

OPEN FILE

Exploration by Mineral Holdings Aust. Pty. Ltd.

on E.L. 43/70

and proposals for further work on

- 1. Dip Range for silica resources  
and
- 2. Keith & Arthur Rivers for metallic minerals.

(Compiled by Vic Threader 30 October 1987)

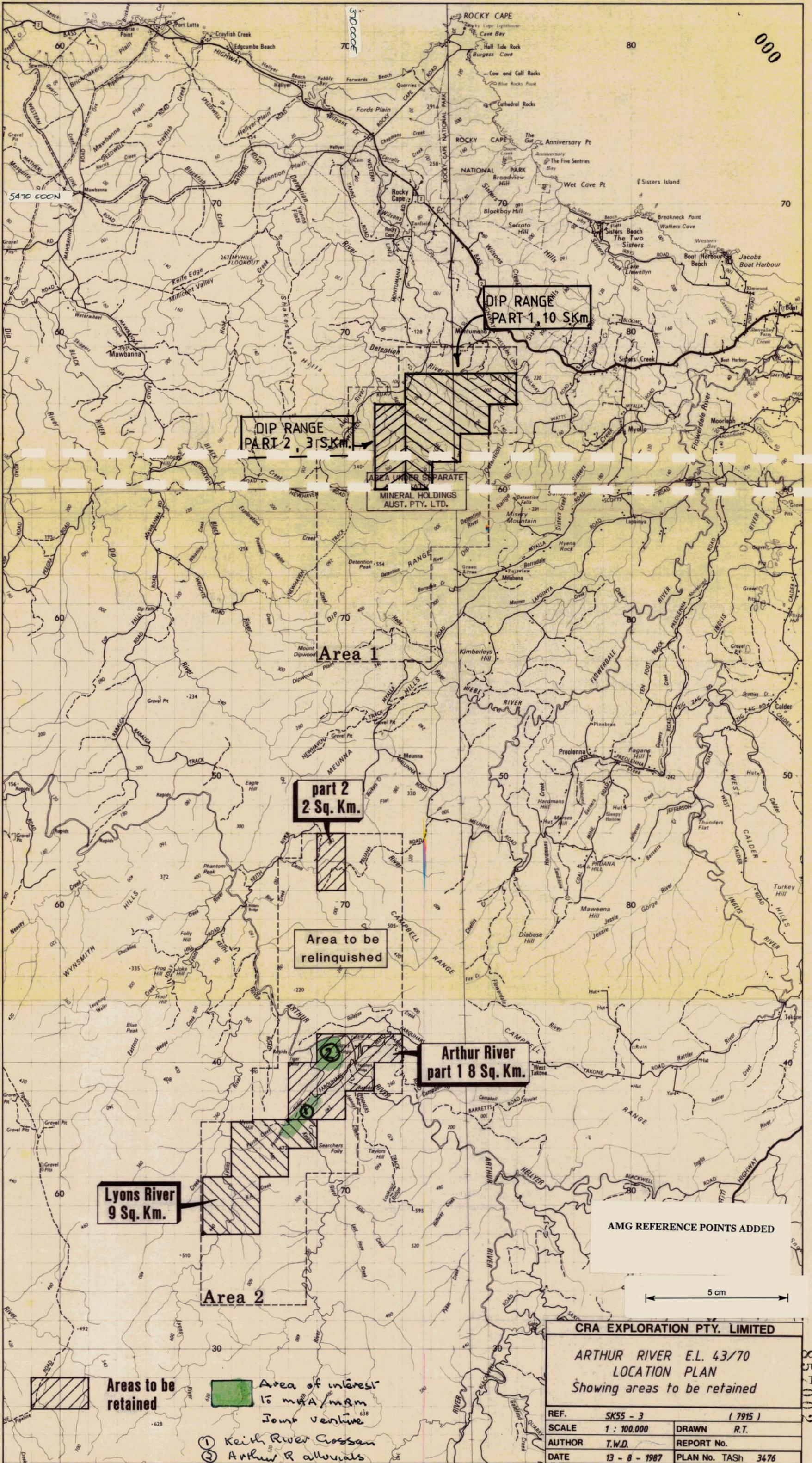
OPEN FILE

MINES  
 RL8718, RL 8717, RL 8721, RL872  
 - 4 NOV 1987  
 LETTER  
 2. 11. '87  
 REFERS.

RL8718, RL 8717, RL 8721, RL872

87-2732

AMG REFERENCE POINTS ADDED



**DIP RANGE  
PART 2, 3 SKM.**

**DIP RANGE  
PART 1, 10 SKM**

**part 2  
2 Sq. Km.**

**Area to be  
relinquished**

**Arthur River  
part 1 8 Sq. Km.**

**Lyons River  
9 Sq. Km.**

**Area 2**

**Area 1**

**AREA UNDER SEPARATE  
MINERAL HOLDINGS  
AUST. PTY. LTD.**

**AMG REFERENCE POINTS ADDED**

5 cm

<b>CRA EXPLORATION PTY. LIMITED</b>	
ARTHUR RIVER E.L. 43/70 LOCATION PLAN Showing areas to be retained	
REF. SK55 - 3	( 7915 )
SCALE 1 : 100,000	DRAWN R.T.
AUTHOR T.W.D.	REPORT No.
DATE 13 - 8 - 1987	PLAN No. TASH 3476



**Areas to be retained**

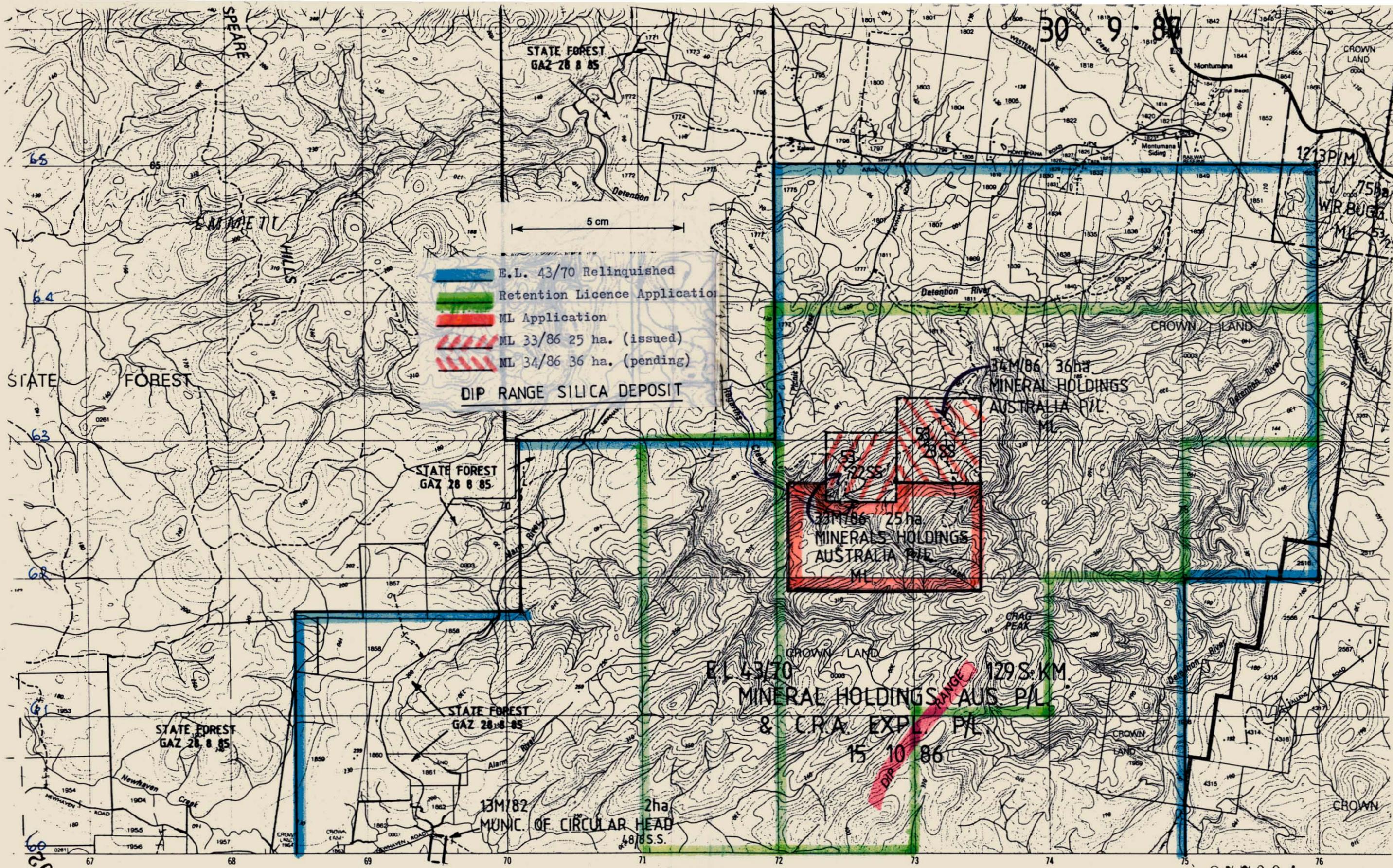


**Area of interest to MPA/MRM Joint venture**

- ① Keith River Crossan
- ② Arthur R alluvials

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DIP RANGE SILICA DEPOSIT



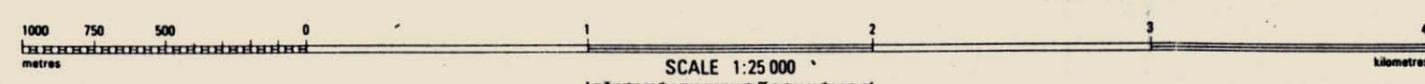
- E.L. 43/70 Relinquished
  - Retention Licence Application
  - ML Application
  - ML 33/86 25 ha. (issued)
  - ML 34/86 36 ha. (pending)
- DIP RANGE SILICA DEPOSIT**

33M/86 25 ha  
MINERAL HOLDINGS  
AUSTRALIA P/L  
ML

34M/86 36 ha  
MINERAL HOLDINGS  
AUSTRALIA P/L

E.L. 43/70  
MINERAL HOLDINGS  
& C.R.A. EXPL. P/L  
15 10 86

13M/82  
MUNIC. OF CIRCULAR HEAD  
2 ha  
48 B.S.S.



- Caravan park; Camping ground; Public toilets
- Disposal area; Information centre; Cemetery
- Picnic area; Trig station beacon; Spot elevation
- Contour with value; Depression contour
- Quarry, pit or open cut mine
- Rock scree; Broken rocky surface
- Dense forest; Medium forest

- Swamp
- Windbreak
- Wet area; Subject to flooding
- Waterfall; Rapids
- Indefinite shoreline or floodbank; Levee
- Tidal rocks or ledge; Offshore rock
- Navigation light or lighthouse; Exposed wreck

BOUNDARIES shown on this map are NOT authoritative. For full particulars please consult the Registrar-General's Division, Law Department; or the Survey Division, Lands Department. Areas within proclaimed towns or less than two hectares may not be depicted. Boundaries of Crown Land (including Reserves) extend to low water mark. To give a land parcel reference, prefix parcel number with municipal number. To use this number to gain title or survey information please consult the Mapping Division. Property and parcel boundaries are shown as at July 1984.

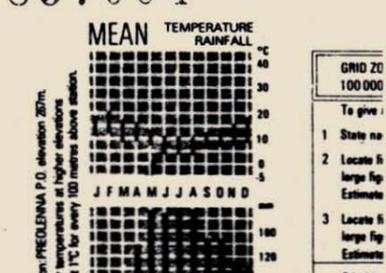
Municipality name and number ..... **ROSS 60**

Municipality boundary ..... **SOUTH**

Ward name .....

Ward boundary .....

Town boundary; Other administrative boundaries .....



Dip Range Silica Deposit

A resource of quartzite of metallurgical grade and silica sand for glass production has been identified on Dip Range. The deposit has not been fully assessed, due to: i) the discovery of new deposits recently exposed during road building to develop the area, and ii) new market possibilities for the undersize fraction from quartzite mining.

An extensive programme by Longworth and McKenzie for the Kaiser Aluminium Company and Mineral Holdings Australia was carried out in 1980-81 for quartzite to be used in the manufacture of silicon metal (Reports TCR 81-1553 and 1573 - Appendices 1 and 2).

The deposit did not meet requirements and the exploration was abandoned.

More extensive quartzite deposits have been recently exposed and the B.H.P. Company is currently investigating the quality of the material for metallurgical purposes.

TCR NO ?? 87 2753  
mentions BHP 1981 drilling

More recently still, Monier Pty. Ltd. have carried out a preliminary investigation of the Longworth and McKenzie test area and have indicated that an extensive deposit of high grade silica is probably present in this area (Appendix 3).

The purpose of the retention licence is to complete the assessment and extract bulk samples for testing under production conditions.

A P P E N D I X 1

(Extract of Stage 3 - Investigations by Longworth and McKenzie Pty.  
Ltd. TCR 81/1640)

Summary

Introduction

Discussions and Conclusions

Figures:

1. Section through Quartzite Peak on Dip Range.
2. Section through BH23 and costean 4 on Dip Range.
3. Diamond drill hole and seismic traverse locations.
4. Seismic traverse locations.
5.  $Al_2O_3$   $SiO_2$  plot from DDH 1
6. " " " " DDH 3
7.  $K_2O$   $Al_2O_3$  " " DDH 1 & 3
8. Geological Map.

## 1.0 SUMMARY

Stage's 1 and 2 have previously been reported. This report contains the findings of Stage 3 (Preliminary Drilling Programme at Dip Range No. 1 North and Quartzite Peak).

The quartzite units were found to be interbedded with mica schists, siliceous fine grained beds, and poor quality silicified limonitic sandstone units.

The quartzite beds within the prospects drilled were found to be overlain by an extensive weathered zone of variable depth. The surface and subsurface weathered beds are composed of white variably cemented (laterally and vertically) units of relatively pure ( $\text{Al}_2\text{O}_3 < 1\%$ ) sandstone. The sub-weathered zone quartzite appears in drill core as a light brown to blue grey, glassy, extremely strong quartzite which frequently is thinly bedded. These bedding planes are prone to contain a variable thickness of micaceous material and the quartzite showed a general trend to decrease in silica quality with depth. From chemical analyses only a small percentage of this quartzite may be considered to have ( $\text{Al}_2\text{O}_3 < 1\%$ ).

## 2.0 INTRODUCTION

This report provides the details of the Stage 3 Preliminary Drilling Programme on silica deposits within the northern half of Exploration Licence 43/70 near Wynyard in northern Tasmania.

The area (known as the Agreement Area) covered by this multi-staged investigation is shown in Figure No. 1 and is the subject of an agreement between Mineral Holdings Australia (MHA) the holder of the E.L. 43/70 and Kaiser Aluminum (KA) who have undertaken the investigation of silica deposits within the Agreement Area. Longworth & McKenzie Pty. Limited (L&M) have been engaged by Kaiser Aluminum to proceed with the investigation programme.

Within this part of northern Tasmania the occurrence of very large reserves of high grade quartzite have been reported in various official publications.

A number of quartzite prospects had been identified during preliminary investigations of this area by personnel associated with MHA. Surface samples had been collected, but only on one prospect (Maynes Creek) had any subsurface investigation been carried out. At the Maynes Creek deposit, BHP collected a bulk sample from surface outcrops and performed some percussion drilling, the cuttings of which were chemically analysed.

A preliminary visit by J.H. Callender (KA), C.L. Adamson (L&M) and K. Pinner (MHA) in January 1981, identified the Dip Range No. 1 area as the prime prospect for the Stage 2 investigation. During the Stage 2 investigation (11th March to 5th April, 1981) the Agreement Area was investigated by a reconnaissance mapping survey to identify other promising prospects in addition to those already identified by MHA; while the prime prospect (Dip Range No. 1 area) was investigated in detail by costeaning, blasting and percussion drilling. Surface samples were also collected from other sites (Quartzite Peak and Mt. Sunshine) by blister blasting.

The major conclusions contained within the Stage 2 report may be summarized as follows:-

- 1) Although the surface chemical characteristics of the quartzites are promising from the surface and limited subsurface exploration it had not been possible to establish the likely stratigraphic variations in chemical and physical properties.
- 2) On the basis of surface and near sub-surface exploration Quartzite Peak and Dip Range No. 1 North were identified as the prime sites for further work.

As a result of the recommendation in the Stage 2 report and subsequent site visit by Dr. J.J. Deric and J.H. Callender (KA) a limited drilling programme was mobilized to drill cored holes at Dip Range No. 1 North and Quartzite Peak (locally known as Shakespear). The object of this programme was to:-

- 1) Define physical and chemical variations with depth in the quartzite/sandstone.
- 2) Provide a basis for realistic estimates of reserves.

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7.0 DISCUSSION AND CONCLUSIONS

The quartzite of the Detention Sub-group and the Jacob Quartzite within the Agreement Area (based on the results of this multi staged programme) are interbedded with schists and other deleterious siliceous fine grained sediments. Surface outcrops of these sediments are generally obscured by sandy slope wash from the quartzite units. This surface cover, in conjunction with the quartzite outcrops, gives the quartzite the false appearance of being present in massive units.

The results of tactile appraisal and chemical analysis of the near surface quartzite sandstones indicate the near subsurface profile (to a depth in excess of 15 metres in some areas) to be a weathered derivative of deeper quartzite units.

Based on the Stage 2 mapping and costeaning work this variable surface weathering is a widespread feature of the quartzites of the Detention Sub-group and the Jacob Quartzite. As described in the Stage 2 report the rock within this weathered zone varies in character with depth and along strike from a white very poorly cemented sandstone to a white glassy silicified quartzite.

While generally the quality of the silica in the upper zone is good, it is conservatively estimated (based on the Stage 2 costeaning and the diamond drill hole results) that at least 50% of this surface zone would be physically unsuitable for the production of ferro silicon (based on the T.E.M.Co standards ref. Stage 2 report).

Below this leached zone the quartzite proper appears as a light brown to grey glassy, extremely strong, largely thinly bedded unit. The bedding planes and to a lesser extent the rock matrix contain variable quantities of micaceous material. The frequency of the occurrence of the fine micaceous bedding planes within the

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- 26 -

quartzite appears to increase with depth. The chemical analyses are consistent with this observation. The impurities in the quartzite tend to grade from the lighter coloured micas (muscovite) and kaolinite to the darker biotite micas with depth as the quartzite grades into schists.

Chemically, figures 4, 5 and 6 show that only a small percentage of quartzite won from this lower zone would be good quality (< 1%  $Al_2O_3$ ) material.

Finally, in addition to the poor chemical quality of the quartzite beds drilled by DDH No. 1, 3 and 4 the general thin width of the units detracted from the deposit. Large quantities of overburden (both in terms of rock between the quartzite beds and spoil from the weathered zone) would have to be moved and stockpiled to recover the required tonnage of quartzite.

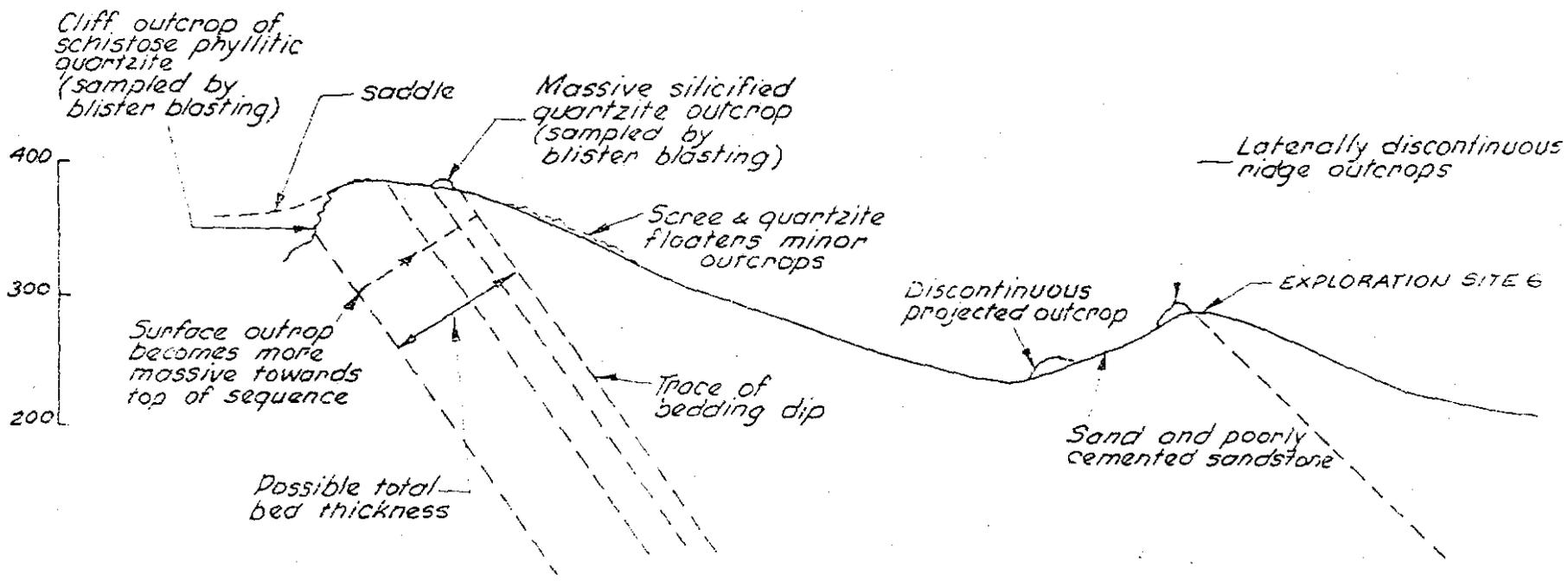
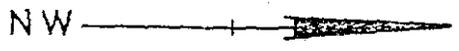
In summary, the Detention Sub-group quartzites have been shown by drilling in the Dip Range area to be unsuitable, and based upon the Stage 2 reconnaissance survey there exists no reason to believe that conditions elsewhere within the Agreement Area would be different. The surface outcrop of Jacob Quartzite at Maynes Creek was tested by B.H.P. and failed on physical specifications (Stage 2 report) and the reconnaissance mapping showed the central portion of the Maynes Creek deposit to be interbedded with weathered phyllitic schist beds.

Based on the foregoing it is not considered that the quartzite units within the Agreement Area contain a sufficient mineable tonnage of quartzite of the chemical and physical quality required.

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8.0 RECOMMENDATIONS

Based on the results from the Stage 3 drilling and subsequent sample analyses no further exploration effort is recommended on the Agreement Area for silica of the specific physical and chemical quality nominated by Kaiser Aluminum



DIAGRAMMATIC SECTION THROUGH  
QUARTZITE PEAK ON  
DIP RANGE 1

5 cm

Consulting Geotechnical Engineers  
 3 Eden Street, Crows Nest 2085 Telephone 929 0125  
 LONGWORTH & MCKENZIE PTY LIMITED



Job No  
 PXT 250

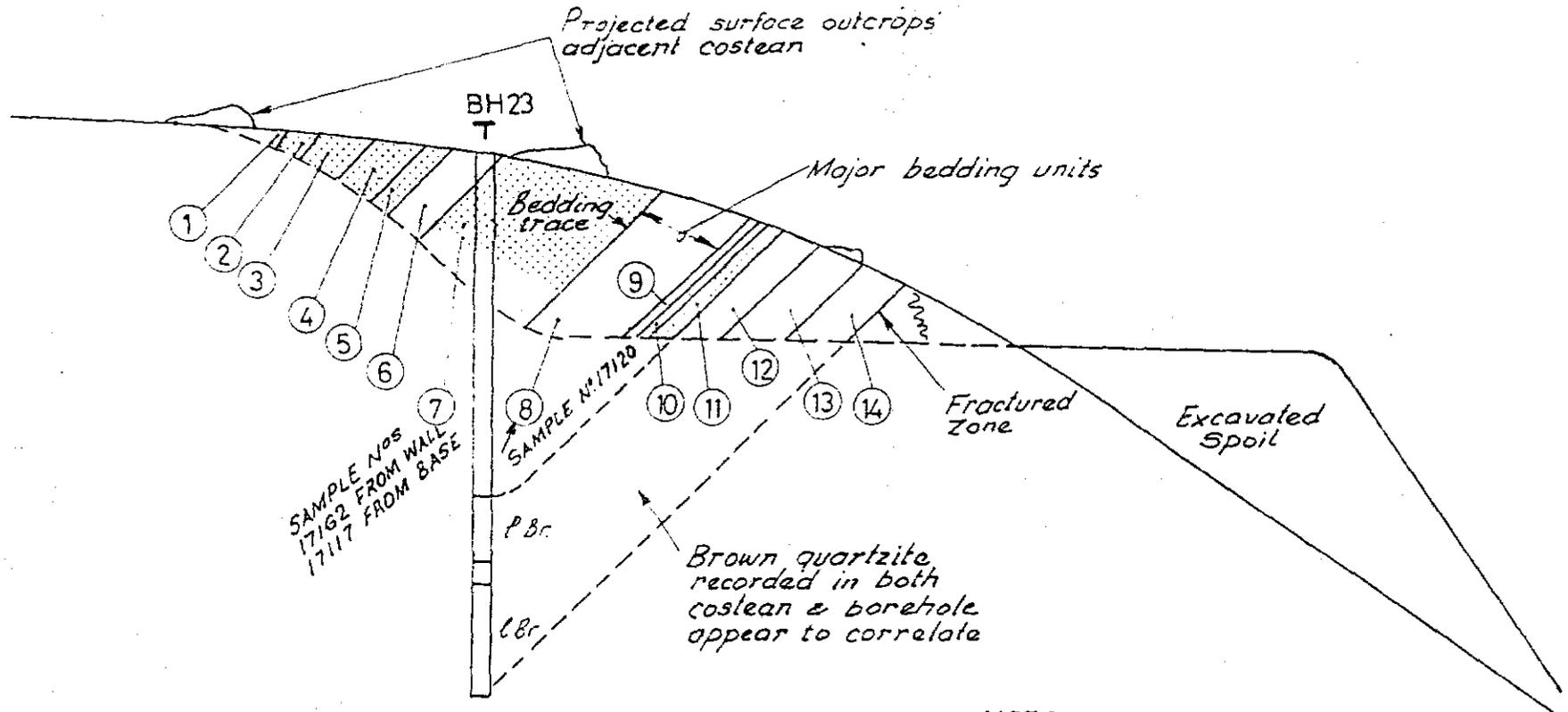
FIGURE NO 2  
 (Stage 2)  
 Fig 1

857013

Consulting Geotechnical Engineers,  
 3 Eden Street, Crows Nest NSW Telephone 924 0122  
 LONGWORTH & MCKENZIE PTY LIMITED



Job No  
 NKT 250



EASTERN WALL COSTEAN 4

0 1 2 3 4 5  
 SCALE 1:100 H.V

NOTE

- ① ROCK DESCRIPTIONS GIVEN IN LOG IS.4/E1 (APPENDIX A)
- PHYSICALLY ACCEPTABLE
- PHYSICALLY SUB TEMCO STANDARD

DIAGRAMMATIC REPRESENTATION OF  
 QUARTZITE / SANDSTONE PHYSICAL CHARACTER  
 AT DIP RANGE 1 NORTH

5 cm

FIGURE NO 4  
 (Stage 2)

857014 Fig 2

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# DIAMOND DRILL HOLE AND SEISMIC TRAVERSE LOCATIONS

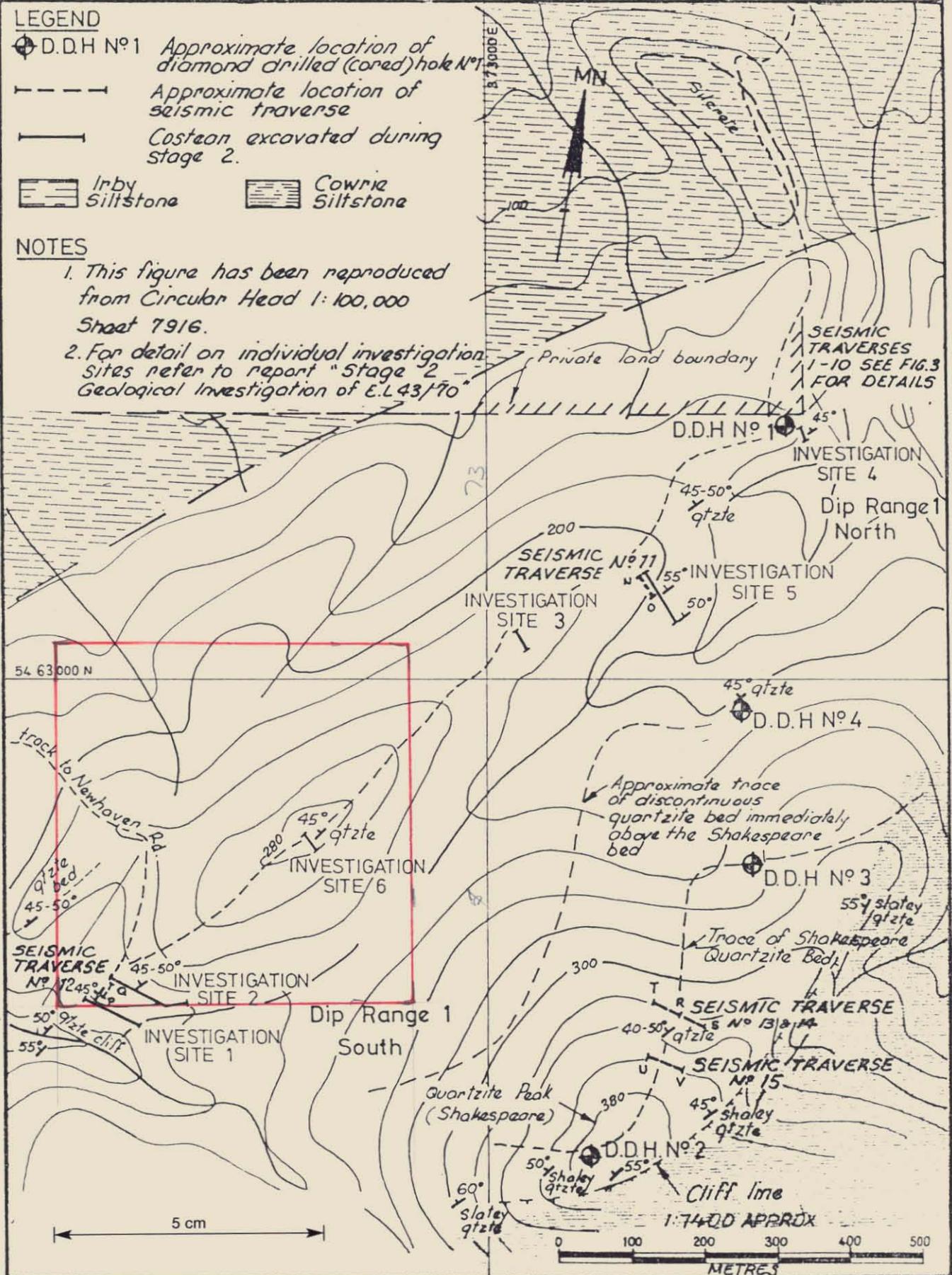
## FIGURE NO 2 (Stage 3)

### LEGEND

- ⊕ D.D.H No 1 *Approximate location of diamond drilled (cored) hole No 1*
- - - - *Approximate location of seismic traverse*
- |—|—| *Costean excavated during stage 2.*
-  Irby Siltstone
-  Cowrie Siltstone

### NOTES

1. This figure has been reproduced from Circular Head 1:100,000 Sheet 7916.
2. For detail on individual investigation sites refer to report "Stage 2 Geological Investigation of E.L43/90"



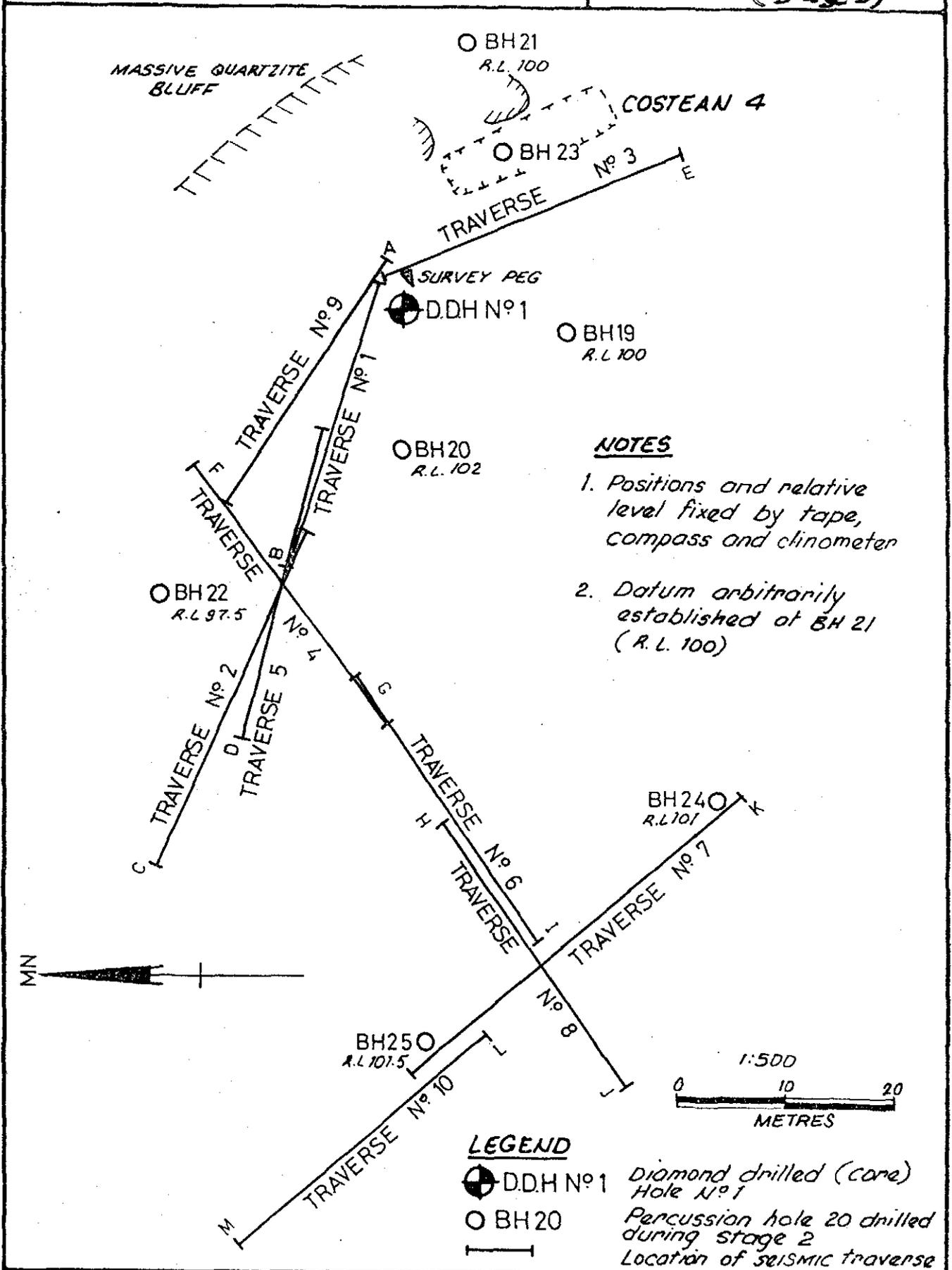
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Fig 4

# DIP RANGE N°1 NORTH SEISMIC TRAVERSE LOCATIONS

# FIGURE N° 3 (Stage 3)



### NOTES

1. Positions and relative level fixed by tape, compass and clinometer
2. Datum arbitrarily established at BH 21 (R.L. 100)

### LEGEND

- D.D.H N°1 Diamond drilled (core) Hole N°1
- BH 20 Percussion hole 20 drilled during stage 2
- Location of seismic traverse

Consulting Geotechnical Engineers  
 3 Eden Street, Crows Nest 2065 Telephone: 929 0122  
 LONGWORTH & MCKENZIE PTY. LIMITED



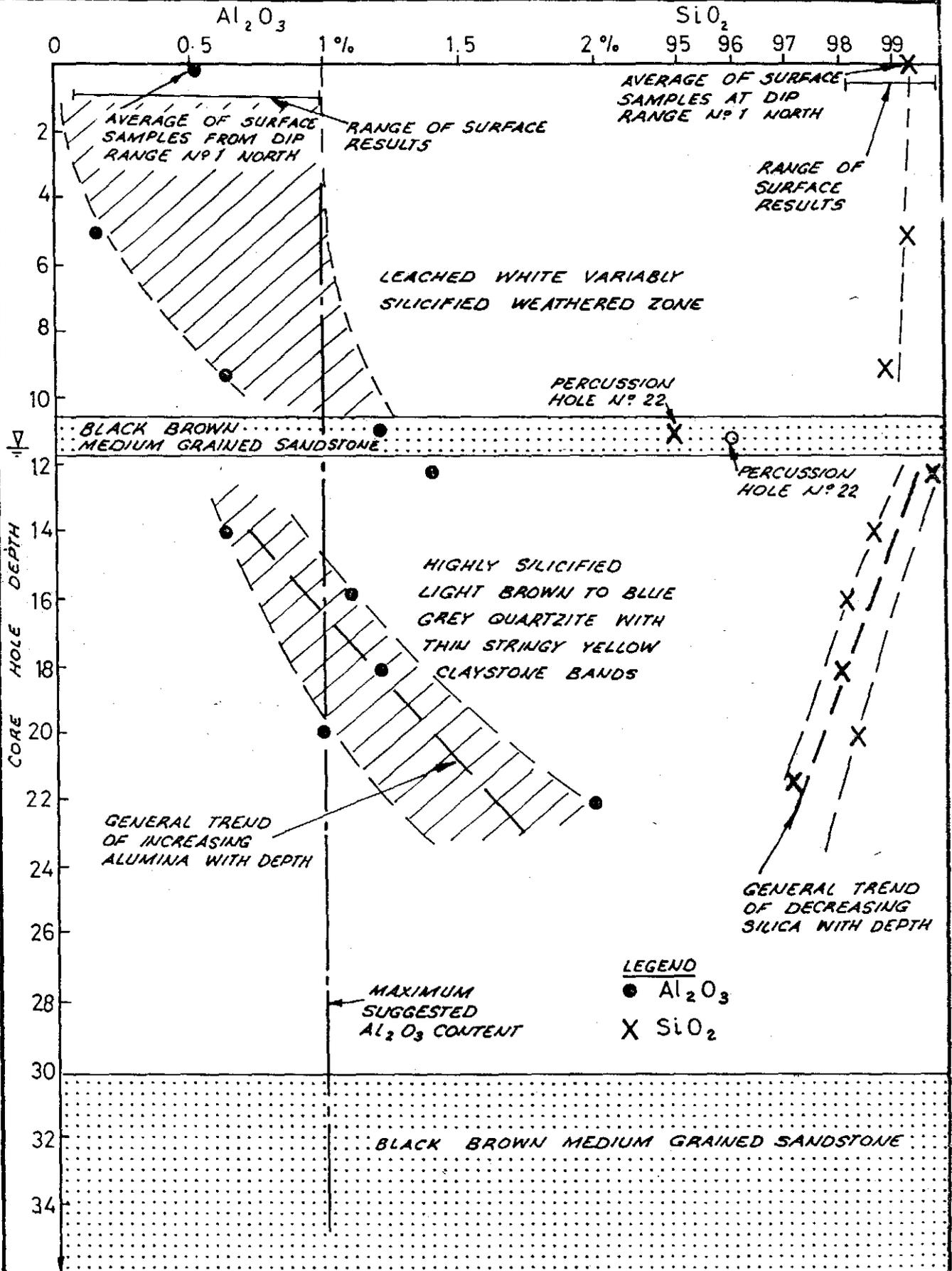
Job N°  
 PXT 250

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D.D.H N° 1 Al<sub>2</sub>O<sub>3</sub> & SiO<sub>2</sub> vs DEPTH

Fig 5  
**FIGURE N° 4**  
(Stage 3)



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 LONGWORTH & MCKENZIE PTY. LIMITED



Job N°  
**PXT 250**

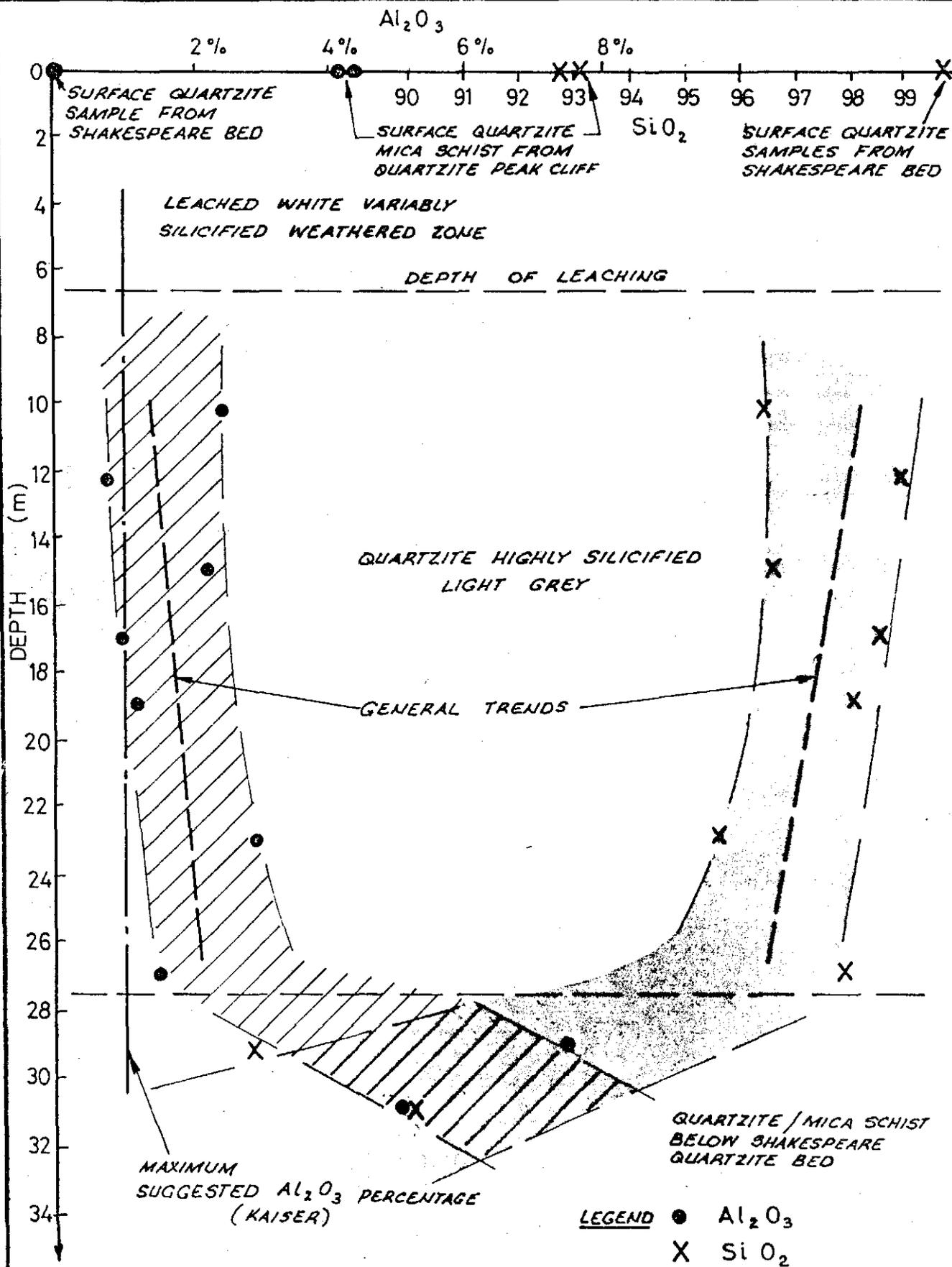
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Fig 6

# D.D.H N° 3 Al<sub>2</sub>O<sub>3</sub> & SiO<sub>2</sub> vs DEPTH

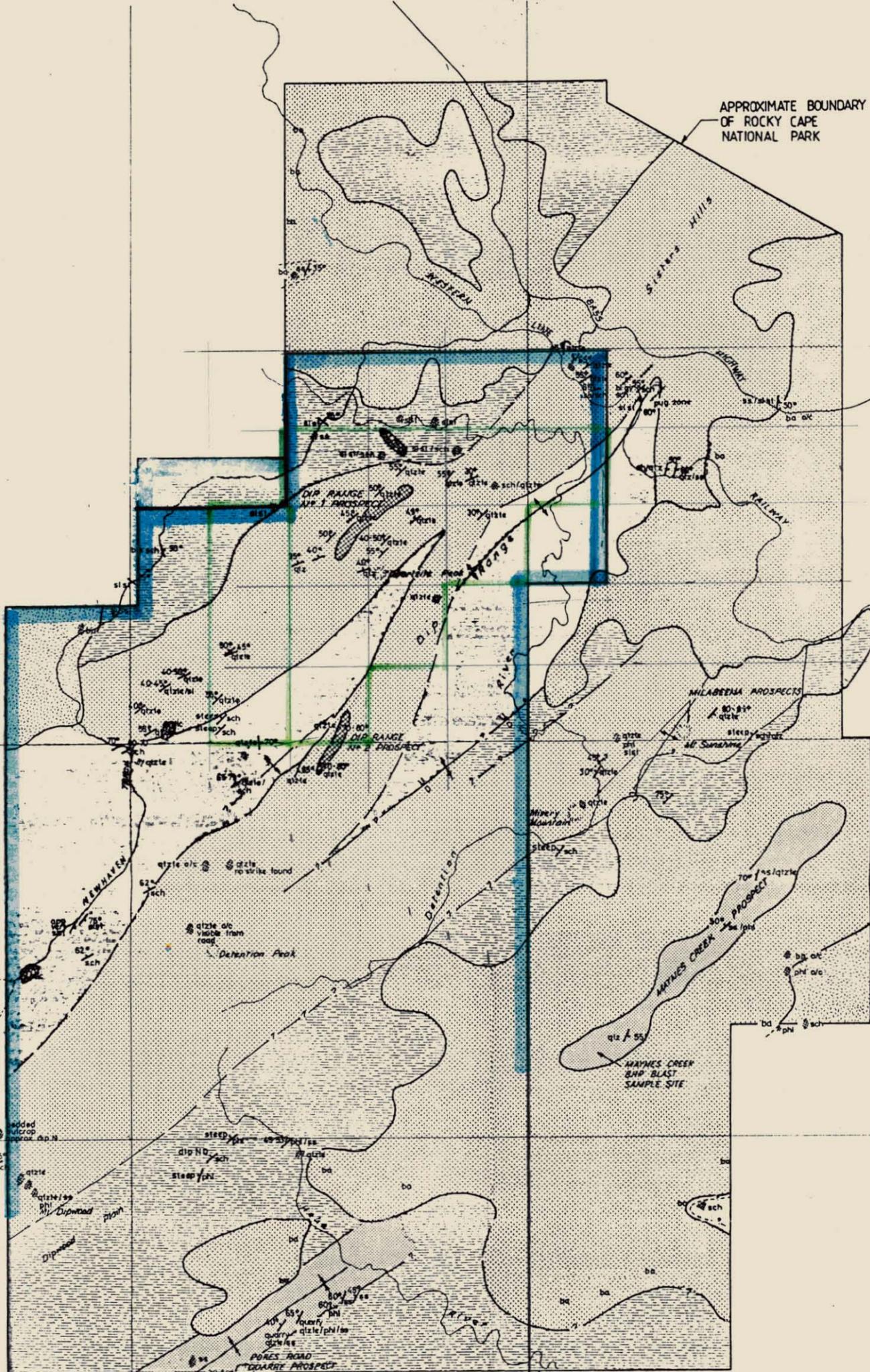
## FIGURE N° 5 (Stage 3)



Jr



APPROXIMATE BOUNDARY OF ROCKY CAPE NATIONAL PARK



SOUTHERN LIMIT OF AGREEMENT AREA

Retention Licence Application  
E.L. 43/70 (relinquished)

LEGEND

- SILCRETE
- BASALT

- KEITH METAMORPHICS
- ROCKY CAPE GROUP
  - JACOB QUARTZITE
  - IRBY SILTSTONE
  - DETENTION SUBGROUP
  - COWRIE SILTSTONE

- ANTICLINE
- SYNCLINE
- FAULT

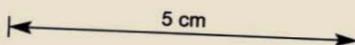
- GEOLOGICAL BOUNDARIES
  - POSITION ACCURATE
  - POSITION APPROX.
  - POSITION INFERRED

LEGEND

- qtz QUARTZ
- qtzite QUARTZITE
- silt SILTSTONE
- sic SILCRETE
- ss SANDSTONE
- ba BASALT
- sl SLATE
- bl BLUE
- blk BLACK
- gy GREY
- ND DIP NOT DETERMINABLE
- 65° MEASURED STRIKE AND DIP OF BEDS
- FOLIATION STRIKE AND DIP
- OUTCROP - NO STRIKE OR DIP
- QUARRY
- phi PHYLITE
- sch SCHIST
- sh SHALE
- shy SHALY



1:60000



A P P E N D I X 2

A discussion of the Longworth and McKenzie exploration  
with recommendations for further study. (Vic Threader)

EL 43/70 (North)  
The Dip Range Silica

Abstract

A Precambrian silica resource has been investigated as a potential feedstock for ferrosilicon manufacture. The resource did not meet requirements but merits further investigation as a source of high grade silica and with probably a lump silica by-product.

Location and Access

Dip Range lies about 6 km. south of Montumana on the Bass Highway and some 20 km. from Pt. Latta. It is reached, at present, by a steep access four-wheel drive track but a better grade road is to be constructed along the valley of Hogarth Creek.

Geology

An Upper Proterozoic sedimentary sequence referred to as the Rocky Cape Group occupies the area. ~~(enclosure 2)~~. Gee (1971)

The stratigraphy is summarised thus:

	<u>Thickness</u>
Jacob Quartzite	1130 m.
Irby Siltstone	760
Detention Sub group	1400
Cave Quartzite	
Port Slate	
Bluff Quartzite	
Cowrie Siltstone	2440 t.

The Detention sub group are the rocks of interest and they occupy around half of EL 43/70 (North).

Gee describes this unit as a uniformly fine grained orthoquartzite with a granular to glassy texture depending on the degree of cementation. He states that it consists of 99% quartz grains with a quartz cement. Some accessory minerals are also present including haematite.

In some road cuttings up to 10% feldspar or 4% mica was observed (Sisters Hills area, to the north of the E.L.)

Exploration

EL 43/70 licence has been held since 1970 and surface sampling by M.H.A. led to a joint venture agreement with B.H.P. to investigate Maynes Creek Prospect. This and Pokes Road Prospect are remnants of the Jacob Quartzite member which has been elsewhere eroded from the sequence. They occur outside (respectively east and south) of the reduced area of EL 43/70 (North). B.H.P. carried out a limited percussion drilling programme and blasted a bulk sample from the SW end of the Maynes Creek Prospect. The grain size and chemical purity of the samples did not meet their requirements and the company withdrew from the venture.

Longworth and McKenzie carried out a programme of costeaning, percussion drilling, hammer seismic traverses and diamond drilling, for Kaiser Aluminium under a joint venture agreement with M.H.A.

Summary of Operations:

- 27 Percussion holes located on 6 "Investigation Sites" (I.S.):
- Holes 1 to 4 on I.S.1
  - 5 to 11 on I.S.2
  - 12 to 14 on I.S.6
  - 15 to 18 on I.S.3
  - 19 to 25 on I.S.4
  - 26 and 27 on I.S.5

~~(Logs are included in the enclosures)~~

Summary logs:

<u>No.</u>	<u>Depth</u>	<u>Description</u>	<u>Reasons for termination</u>
1.	12	White sand	Rods jamming
2.	15	White sand	Target Depth
3.	9	White sand with some chips at surface	Rods jamming
4.	15	White sand	Target depth
5.	15	White sand, mixed with sandstone chips below 12th	" "
6.	7	White sand (very rapid drilling)	Too soft
7.	15	" " " " "	Target depth
8.	15	" " " " "	" "
9.	15	" " " " "	" "
10.	15	" " " " "	" "
11.	15	Cream to brown sand and some siltstone	" "

12.	15	White and brown sand and sandstone/siltstone	Target depth
13.	12	White sand, light brown sand from 3-6m.	Too wet
14.	15	White and brown quartzite	Target depth
15.	15	0-5 white quartzite, remainder white and yellow sand	" "
16.	15	White sand	" "
17.	15	White sandstone/quartzite	" "
18.	12	0-2.5 White sandstone	Too hard
		2.5-7.5 White sand	
		7.5-12 brown quartzite	
19.	15	0 - 2.25 White sand	Target depth
		2.55 - 15 White and brown sandstone/quartzite	
20.	15	0 - 1.5 White sand	" "
		1.5 - 15 White and brown sandstone/quartzite	
21.	14.25	0 - 1 White and brown sandstone and quartzite	Bit collapsed
22.	15	0 - 1.5 White sand	
		1.5 - 15 Brown and white sandstone	Target depth
23.	12	White and brown sandstone	Too hard
24.	15	0 - 2.7 white sand	Target depth
		2.7 - 15 White and brown sandstone	
25.	9	Light brown sand	Rods jammed
26.	12	White sand	
27.	6	White sand	Bit breaking

Hammer seismic spreads were conducted by L. & M. in an effort to determine the depth of weathering. Their conclusions were that the method did not produce consistent results but it did show that the weathering was widespread ~~(enclosure no. 5)~~.

#### Diamond Drilling

In stage 3 of the L. & M. exploration programme, a limited diamond drilling programme was undertaken to "(1) Define the physical and chemical variations with depth in the quartzite/sandstone, and (2) Provide a basis for realistic estimates of reserves."

#### Summary of Diamond Drillhole Logs

#### Samples

1.	0 - 10.5 sand and sandstone (60% recovery)	1, 2
	10.5 - 11.7 Brown/black sandstone	3
	11.7 - 30.2 Light brown highly silicified quartzite	4 - 9
	30.2 - 36.1 Iron-stained silicified silty sandstone	
2.	0 - 6.7 Fine white sandstone	
	6.7 - 17.7 Thinly bedded brown and green shaley micaceous sandstone	

3. 0 - 0.5 Fine to medium white variably silicified sandstone - 85% friable
- 6.5 - 27.6 Glassy thinly bedded extremely strong quartzite with micaceous material on bedding planes. 1,2,3,4,5,6,7
- 27.6 - 31 Grading down into interbedded quartzite and siliceous mica schist. 8, 9
4. 0 - 1.4 m. Sand and slope wash.
- 1.4 - 2.3 Black schist
- 2.3 - 9.5 Brown-grey quartzite with frequent bands of mica schist.
- 9.5 - 11.2 Black schist
- 11.2 - 36.1 Thinly bedded micaceous quartzite

(Sample numbers refer to enclosure 6)

The report concludes that:

1. There has been deep weathering and variable secondary silicification.
2. Below the leached zone, the rocks are thinly bedded and decrease in purity with increasing depth. This is illustrated in plot of  $Al_2O_3$ ,  $K_2O$  and  $SiO_2$  against depth ~~(see enclosure 8)~~.

Diamond Drillhole 1 and 3 were selectively sampled, analytical results are given in enclosures 6 and 7, and a summary is given in enclosure 8. Basically their data shows a decrease in silica content with increase in depth both in the upper leached zone and in the lower quartzite units. There is a corresponding increase in impurities with depth, the major contaminant being alumina.

As a result of this work, L. and M. reported to Kaiser Aluminium that "no further exploration effort is recommended on the agreement area for silica of the specified physical and chemical quality."

#### Discussion

The purpose of this exploration was to search for a lump silica resource for the production of ferrosilicon or silicon metal (see specification). The next stage of the exploration would presumably

have been to systematically grid test the area for reserve estimate purposes. This was not done due to failure of the material to meet specifications.

Analytical testing was confined to sandstone and quartzite samples in the diamond drill holes.

In general terms, the Detention Quartzite has been variably weathered to depths of 15m. and resilicified at the surface to produce a silicified (quartzite) cap and an underlying silica sand which grades down into impure sandstone and interbedded schist.

It is considered that a significant resource of silica sand has been discovered by the L. & M. exploration which has not been evaluated. The area covered by the percussion holes covers an area of around 1200m. x 100m. (120 000 s.m.) with an average thickness of white sand of around 9 m. This is therefore an indicated resource of 1 million tonnes which needs further evaluation. ~~(Shaded area on enclosure 3).~~

Example of some current silica specifications

<u>Purpose</u>	Max Al <sub>2</sub> O <sub>3</sub>	Max Fe <sub>2</sub> O <sub>3</sub>	<u>Grain Size</u>
Ferrosilicon	1.0	0.2	25 mm.
Silicon Metal	0.15	0.2	25 mm.
Glass sand	0.03	0.012	97% 180 microns

Although the exploration failed to find a quartzite deposit of the desired size and quality, the area is worthy of further examination to determine the extent of sand resource and its amenability to beneficiation.

There are two very impressive quartzite outcrops at either end of the lease areas and these, together with quartzite which occurs throughout the investigation area could constitute a significant resource as a by-product to silica sand mining and should be assessed.

A P P E N D I X 3

Logs, Assay Results and Borehole Locations by

Monier Ltd., June 1987

A preliminary investigation for high quality glass sand.

026

# MONIER LIMITED

REGISTERED OFFICE THE MONIER BUILDING  
6-8 THOMAS ST. CHATSWOOD, N.S.W. AUSTRALIA  
P.O. BOX 295, CHATSWOOD, N.S.W. 2067  
TELEPHONE (02) 411 9611 FAX No (02) 411 1245  
TELEX AA26673 CABLES & TELEGRAMS "MONIER" SYDNEY

12th June 1987

MINERAL HOLDINGS AUSTRALIA PTY LTD  
2nd Fl. 100 Collins Street  
MELBOURNE Vic 3000

*Handwritten signature*  
A 18/6/87

For the attention of Mr. Neil Thomas

Dear Neil,

I now have the results of the sand drilling on the Dip Range. They are surprisingly good and are as follows:

Hole Number	Depth (feet)	Fe <sub>2</sub> O <sub>3</sub> (ppm)
2	10	159
2	20	133
2	30	136
2	40	273
3	10	134
3	20	152
3	30	143
4	20	126
4	30	249

The samples analysed were as mined and acid washed to remove drill steel fragments, loose clay etc. It has been our experience that a full sand washing plant generally halves the Fe<sub>2</sub>O<sub>3</sub> levels obtained after acid washing. This means that the sand strata intersected by drilling has the right quality to be a glass sand deposit. What has to be determined is the quantity of material available as considerable difficulty was encountered in drilling the sand due to locating patches of quartzite.

There is now considerable interest in locating glass sand deposits following the demise of the Shelbourne Bay project and I understand that Kevin Pinner thought I had drilled the wrong area. I would be happy for Kevin to redirect me if you think considerable reserves could be encountered.

Yours sincerely,

*B. R. Harrison*

B.R. HARRISON  
Development Manager,  
Construction Materials Division.

30/13

## DRILL LOGS      DIP RANGE      13.3.87

## Hole Number 1.

<u>Depth</u>	<u>Strata</u>
0-30'	Shale, silt stone with quartz pebbles generally grey-yellow-brown in colour.

## Hole Number 2.

<u>Depth</u>	<u>Strata</u>
0-40'	Firm sand with pebbles, occasionally slightly silicified, grey-off white in colour

## Hole Number 3

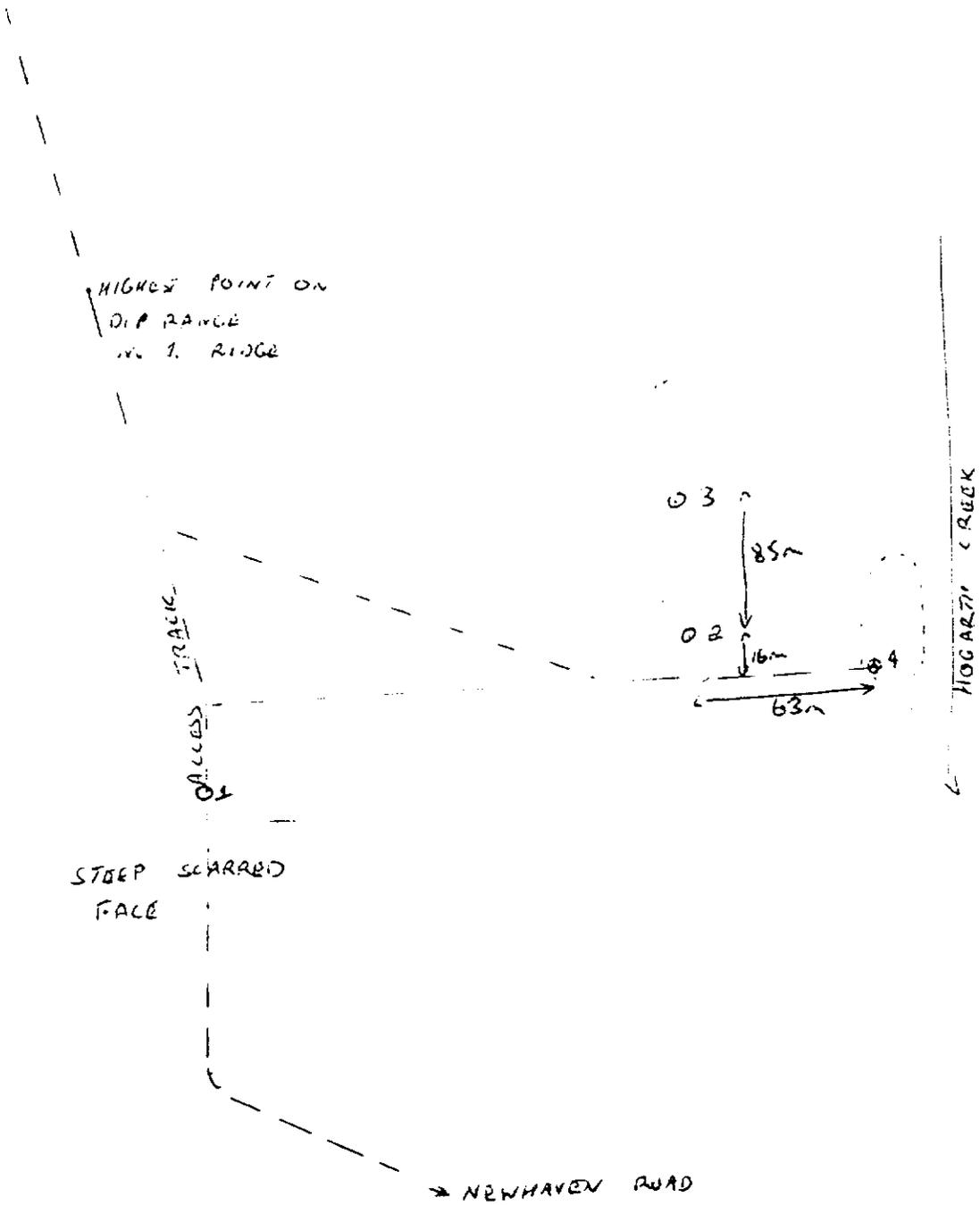
<u>Depth</u>	<u>Strata</u>
0-30'	Soft Sand which lead to the rods jamming. Grey off white in colour

## Hole Number 4

<u>Depth</u>	<u>Strata</u>
0-14'	Hard quartzite
14'-30'	Firm Sand grey-of white in colour
30'-35'	Hard quartzite

030498

028



029



857031  
03 6547639

FACSIMILE MESSAGE  
SYDNEY, AUSTRALIA  
(02) 411 1245

DATE: 10.4.87                      TRANS. NO: 8441                      PAGE 1 OF 2  
TO: MINERAL HOLDINGS AUSTRALIA PTY LTD - NEIL THOMAS  
FROM: B. R. HARRISON      MONIER LIMITED  
SUBJECT:                      DRILLING- OIL RANGE

FOUR AIR TRAIL PERCUSSION HOLES WERE DRILLED  
IN THE OIL RANGE AND SAND OR DRILLED QUARTZITE  
COLLECTED.

THE SITE OF THE DRILL HOLES IS SHOWN ON THE  
NEXT PAGE.

SAMPLES HAVE NOT YET BEEN ANALYSED.

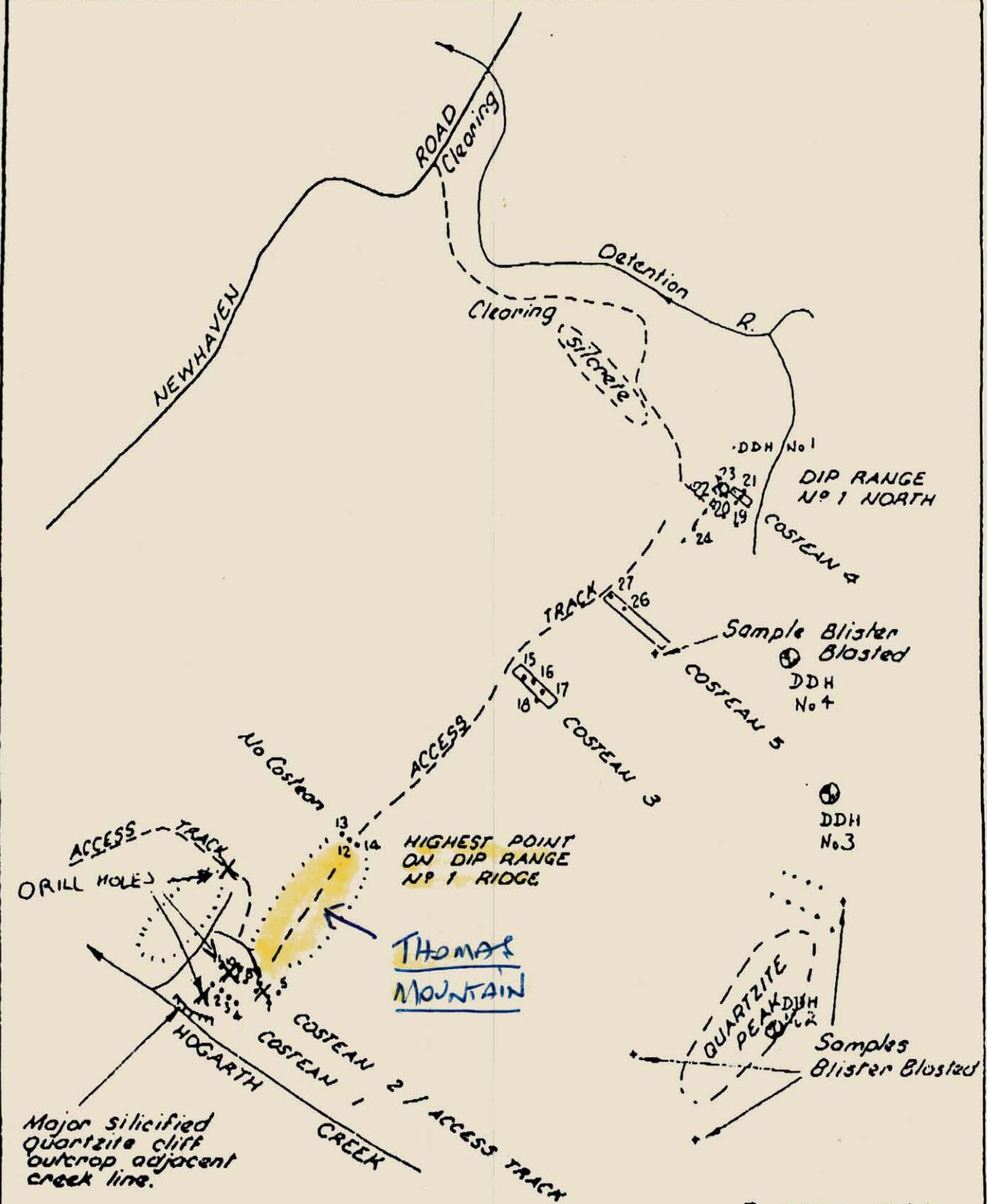
COSTS INCURRED IN DRILLING WERE

DRILL RIG	\$800
BULL DOZER	\$400
LOW LOADER	\$500
SALARIES	\$500
ACCOMMODATION	\$100
AIRFARES	\$400
	<u>          </u>
	\$2700

REGARDS  
B.R. Harrison

030

FIGURE NO



**SKETCH OF BOREHOLE  
& COSTEAN LOCATIONS**  
NOT TO SCALE

- ⊕ CORED HOLES
- ... SEISMIC TRAVERSES
- PERCUSSION HOLES



Arthur River - Keith River

Exploration for Metallic Minerals

Arthur River - Keith River  
Exploration for Metallic Minerals

A joint venture agreement between C.R.A. and Mineral Holdings Australia investigated the Keith River gossan in 1972. This consisted of: i) 2 diamond drill holes: KR.1 (241.5m.) and KR.2 (165.3m.). These holes penetrated 60m. and 30m. of pyrite, magnetite/haematite and siltstone in amphibolite (logs and log locations attached). ii) 16 north-south mapping and sampling traverses (for details see TOR 72-904) and iii) stream sediment sampling in the Keith and Arthur Rivers (sample locations and bare metal results attached).

Copper, lead and zinc values were disappointing but gold has been found in amphibolites from some of the Arthur River boreholes.

The newly formed Mount Royal Mining/Mineral Holdings joint venture will further investigate the iron formation of the Keith River gossan and the gold content of the Arthur-Keith alluvials.

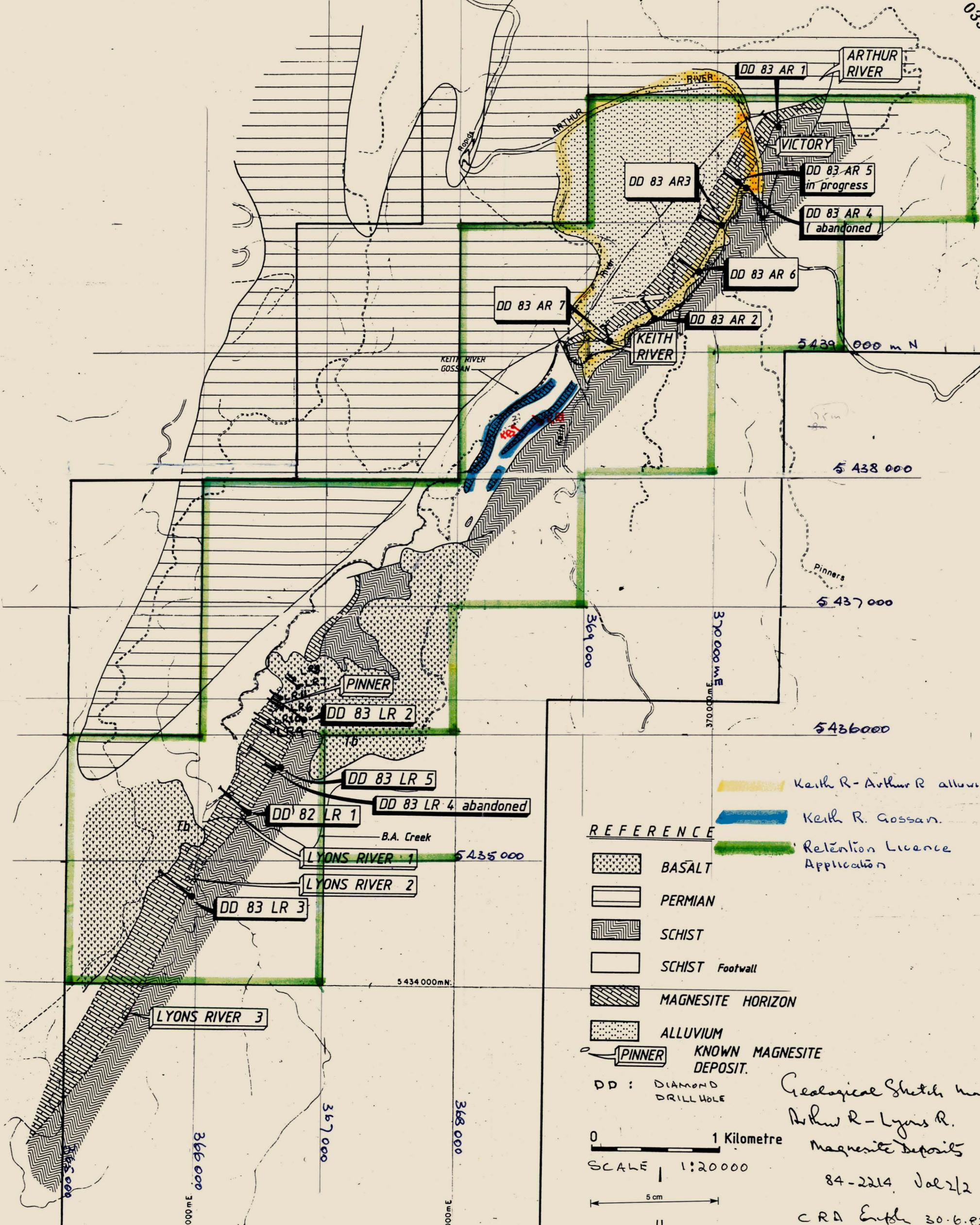
Attachments:

Map showing the C.R.A./M.H.A. Retention Licence area and the areas of interest to the M.R.M./M.H.A. joint venture.

Geological Map of the magnesite areas and the Keith River Gossan showing borehole locations.

Map showing the location of geochemical samples and analytical results.

Graphic Logs of K.R.1 and K.R.2



REFERENCE

- BASALT
- PERMIAN
- SCHIST
- SCHIST Footwall
- MAGNESITE HORIZON
- ALLUVIUM
- PINNER KNOWN MAGNESITE DEPOSIT.
- DD : DIAMOND DRILL HOLE

- Keith R - Arthur R alluvials
- Keith R. Gossan.
- Retention Licence Application

0 1 Kilometre  
 SCALE 1:20000  
 5 cm

Geological Sketch map  
 Arthur R - Lyons R.  
 Magnesite deposits  
 84-2214, Vol 2/2  
 CRA Enfr 30.6.83

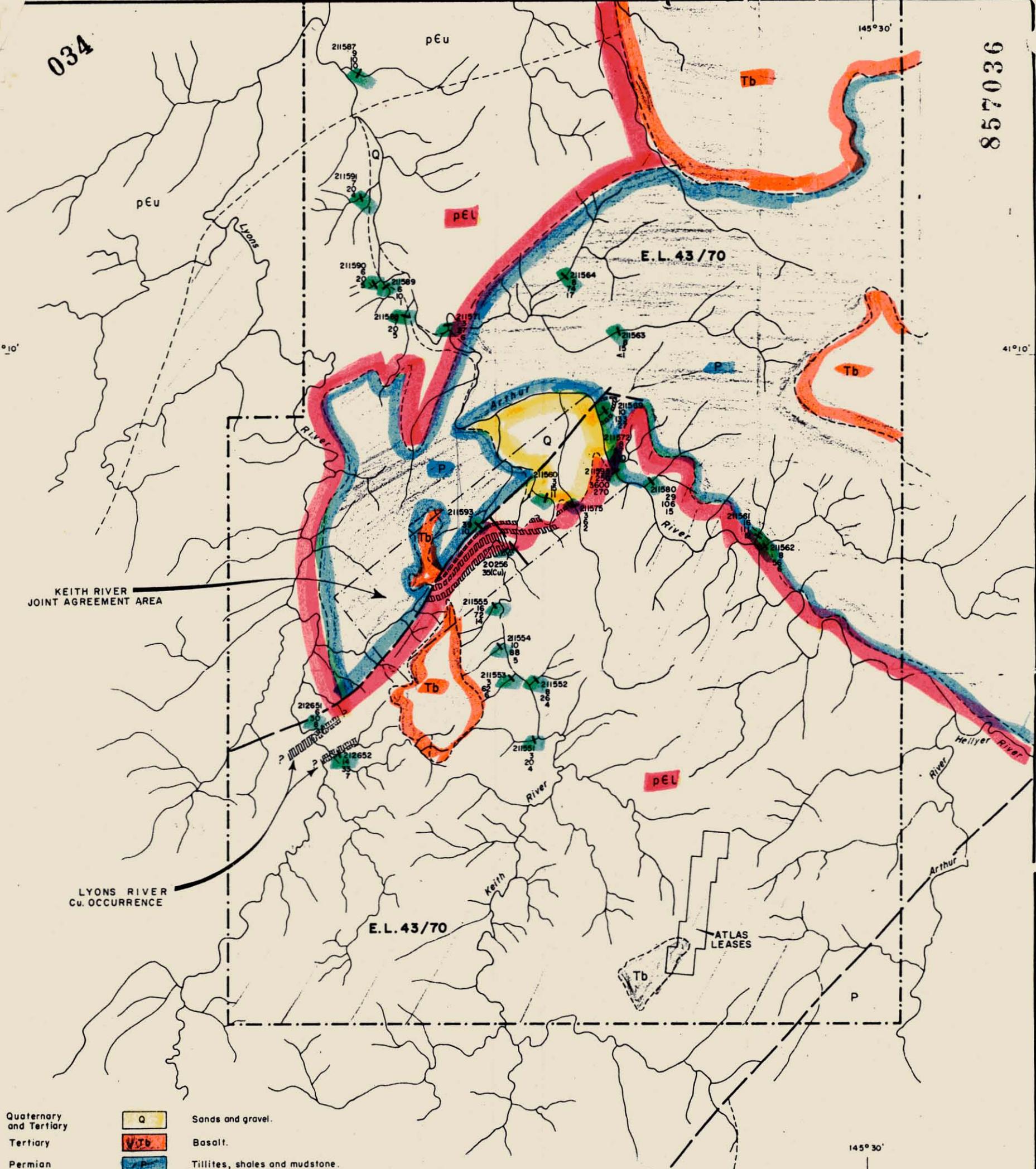
034

857036

145°30'

41°10'

145°30'



Quaternary and Tertiary  
Tertiary  
Permian  
'Younger' Precambrian  
Older Precambrian

Q  
Tb  
P  
pEu  
pEL

Sands and gravel.  
Basalt.  
Tillites, shales and mudstone.  
Neasey quartzites and slates.  
Keith Beds - schists, phyllites, slate and quartzite with Sulphide Horizon.

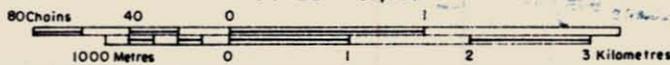
--- Geological boundary  
- - - Fault

Geochemical drainage - sample location and number.

211555  
Pb  
Zn in ppm  
Cu

5 cm

SCALE 1:63,360



C. R. A. EXPLORATION PTY LIMITED

E.L.43/70 N. W. TASMANIA  
GEOLOGICAL - GEOCHEMICAL PLAN

PORTION OF 'BURNIE' SHEET - SERIES I:63360

SCALE 1" to 1 mile

TM. PORTER, June '72

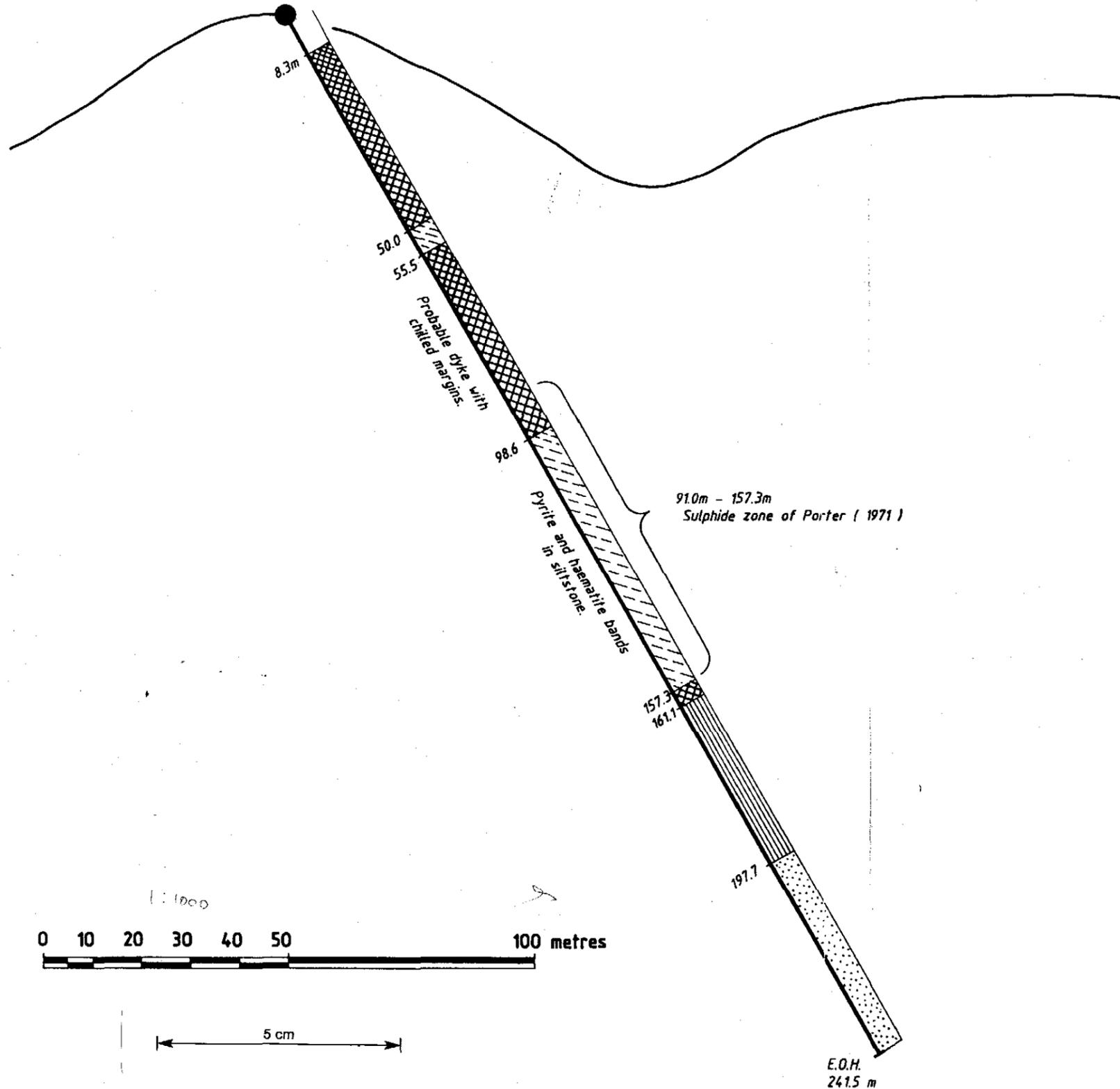
PLAN No T 813

857037

154° AMG

324° AMG

DD 71 KR 1  
60°



**LEGEND**



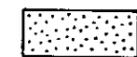
Amphibolite



Siltstone



Carbonate veined siltstone



Carbonate veined sandstone

368565mE AMG  
5 438435mN

CRA EXPLORATION PTY. LIMITED

E.L. 43/70 ARTHUR RIVER  
KEITH RIVER PROSPECT  
DD 71 KR 1 SECTION

REF.	SK55 - 3	83-2036
SCALE.	1 : 1000	DRAWN. R. T.
AUTHOR.	V.A.W.	REPORT N°. 12283
DATE.	20 - 6 - 1983	TASH N°. 1426

035

036

857038

KR2...  
(Keith R. Rossen)

LEGEND



SANDSTONE



SILTSTONE



AMPHIBOLITE



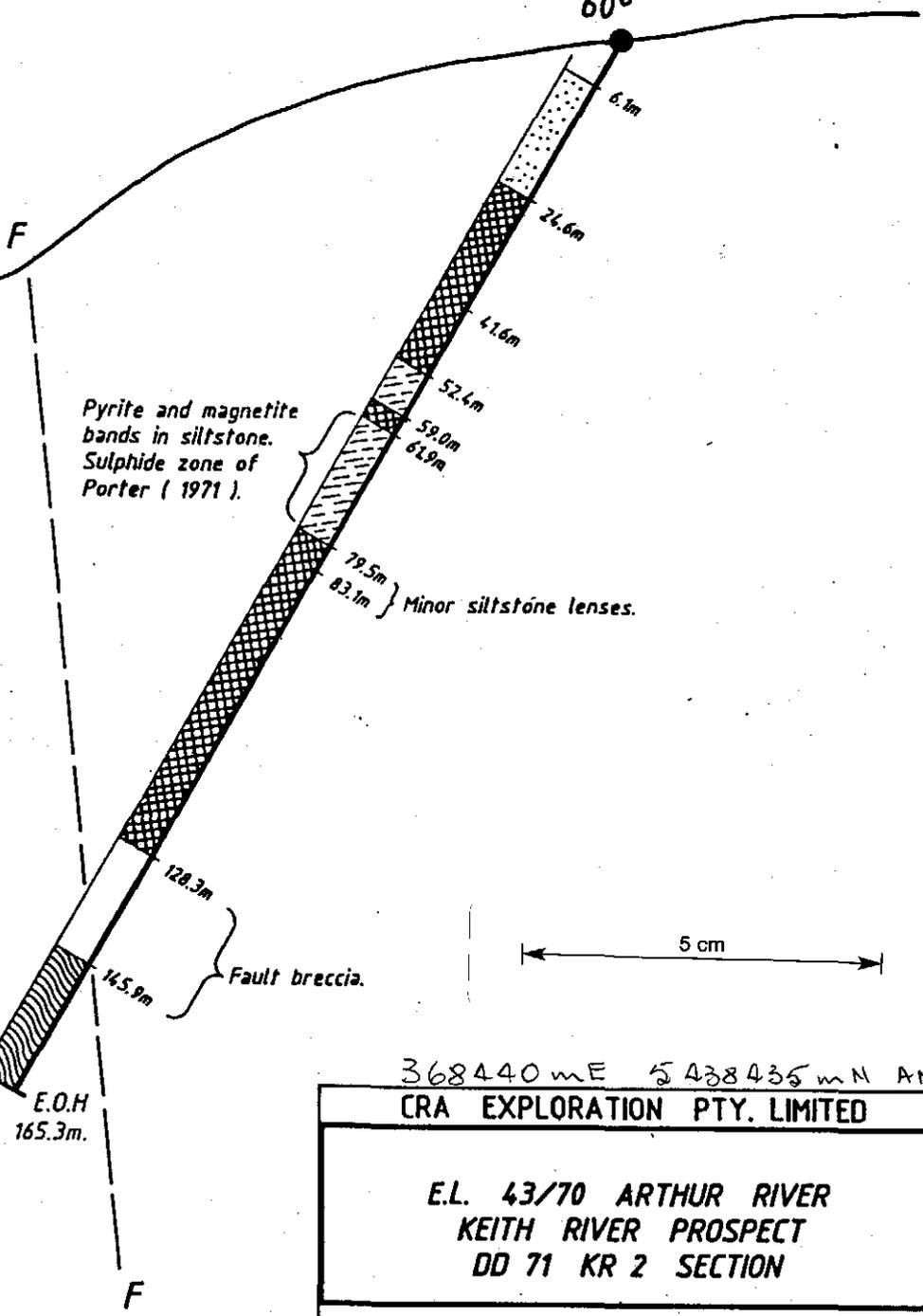
SHEARED PERMIAN ROCKS

130° AMG ✓

310° AMG

DD 71 KR 2

60°



368440 mE 5 438435 mN AMG

CRA EXPLORATION PTY. LIMITED

E.L. 43/70 ARTHUR RIVER  
KEITH RIVER PROSPECT  
DD 71 KR 2 SECTION

Ref: SK55 - 3

83-2036

Scale: 1 : 1000

Drawn: R. T.

Author: V. A. W.

Report N°: 12283

Date: 23 - 6 - 1983

Plan N°: TASH 1427

1 : 1000

0 10 20 30 40 50 metres