them. Pyrite occurs at Sample Areas 1, 4 and 5. It is the Track formation with its magnetite content that was the cause of the aeromagnetic anomaly No. 1.

2. The Red Soil Area occurs to the north of the northern end of the Track formation. It has a general northerly trend with a length of nearly twenty chains and a width ranging up to about six chains. The soil is red, and contains numerous fragments of magnetic material

(almost certainly magnetite), but little information has been obtained about the underlying rocks and mineralised formations. It is expected that the magnetite would come from the underlying formations, but this has not yet been proved. At some places, the rocks have been exposed and contain micaceous and specular hematite. At some of these places, these rocks are probably completely weathered ultrabasic rocks.

3. Other formations (excluding the Keith Body). Along the eastern side of the Main track between trenches A.7. and A.3., there are several outcrops of iron minerals (mainly limonite), but with hematite in at least one place. These could represent a formation or a few parallel formations generally parallel to the Track formation.
4. Keith Body. Our current knowledge suggests that this has a general north-easterly strike and has a slightly more easterly strike than the Track and parallel formations. Until detailed surveys have been made, the actual strike will not be determined, but it is expected to be nearer to north-north-easterly. Further if the Body dips to the south-east, its trend down the steep slopes to the Keith River, would be more easterly than the strike. Thus, it is possible that the strike is north-north-easterly rather than north-easterly. If such is the case, it is possible that the Keith Body is a north-north-easterly continuation of the formation or formations indicated by the limonite outcrops east of the Main Track between trenches A.7. and A.3. If they are continuous throughout the total length would be about sixty chains.

### III RELATION OF THE FORMATIONS TO THE GEOLOGICAL STRUCTURE (See Plate 2)

A zone of white quartzites extends from trench A.9. and station 11 north-north-easterly along the Main track to station 39. Good exposures showing strikes and dips are few, the only reliable one being along the track into the Keith Body where the strike is forty-five degrees and the dip to the north-west. This strike agrees generally with that of the zone as a whole. On the Main track north of station 31, planes strike at two hundred and eighty degrees but they are probably joint planes.

The north-western boundary of the quartzites is generally along the Main track between stations 14 and 21. It is also evident between station 8 and 9. Schists occur to the west of the quartzites. Few outcrops show the strike of the bedding or the schistosity. Near S.A.1. the planes in the schists strike at thirty degrees and dip at forty-five degrees to the north-west. At S.A.6, the planes strike at twenty-five degrees and dips are vertical or high to west. The Track formation occurs in the schists close to the boundary with the quartzites.

In the Red Soil Area to the north-east, the quartzites junction on their north-western boundary with a completely weathered rock probably an ultrabasic rock.

The south-eastern boundary of the quartzites crosses the Main track between stations 39 and 40, and also the track into the Keith Body east of station 31.

The country rocks in the Keith body appear to range from slates to schists; these schists are part of the belt to the south-east of the quartzites. No reliable strikes and dips have been found.

Little information is available as to the country rocks with which the limonite outcrops to the south-east of the Track formation are associated, but it is probably that most, if not all, of them are in the schists to the south-east of the quartzites.

The general structure is, therefore, a north-north-easterly belt of quartzites between schists. The Track formation occurs in the western belt of schists. The Keith Body and its probable south-western extension occur in the eastern belt of schists.

#### IV THE KEITH BODY

The following description is based on a visit of inspection of some of the outcrops of this body. From the Main track, trench A.1. was followed and the limonite outcrop at its end was examined. Between 5 and 6 chains from the Main track, a small creek was crossed and the north-western boundary of the Keith Body reached a short distance beyond the creek.

A zig-zag course was followed along the body to the north-east, and across the body to its south-eastern boundary. Ten outcrops were inspected. Six of these were low cliffs, groups of boulders or less prominent outcrops, and the other four were outcrops exposed by bull-dozed tracks.

Limonite was the most common mineral present in the outcrops and it was present in the ten outcrops. Hematite was present in five outcrops and red ochre in three. Some of the hematite was micaceous, and specular hematite (or a mineral resembling it) was present in one or two outcrops. Magnetite appeared to be absent, except possibly in one outcrop; but some of the limonite appeared to be magnetic, and magnetic pieces <sup>were</sup> ~~was~~ obtained from the soil in at least four places. A small amount of quartz was present in two outcrops, and silicification of the country rocks was evident in four outcrops.

The country rocks associated with the limonite appeared to be slaty types, but could have been schists somewhat altered and weathered. Along the portion of the bull-dozed track into the Keith Body nearest to the Main track (Stations 31 and 32), the country rocks are siltstones or fine sandstones (perhaps weathered quartzites).

The outcrops are oxidised ones as is evident from the large amount of limonite, and a smaller amount of red ochre. Some of the hematite may be secondary but some is possibly primary. If magnetite is present it must be in small amount. The magnetic pieces in the soil must contain some magnetite.

The only primary mineral present is the small amount of quartz in two outcrops (and also in the limonite in trench A.I.). However, some of the hematite may be primary. In the primary one, the formations could contain magnetite, hematite or pyrite, with or without associated sulphides. It is unlikely that much magnetite is present, because the Keith Body does not appear to have been a factor in producing the No. 1 aeromagnetic anomaly. Either hematite or pyrite, or both, could be present in the primary zone. Visual examination of the limonite, etc. does not show the presence of any oxidised minerals of copper, lead, etc., and it is possible that such associated sulphides are <sup>not</sup> present.

## V CONCLUSIONS

The Keith Body occupies a zone about twenty to twenty-five chains long and five chains wide. It has a general north-easterly trend, but the actual strike may be nearer to north-north-easterly. The zone extends from the region immediately west of station 31 on the Main Track north-easterly to at least the Keith River. From near station 31 there is a fall of about 580 feet to the Keith River. In general the zone is more or less parallel to the Main Track between stations 32 and 45 and on the south-eastern side at a distance ranging from five to ten chains.

In the zone there are numerous outcrops consisting mainly of limonite. The outcrops have not yet been fixed in position by survey, and their distribution is not known. It is not contended that the zone is necessarily occupied by one mineralised body. It may well be that there are parallel formations within the zone. Further testing will be necessary to determine the distribution of mineralisation within the zone.

The outcrops consist, as stated above, mainly of limonite. Hematite occurs in lesser quantity in the form of massive hematite, micaceous hematite and perhaps specularite. Red ochre is also present. Magnetite, if present, is in small quantity, but fragments in the soil are magnetic and are probably magnetite, and some pieces of limonite are also magnetic. Quartz was present in two outcrops and evidence of silicification was present in four outcrops.

Except for the quartz and perhaps some of the hematite, the remaining minerals are oxidised ones. There is no visible evidence to indicate the primary minerals (other than quartz and perhaps some hematite) below the zone of oxidation. There could be magnetite, hematite, pyrite and perhaps sulphides of other metals. Magnetite must be absent, or present in only small amounts, because the body has not given rise to an aero-magnetic anomaly, or been responsible for any part of Anomaly No. 1. In the outcrops, there is no visible evidence of the presence of oxidised minerals such as copper, lead or zinc. Sampling of the main outcrops has been arranged and the samples will be analysed to determine what metals, in addition to iron, are present.

Further testing and especially drilling will be needed to determine the minerals present below the zone of oxidation.

*P. B. NYE*  
P. B. NYE

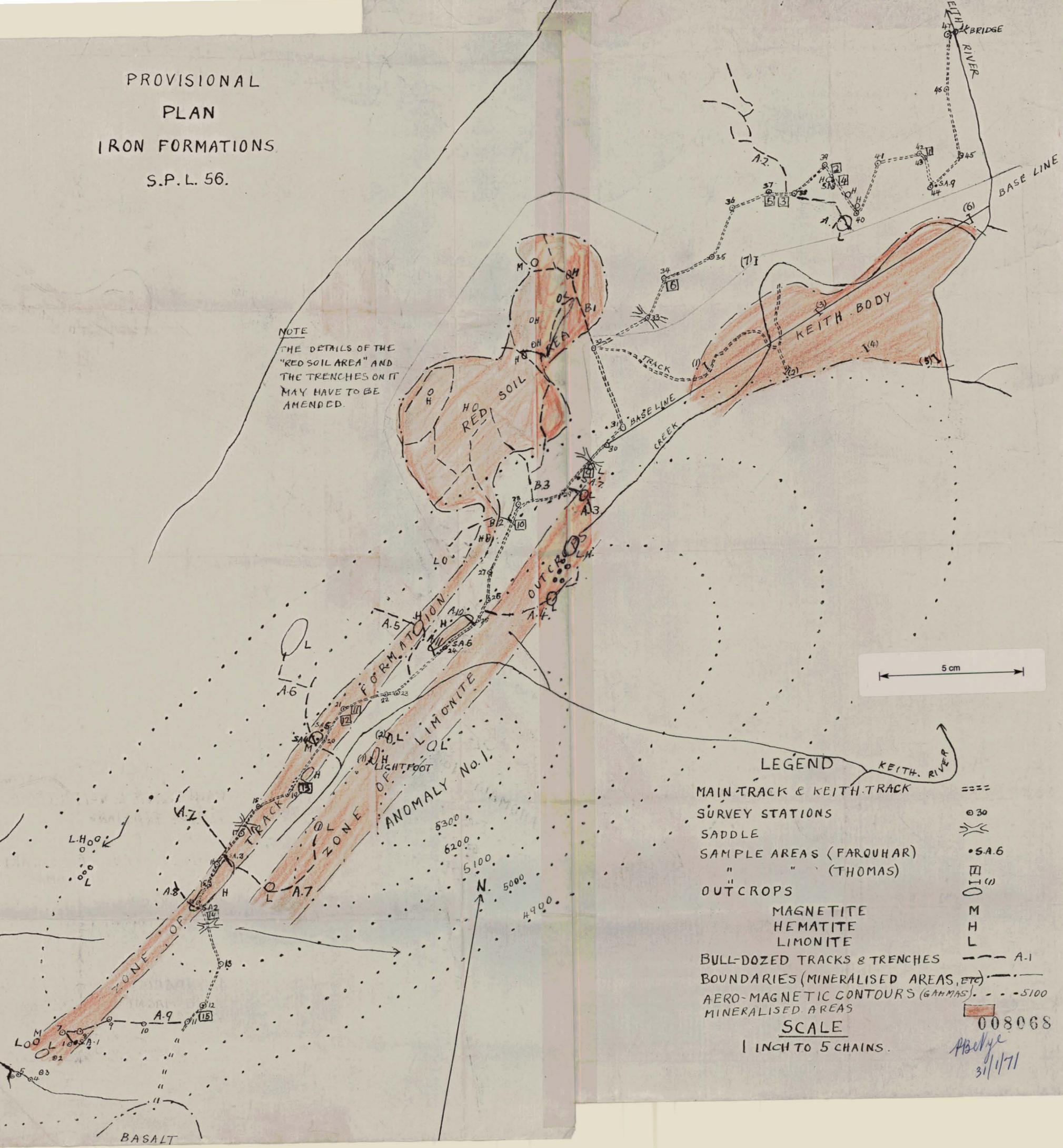
Melbourne.

31st December, 1970.

067

PROVISIONAL  
PLAN  
IRON FORMATIONS  
S.P.L. 56.

NOTE  
THE DETAILS OF THE  
"RED SOIL AREA" AND  
THE TRENCHES ON IT  
MAY HAVE TO BE  
AMENDED.



5 cm

LEGEND

MAIN TRACK & KEITH TRACK	====
SURVEY STATIONS	○ 30
SADDLE	∩
SAMPLE AREAS (FAROUHAR)	• SA.6
" " (THOMAS)	□
OUTCROPS	○
MAGNETITE	M
HEMATITE	H
LIMONITE	L
BULL-DOZED TRACKS & TRENCHES	- - - A.1
BOUNDARIES (MINERALISED AREAS, ETC)	---
AERO-MAGNETIC CONTOURS (GAMMAS)	... 5100
MINERALISED AREAS	■

SCALE  
1 INCH TO 5 CHAINS.

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A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.  
31/1/71

068

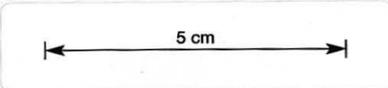
PROVISIONAL  
PLAN  
IRON FORMATIONS  
S.P.L. 56.

NOTE

THE DETAILS OF THE  
"RED SOIL AREA" AND  
THE TRENCHES ON IT  
MAY HAVE TO BE  
AMENDED.

APPROXIMATE POSITION AND EXTENT  
OF ZONE CONTAINING NUMEROUS OUTCROPS  
OF LIMONITE (KEITH AREA)

TRACK TO KEITH AREA.



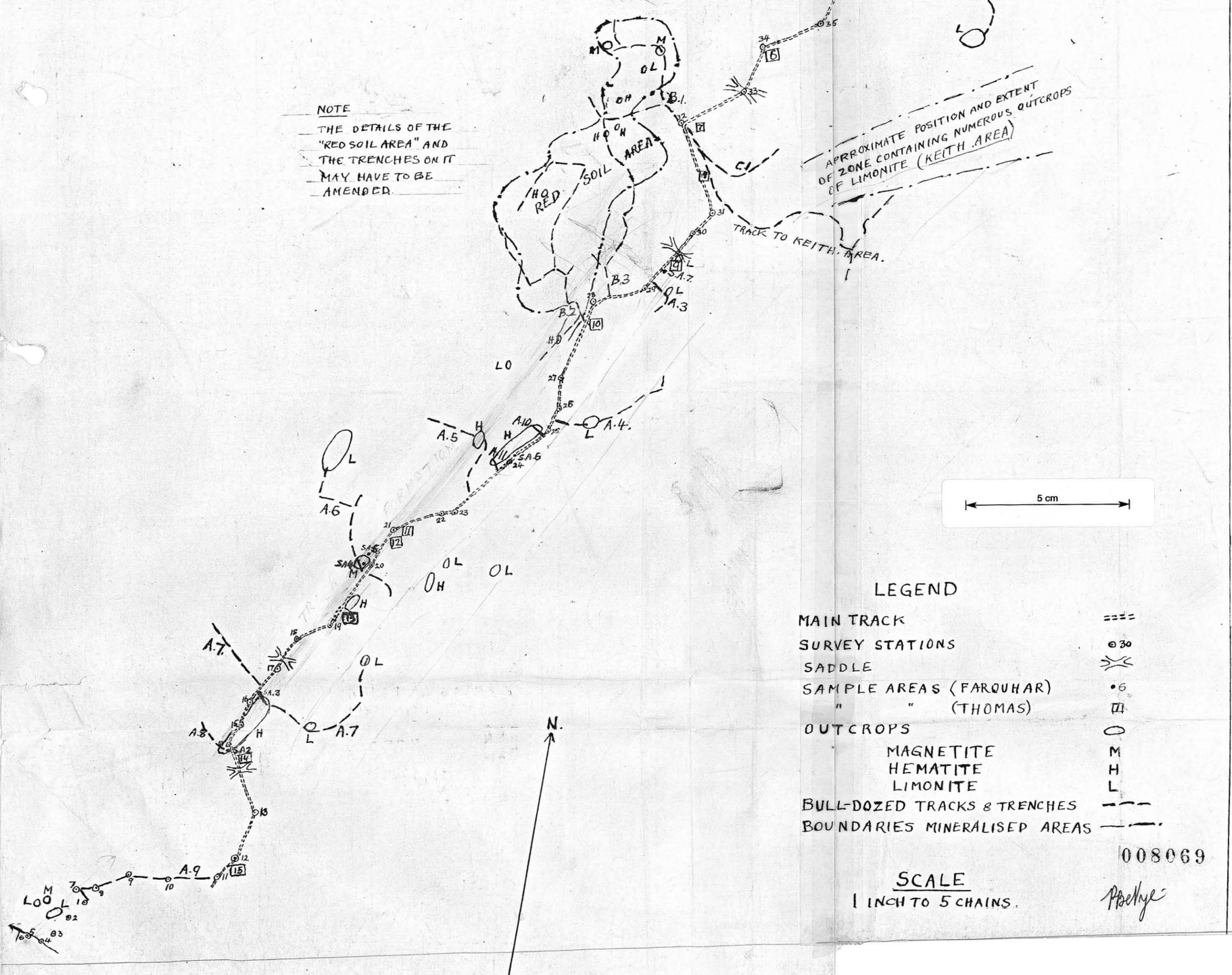
LEGEND

MAIN TRACK	----
SURVEY STATIONS	○ 30
SADDLE	∩
SAMPLE AREAS (FARQUHAR)	○ 6
" " (THOMAS)	□
OUTCROPS	○
MAGNETITE	M
HEMATITE	H
LIMONITE	L
BULL-DOZED TRACKS & TRENCHES	---
BOUNDARIES MINERALISED AREAS	- - -

SCALE  
1 INCH TO 5 CHAINS.

008069

*P. Kelly*



008

GEOLOGICAL  
PLAN  
IRON FORMATIONS  
S.P.L. 56

PERMIAN  
FAULT  
PRE-CAMBRIAN

WETHIL RIVER  
BRIDGE

BASE LINE

BASE LINE

GULLY

LEGEND

- MAIN TRACK =====
- SURVEY STATIONS ○30
- SADDLE
- SCHISTS
- QUARTZITES
- BASIC OR ULTRABASIC ROCK (?)
- INFERRED BOUNDARY

5 cm

SCALE  
1 INCH TO 5 CHAINS.

008070

APB  
2/12/70  
9/1/70

