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095001

OPEN FILE

EXPLORATION LICENCE

11/84

MAC CAMPBELL FORSTER

WELD RIVER

SOUTHERN TASMANIA

- 2 SEP 1985
DEPT. OF MINES
No. 9355/85

ANNUAL REPORT OF ACTIVITIES

FOR THE YEAR ENDED 27. 9. 85

MICROFILMED

Report Prepared for
M. C. Forster by
T. G. SUMMONS
Summons Geoservices Pty. Ltd.
August, 1985.

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SUMMARY

Within Exploration Licence 11/84, the inlier of Precambrian age rocks is composed of three main lithological groups, the orthoquartzite, siltstone, and dolomite associations.

Previous investigations into the extent and quality of the hard rock silica resources of the area have been directed at the orthoquartzite group, particularly where it crops out as Glovers Bluff.

Detailed field and furnace evaluation of the Glovers Bluff quartzite have been conducted over a period of eleven years, and have confirmed it as a chemically and physically high calibre source of silica.

Work completed during the year has extended the data on the Glovers Bluff deposit, and has also briefly appraised other sources of silica, in the form of silicified dolomite and silicified ultramafic rocks.

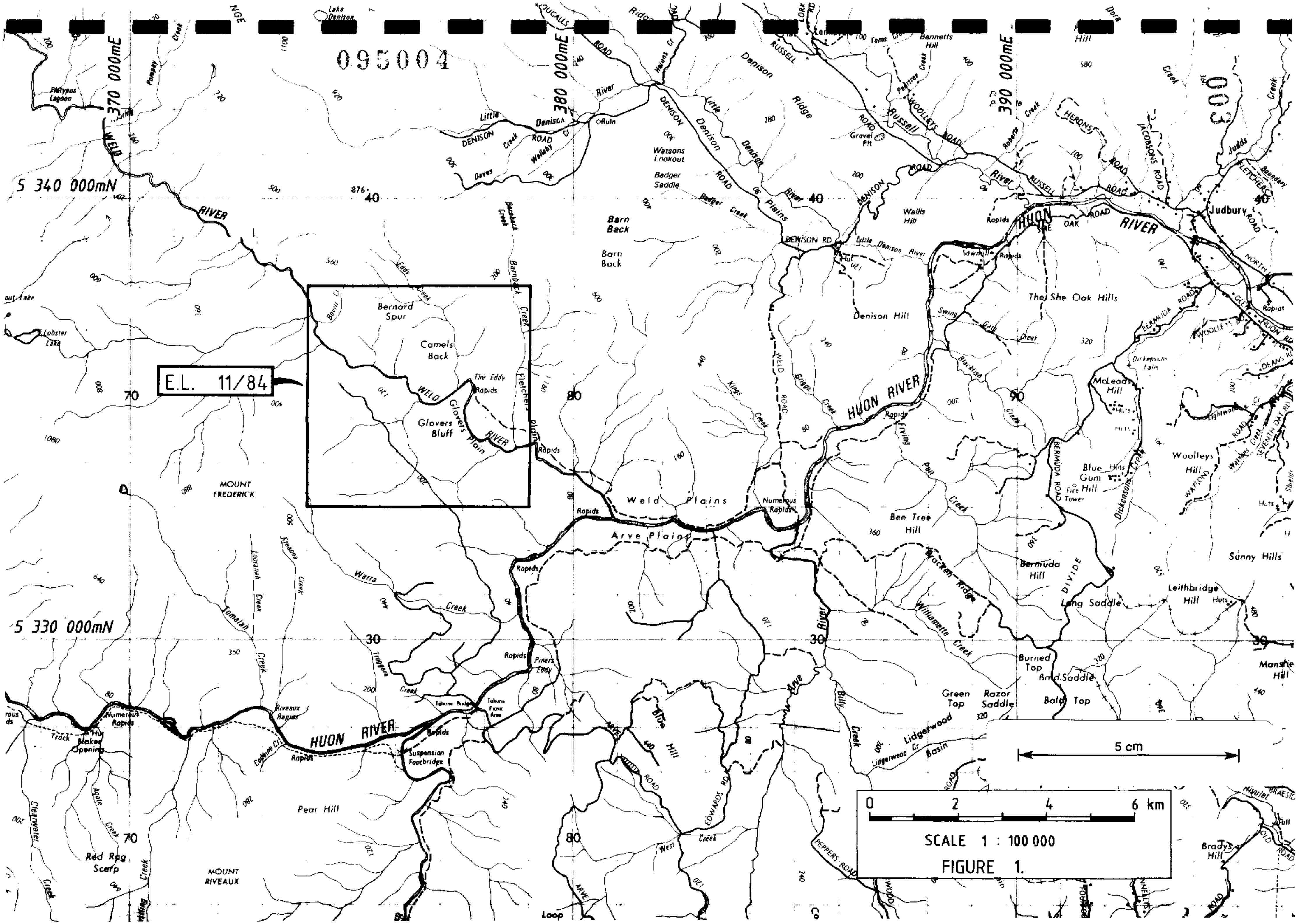
095004
370 000mE
380 000mE
390 000mE
5 340 000mN
5 330 000mN
E.L. 11/84
WELD RIVER
HUON RIVER
Bernard Spur
Camels Back
Glovers Bluff
The Eddy Rapids
Weld Plains
Arve Plains
Barn Back
Watsons Lookout
Badger Saddle
Denison Hill
Wallis Hill
The She Oak Hills
Judbury
MOUNT FREDERICK
MOUNT RIVEAUX
Pear Hill
Red Rag Scarp
Blakes Opening
Suspension Footbridge
Tahune Bridge
Bee Tree Hill
Bermuda Hill
Long Saddle
Leithbridge Hill
Sunny Hills
Woolleys Hill
Blue Gum Hill
McLeods Hill
Burned Top
Bald Saddle
Bald Top
Green Top
Razor Saddle
Lidgerwood Basin
Bradys Hill
Warra Creek
Blue Hill
5 cm
0 2 4 6 km
SCALE 1 : 100 000

FIGURE 1.

1. INTRODUCTION

Exploration Licence (EL) 11/84, covering 21 sqr. k.m. was granted to M. C. Forster on the 27th September, 1984 for a period of one year.

The licence is bounded by AMG co ordinates 474 000E, 479 000E, 5 233 000N and 5 238 000N, and embraces a total area of 25 sqr km centred on the Weld River in Southern Tasmania (refer Figure 1.).

Within the licence area there are three Mineral Leases (ML's) totalling 3.37 sqr km in area as follows:

ML 39M/76 - in the name of M. C. Forster, covering 202 ha.
ML 9M/77 - in the name of Electrona Carbide Industries P/L, 35 ha.
ML 10M/77 - in the name of Electrona Carbide Industries P/L, 100 ha.

Further details are shown in Figure 2.

The licence is situated in a low altitude high rainfall region, and vegetation cover ranges from button grass over the inlier of Precambrian rocks, to Eucalyptus obliqua tall and wet forest over younger rocks.

The E. obliqua forests also include E. regnans, globulis etc., and have understories ranging from open to dense scrub.

Access to the licence is via a Forestry Commission road in the south (Weld Road), and by a 4WD track (now in disrepair) to the north of the Weld River.

This report details exploration activities in EL 11/84 for the twelve months ended 27th September, 1985.

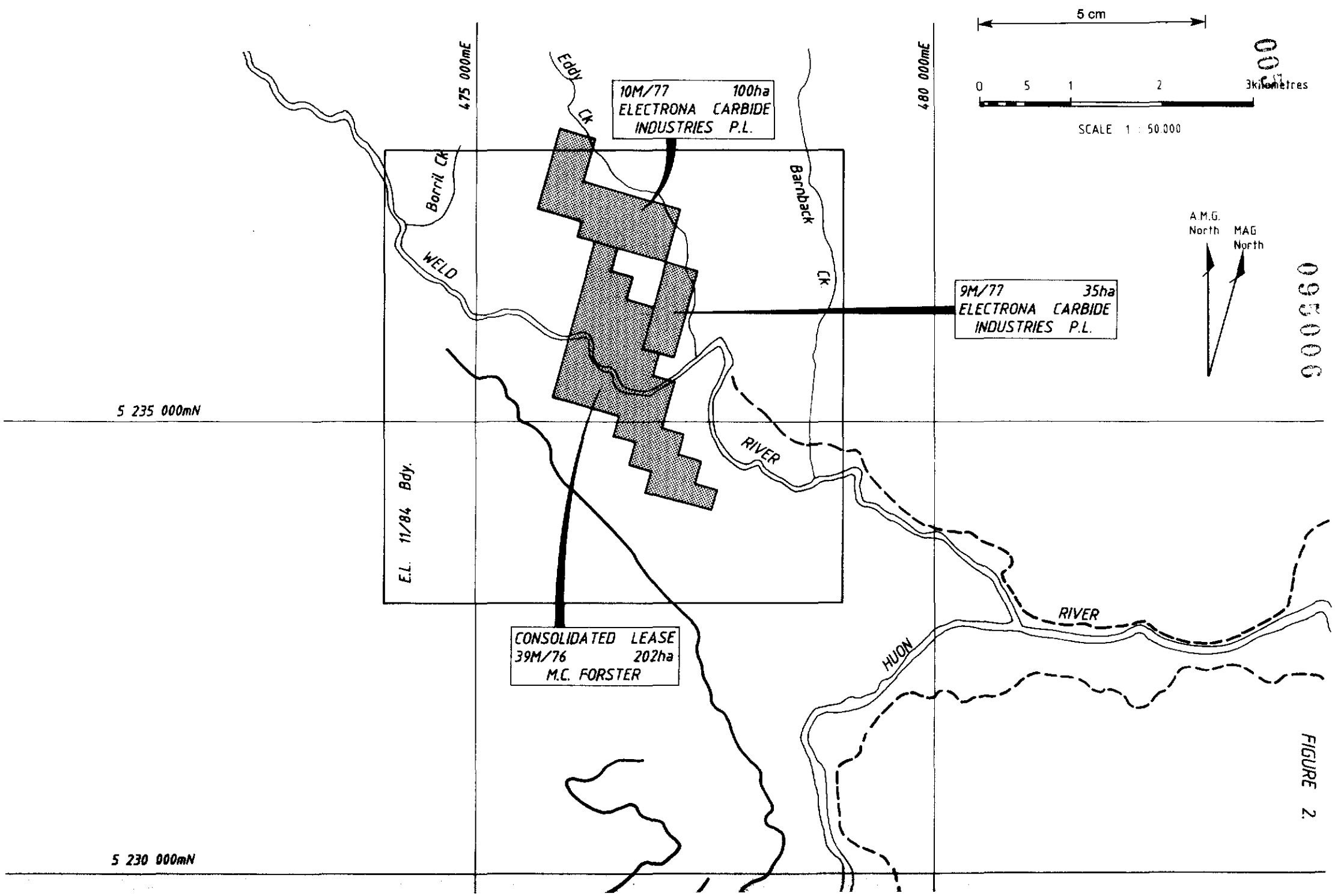
5 cm
0 5 1 2 3kilometres
SCALE 1 : 50 000
A.M.G. North
MAG North
475 000mE
480 000mE
Eddy Ck
Barril Ck
WELD
Barnback Ck
10M/77 100ha
ELECTRONA CARBIDE INDUSTRIES P.L.
9M/77 35ha
ELECTRONA CARBIDE INDUSTRIES P.L.
E.L. 11/84 Bdy.
CONSOLIDATED LEASE
39M/76 202ha
M.C. FORSTER
RIVER
RIVER
HUON
5 235 000mN
5 230 000mN

FIGURE 2.

2. BACKGROUND HISTORY

2.1. The history of exploration and exploration/mining tenements, over the inlier of Precambrian rocks in the valley of the lower Weld River in south west Tasmania, although of short duration, is never the less interesting and deserving of description.

2.2. The earliest recorded exploration in the area was the granting of a Reward Lease for nickel and cobalt to H. E. Evenden on the 24th February 1917. This lease was ML 7275M and covered 80 acres immediately north of the Weld River, and east of Hogsback Hill (refer Fig. 3).

No records of production exist, and it is unlikely that any of the four shafts sunk ever yielded payable material prior to the expiry of the lease on 29th August, 1928.

Some time later, a Reward Lease for osmiridium was granted to Messrs. W. G. Fitzgerald, C. T. Fletcher and L. Wilson on the 23rd February, 1926; this lease (ML 9636M) covered 10 acres immediately south of the Weld River, and would appear only to have been superficially prospected.

2.3. During the late 1960's, Australian stock exchanges experienced a mining and exploration share "boom", with mineral exploration company shares reaching unprecedented prices, the cream of which were the companies with nickel prospects.

In 1968, M. C. Forster, then a surveyor with the HEC and part time prospector, recalled the record of nickel in the lower Weld River, and applied for a Special Prospecting Licence (SPL) in the vicinity of the Glovers Bluff inlier.

SPL 42, covering 25 sqr miles was granted on the 18th September 1968, and shortly after the adjacent SPL 44 was granted to his wife H. S. Forster for the same sized area.

Exploration of these SPL's was considerably difficult due to absence of any access tracks, with the result that M. C. Forster constructed his own road along the north bank of the Weld River to a point on the latter known as "The Eddy" within SPL42 (see Fig. 3 for location).

However, surface sampling of the rocks in the SPL's did not indicate any promising nickel prospects, and Forster turned his attention to the white quartzite cliffs of Glovers Bluff. He was cognisant of the utilization of the quartzite near Lune River in the manufacture of ferrosilicon at Electrona during the period 1939 - 45, and realised that at Glovers Bluff he was looking at a possibly significant resource of high grade silica. However, he kept his discovery secret, principally due to the lack of access, and joined the nickel exploration rush in Western Australia, such that by 1970 both his SPL's had lapsed.

2.4. Following this, Inland Exploration NL was granted EL 3/70 covering 300 square miles, which included the Precambrian rocks of the lower Weld. Forster's track was utilized by others, and F. K. H. Sheppein took out ML 145M/70 covering "The Eddy" in 1970, and the adjacent ML 19M/71 in 1971.

However, little work of any consequence was performed during this time, although Sheppein apparently established that the "marble" resources of the area were non existent.

2.5. In about late 1972, the Forestry Commission had bridged the Huon River upstream of the Weld - Huon confluence and had commenced work on the Weld Road which is located on the south bank of the Weld River.

Forster, realising his opportunity to gain vehicular access to Glovers Bluff, applied for a new SPL, which was granted to his brother B. R. Forster on the 19th April, 1973 as SPL 122. This SPL covered 10 square miles, and overlapped the earlier SPL's 42 and 44.

At about this time, M. C. Forster wrote a far sighted report incorporating his ideas for the establishment of a silicon - ferrosilicon - magnesium industry in southern Tasmania.

He envisaged utilising Glovers Bluff quartzite and locally produced charcoal from the logging industry, and apparently attracted the interest of Consolidated Goldfields Australia (CGFA), who approached him on the 10th April, 1974 in the Kalgoorlie caravan park to sign a letter of intent regarding Glovers Bluff etc.

2.6. Eventually Forster sold the option to develop the silica resource and transferred SPL 122 to CGFA on the 17th May, 1974, but as the SPL had already expired, Forster then applied for, and was granted four ML's (70M/74, 71M/74 72M/74 and 73M/74). These ML's had a combined area of 396 ha covering both Glovers Bluff and Camels Back, and were transferred to CGFA.

During this time, CGFA and the Australian Industries Development Corporation had combined to form Kemmerton Pty. Ltd. which operated the Carbide works at Electrona.

Testing of the Glovers Bluff quartzite by CGFA involved the drilling of four cored and four open holes during the 1974 - 1975 period, and in September 1974, a 1000 ton bulk sample was sent to Electrona for atrial production of ferro silicon

Although the results of this smelting were encouraging, the economics of ferro alloy production were unattractive due to the depressed state of the steel industry at the time, and Forster terminated the option agreement with CGFA on the 21st May, 1976.

2.7. Coincidentally, in about the same month of 1976, the South West Tasmania Advisory Committee was established to implement the Cartland Committees' recommendations for a conservation area in south west of the the state.

However, successive Labor governments failed to resolve the problems that this advisory body faced both externally and internally, with the result that a moratorium on all mineral exploration was imposed from 1976 until 1982, when the Gray Liberal government was elected to power.

2.8. Prior to the moratorium debacle, Forster had combined the four ML's in to Consolidated ML 39M/76, presently covering 202 ha.

He also applied for three Prospecting Licences (on the 12th April, 1976) covering Bernard Spur, which in 1979 were converted to ML applications 24M/79, 25M/79 and 26M/79 in the name of H. S. Forster.

2.9. Following the departure of Kemmerton Pty. Ltd. from Electrona in 1976, Electrona Carbide Industries Pty. Ltd. was created with White Industries Ltd.

and the Tasmanian Government as the major shareholders.

ECI Pty. Ltd. then set about reviewing the Electrona operations, and appraised a range of alternative products, which included silicon and ferrosilicon.

The unpegged portions of Camels Back and Bernard Spur were taken up by ECI Pty. Ltd. as ML's 9M/77 and 10M/77, and Forster advised White Industries to apply for an Exploration Licence of 80 sqr km centred on the Glovers Bluff quartzite deposit.

This EL application (6/80) was never granted, as it lay within the proposed South West Conservation Area, which at that time did not have a management plan decided upon.

2.10. By 1980, White Industries had apparently lost interest in actively pursuing the silica utilization problem, and Forster entered an option agreement with the Broken Hill Proprietary Company through its subsiduary Tasmanian Electro Metallurgical Company (TEMCO) to further investigate the Glovers Bluff deposit.

This deal was signed on the 25th July, 1980, and resulted in the drilling of approx. six cored holes, with the usual analytical and geological data generation.

However, the Forster - TEMCO agreement was terminated for a variety of reasons on the 2nd February, 1982.

2.11. Meanwhile, on the other side of the Weld River, at Camels Back and Bernard Spur, Forster had, on the 13th April 1981, given two other companies an option to assess the silica potential of these other quartzite deposits, (via ML applications 24M - 26M/79).

These companies joint ventured were the Kaiser Chemical Corporation of Australia Ltd., and Pioneer Concrete Services Ltd., who accepted an additional option over Glovers Bluff (via ML 39M/76) on the 15th April 1982.

2.12. In early 1984, Kaiser withdrew from the joint venture, its position

eventually being taken by Pechiney Australia Ltd. in 1985.

On the 29th February, 1984, Forster again applied for an SPL over the Precambrian rocks of the Lower Weld River.

However, following advice from the Department of Mines, SPL application 841 was amended to an application for an Exploration Licence.

Concomitant with the granting of EL 11/84 on the 27th September, 1984, Forster withdrew his applications for ML's 24M, 25M and 26M/79.

3. PREVIOUS EXPLORATION

Although parts of the preceding section describe previous exploration in the area, the protracted and at times complex tenement and company successions require summarising.

The Precambrian age rocks in the valley of the lower Weld River may be unique in that they have been covered by almost the entire range of exploration/mining tenements possible (namely Mineral Leases, Prospecting Licences, Special Prospecting Licences and Exploration Licences).

Investigations of the quartzites have at times been very detailed, and the estimated total expenditure to date is in excess of one million dollars.

The principal phases of the exploration/investigation of the Glovers Bluff quartzite deposit have been as follows:

1968 - 69: Discovery and initial sampling by M. C. Forster.

1974 - 76: Consolidated Goldfields Aust. Ltd. - drilling of cored and open holes, analyses, thermal stability tests, trial smelting, and feasibility studies.

1980 - 82: Tasmanian Electro Metallurgical Coy - drilling of cored holes, analyses and feasibility studies.

1982 - 84: Pioneer Concrete Services Ltd. and Kaiser Chemical Corporation of Aust. Ltd. - drilling of open holes, analyses, and feasibility studies.

1985 - : Pioneer Concrete Services Ltd. and Pechiney Aust. Ltd. - detailed feasibility studies in to silicon production, planning to convert furnace at Electrona etc.

The principal published reports relating to this work are Forster (1973), CGFA Ltd. (1975) and Hassell (1981).

4. CURRENT EXPLORATION

4.1. Exploration of the licence area during the past year has centred on three aspects, drilling, mapping and investigations in to alternative sources of silica.

4.2. DRILLING

During December, 1984, approx. 10 open holes were drilled with an airtack rig at Glovers Bluff; these holes were designed to infill the earlier drilling by CGFA and TEMCO.

4.3. MAPPING

Mapping of part of the licence area was done by interpreting black and white aerial photographs flown in 1981 (M50, runs 77W, 78W and 79W), in conjunction with limited field traverses mainly north of the Weld River.

The major problem at this stage is differentiation between silicified carbonates and silicified ultramafics in areas difficult to access.

4.4. ALTERNATIVE SILICA

M. C. Forster has identified several high grade silica rocks in the licence area, which are not orthoquartzites.

He has also located a possible additional source of high grade silica at Pyramid Hill.

Analytical and petrographic work on these rock types has been done, and is described in the next section.

5. RESULTS

5.1. DRILLING

Final compilation of the results of the air track drilling, including the correlation with earlier results, had not been completed at the time of writing this report.

5.2. MAPPING

Results of the mapping are detailed in Figure 3.

5.2.1. PRECAMBRIAN

In essence, three Precambrian sedimentary associations are recognised, all of which have been intruded or buried by Palaeozoic and Mesozoic rocks.

5.2.1.1. Orthoquartzite Association - this group consists predominantly of well sorted, equigranular quartz sandstone with a siliceous cement. Minor impurities in the form of Kaolin/feldspar grains and rare sericite and hellyerite occur.

This association forms the central ridges of Bernard Spur, Camels Back, and the main face of Glovers Bluff.

A second, less extensive group of orthoquartzites strikes parallel to Camels Back, and comprises the Pyramid Hill trend.

Most of the investigations in to the quality of the silica in the area over the past 17 years, have been in the orthoquartzite association where it forms Glovers Bluff.

5.2.1.2. Siltstone Association - this group is poorly documented at present, but appears to consist of interbedded greywacke - quartz sandstone - siltstone, all variably silicified. It is likely that the quartz sandstones are compositionally similar to the orthoquartzites, but formed in an overall different depositional environment.

Distinction between this group and the orthoquartzites is not always clear,

and facies changes/gradational boundaries along strike may occur (e.g. west of Bernard Spur).

5.2.1.3. Dolomite Association - this group is also poorly understood at present, and in addition to dolomite may include magnesite and dolomitic shales and siltstones.

A notable feature of this group is the extensive silicification, the causes for which have not yet been fully resolved.

Elsewhere, alteration of the dolomite has resulted in either talcose or diopsidic varieties being formed.

5.2.2. CAMBRIAN

An exposure of intensely silicified, originally pyroxene and serpentine bearing ultramafic occurs within the old Reward Lease for nickel and cobalt,(refer Appendix 1.).

The extent of the nickel/cobalt mineralization appears limited, and to have been coatings of the secondary nickel salt hellyerite.

In common with other ultramafic bodies in the state this (and other) occurrences are assumed to have a Cambrian age of emplacement.

Although a recent petrographic report (Appendix 1) on a dolerite adjacent to this ultramafic suggests a Jurassic age, an earlier description by G. Everard in 1973 indicates that some of the dolerite in the area is "pre-Jurassic".

5.2.3. PERMO-TRIASSIC

Parmeener Super Group sediments cover much of the Licence area, and include lithocorrelates of the Wynyard Tillite, and the Quamby Formation.

The top of Glovers Bluff has relict patches of pebbly tillite over it, and it is possible that the present apices of the resistant Precambrian rocks were glacial pavements during Permian time.

5.2.4. JURASSIC

Dolerite sills intrude all the older rocks, but mainly the Parmeener sediments; the southwest and north east corners of the licence area are formed by generally topographically elevated blocks of dolerite (e.g. Weld and Snowy Ranges).

As indicated previously, some of the doleritic igneous rocks in the area may not necessarily be of Jurassic age.

5.2.5. STRUCTURE

5.2.5.1. Bedding The Precambrian sedimentary rocks strike 310° - 340°, and dip steeply to the SW and NE. Ripple marks in the orthoquartzite suggest shallow water conditions of deposition.

Parmeener sedimentary rocks appear to either infill pre-Permian topographic lows, or to be generally flat lying.

5.2.5.2. Folding No detailed studies of folding have been made, although north west trending, tight folds are apparent in the Precambrian sediments, and polyphase deformation of these rocks is to be expected.

5.2.5.3. Faulting The orientation of photo linears shown in Figure 3 includes all types of linear structures, ranging from joints in dolerite to gross bedding forms in the sediments of Precambrian age.

Detailed discrimination of those photo linears which represent fractures has not been attempted to date.

The inferred faults shown in Figure 3 have general trends of ENE and NS, although this interpretation is preliminary.

5.3. SILICA POTENTIAL (EXCLUDING ORTHOQUARTZITES)

Silica rich rocks east of Glovers Bluff and close to the Weld River fall in to two main categories; silicified carbonates and silicified ultramafics.

5.3.1. SILICIFIED DOLOMITE

Silicified dolomite crops out on (and forms) the Hogs Back and south of it in the Weld River. Limited petrographic data (Appendix 1) suggests original fine grained carbonates with silicification post dating the formation of breccia

fabrics.

Mineralogically these silicified dolomites consist of pseudomorphous clear mosaic quartz, and variably cut by quartz veins. Earlier descriptions of similar rocks by G. Everard in 1973 included chalcedony, quartz and chert.

Compositionally the silicified dolomites are exceptionally high grade sources of silica, although some analyses suggest incomplete leaching/replacement of Mg and Ca (e.g. Samples WR-1 in Appendix 2, and WR-5 in Appendix 3).

The average of four* samples from Hogsback Hill and on the bank of the Weld River was as follows:

SiO_2	: 99.6%	MgO	: 372ppm
Al_2O_3	: 0.09%	CaO	: 335ppm
Fe_2O_3	: 0.03%		

More detailed sampling and mapping is required in this area before firm conclusions regarding grade distribution and hence quality control can be reached.
(*Samples WR-2,3 in Appendix 2, and WR-1,4 in Appendix 3).

5.3.2. SILICIFIED ULTRAMAFIC

Silicified ultramafic rocks have only been observed east of Hogback Hill in the vicinity of the old Reward Lease for nickel and cobalt. Petrographic data (Appendix 1) details amorphous silica (chalcedony), while a single chemical analysis (WR-2 in Appendix 3) shows a LOI of 7.42%, which is highly suggestive of opal, or opaline silica.

Compositionally the silicified ultramafic sample also appears to be a very high grade source of silica, as follows:

SiO_2	: 92.4% (but 99.8%anhydrous)		
Al_2O_3	: 0.07%	MgO	: 480 ppm
Fe_2O_3	: 0.07%	CaO	: 240 ppm

The extent, both laterally and vertically, of the silicification cannot be reliably estimated at present; the close proximity to the silicified dolomite

at Hogsback Hill, in conjunction with the apparent absence of relict opaque minerals, raises the question of false ultramafic status.

However, the Reward Leases for nickel, cobalt and osmiridium in the general area lend credibility to the existence of a bone fide ultramafic parent rock.

The silicification is considered to be the result of deep chemical weathering, possibly laterization, whereby SiO_2 has been mobilized down profile, contemporaneous with up profile migration of R_2O_3.

5.4. THERMALLY ALTERED DOLOMITE

Several localities in the Weld River approx. 300m south of "the Eddy" show the development of diospidic dolomite, which has apparently also been variably silicified.

This material was initially considered to be dolomite (which is consistent with its present morphology), but chemical (ICPS) and mineralogical (XRD) analyses by AMDEL (Appendix 4) showed it to be predominantly diopside.

Additional XRD work on duplicate samples by the Tasmanian Department of Mines (V.M. Threader pers. comm.) have confirmed the presence of both dolomite and diopside.

Examination of Figure 3 shows the locality of the diopside to be near the contact of a Precambrian age dolomite and a ?Jurassic age dolerite, the latter igneous body evidently inducing the contact metamorphism in the country rock.

REFERENCES

Consolidated Goldfields Ltd., 1975: Final Report, Glovers Bluff Quartzite, SPL 122; Unpub. Rep: CGFA Ltd.

Forster, M. C. : Proposed Silicon - Ferrosilicon - Magnesium, Industry in southern Tasmania. (Unpublished).

Hassell, D. J. 1981: Diamond Drilling of the Weld River Quartzite Deposit; Unpub. Rep. TEMCO.

APPENDIX 1.

020

095021

Central Mineralogical Services

39 Beulah Road
Norwood, S.A. 5067
Telephone 42 5659

Mr. J.S. Noakes
Chief Geologist
Queensland Mines Ltd.
Suite 2, 8th Floor
50, Margaret Street
SYDNEY / N.S.W. 2000

25th July, 1985

REPORT CMS 85/7/20

YOUR REFERENCE:	Letter dated 10.7.1985
DATE RECEIVED:	11th July, 1985
SAMPLE NOS.:	6 Samples
SUBMITTED BY:	J.S. Noakes
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

REPORT CMS 85/7/20

Six rock samples were received for petrographic study (sample WR 5 was missing); thin-sections were prepared and are described in the attached table.

Summary

Sample 1 (Hogsback Dolerite) was compared with published descriptions of Tasmanian basic igneous rocks of Cambrian, Jurassic and Tertiary ages, as well as with known data, and it was concluded that the rock was most probably Jurassic, for various petrographic reasons; admittedly, the Cambrian basic rocks are less well-documented than the others.

Samples 2 and 6 are believed to be silicified carbonate rocks, and show the same characteristics as the known silicified carbonates in the Pine Creek geosyncline.

Sample 3 is best interpreted as a silicified ultramafic, but there is little firm evidence; in particular, the absence of relict opaques (such as chromite or magnetite) is an anomaly.

Sample 4 is very similar to the silcretes occurring as mesas in the Cooper Basin (e.g. at Innamincka) and other localities; the presence of ultrafine leucoxene seems to be characteristic, imparting a creamy or whitish opacity to the cement. The cement is replacive.

Sample 5 is an orthoquartzite, from which minor primary components such as detrital feldspar have been leached.

H.W. Fander, M. Sc.

CENTRAL MINERALOGICAL SERVICES

CENTRAL MINERALOGICAL SERVICES

Sample No	Rock Type - Composition	Fabric	Minor Minerals	Comments
T.S. 53944	Dolerite. Small random laths of fresh, complexly twinned labradorite; subophitic fresh pigeonite with dark rims. Small interstitial micrographic intergrowths.	Typical doleritic fabric, but with erratic grainsizes. Mesostasis very fine-grained.	Accessory apatite, magnetite, pyrite. Incipient uralitisation. Quartz/K-feldspar.	Relatively fresh rock, showing all the features of Jurassic dolerites and unlike either Cambrian or Tertiary types.
2 WR 1	Silicified ?Carbonate Rock. Now consists of haphazard fine- to medium-grained mosaic quartz, with minute (1-5 μ) carbonate inclusions, sporadic ?carbonaceous matter.	Vaguely outlined breccia fabric in places. Originally ?fine-grained.	None detected.	Quartz textures and carbonate inclusions are typical of silicification of carbonates, probably postdating brecciation.
3 WR 2	Silicified ?Ultramafic. Composed of amber-coloured amorphous silica, with relict network fabric and ?pyroxene textures in places.	Primary features are poorly preserved, but suggest medium-grained rock.	Silicified veins of ?carbonate.	Not unlike some of the silicified serpentinites in W.A. Original rock may have been Mg-rich pyroxenite.
4 WR 3	Silcrete. Angular to subangular silt- to sand-sized quartz grains, in a matrix/cement of microcrystalline quartz pigmented with ultrafine leucoxene.	"Terrazzo texture", typical of silcretes. No bedding, but well-sorted.	Detrital zircon, tourmaline, ilmenite, ?monazite, rutile.	Believed to be a silcrete, and contains silicified ?worm-burrows or rootlet tubes. Presence of fine leucoxene in cement is characteristic.
5 WR 3	Orthoquartzite. Framework of closely packed subangular to subrounded quartz grains cemented by quartz overgrowths in optical continuity.	Whole rock is weakly stressed. Well-sorted grains; long axes aligned.	A few cavities, possibly representing leached detrital feldspar. Rare leucoxene.	Appears to be a very pure quartz rock free of Fe-staining or other contaminants. Mature sediment.
6 WR 4 (T.S. 53949)	Silicified ?Carbonate Breccia. Angular fragments of totally silicified fine carbonate rock, cemented by clear mosaic quartz, and cut by quartz veins.	Relict rhombohedral textures preserved in places, but mostly devoid of features.	Faint limonite staining has accentuated relict textures.	Evidently very thoroughly leached and silicified, as no carbonate has survived (cp. WR 1). Probably silicified after brecciation.
7 WR 5	Not received.			

1 Hogsback Dolerite
2 Hogsback Silica -
3 Mt Rawdon Silica
4. Silcrete Lake River
5 Pyramid Hill Orthoquartzite
6. Adit near Weld River

022 096023

APPENDIX 2.

024

095025

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.
Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560

ANALYTICAL REPORT No. 999.0 08 3094

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Queensland Mines Ltd.,
FCR House,
8th Floor, 50 Margaret St.,
Sydney N.S.W. 2000

ORDER No.	PROJECT

DATE RECEIVED	RESULTS REQUIRED
22.5.85	URGENT

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	3

STATE OF SAMPLES	PRE-TREATMENT								ANALYSIS			
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
D	WR1-3		1		2				TiO2,Al2O3, Fe2O3(T),MnO,MgO CaO,Na2O,K2O, P2O5		408 LIO

RESULTS TO
J. Noakes
As Above

RESULTS TO
M. Foster,
"Lee Wave"
RMB 341
Kingston,Tas. 7150

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	RO	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

025

095026

ANALABS

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.0 08 3094	20.6.85		1 OF 2

TUBE No.	SAMPLE No.	Na2O	MgO	Al2O3	SiO2%	P2O5%	K2O	CaO	TiO2	MnO
1	WR 1	50	380	800	99.5	X	50	2800	X	40
2 *	WR 2	40	310	700	99.5	X	40	240	X	40
3	WR 3	50	230	1450	99.5	X	70	270	X	20
4										
5	* SILICIFIED DOLOMITES FROM MOUNT BRUCE AREA.									
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	10	50	0.1	0.007	10	10	50	10
24	DIGESTION									
25	METHOD	103	103	103	103	402	103	103	103	103

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

026 095027

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.0 08 3094	20.6.85		2 OF 2

TUBE No.	SAMPLE No.	** Fe2O3	LOI%								
1	WR 1	2600	0.10								
2	WR 2	2500	0.13								
3	WR 3	2600	0.05								
4											
5		**	SUSPECTED CONTAMINATION.								
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23	DETECTION	10	0.01								
24	DIGESTION										
25	METHOD	103	408								

Results in ppm unless otherwise specified.
T = element present; but concentration too low to measure
\- = element concentration is below detection limit
N = element not determined

AUTHORISED OFFICER

APPENDIX 3.

028

095029

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 — 52 Murray Road, Welshpool, W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No.

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Queensland Mines Ltd.,
F.C.N. House
8th Floor, 50 Margaret St.
Sydney N.S.W.

ORDER No.	PROJECT

DATE RECEIVED	RESULTS REQUIRED
18.7.85	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	9

SAMPLE NUMBERS	PRE-TREATMENT: DATE	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
MH1-5 LM1-D	1	2						TiO_2, Al_2O_3, Fe as Fe MnO, MgO, CaO, Na K_2O, P_2O_5, ZrO_2 SiO_2, LOI Cu, Ni, Pb, Cr, Co		INA

RESULTS TO: Mr. Moore
Attn: J.S. Meakes

RESULTS TO:

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
½ core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
crushing	CU	nitric acid	A3	other mixed acids	Mx	spectrophotometry	SPEC
	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
	PU	HF mixture	A6	ignition	IG	titration	TTN
	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
	Th	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
	Sh					fluorescence	FLUOR
	Liq					inductively coupled plasma	ICP

029

095030

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.0 03 3188	30.7.85		1 OF

TUBE No.	SAMPLE No.	Na2O	MgO	Al2O3	SiO2%	P2O5%	K2O	CaO	TiO2	Cr
1	LR 1	70	170	1500	98.4	X	200	180	3060	20
2	LR 2	30	70	700	99.5	X	60	90	2150	5
3	LR ①	40	60	350	98.6	X	65	80	50	X
4	LR ① Hogsback	50	350	850	99.6	X	45	310	100	5
5	LR 2 Ni Reward	20	480	700	92.4	X	10	240	50	9
6	LR ③ Pyramid Hill	50	50	350	99.8	X	35	60	100	X
7	LR ④ Adit	30	600	500	99.7	X	15	520	50	X
8	LR 5 River below Adit	50	1900	700	99.9	0.007	30	1950	100	5
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	10	50	0.1	0.007	5	10	50	
24	DIGESTION									
25	METHOD	193	193	193	193	402	193	193	193	40

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	990.0 08 3168	30.7.85		2 OF 2

TUBE No.	SAMPLE No.	MnO	Fe2O3	Co	ZrO2	Cd	Pb	Bi	LOI%	
1	LR 1	80	3950	195	940	X	X	X	0.34	
2	LR 2	40	540	115	640	X	X	X	0.09	
3	LR 3	5	220	95	X	X	X	X	1.34	
4	WR 1 Hogsback		280	100	7	X	5	X	0.16	
5	WR 2 N 2	X	670	80	X	X	10	X	7.42	
6	WR 3 Pyramid 4.11	X	230	120	45	X	X	X	0.08	
7	WR 4 Adit River	5	400	150	X	X	X	X	0.12	
8	WR 5 below Adit	610	16500	120	X	X	10	X	1.86	
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	10	5	7	0.5	5	5	0.01	
24	DIGESTION									
25	METHOD	103	103	103	401	103	103	103	408	

Results in parts per million unless otherwise specified.

APPENDIX 4.

1032

095033 (4)

The Australian
Mineral Development
Laboratories

mington Street, Frewville
South Australia 5063
ne Adelaide (08) 79 [illegible]
Telex AA8[illegible]

Please address
correspondence to
P.O. Box 11[illegible]
SA 5063
In reply quote

12 June 1985

3434/[illegible] - M6644/85

Australian Newsprint Mills Limited
GPO Box 1001K
HOBART Tas 7001

85960186

Attention Mr B Stafford

REPORT M6644/85

YOUR REFERENCE	Letter dated 29 May 1985.
TITLE	Testing of Dolomite.
DATE RECEIVED	3 June 1985.
WORK REQUIRED	Brightness Determination, Chemical Analysis, and Mineralogy.

Investigation and Report by: Lyn J Day.

Chief, Materials Section: Philip J Barry.

for [illegible]
Manager
Mineral & Materials Sciences Division

Head Office
[illegible]ington Street, Frewville
South Australia 5063,
Telephone (08) 79 1662
Telex Amdel AA82520
Pilot Plant,
Osman Place
Thebarton, S.A.
Telephone (08) 43 8053
Branch Laboratories
Melbourne Vic.
Telephone (03) 645 [illegible]
Perth, W.A.
Telephone (09) 325 [illegible]

1. INTRODUCTION

A sample labelled as dolomite was submitted for testing to determine its brightness, chemical composition and mineralogy.

2. PROCEDURE

A portion of the sample was crushed to a fine powder. This was sieved on a 53 micrometre screen. The brightness of the minus 53 micrometre material was determined using a Zeiss Elrepho electric reflectance photometer. Brightness quoted is at 457 nanometres, using the R457 filter. Yellowness quoted is the difference between R457 and R57 values.

The sample was analysed using inductively coupled plasma atomic emission spectroscopy.

The mineralogy of the sample was determined using X-ray diffraction techniques.

3. RESULTS

3.1 Brightness

Brightness (R457)	=	88.6
Yellowness (R57-R457)	=	1.5

3.2 Chemical Analysis

	%
SiO_2	53.3
TiO_2	<0.01
Al_2O_3	<0.01
Fe_2O_3	<0.01
MnO	<0.01
MgO	17.0
CaO	28.0
Na_2O	0.06
K_2O	0.17
P_2O_5	<0.01
L.O.I.	2.08
Total	100.6
CO_2	1.63

3.3 X-Ray Diffraction

The sample was found to consist essentially of the mineral diopside, $CaMgSi_2O_6$. Diopside is a naturally occurring metamorphic mineral.

4. DISCUSSION

Diopside is quite hard with a Mohs' hardness of 6 which is only slightly less than quartz. It is therefore not considered suitable for use in a paper-coating formulation.

dt:2.

85-2480

EXPLORATION LICENCE 11/84
M.C. FORSTER
REGIONAL GEOLOGY

(Based on uncorrected photo mosaic)
(and limited traversing.)

095036

JURASSIC	J	Dolerite
PERMO-TRIASSIC	P	Parmeener Super Group
CAMBRIAN	€u	Ultramafic - Undifferentiated
PRECAMBRIAN	Pc	Dolomite
	Pb	Siltstone
	Ps	Orthoquartzite

Fault - Inferred
Photolinear
Road
Track
Old Tracts of Weld River
Exploration Shaft (Circa 1917)

Geology: SUMMONS GEOSERVICES PTY. LIMITED
Drawn: R.T. 26th. August, 1985.

FIGURE 3.

5 238 000 mN
479 000 mE
5 235 000 mN
474 000 mE
5 233 000 mN
480 000 mE

E.L. 11/84 Boundary

Scale 1 : 20.000

0 1 2 kilometres

5 cm

035