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EXPLORATION LICENCE 18/75

FORTH, TASMANIA

FINAL REPORT

MICROFILMED

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FIGURES

1. Distribution of Proterozoic quartzite within EL 18/75, Forth Area, Tasmania. Taken from Mines Department 1:63,360 geology sheet.
2. Sections showing drill results at John's. (a, b, c).
3. Sections showing drill results at Hopkins'. (a, b)
4. 1:2000 map of John's deposit.
5. 1:2000 map of Hopkins deposit.
6. 1:20,000 map showing results of reconnaissance traversing of Proterozoic quartzites.

1. SUMMARY

Exploration was carried out over Proterozoic quartzites in the Forth area of Northern Tasmania to determine if economic deposits of quartzite suitable for ferro-silicon production at TEMCO were present.

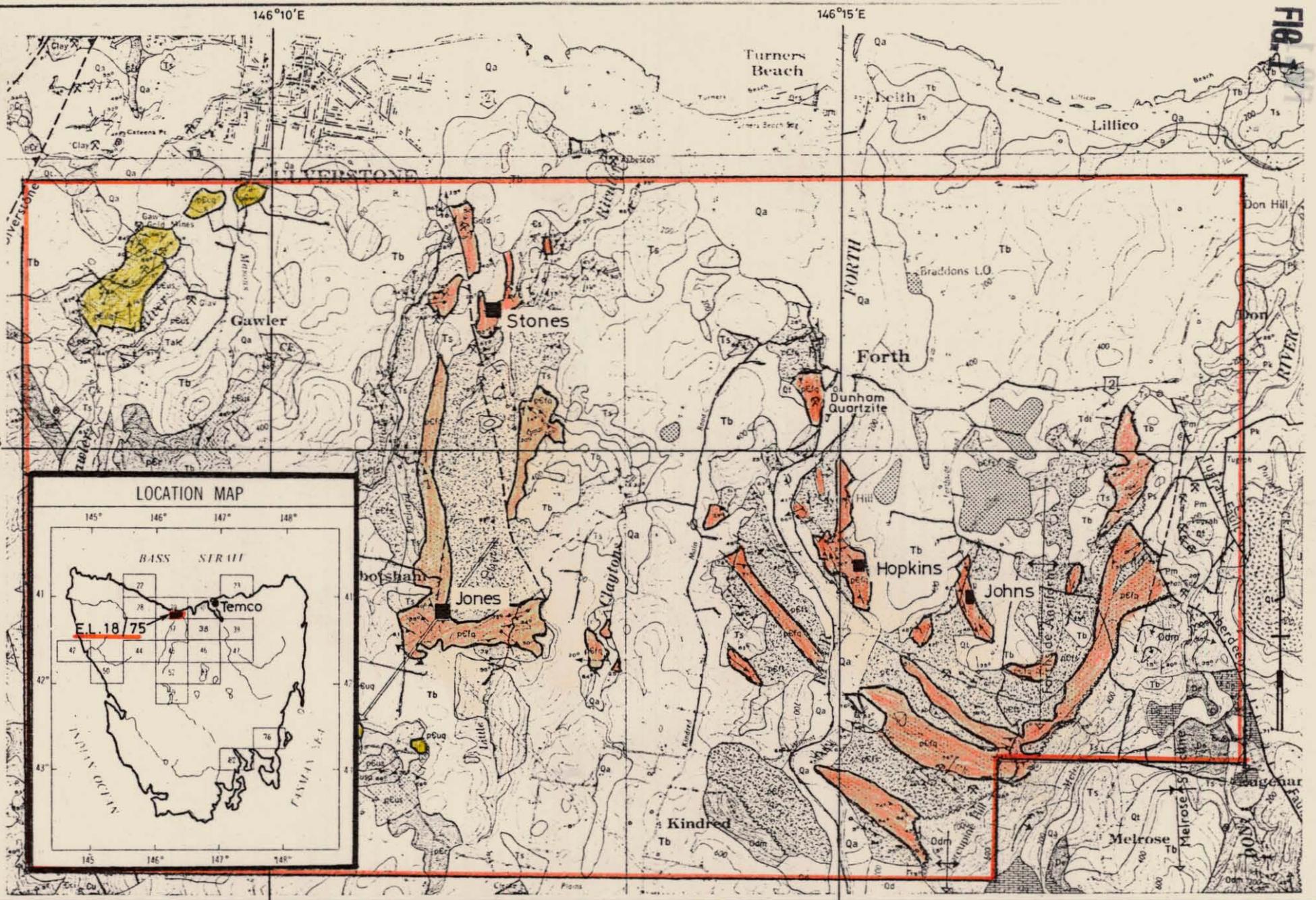
Quartzite was required to meet an anticipated shortfall in supplies from the original source at Beaconsfield.

The quartzites were found to be generally micaceous with alumina in excess of requirements.

The reconnaissance programme failed to locate large tonnages sufficient to supply TEMCO's total needs, but small very low alumina deposits were located. These had potential as sources for 3000 t.p.a. of physically stable material for low alumina ferro-silicon production.

Drilling of the best two deposits located indicated that only small amounts of low alumina quartzite were present, apparently as a weathering product with irregular near surface distribution from 0 to 12 m in depth.

Tonnages of acceptable grade quartzite are less than would justify mining under existing circumstances.



Centre
Melbourne
Date
3 - 11 - 76

THE BROKEN HILL PROPRIETARY CO. LTD.
E.L. 18 / 75, FORTH AREA, TAS.
DISTRIBUTION OF PROTEROZOIC QUARTZITE

Project No
Drawing No
A4-

Photo-copied from Mines Dept. 1:63,360 geol. sheet "DEVONPORT"

5 cm

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2. INTRODUCTION

An exploration licence (EL 18/75) was taken out in the Forth area of northern Tasmania in October 1975 (see fig. 1). It was taken out to examine the Proterozoic quartzites of the Ulverstone and Forth Metamorphics as potential sources of high grade silica for ferro-silicon manufacture at TEMCO's Bell Bay plant.

Acceptable silica should contain at least 98% SiO_2 , less than 0.8% Al_2O_3 and preferably less than 1.0% Fe_2O_3 while also conforming to hardness and thermal stability requirements. Suitable silica in the form of quartzite would be required at the rate of 50,000 tonnes per year, in a sizing of 48 mm - 150 mm amounting to a required one million tonnes for 20 years production.

Earlier drilling results on Company leases at Beaconsfield, the planned source of silica, were disappointing and the Forth area was chosen as the closest alternative potential source of suitable material. The Beaconsfield deposits are composed of Ordovician sandstone/conglomerate and the Forth area contains Proterozoic quartzites which were thought to have better potential.

Interest in the Forth area was stimulated by a deposit known as Dunham's from which a shipment of material well suited to ferro-silicon manufacture had been sent to Newcastle during the war years. The settled area of Forth now extends too close to the deposit to allow mining on the required scale, but it was expected that similar material could be located elsewhere in quartzites of the same age.

It was proposed that a search of the mapped quartzites be carried out to locate any similar material to the above. These were to be sampled, mapped and drilled if necessary to provide, if not the whole one million tonnes required, enough to blend with inferior material from Beaconsfield or other sources.

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When only two small deposits were located and it was discovered that a successful blend could not be obtained by blending high purity quartzite with more aluminous material (the aluminous material softens at a lower temperature clogging the Furnace) the deposits were examined as low tonnage, (3000 t.p.a.) low alumina ferro-silicon feed.

Subsequently, when product from the Beaconsfield mine was found to be suitable for low alumina ferro-silicon, a follow up programme of shallow percussion drilling was carried out to determine whether sufficient reserves of "average grade" quartzite existed to warrant developing the two Forth deposits.

3. GEOLOGY

3.1 General

Outcrops of high purity quartzite occur within Proterozoic quartzites of the Ulverstone and Forth Metamorphics. The quartzites are generally schistose and micaceous and are associated with quartz, mica schists and amphibolites. Most of the mapped quartzite on the Devonport 1:63,360 geology sheet contains visible mica and up to 20-30% mica.

3.2 Lithology

The Forth Quartzite contains variable amounts of interstitial muscovite with coarsely recrystallised quartz grains. The mica content has the main influence on field appearance which grades from quartz schist or foliated micaceous quartzite, through layered flaggy quartzite with mica concentrated in layers, to coarse saccharoidal mica-free types. The Forth schist is coarsely micaceous, red or brown, foliated with porphyroblasts of almandine and albite, quartz in trails and minor opaques.

High purity quartzite does occur as outcrops which are an obvious alteration product of micaceous quartzite from which the mica has been leached, with secondary silica infilling the cavities in some cases. These outcrops are frequently erratic in outline and distribution as they become micaceous along strike and down dip. There is generally evidence of previous mica either through a porous schistose texture or by shiny, parallel quartz grain surfaces. In both cases it is apparent that mica has been leached out and in the latter the flat walls of the cavities reproduce the reflectance of the original mica.

Several areas of white pure quartzite were located however, where there is little evidence of mica. These appear to occur within a primarily low mica unit about 20 m thick which, unlike the above type, shows some strike continuity. This unit contains some schistose bands indicative of original mica, alternating with the predominantly low mica quartzite.

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Tertiary basalts form a plateau cover over much of the area. These are often underlain by a hard silcrete-like conglomerate mapped as sub-basaltic gravel. Much of this material appears highly siliceous but only occurs up to several metres thick and mainly covered by basalt. This rock type does indicate a phase of silica mobility and mica destruction and removal which may equate with the formation of the high purity quartzite outcrops which in all cases occur beneath the level of nearby basalts.

Cambrian serpentinites containing minor short fibre asbestos and some siliceous boxworks intrude the Proterozoic rocks.

3.3 Structure

The two main groups of Proterozoic outcrop are formed by two south and south westerly plunging anticlinoria to the east and west of the Forth River respectively. This gives a predominant steep foliation dip with northerly strike. The foliation appears to represent bedding or an early foliation which has since been isoclinally folded. Minor isoclinal folds are visible though outcrop is rarely good enough to allow a comprehensive interpretation. Occasional larger overturned isoclinal folds with an amplitude of 10 m are visible. The isoclinal folding means that a thin low mica quartzite band could produce a considerable thickness of outcrop through tight folding.

3.4 Petrology

A petrological study was carried out to try and explain the apparent transition of high purity quartzite outcrops to micaceous quartzite along strike. Brief results are given in Appendix 9.1.

A thin section comparison was made of high purity quartzite

from Dunham's and the two new prospects located, with other quartzite outcrops in the area. It was inferred from this that little mica had ever been present in the high purity quartzites because -

- (a) few cavities after mica are present
- (b) there is only minor evidence of secondary silica infilling cavities. This is generally chalcedonic and readily detected.

On this basis it was considered that the material should not become more micaceous at depth.

However, one thin section contained a band of fine mica cavities, undetectable in hand specimen, adjacent to non-micaceous quartzite (see M.R.L. Memo. Appendix 9.1). From this, it is possible that, with the small number of samples examined some formerly micaceous material does make up the outcrop.

There are also more obviously schistose textured bands from which mica has been leached. In some cases extensive silicification has altered these bands along strike making these also difficult to differentiate from the primarily low mica quartzite in outcrop.

Some authigenic overgrowths of crystalline quartz occur on grains lining cavities, particularly larger cavities visible in hand specimen.

The above indicates that some mica could be expected in the unaltered form of even the high purity quartzite. Drilling is the most conclusive method of determining how deep the alteration zone extends and the proportion of mica in the unaltered material.

4. WORK CARRIED OUT

4.1 Reconnaissance, Sampling, Mapping

The Exploration Licence was taken up following several days reconnaissance sampling along road cuttings and in council gravel pits in the area.

An examination was made of all significant quartzite outcrops within the licence area, shown on the Devonport 1:63,360 geology sheet. Gravel pits, quarries and road cuttings were checked and traverses were made over the rest of the outcrops to locate non-micaceous sections. The locations of sample traverses are shown on Fig. 6, and it was felt that, due to the obvious mica content of most of the material, a sufficiently detailed coverage was achieved.

Samples were taken for petrological study, the results of which are appended. Five bulk, surface chip samples were taken along traverses over two small non-micaceous deposits, to check the suitability of the quartzite. The samples were taken at 0.5 m intervals with a 10 lb. hammer producing 3 - 5 cm dia. chips.

The two non-micaceous deposits located were plane table mapped to delineate the clean quartzite and determine whether drilling was warranted.

One of the two deposits (K. John's) had been previously costeamed and quarried for loose road metal. The other (B. Hopkins) was tested with six shallow 1.5 m pneumatic hand drill holes on the outcrop to check that mica did not occur beneath a thin crust of silicified quartzite. Twenty-four pits up to 2.5 m deep were sunk with a back hoe in the soil cover surrounding the outcrop to test for lateral subsurface extensions of suitable quartzite.

4.2 Drilling

4.2.1 Diamond

Three angle diamond drill holes were drilled on the two deposits as the only conclusive method of checking whether the subsurface material becomes micaceous and if so whether sufficient low alumina material is available above this for mining.

The first two holes were drilled at John's prospect, inclined at 35° from horizontal toward 60°, approximately perpendicular to banding in outcrop. The holes were drilled to 13.77 and 18.20 m respectively.

The hole at Hopkins' prospect was drilled at 25° to the horizontal towards 50° in an attempt to intersect the material close to the surface where silicification may have improved grades.

A Mindrill E.1000 sled mounted drill rig was used drilling NQ. Progress was extremely slow due to the rig type, the 8-hour day 5-day week worked and the hardness of the quartzite. Four weeks were taken to drill 56.97 metres over three holes.

4.2.2 Percussion

Because of the slow progress and expense of further diamond drilling two vertical percussion holes were drilled, one at each prospect, to supplement the diamond drilling.

The hole at John's was to a depth of 20.5 m and at Hopkins' to 14 m.

A Mayhew 1500 drill rig was used.

Subsequently a small shallow percussion drilling programme of 11 holes to a maximum of 21 m was carried out on the deposits to determine if sufficient non-micaceous quartzite occurred to warrant mining.

3 holes totalling 63 m were drilled on M.L.942P/M at John's
5 " " 78 m " " adjacent to M.L.942P/M
above

3 holes totalling 42 m were drilled on M.L.941P/M at Hopkins'

An Atlas Copco air trac drill fitted with a dust collector was used and was ideally suited, requiring no site preparation on hill slopes and being fast and economical. Drilling was completed in three days.

4.2.3 Sample Analysis and Examination

Drill core was boxed, logged, photographed and suitable sections were halved with a diamond saw. One half of the core was delivered to TEMCO for physical testwork - heat decrepitation and tumbling breakdown - and preparation for the following analyses at Newcastle, SiO_2 , Al_2O_3 , and Fe_2O_3 .

Percussion chip samples were submitted for the same analyses.

A petrological examination of samples of core was carried out to determine whether the non-micaceous quartzite intersected was a primarily low mica unit or whether it was a more intensely mica leached form of the finely micaceous types existing at depths.

5. RESULTS

5.1 Reconnaissance

The areas covered in the reconnaissance survey of the quartzites on the Devonport geology sheet, within the Exploration Licence, are shown in Fig. 6. Most of the quartzites are schistose and micaceous or with evidence of mica having been removed. There are also a number of outcrops of more massive less schistose quartzite in which very fine micas are or were homogeneously distributed. In these the fineness of the mica means that it is difficult to detect in hand specimens but is noticeable when orientated so that light is reflected from the parallel mica plates, in unison.

Two areas of massive pure quartzite outcrop similar to Dunham's deposit were located for further investigation. These are referred to by the property owners names i.e. John's and Hopkins'.

Other areas of pure quartzite do occur in the Exploration Licence at Stone's and Jones' quarries but they are friable and have been intensely leached. Mica is present but uncommon, though it appears to have been widespread prior to leaching. This type of deposit tends to occur as a ridge capping.

Stone's quarry is operated for sand to which 60% of the material breaks down on screening. Clay patches occur in the pit although leaching extends beyond the base of the pit at 5 metres beneath the surface. Mica is present in scree on the very steep hill slope at the south end of the pit, along strike from the workings. Micaceous quartzite also occurs to the North.

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Jones' quarry contains material assaying up to between 98.8% SiO₂ and 0.38% Al₂O₃ according to Mines Department assays of Jones' samples. The deposit is similar to Stones' above in being leached, friable, with mica on surrounding slopes.

5.2 Mapping, Sampling and Testing

Plane table maps of the two best deposits located above at John's and Hopkins' were produced to define structure, possibility of extensions, potential reserves and suitable drill sites if required.

Little structural detail was detected because weathering and silification have obscured banding. The dip of bedding and tectonic banding are parallel and fairly consistently westerly between 40° and 65°. It is difficult to relate separate groups of outcrop structurally as much of the outcrop is controlled by sporadic alteration of micaceous quartzite rather than one resistant non-micaceous unit.

The seven bulk sample results appended (Located on maps above) are all acceptable, varying between 98.5 and 99.2% SiO₂, with <1.3% Fe, ^{Fe₂O₃} 0.02% Al₂O₃ and good physical stability. The average specific gravity of the samples is around 2.5 which is lower than the normal 2.6 and could indicate porosity caused by removal of mica.

Initial petrological work indicated that the high purity material had never contained mica. However field work and further petrology suggested that the non-micaceous material probably only exists as bands up to several tens of cm. wide separated by material which originally contained significant mica (see also Petrology section).

Pits at Hopkins prospect around the main outcrop revealed soft, schistose micaceous quartzite beneath soil along strike

to the south, and leached porous quartzite to the north (see Map). The six 1.5m jackhammer holes on this outcrop did not intersect mica, showing alteration to extend beyond this depth.

While only a potential of the order of one to two hundred thousand tonnes was thought to be available within 30 metres of the surface of the outcrops, it was felt that the extremely high purity and the possibility of subsoil extensions warranted drilling.

5.3 Drilling

5.3.1 John's Prospect

The two diamond holes were drilled close to perpendicular to the banding in outcrop and little dip deviation apart from minor tight fold closures was found in the core. Dip generally ranged up to 5° from perpendicular to the long core axis i.e. 50° - 60° true dip.

Detailed drilling logs are appended but in summary both holes intersected approximately six metres of non-micaceous quartzite above alternating schistose micaceous and finely, homogeneously micaceous, massive quartzite bands.

The percussion holes confirmed the results of the diamond drilling showing that a mica leached zone extends on average some 5 - 6 m below the surface within a primarily low-mica quartzite.

5.3.2 Hopkins' Prospect

D.D.H.3, sited to drill beneath large outcropping tors, intersected weathered micaceous quartzite.

P.H. 2 and 12 drilled on top of quartzite outcrop approximately 30 m along strike from D.D.H.3 intersected ≤ 11 m of $\leq 0.05\%$ Al_2O_3 , very hard quartzite above micaceous quartzite. This result was not consistent with that of the diamond drill hole or the other two percussion holes indicating that mica removal was irregular, possibly related to a former land surface. PH 11 to the S.E. penetrated an eight metre cap of non-micaceous quartzite over micaceous quartzite and PH 13 to the north intersected micaceous quartzite from the surface.

6. LEASES

Two mining leases 941 P/M and 942 P/M were taken up over the drilled deposits as shown on figs. 4 and 5.

Agreements covering the possibility of mining were made with the respective land holders, Messrs. K. John and B.R. Hopkins.

It is understood that an objection to the Company's application on John's property has been lodged by a Mr. F. Frangou who proposes establishing a piggery. The property is currently up for sale.

7. CONCLUSIONS

The Proterozoic quartzites in the exploration licence are fundamentally micaceous and as such contain too much alumina for TEMCO's needs.

Two possibilities existed for deposits of pure material in this environment; either an essentially non-micaceous unit or deep weathering of the micaceous quartzite with removal of mica.

Drilling of the two best deposits located supports the conclusion from mapping, that on the above basis the area has no potential for large tonnage, low alumina quartzite.

Small deposits of $\leq 0.8\% \text{Al}_2\text{O}_3$ quartzite may occur but only as thin, rare low-mica units and/or erratically mica-leached sections extending to from six to ten metres below the surface.

Although close to the surface, the small size and erratic distribution of low mica quartzite, with some contained unleached pockets, mean the deposits are unlikely to be of use to TEMCO.

Alumina occurs mainly in the form of mica, so, although not analysed for, K would also be expected to increase with depth.

RECOMMENDATIONS

No further exploration is recommended in the Proterozoic quartzites of the Forth area.

The exploration licence EL 18/75 was allowed to lapse on its expiral at the end of March, 1977.

APPENDIX 9.1

019

27 FEB 1976

Melbourne Research Laboratories
245-273 Wellington Road
Clayton, Victoria 3168
P.O. Box 274, Clayton
Telephone 560-7066

283021

Memo to: Geologist, Raw Materials

Date 11.2.76

Our Ref: MDLG:DAO' C

Your Ref:

Subject: Development of pure quartzites from micaceous quartz schists in the weathering profile in Tasmania

File: M.294

Date:

In the course of petrological examinations of various Tasmanian quartzite samples, one surface sample from the Forth area showed a distinct variation in physical properties and was described in detail (MRL 7521; MEL 5465). This pure quartzite in hand specimen varied from a massive, untextured white quartzite (A) to a parallel fractured (schistose) white quartzite (B). Fine drusy quartz was observed on thin, high angle fractures.

In thin section, quartzite A was found to contain about 5% parallel, plate-like holes about 0.2 mm long within an equigranular, granoblastic quartz assemblage (0.2-0.4 mm) with interlobate grain boundaries* (Plate 1A). By comparison with associated sub-surface samples these "boxworks" or holes were obviously after biotite mica.

Quartzite B, on the other hand, consisted of granoblastic quartz without biotite "boxworks". The quartz was inequigranular (two populations of grain sizes at 0.2-0.4 mm and 0.04 mm) with interlobate grain boundaries (Plate 1B). The finer grained quartz occurred in sub-parallel lenses which give rise to the schistosity in hand specimen. Moderately abundant irregular holes are associated with this quartz and presumably formed by its dissolution (Plate 1C). These holes are often partially or completely filled with euhedral overgrowths on the coarser grained quartz (ie drusy quartz), and a younger chalcedonic colloform overgrowth (Plate 1D).

The following rock history is postulated:

- 1) deformation(s) of the primary sediment to give rise to interbedded biotite quartz schist and quartzite. Owing to the compositional differences, these layers deformed and recrystallized differently ie equigranular vs inequigranular quartz textures.
- 2) dissolution of biotite and the finer-grained quartz** during early "weathering" in probably alkaline (pH > 7) waters. This produced a porosity in both layers but permeability only in the quartzite B layer (due to the discontinuous but interconnecting fine quartz lenses).
- 3) Continued movement of groundwaters through the permeable quartzite B layer resulted in later precipitation of firstly drusy quartz overgrowths, and later thin chalcedonic overgrowths. This may correspond to an increasing acidity

* Textural terminology from A.C. Moore, Lithos 3, 123-127, 1970.

** This would dissolve in preference to the coarser-grained quartz because of the much higher percentage of grain boundaries per unit volume.

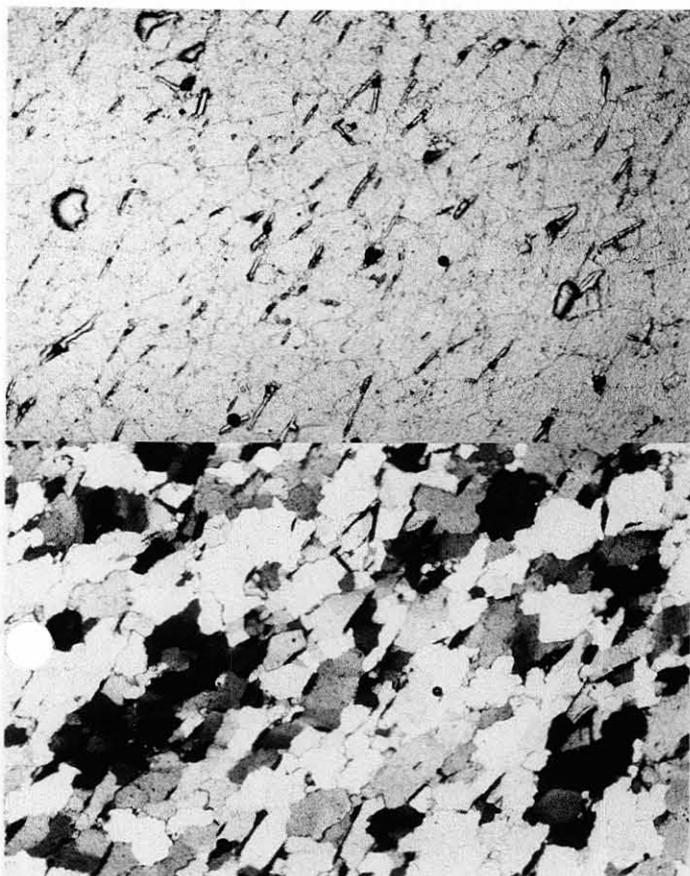
of the groundwaters (associated with the development of peat moss soils? and increasing denudation of the profile).

Thus results have several implications. Although some pure quartzites may persist to depth the majority of petrological work to date indicates that these units will be in the minority, and when present will be interbedded with micaceous quartz schists at depth. Consequently large tonnages of good grade quartzite are unlikely to be found in these sequences in Tasmania. Exploration is also likely to be made more difficult by the fact that mica boxworks are not always visible in hand specimen when present.

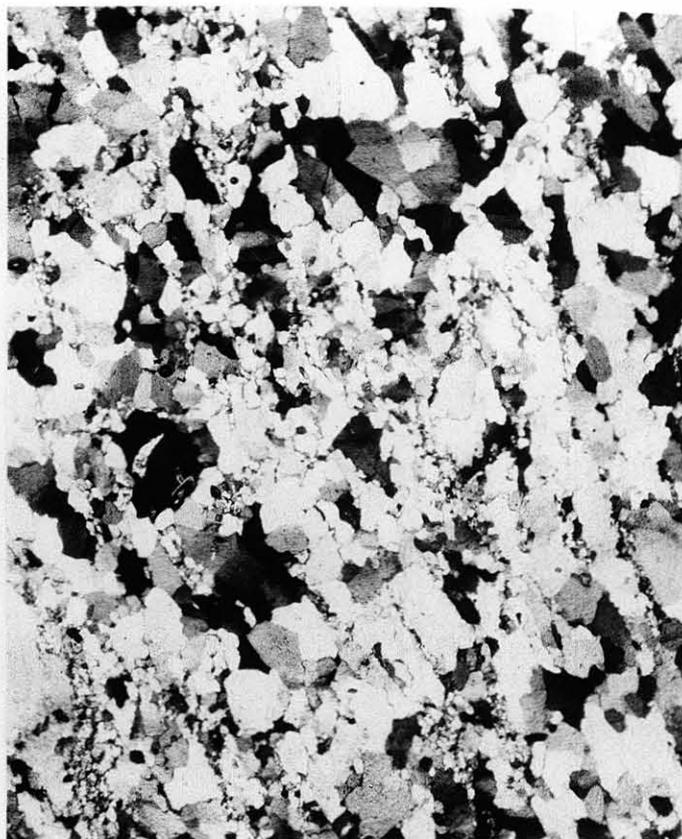
Secondary silicification of the quartzites is minor, and is likely to be confined to permeable units in the sequence.

Goode
David J. Gilbert
A.D.T. Goode
D.J. Gilbert

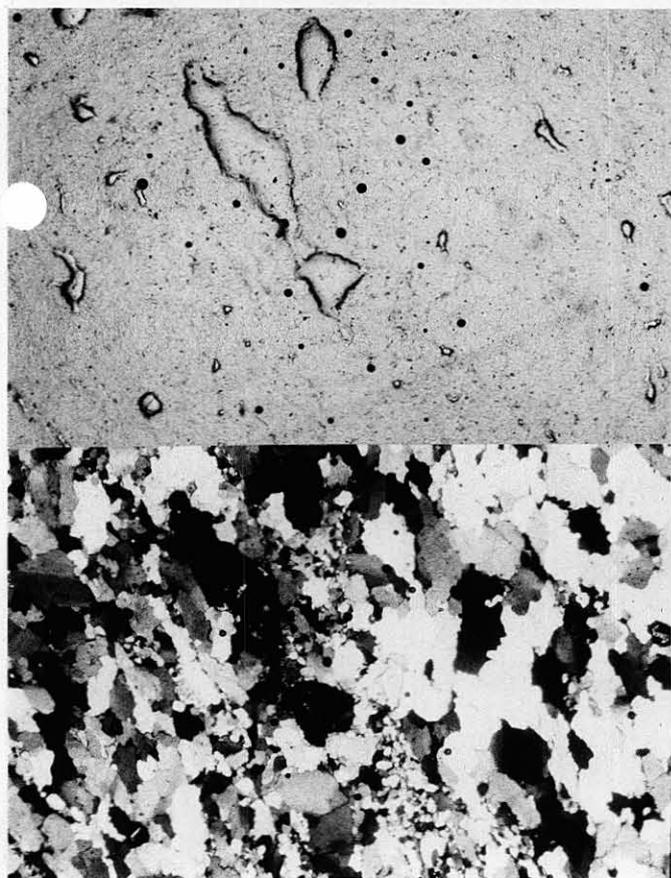
c.c. Mr. J. Harms
Mr. I. Reid
Library



A



B



C



D

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PLATE 1

- A. MRL 7521 Magnification 25 x
Quartzite "A" with aligned mica "boxwork".
Equigranular granoblastic quartz with interlobate grain boundaries is evident in the lower half of the photograph (crossed nicols).

- B. MRL 7521 Magnification 25x, crossed nicols.
Quartzite "B" with inequigranular quartz showing interlobate grain boundaries. Mica "boxwork" is absent.

- C. MRL 7521 Magnification 25x, ordinary light (upper half),
crossed nicols (lower half).
Quartzite "B" showing irregular holes, roughly aligned parallel to streaks of finer grained quartz and probably formed following partial dissolution of this finer grained quartz.

- D. MRL 7521 Magnification 100x, crossed nicols.
Quartzite "B" with narrow cavity (centre), showing two periods of silica precipitation.

Earlier deposition comprises "sawtooth" euhedral optically continuous drusy overgrowth surrounded by later chalcedonic colloform overgrowth.

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THIN SECTION DESCRIPTIONS

Locations: As shown on Figures 4, 5 and 6.

General: Muscovite - 38.7% Al_2O_3 , i.e. 1% muscovite +
= 0.4% Al_2O_3

MRL.7416 (MEL.5413) - Stone's quarry

Hand specimen: Finely lineated grey quartzite with slicken-sided quartz grains and no visible mica.

Minerals: Quartz with minor biotite (<1%)

Conclusion: Quartzite containing minor residual biotite in elongate cavities.

MRL.7418 (MEL.5417) - Jones' quarry

Hand specimen: Visibly micaceous quartzite. Less obviously micaceous quartzite does occur in quarry.

Minerals/Texture: Elongated and schistose quartz containing fine tourmaline. Lath shaped holes some containing minute relict laths of sericite or muscovite. Dark streaks in some holes of mica altered to iron and clay.

Conclusion: Schistose quartzite with relict "muscovite boxwork" representing 3-5% originally. Unaltered rock probably >1% Al_2O_3 .

MRL.7419 (MEL.5422) - South end of Hopkin's prospect

Hand specimen: White massive, semi friable pure quartzite with minor lath shaped cavities.

Minerals/Texture: Quartz with rare sericite within quartz grains. Occasional lath shaped holes but <1%. Sub-polygonal equigranular.

Conclusion: Quartzite with no evidence of silicification of mica and only very little of mica removal. Comparable to Dunham's deposit.

MRL.7420 (MEL.5423) - Hopkin's prospect, outcrop over DDH3.

Hand specimen: Hard quartzite as MRL.7419.

Minerals/Texture: Quartz, clay, zircon and rare sericite in some quartz grains. Occasional lath shaped boxworks after mica, between some quartz grains (generally <1%). A lot of elongate cavities (constituting <10%), many of which appear larger than for mica.

Conclusion: Quartzite with some sericite boxwork (probably <1%) but which may have contained more

MRL.7421 (MEL.5424) - South end of Hopkin's prospect

Hand specimen: Hard white quartzite with possible silicification.

Minerals/Texture: Quartz, with rare zircon and sericite within quartz grains (<1%). Quartz grains surrounded by chalcedonic silica but no evidence of this replacing earlier micas (i.e. no lath shaped pseudomorphs).

Conclusion: Secondary chalcedonic silica cemented quartzite without replacement of micas and only rare sericite.

THIN SECTION DESCRIPTIONS (continued)MRL.7422 (MEL.5426) - Dunham's quarry

Hand specimen: Friable, milky quartzite with few cavities but a lot of shiny slickensided quartz grains.

Minerals/Texture: Quartz with minor enclosed sericite (<1%) and some lath shaped cavities and sericite "boxwork" (≈2%)

Conclusion: Pure quartzite possibly with more mica at depth.

MRL.7423 (MEL.5427) - Dunham's quarry

Hand specimen: Hard clean white quartzite with very few elongate cavities.

Minerals/Texture: Clean quartz with rare zircons and no sericite or sericite "boxwork"

Conclusion: Pure quartzite.

MRL.7424 (MEL.5429) - Badcock's, north of Hopkin's deposit

Hand specimen: Mica rich quartzite in which mica is parallel to cleavage oblique to banding. T.S. apparently cut along a quartz band although across cleavage.

Minerals/Texture: quartz with lath shaped holes and traces of mica "boxwork" after mica.

Conclusion: Although T.S. shows only 2% probable mica the quartzite in general is micaceous.

MRL.7425 (MEL.5514) - Ertler's, north of John's deposit

Hand specimen: white, hard quartzite with random coarse mica flakes

Minerals/Texture: quartz with 1% of muscovite as narrow laths.

Conclusion: Non silicified low mica quartzite

MRL.7466 (MEL.5446) - East side of ridge continuation from Stone's quarry.

Hand specimen: limonitic gossan within serpentinite. Magnetic.

Minerals/Texture:

MRL.7468 (MEL.5457) - North end of Badcock's, north of Hopkin's

Hand specimen: slightly schistose pure quartzite though mica occurs in outcrop

Minerals/Texture: Quite a few fine elongate cavities, which do not appear due to mica in most cases, between euhedral quartz grains.

Conclusion: Fairly pure quartzite not necessarily representative of outcrop.

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THIN SECTION DESCRIPTIONS (continued)

283027

MRL.7469 (MEL.5458) - south end of tors at Hopkins prospect
in small cave.

Hand specimen: Hard silicified looking quartzite on surface
of tor, becoming schistose inside cave.

Minerals/Texture: Interlocked quartz grains with many elongate
parallel cavities obviously after mica. Some
cavities bent or inclined. Very few opaques.

MRL.7470 (MEL.5462A) - East side of John's

Hand specimen: Finely micaceous white quartzite

Minerals/Texture: Equigranular interlocked quartz with a con-
siderable number of elongate cavities with
partly removed mica.

MRL.7471 (MEL.5462B) - As above, along strike

Hand specimen: Non micaceous quartzite with fine cavities after
mica.

Minerals/Texture: Similar texture to above with no mica and
chalcedonic silica infilling cavities.

MRL 7422



MRL 7471



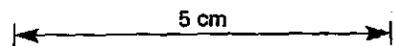
APPENDIX 9.2

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283029

Location. Forth, Tas. Coordinates, local. JOHN'S Geographical E. _____
 Angle of depression. 35° Bearing (Mag) 60° S. _____
 Drill Co. Mono Pumps Driller. _____ Drill type. Mindrill 1000 Commenced. _____
 Sheet 1 of 2 SCALE 1:50 Completed. _____

Geology	Graph Log.	Depth (m)	Mineralisation	Analyses %					
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	LOI	
HARD WHITE QUARTZITE WITH SOME RECRYSTALLISATION IN CAVITIES PARALLEL TO BANDING. DIP 70°-90° to LCA.		3.6		2.5 m					
				3.5 m	99.2	0.05	0.35	0.03	0.2
AS ABOVE WITH SOME BLACK INFILLING OF CAVITIES BETWEEN 4.07 AND 4.27		6.08		4.9 m					
				6.0 m	98.9	0.02	0.61	0.02	0.29
AS ABOVE + BK-bn CAVITIES AFTER MICA BY QTZT + HOMOGENOUS MICA		6.40		5 Ave	99.05	0.055	0.48	0.06	0.24
SOFT BLACK MICACEOUS QUARTZITE		7.19							
"		7.35							
MYONITISED QUARTZITE AND SCHIST		7.58							
MICA LEACHED POROUS WHITE QTZT		7.70							
HOMOGENOUSLY MICACEOUS QUARTZITE WITH SOME LEACHED SCHISTOSE SECTIONS WITH BLACK INFILL.		9.60							
WHITE LEACHED QTZT + SPORADIC MICA		9.98							
GREY MICACEOUS QUARTZITE WITH BLACK STAINED LEACHED SCHISTOSE SECTIONS		10.67							
AUTHIGENIC QTZ IN QVTS AFTER MICA IN QTZT		10.95							
HOMOGENOUSLY MICACEOUS QTZT WITH SOME LEACHED AND BLACK SECTIONS AND MINOR MICA		11.77							
HOMOGENOUSLY MICACEOUS QTZT		12.05							
BLACK JOINTED AND FLECKED QTZT		12.53							

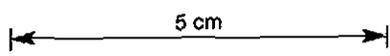


029

THE BROKEN HILL PTY. CO. LTD. Project. QUARTZITE EL 18/75 DRILL HOLE DDH1
 Location. Ferth, Tas. Coordinates, local. JOHN'S Geographical E. _____
 Angle of depression. 35° Bearing (Mag) 60° S. _____
 Drill Co. Noro Pumps Driller. _____ Drill type. Mindril 1000 Commenced. _____
 Sheet 2 of 2 SCALE 1:50 Completed. _____

283000

Geology	Graph Log	DEPTH (M)	Mineralisation	Analyses %				
FRIABLE HOMOGENEOUSLY MICACEOUS QTZT	12.75						
HARD " " "	13.15						
WTH. LMNE AND BK SCHISTOSE MIC. QTZT	13.74						
HARD HOMOGEN. MIC QTZT	13.77						
END HOLE								

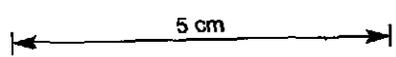


031

283032

THE BROKEN HILL PTY. CO. LTD. Project QUARTZITE EL 18/75 DRILL HOLE DD112
 Location: FORTH TIS Coordinates, local. 5011N5 Geographical E. _____
 Angle of depression. 35° Bearing (Mag) 60° S. _____
 Drill Co. NONO PUMPS Driller. _____ Drill type. Mindrill Elcoo Commenced. _____
 Sheet 2 of 2 SCALE 1:50 Completed. _____

Geology	Graph Log	Depth (m)	Mineralisation	Analyses %				
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	LOI
Foliated micaceous quartzite. Soft br-wt with dk joint filling.	13.57						
Slightly harder, less foliated pale brown quartzite with micaceous bands and fine homogeneous mica.	16.56						
Harder white quartzite with internal mica homogeneously distributed. Some partly mica leached bands 5-20 cm apart.	15.53	Dip 90° to LCA. Minor Fold 15.83					
As above with dip 30-85° to LCA.	16.60						
Hard white finely homogeneously micaceous quartzite alternating with bands of micaceous schistose quartzite.	18.20						
END HOLE								

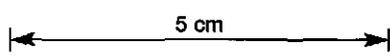


32

THE BROKEN HILL PTY. CO. LTD. Project. Y260 Quartzite, Tas. DRILL HOLE D.D.H. 3.
 Location. Forth, Tas. Coordinates, local. Hopkins Geographical E. _____
 Angle of depression. 25° Bearing (Mag) 50° S _____
 Drill Co. Meno Driller. _____ Drill type. Mindrill A 1000 Commenced. _____
 Sheet 1 of 1 Scale 1:100 Completed. _____

283033

Geology	Graph Log	Core Log	Mineralisation	Analyses %			
light brown soft weathered micaceous quartzite. Mica foliation dip around 15-25° to long c/a. Dark brown to black intersecting joints fillings. Mica homogeneous distribution.	0-5						
light brown, very soft sandy weathered micaceous quartzite.	5-10						
Cream and white very soft weathered micaceous quartzite with occasional harder patches. With mica homogeneous.	10-15						
Largely as above probably in missing sections, but harder material retained. white fractured homogeneous micaceous quartzite medium hard to friable showing shiny crystal faces, probably from regrowth during metamorphism and limited silicification.	15-20						
Bluish black micaceous clay with some quartz fragments. Most of rock missing.	20-22						
No core but water remained dark grey as for above.	?						

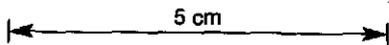


033

THE BROKEN HILL PTY. CO. LTD. Project. QUARTZITE EL 13/15 DRILL HOLE PH 1
 Location. FOATH TAS. Coordinates, local. JOHN'S Geographical E. _____
 Angle of depression. 90° Bearing (Mag) _____ S. _____
 Drill Co. Mono Pumps Driller. _____ Drill type. Maghew 1500 Commenced. _____
 Sheet 1 of 1 Scale 1:100 Completed. _____

283034

Geology	Graph Log.	Core Loss	Mineralisation	Analyses %					
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	LOI	
Red brown surface clay.									
Light brown clay.									
light green-grey structureless clay									
Fine pebbles of brown-black quartzite	o o o								
Hard white quartzite block at base.	o o o			6.5					
Hard white chips of non-micaceous quartzite. Water and SO ₂ smell.	o o o			49.3	0.05	0.30	0.03	0.3	
				8.5					
				98.6	0.25	0.35	0.10	0.4	
				9.5					
Fine white non-micaceous qtz + some schist	o o o								
As above, softer with very finely mic qtz.	o o o								
Micaceous quartz sand with a few lumps of white qtz which may be exotic.	o o o								
Hard white quartzite with some finely micaceous quartz and some bands of coarse mica schist.	o o o								
Quartz-mica sand, soft. Coarse mica schist running through white quartzite.	o o o								
Harder than above but similar. with fine and coarse mica within quartzite.	o o o								
Hard, white, finely homogeneously micaceous quartzite similar in appearance to surface sample MEL 5430	o o o								
20.5m. END HOLE									

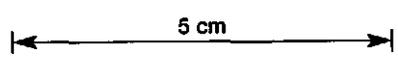


03A

THE BROKEN HILL PTY. CO. LTD. Project. QUARTZITE EL 18/75 DRILL HOLE PH 2
 Location. FORTH TAS Coordinates, local. HOPKINS' Geographical E. _____
 Angle of depression. 90° Bearing (Mag) _____ S. _____
 Drill Co. Mono Pumps Driller. _____ Drill type. Magnum 1500 Commenced. _____
 Sheet 1 of 1 Completed. _____

10
11
12
13
14
15
16

Geology	Graph Log	Core Loss	Mineralisation	Analyses %					
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	LOI	
Hard becoming very hard, white non-micaceous quartzite. Some black stained lumps of Fall-in in top section.				48.7	0.05	0.25	0.10	0.6	
				5	94.2	40.05	0.40	0.05	0.3
Soft brown sandy non-mic qtz.									
Hard quartzite as top of hole.				99.1	0.05	0.30	0.03	0.4	
				10	99.4	0.02	0.16	0.05	0.3
				11					
Soft sandy gw/bn micaceous qtz.									
As above with occasional coarse mica schist fragments.									



035

THE BROKEN HILL PTY. CO. LTD.

Location. John's Coordinates, local. See Plan Geographical E. _____
 Angle of depression. 60° Bearing (Mag) 50° S. _____
 Drill Co. N.W. Drilling Driller. Glen Phillips Drill type. _____ Commenced. 14/2/77
 Sheet 1 of 1 Scale 1:100 Completed. 14/2/77

283036

Geology	Graph log	Loss	Comments	Analyses %		
				SiO ₂	Al ₂ O ₃	
<p>Red clay. Very difficult drilling without a drag bit. Hole stopped because of very slow penetration rate and danger of jamming bit down hole.</p> <p>12m</p>						

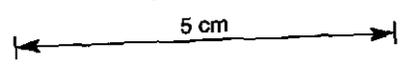
5 cm

036

283032

THE BRITISH PETROLEUM CO. LTD. Y260 FORTH QUARTZITE PH 4
 Location. John's Coordinates, local. See Plan Geographical E. _____
 Angle of depression. 50° Bearing (Mag) 50° S. _____
 Drill Co. N.W. Drilling Driller. Glen Phillips Drill type. Atlas Copco Airtrac Commenced. 15/2/77
 Sheet 1 of 1 Scale 1:100 Completed. 15/2/77

Geology	Graph	Log	Loss	Comments	Analyses %	
					SiO ₂	Al ₂ O ₃
White medium hand quartzite largely as fine powder.					99.5	0.05
light brown, soft, finely micaceous quartzite.					95.0	2.0
					89.8	5.6
Off white medium to coarsely micaceous quartzite, soft drilling.					91.7	4.4
					92.9	4.0
END HOLE 21M						



837

283038

THE BROKEN HILL PTY. CO. LTD. Project. Y260 FORTH QUARTZITE DRILL HOLE PH 5
 Location, JOHNS Coordinates, local. See Plan Geographical E. _____
 Angle of depression. 50° Bearing (Mag) 50° S. _____
 Drill Co. N. West Drilling Driller. Glen Phillips Drill type. Atlas Copco Airtrac Commenced. 15/2/77
 Sheet 1 of 1 Scale 1:100 Completed. 15/2/77

Geology	Grain size	Loss	Comments	Analyses %			
				SiO ₂	Al ₂ O ₃		
Red clay and soil							
Medium hard white quartzite. wet gravel of quartzite chips & brown clay							
Hard white quartzite but with intermixed brown clayey water and balls, as contamination from above.							
Softer quartzose gravel							
White quartzite. Hard but contaminated with clayey water and balls							
Softer micaceous quartzite with brown clay balls and water							
As above but of medium hardness.							
END HOLE 21 m							

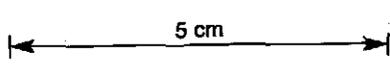
5 cm

038

283039
630382

THE BROKEN HILL PTY. CO. LTD. Project Y260 FORTH QUARTZITE DRILL HOLE PH6
 Location JOHN'S Coordinates, local see Plan Geographical E. _____
 Angle of depression 50° Bearing (Mag) 50° S _____
 Drill Co. North West Drilling Driller Glen Phillips Drill type Atlas Copco Airtrac Commenced 15/2/77
 Sheet 1 of 1 Scale 1:100 Completed 15/2/77

Geology	Graph Log.	Loss	Comments	Analyses %			
				SiO ₂	Al ₂ O ₃		
Aluvium and loose quartzite. Some contamination by red clay from above. Hard white non-micaceous quartzite.				99.1	0.20		
Hard white quartzite with fine mica within fines.				97.8	1.0		
As above with not a lot of mica.				98.8	0.40		
Off white, light brown sample of white quartzite and micaceous quartzite.				97.9	0.70		
light brown very micaceous quartzite. Hard from 12-14 metres softer from 14-21 m.				88.0	5.9		
END OF HOLE 21M.							

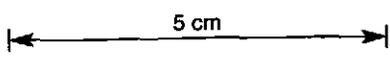


039

283040

THE BROKEN HILL PTY. CO. LTD. Project. Y260 FORTH QUARTZITE DRILL HOLE PH7
 Location. John's / Pointons Coordinates, local. see Plan Geographical E. _____
 Angle of depression. 45° Bearing (Mag) 40° S. _____
 Drill Co. North West Drilling Driller. Glen Phillips Drill type. _____
 Sheet 1 of 1 Scale 1:100 Commenced. 15/2/77
 Completed. 16/2/77

Geology	Graph Log	Loss	Comments	Analyses %			
				SiO ₂	Al ₂ O ₃		
white partly micaceous quartzite.				98.2	0.45		
white, non-micaceous, medium hard quartzite with some orange stained chips.				99.0	0.05		
As above.				90.4	5.1		
Medium brown, medium to soft micaceous quartzite							
off white soft micaceous quartzite				93.4	3.9		
Pale yellow soft micaceous quartzite.							
Yellow brown as above				91.3	4.3		
off white micaceous quartzite Hard from 18-19.5 m.							
END HOLE 21 m.							



040

283041

THE BROKEN HILL PTY. CO. LTD. Project. Y260 FORTH QUARTZITE DRILL HOLE P118

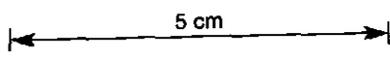
Location. Johns/Pointons Coordinates, local. See Plan Geographical E. _____

Angle of depression. 45° Bearing (Mag) 40° S. _____

Drill Co. North West Drilling Driller. G. Phillips Drill type. Air trac Atlas C. Commenced. 15/2/77

Sheet 1 of 1 Scale 1:100 Completed. 15/2/77

Geology	Graph Log	Loss	Comments	Analyses %			
				SiO ₂	Al ₂ O ₃		
Red clay							
Very soft pale yellow quartz sand with white quartzite chips and lumps, minor mica.				98.5	0.40		
Medium brown, medium hard micaceous quartzite with white non-micaceous chips.				90.4	4.7		
Brown micaceous quartzite, wet, no sample taken.							
END HOLE 12m.							

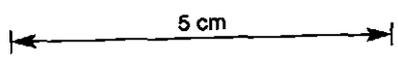


041

283042

THE BROKEN HILL PTY. CO. LTD. Project. Y260 - Forth Quartzite DRILL HOLE PH 9
 Location. Johns/Fishers Coordinates, local. See Plan Geographical E. _____
 Angle of depression. 50° Bearing (Mag) 50° S. _____
 Drill Co. North West Drilling Driller. G. Phillips Drill type. Atlas C. Airtrac Commenced. 15/2
 Sheet 1 of 1 Scale 1:100 Completed. 15/2

Geology	Graph Log.	Loss	Comments	Analyses %		
				SiO ₂	Al ₂ O ₃	
Hard white very finely powdered quartzite.				99.2	0.10	
As above but softer with a trace of mica in the last metre.				98.4	0.55	
Yellow brown soft micaceous quartzite with some white quartzite chips.				86.8	5.4	
Medium hard off white micaceous quartzite.				92.2	3.9	
Medium hard yellow brown micaceous quartzite.						
END HOLE 18m						

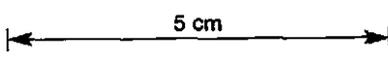


042

283043

THE BROKEN HILL PTY. CO. LTD. Project. Y260 FORTIN QUARTZITE DRILL HOLE PH 10
 Location. John's/Fishers Coordinates, local. See Plan Geographical E. _____
 Angle of depression. 50° Bearing (Mag) 50° S. _____
 Drill Co. _____ Driller. _____ Drill type. _____ Commenced. _____
 Sheet _____ of _____ Scale _____ Completed. _____

Geology	Graph Log.	Loss	Comments	Analyses %		
				SiO ₂	Al ₂ O ₃	
Loose scree and soil with white non-micaceous quartzite chips.						
White, slightly micaceous, hard quartzite with chips as above.				98.4	0.45	
White quartzite without mica and a little very finely micaceous brown quartzite. Hard to 8m then medium to soft.						
Light to dark brown quartzite with wet gravel from 11m. Slightly micaceous.						
Coarse gravelly chips of white homogeneously micaceous quartzite and brown micaceous mud. Wet.						
END HOLE 15m						

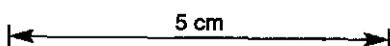


043

283044

THE BROKEN HILL PTY. CO. LTD. Project Y260 FEATH QUARTZITE DRILL HOLE PH 11
 Location Hopkins Coordinates, local See Plan Geographical E. _____
 Angle of depression 50° Bearing (Mag) 50° S. _____
 Drill Co. North West Drilling Driller G. Phillips Drill type Atlas C. Airtrac Commenced 16/2/77
 Sheet 1 of 1 Scale 1:100 Completed 16/2/77

Geology	Graph Log.	Loss	Comments	Analyses %			
				SiO ₂	Al ₂ O ₃		
Hard white non-micaceous quartzite.				99.3	0.05		
Light brown, medium soft slightly micaceous quartzite.				99.3	0.05		
Soft light brown micaceous quartzite with chips of white quartzite which may be contamination from above.				96.2	1.7		
END HOLE 15m							



044

THE BROKEN HILL PTY. CO. LTD.

Project. Y260 FORTH QUARTZITE DRILL HOLE P112

Location. Hopkins Coordinates, local. _____ Geographical E _____

Angle of depression. 60° Bearing (Mag) 50° S _____

Drill Co. North West Drilling Driller. G. Phillips Drill type. Atlas C. Airtrac Commenced. 16/2/77

Sheet 1 of 1 Scale 1:100 Completed. 16/2/77

283045

Geology	Graph Log.	Loss	Comments	Analyses %		
				SiO ₂	Al ₂ O ₃	
Very Hard, white, non-micaceous quartzite.				99.1	0.05	
As above						
As above becoming micaceous at depth.				93.8	3.0	
Medium brown soft, partly micaceous quartzite.						
Light brown, soft, micaceous quartzite.						
END HOLE 15m						

5 cm

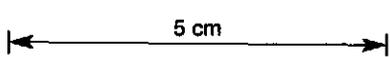
045

283046

THE BROKEN HILL PTY. CO. LTD. Project Y260 FORTH QUARTZITE DRILL HOLE Pit 13

Location Hopkins' Coordinates, local See Plans Geographical E. _____
 Angle of depression 60° Bearing (Mag) 50° S. _____
 Drill Co. North West Drilling Driller G. Phillips Drill type Atlas C. Air Rec Commenced 16/2/77
 Sheet 1 of 1 Scale 1:100 Completed 16/2/77

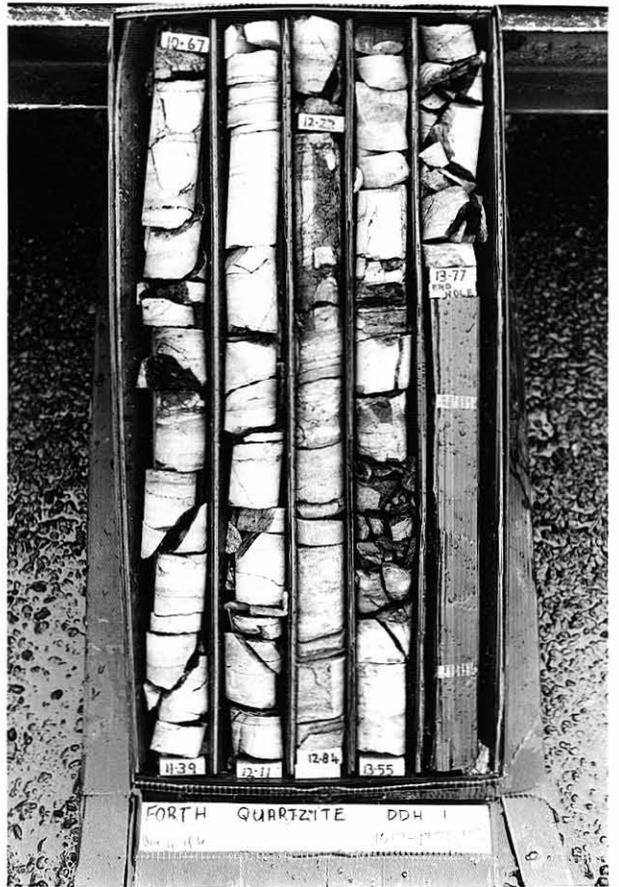
Geology	Graph Log.	Loss	Comments	Analyses %		
				SiO ₂	Al ₂ O ₃	
Off white soft quartzite with little or no mica.						
Dark brown soft micaceous quartzite						
Medium brown soft micaceous quartzite. Water at bottom.						
As above, not sampled.						
END HOLE 12m						

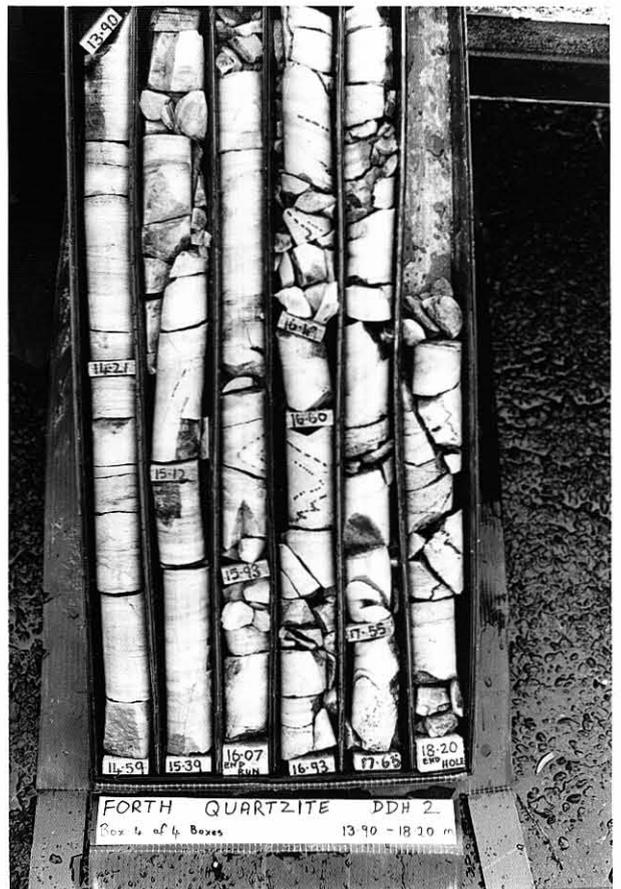
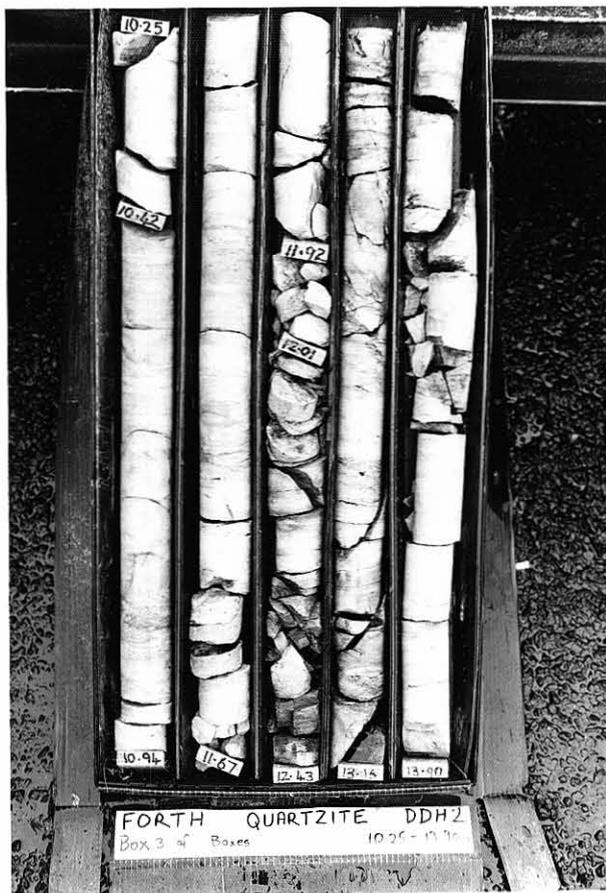


APPENDIX 9.3

047

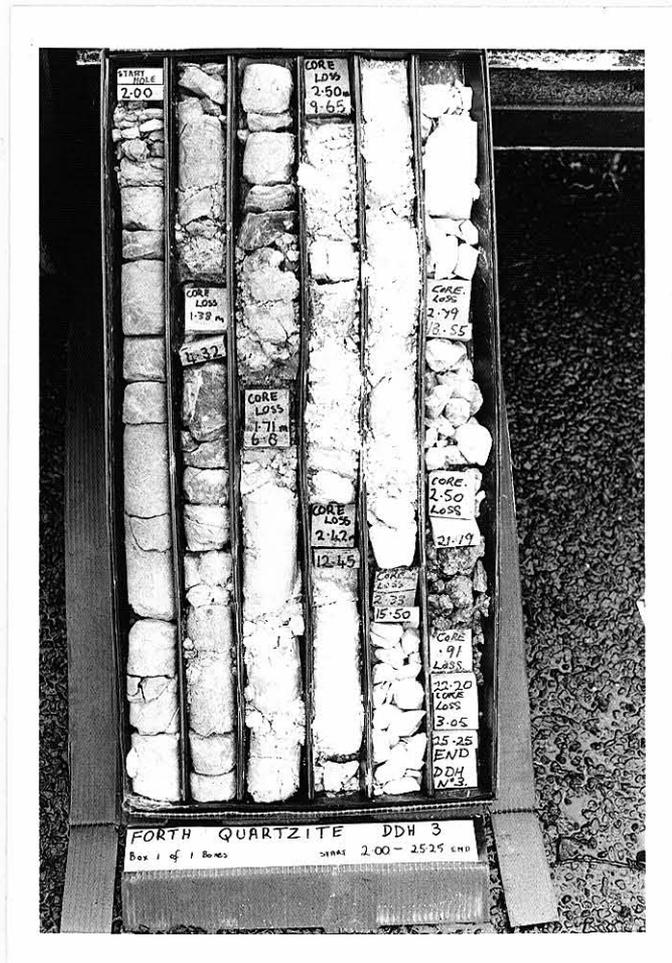
283048





049

283050



APPENDIX 9.4

051

SURFACE BULK SAMPLE RESULTSRESULTS OF THERMAL STABILITY TESTS

Quartzite Samples	Density g/cc	+ $\frac{3}{4}$ " Fraction after heating	+3/16" Fraction after tumbling	Location	SiO ₂	Fe	Al ₂ O ₃	P ₂ O ₅
MEL 5430	2.54	100.00%	98.3%	John's	99.2	0.6	0.02	<0.02
5431	2.50	82.5%	96.6%	"	98.5	1.3	<0.02	<0.02
5432	2.54	94.5%	98.8%	"	98.8	1.0	<0.02	<0.02
5433	2.54	83.7%	95.7%	Hopkins N	98.7	0.75	0.06	<0.02
5434	2.56	94.9%	87.2%	Hopkins Middle	98.7	0.8	0.04	<0.02
5435	2.33	95.0%	96.8%	Hopkins E	98.8	0.8	<0.02	<0.02
5436	2.49	97.9%	97.9%	Hopkins SW	99.0	0.45	<0.02	<0.02
5445	2.57	94.2%	95.0%	Stone's Quarry	97.1	1.2	0.18	<0.02

283052

052

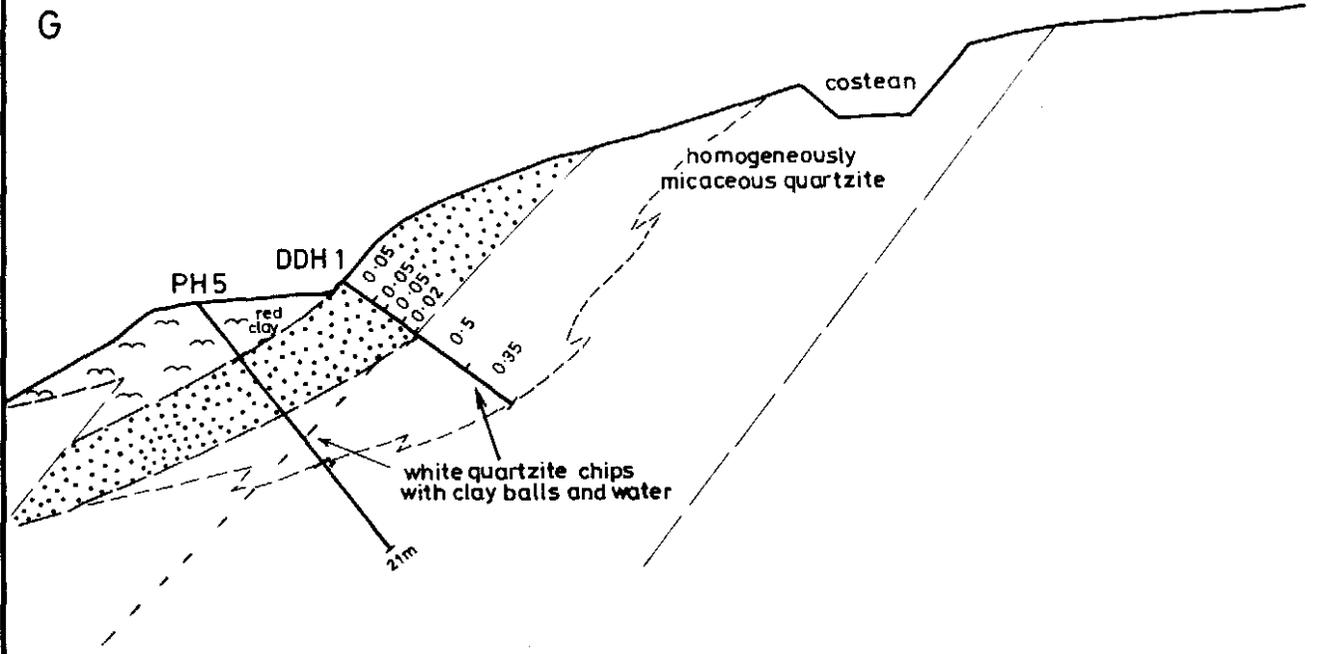
WEST

283053

FIG. 2 A

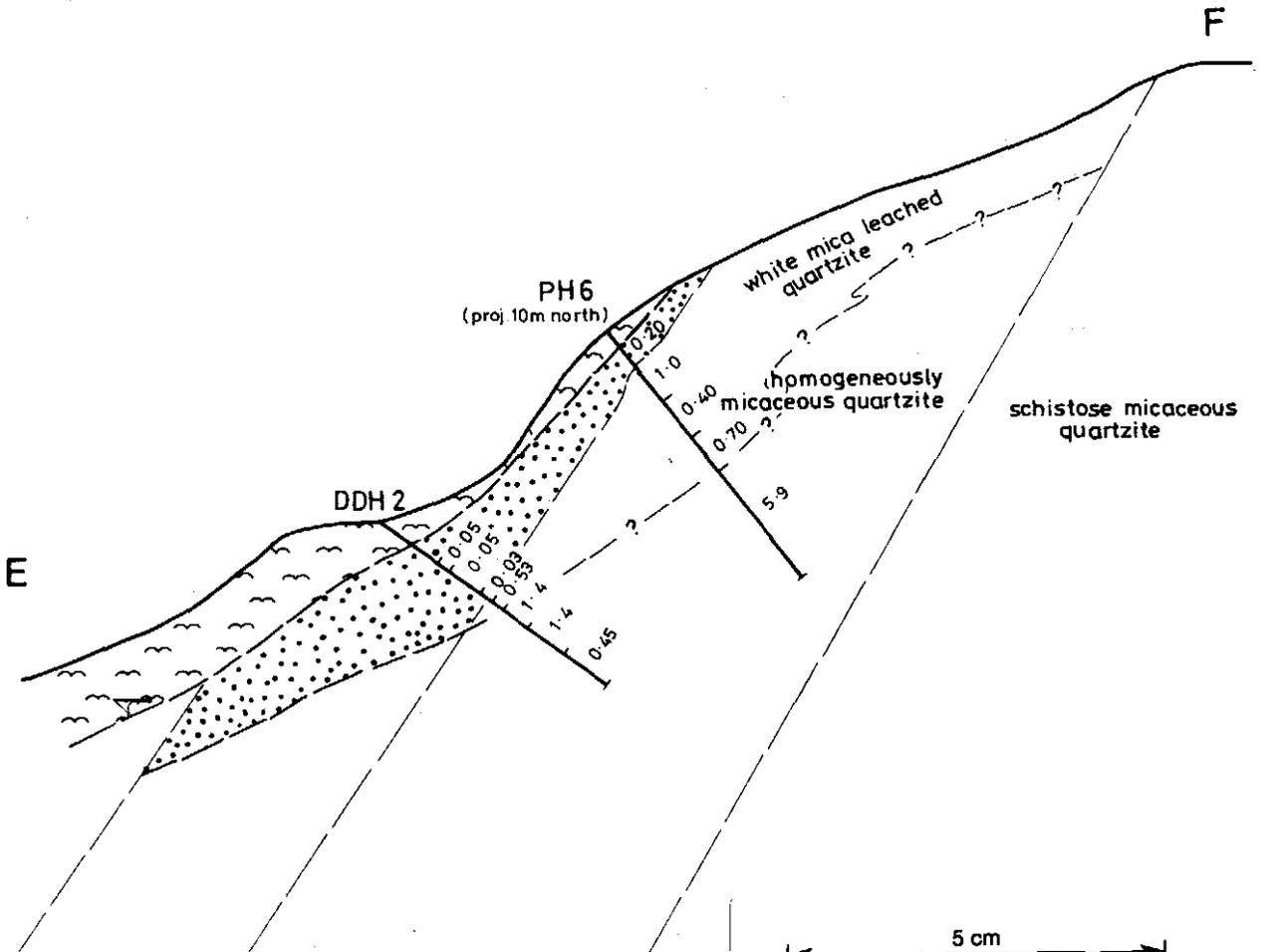
EAST
H

G



SECTION G—H

F



SECTION E—F

DDH 2

Drillhole and number

0.03 % Al₂O₃

Alluvium

Quartzite

Scale 1:500

0 5 10 15 20 Metres

Centre
Melbourne

Date
22 9 76

THE BROKEN HILL PROPRIETARY CO. LTD.

DRILL SECTIONS G—H, E—F

K.R. JOHNS QUARTZITE PROSPECT, FORTH, TAS.

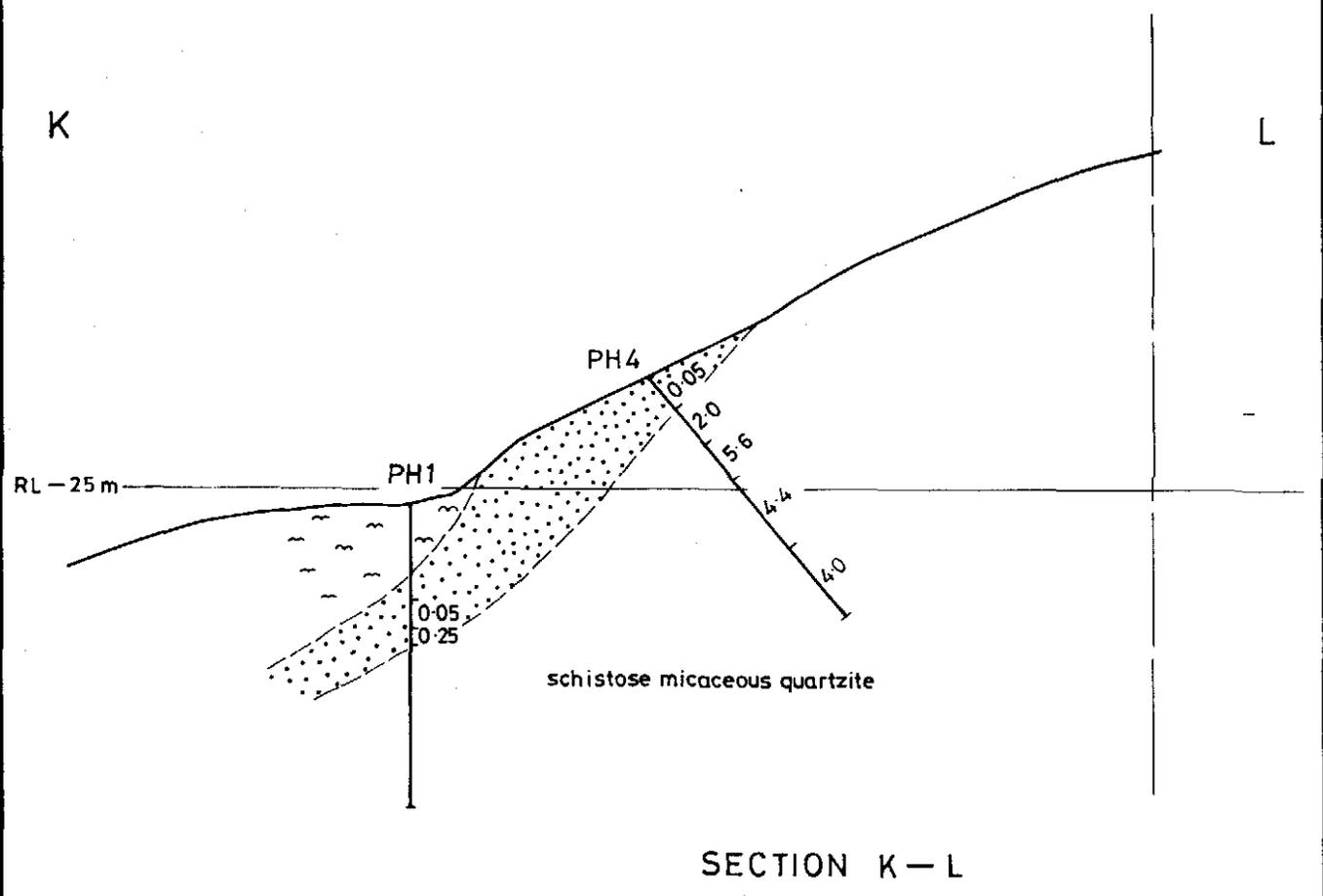
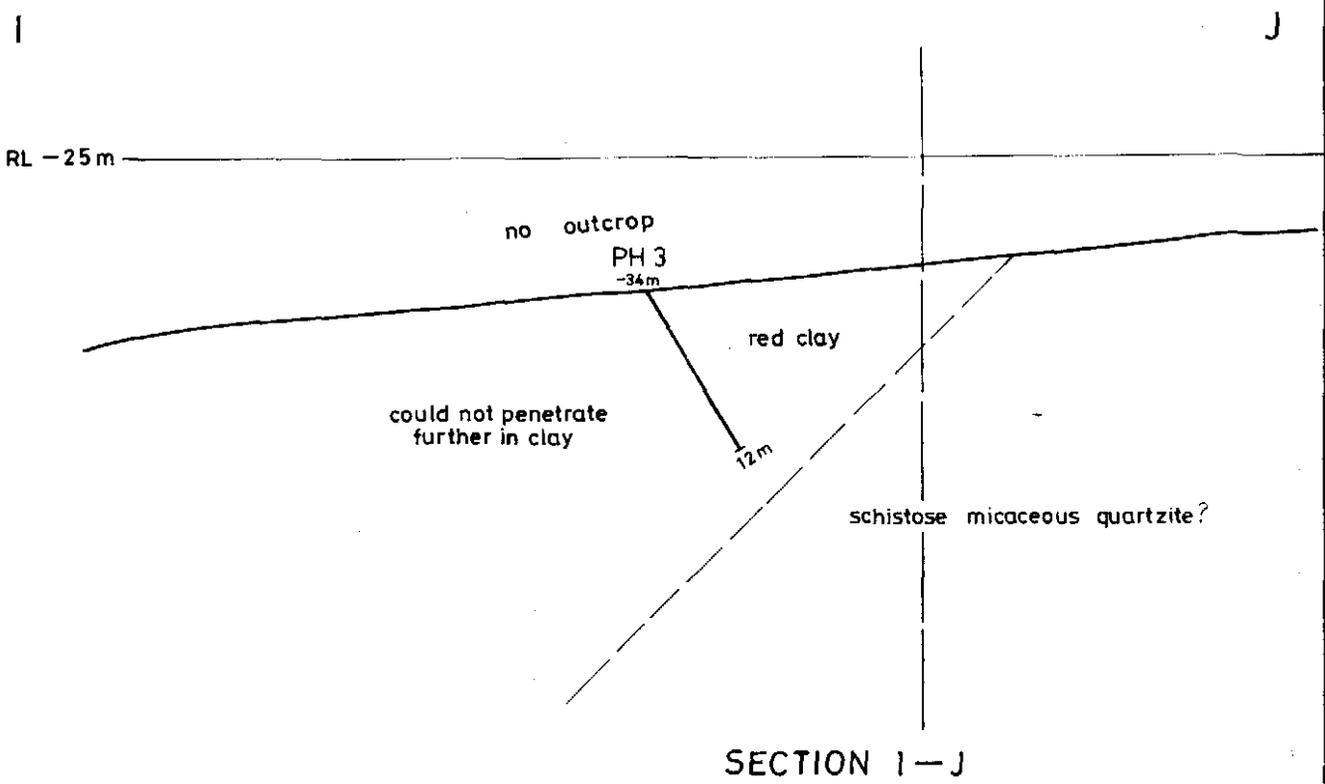
Project No.

Drawing No.
A4-1771-1

053

283054

FIG. 2B



Centre:
Melbourne

Date:
4-4-77

THE BROKEN HILL PROPRIETARY CO. LTD.
QUARTZITE - FORTH AREA, TAS.
SECTIONS - K. JOHN'S PROSPECT

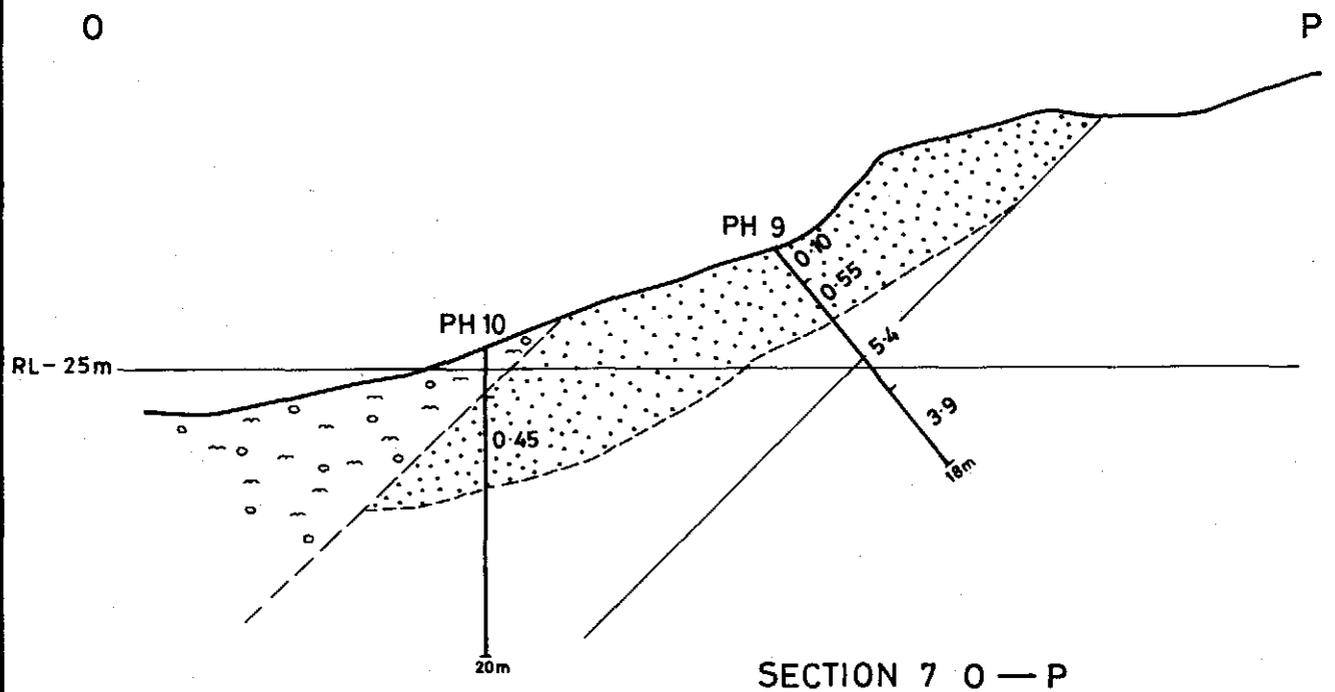
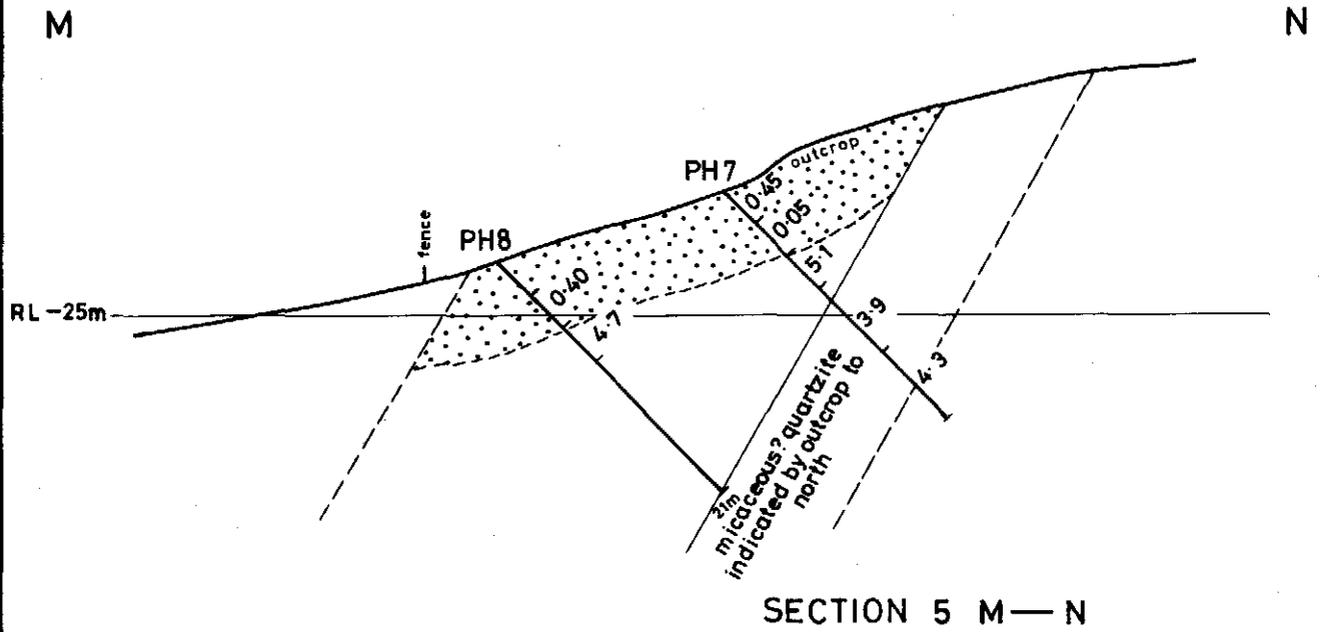
Project No

Drawing No
A4-1771-2

054

283055

FIG. 2c.



5 cm

Scale 1:500

0 5 10 15 20 Metres

Centre:
Melbourne

Date:
4-4-77

THE BROKEN HILL PROPRIETARY CO. LTD.
QUARTZITE — FORTH AREA, TAS.
SECTIONS — K. JOHN'S PROSPECT

Project No

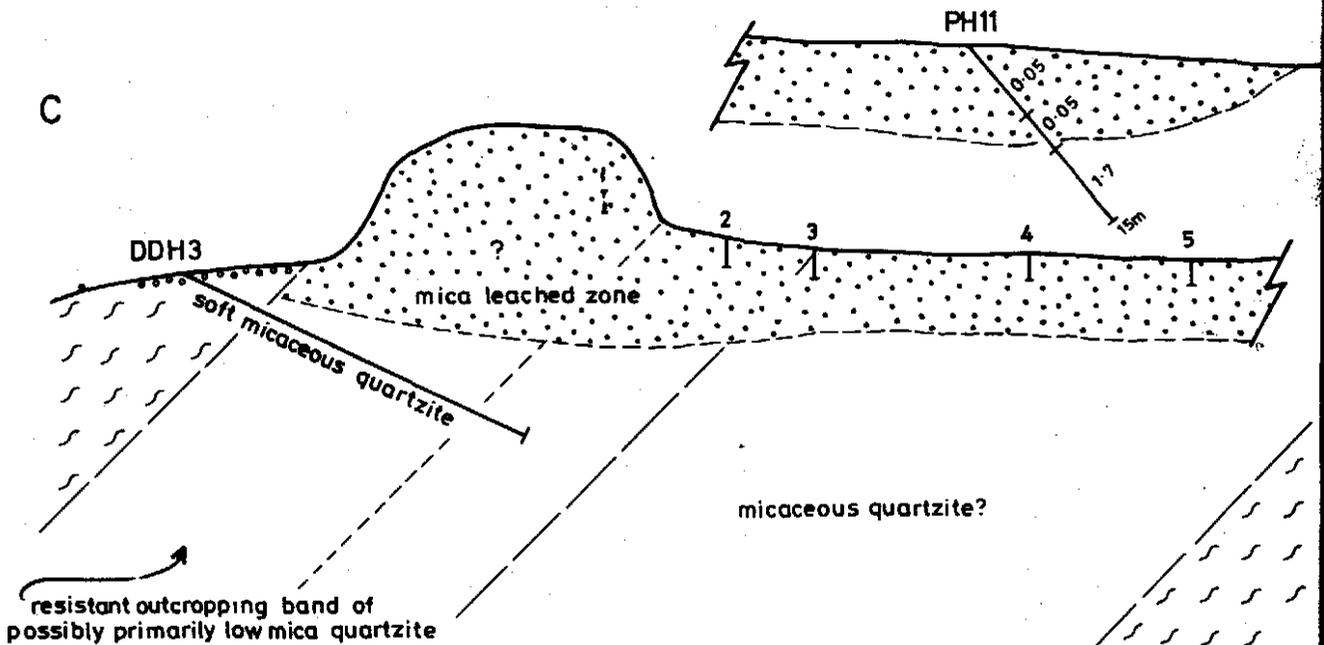
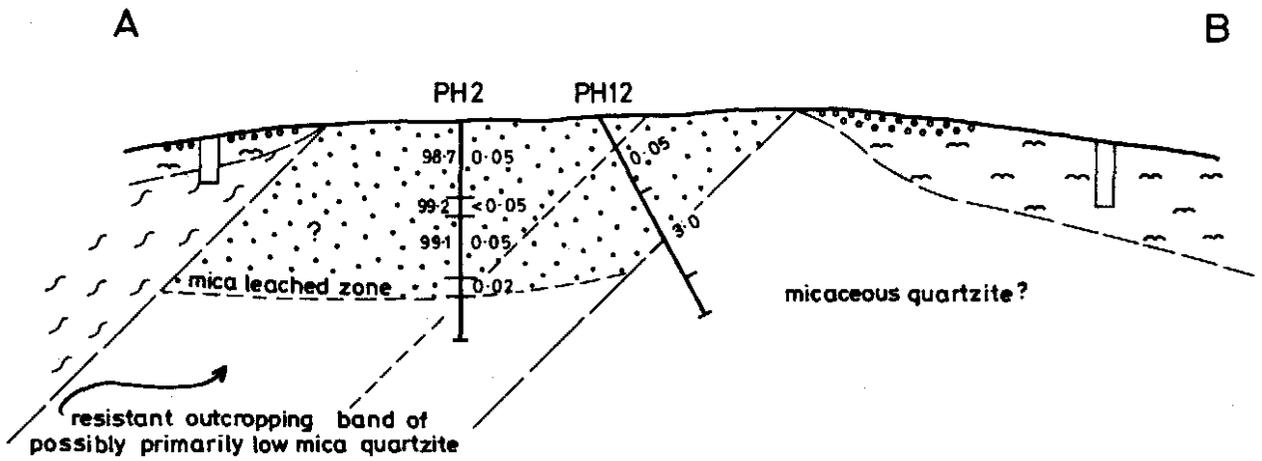
Drawing No
A4-1771-3

055

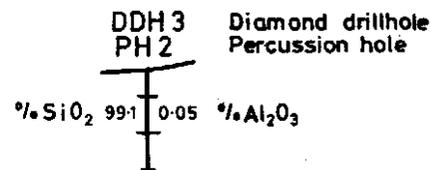
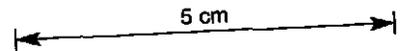
WEST

283056

FIG. 3 A. EAST



- Low alumina quartzite
- Schistose micaceous
- Alluvium
- Quartzitic scree
- Pit
- Shallow percussion hole



Scale 1:500



Centre
Melbourne
Date
11 - 10 - 76

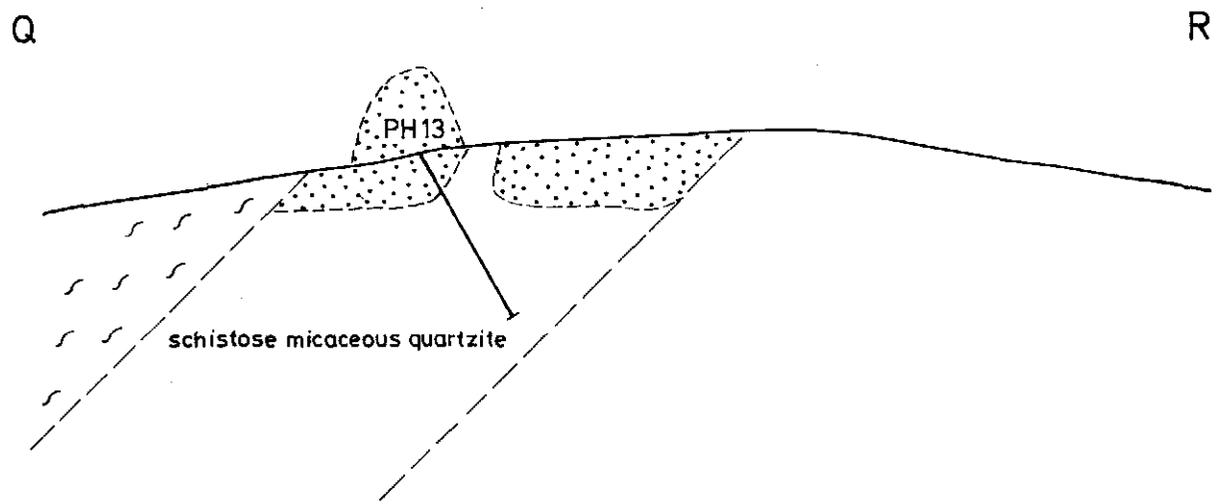
THE BROKEN HILL PROPRIETARY CO. LTD.
QUARTZITE - 18/75 FORTH, TAS.
SECTIONS A-B & C-D, HOPKINS PROSPECT

Project No.
Drawing No.
A4-1770-1

056

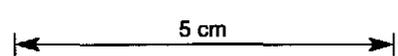
283057

FIG. 3B



SECTION Q-R

Scale 1:500



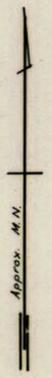
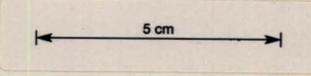
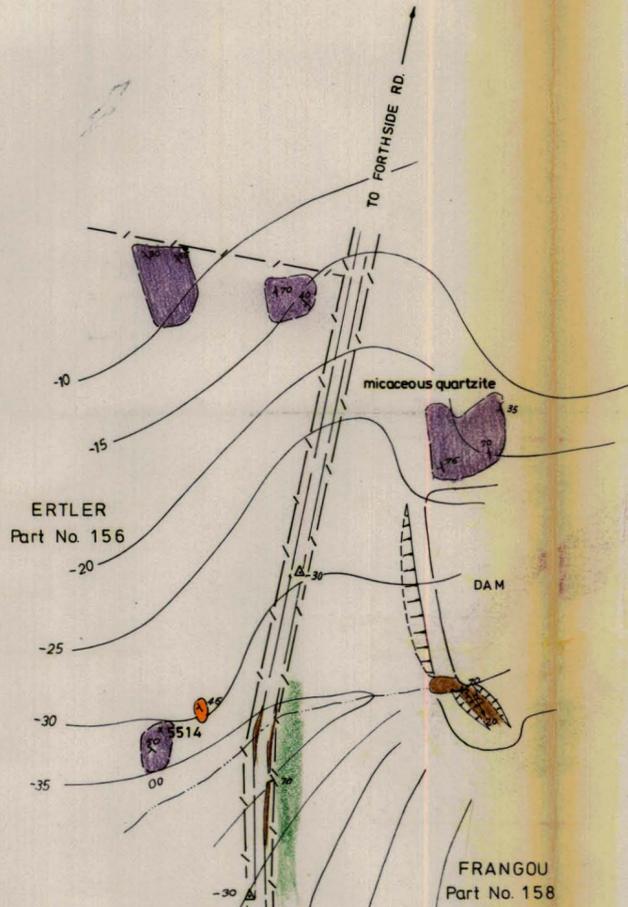
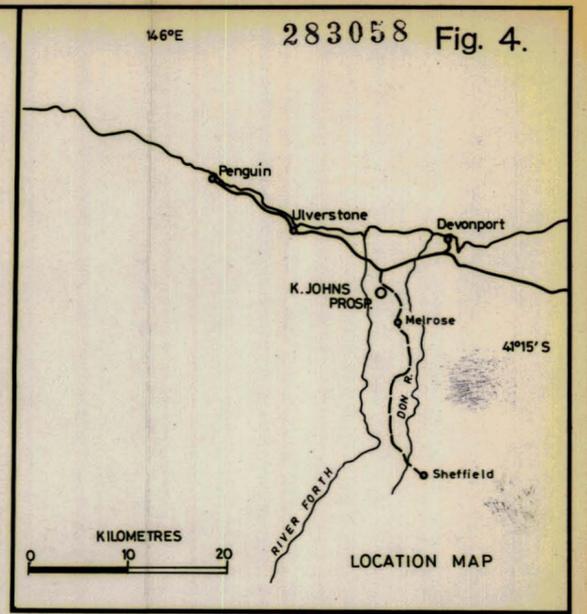
Centre:
Melbourne

Date:
4 - 4 - 77

THE BROKEN HILL PROPRIETARY CO. LTD.
QUARTZITE - FORTH AREA, TAS.
SECTION - B. HOPKINS PROSPECT

Project No

Drawing No
A4-1770-2



JOHN Part No. 157

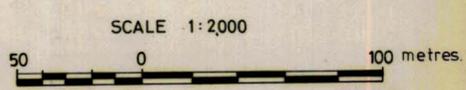
POYNTON Part No. 160

LEGEND

- Outcrop - White qtzit banded or massive
- inferred - " " " " "
- Micaceous qtzit which may also be massive
- Non micaceous quartzite with a schistose appearance indicates removal of mica
- Outcrop - Schistose micaceous quartzite or quartz mica schist
- Inferred - " " " " "
- Root - " " " " "

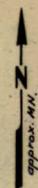
- 5- Approximate contour line
- Creek
- Fence
- Track
- Sample traverse with Mel.No.
- Outcrop boundary
- Boundary of projecting outcrop
- Pegged survey point with R.L.
- Cross section line
- Percussion hole
- Diamond drill hole
- Petrological sample with M.E.L. number

Mining lease application 942 P/M.



78-1242.

E.L. 18/75 TAS.- OUTCROP MAP: METAMORPHICS QUARTZITE PROSPECT- K. JOHN'S PROPERTY		
Drawn: C.R.	Date: 18-2-76	Centre: Melbourne
Traced: E.D.	Project No.	Drawing No.
Checked	1189	A2-1205
O.I.C.		

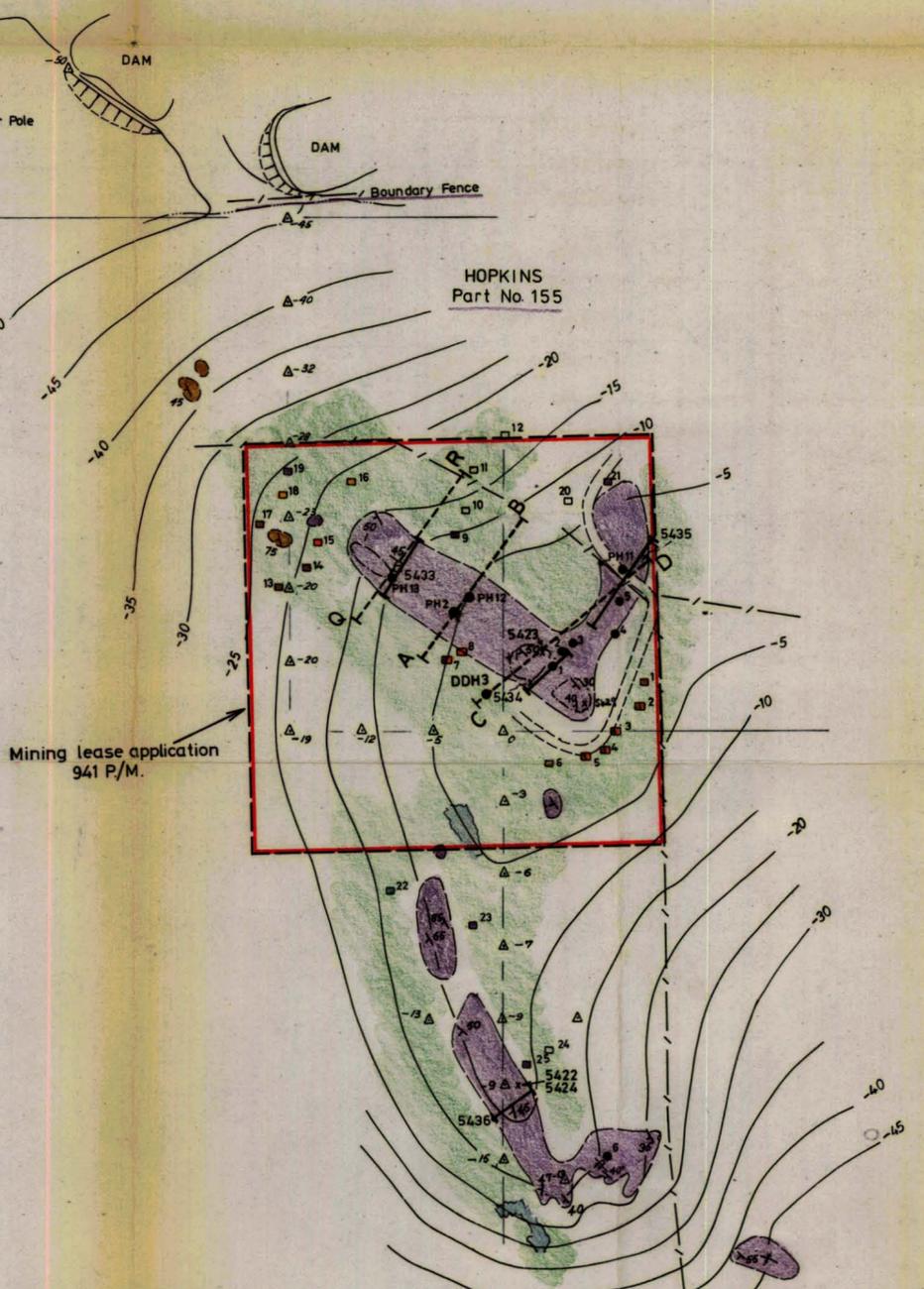
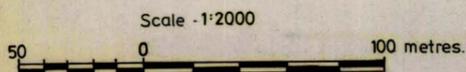
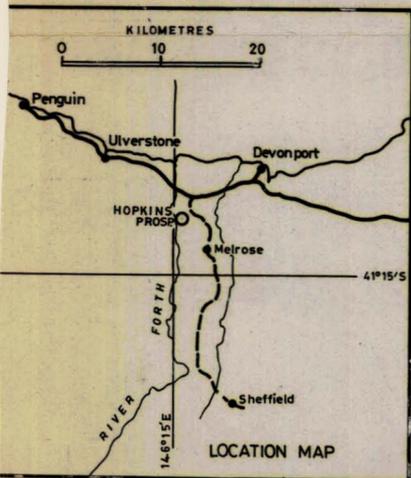
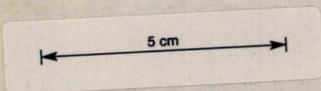
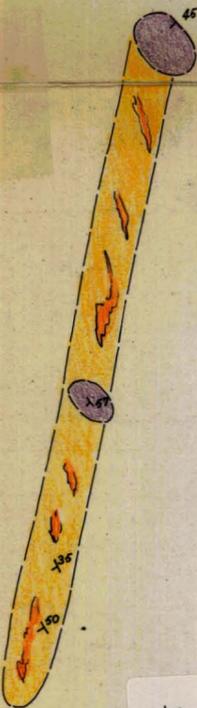


HOWARD
Part No. 142

BADCOCK
Part No. 154

- Outcrop: White qtzt banded or massive
- Outcrop: Micaceous quartzite which may also be massive
- Outcrop: Non micaceous quartzite with a schistose appearance indicates removal of mica.
- Inferred massive quartzite
- Outcrop: Schistose micaceous quartzite or quartz mica schist
- Outcrop/Float: Schistose micaceous quartzite or quartz mica schist
- Inferred micaceous quartzite or quartz mica schist

- 50- Approximate contour line, sometimes extrapolated to indicate topography.
- Creek
- Fence
- Track
- Sample traverse with Mel. No.
- Outcrop boundary
- Boundary of projecting outcrop
- Cross section line
- Pegged survey point with R.L.
- Pit - approx. 8' deep
- Pneumatic drill hole - 5' deep, no mica detected
- Percussion hole
- Diamond drillhole
- Petrological sample with MEL number

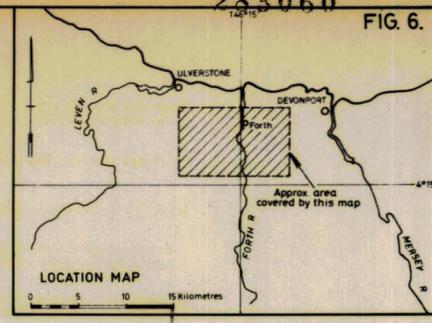


Mining lease application
941 P/M.

78-1242

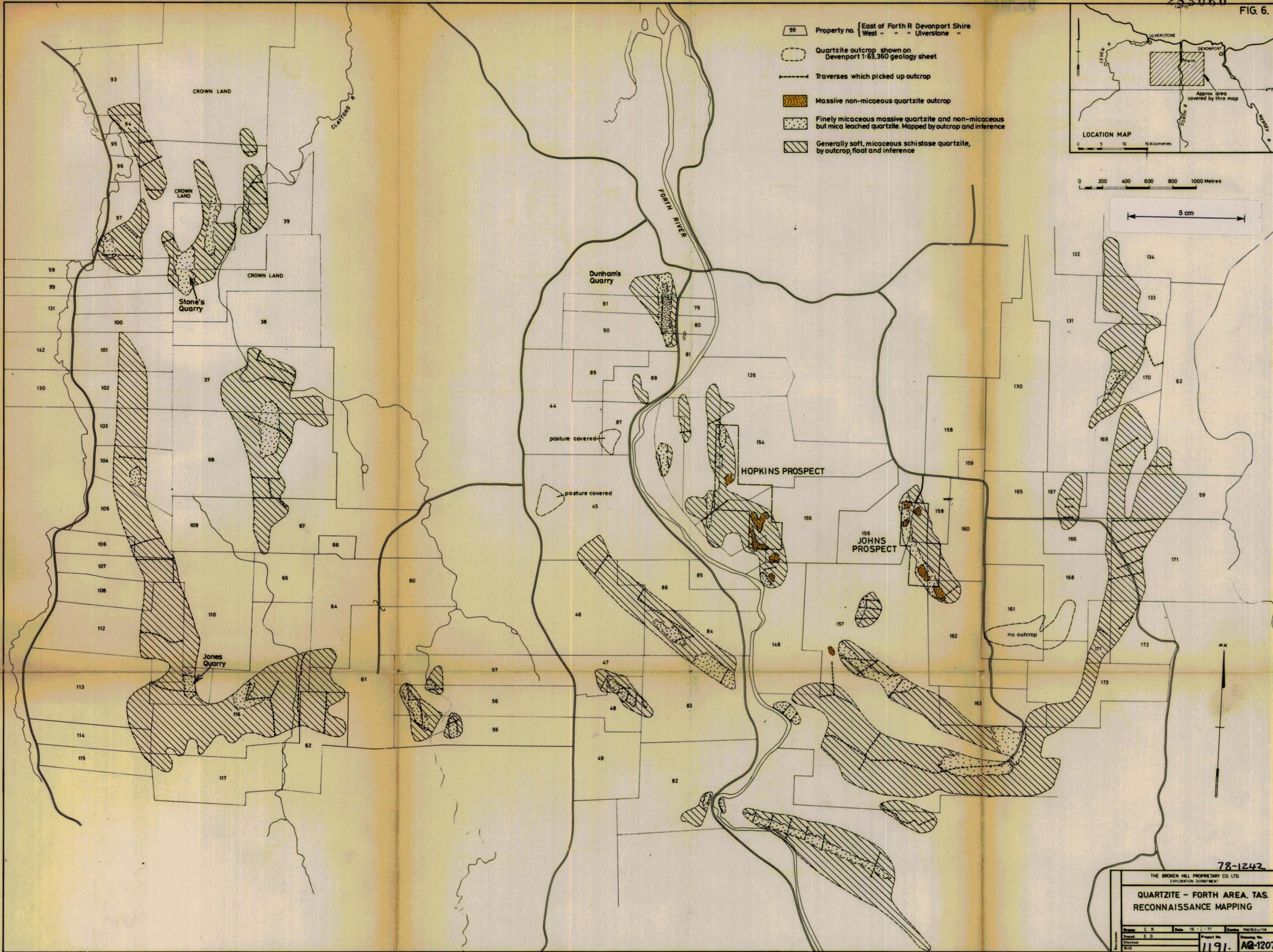
The B.H.P. Co. Ltd., WHYALLA S.A.	GEOLOGY. <i>C. Roberts</i>	A2- 1206
OUTCROP MAP - METAMORPHICS EL18/75 TAS.	DRAWN. <i>E. Dutch</i>	SA-
QUARTZITE PROSPECT ON B.HOPKINS PROPERTY	CHECKED.	
	DATE. <i>4.4.77</i>	1190

- 99 Property no. { East of Forth R Devonport Shire
West " " Ulverstone " }
- Quartzite outcrop shown on
Devonport 1:63,360 geology sheet
- Traverses which picked up outcrop
- Massive non-micaeous quartzite outcrop
- Finely micaeous massive quartzite and non-micaeous
but mica leached quartzite. Mapped by outcrop and inference
- Generally soft, micaeous schistose quartzite,
by outcrop, float and inference



0 200 400 600 800 1000 Metres

5 cm



78-1242

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

**QUARTZITE - FORTH AREA, TAS.
RECONNAISSANCE MAPPING**

Drawn: C. B.	Date: 15-2-77	Scale: Melbourne
Checked: E. D.	Project No:	Drawing No:
Checked: G.T.C.	1191	AQ-1207