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COPY FOR MINES DEPARTMENT

from M.C. Forster

consolidated lease 34/76

"DIAMOND DRILLING
OF THE
WELD RIVER QUARTZITE DEPOSIT
IN
SOUTHERN TASMANIA

BY

D. J. HASSELL

MINING SUPERVISOR --TEMCO

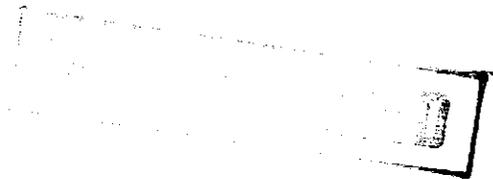
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TEMCO - BELL BAY



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ACKNOWLEDGEMENTS:

SUMMARY

A diamond drilling programme was carried out on part of a mining lease for quartzite in the Weld River region of Southern Tasmania from March to May 1980.

Results obtained indicate an immediate potential for at least 1.5 mill tonnes of high grade quartzite although outside the chemical specifications set for use at Temco with a further probability of greater mineable reserves to the North of the area drilled with similar chemical and physical properties.

The lease is relatively remote and supply of quartzite from the area is subject to logistics problems which, at the present time, result in the deposit being uneconomic as a silica supply for use at Temco.

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"DIAMOND DRILLING OF THE WELD RIVER
QUARTZITE DEPOSIT IN SOUTHERN TASMANIA"

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1. INTRODUCTION

The mining lease (consolidated lease No. 39M/76) is held by Mr Mac Forster (prospector) and comprises 202 hectares covering quartzite outcropping to the North and South of the Weld River approximately 22Km (direct) North West of the town of Geeveston in Southern Tasmania.

The lease is subject to a 3 year option agreement with B.H.P., ending on 31st December 1983.

Part of the quartzite outcrop (Glovers Bluff) was subjected to limited drilling by Consolidated Goldfields Aust. Ltd., in 1974 and eventually a trial parcel of approximately 1000t of quartzite was mined from Glovers Bluff and used in test smelting ferrosilicon at Electrona.

It was reported that the quartzite should be well suited to the production of 75% ferrosilicon, although it would seem that some problems were encountered during the test and these were attributed to excessive fines in the quartzite.*

Consolidated Goldfields did not go ahead with the venture and no further work of any significance was carried out until that covered in this report.

* Said to be from a preliminary report by Sverre Olsen of Sintef Soutes, Troheim Norway.

2. WORK CARRIED OUT

2.1 SURVEYING AND ACCESS

A rough baseline was cleared by hand and measured out using tape and compass.

Bore holes were set out roughly equidistant along this line and re-sited if necessary where practical difficulties could be easily overcome by doing so.

Access roads were up-graded to 4 wheel drive status and over-hanging fallen trees cleared to allow passage of trucks.

2.2 DRILLING

Five bores were drilled in quartzite as shown on the general plan.

All were angled at 45° to the North East and had target depths of 100 metres although this depth was not attained in some cases.

A sixth bore was sited to the South West of the outcropping quartzite on the Permian Tillite.

The aim of this bore was to prove that the Tillite did actually unconformably overlie the quartzite sequence as indicated by surface geological reconnaissance.

Drill cores were all logged on site and returned to Temco for chemical analysis.

A further survey using planetable equipment was carried out to establish more accurately the relative positions and collar heights of the bores.

From the information obtained, a general surface plan and cross-sections were drawn up. (See Appendices 1 and 4 respectively.)

3. GEOLOGY

3.1 GENERAL GEOLOGY

The Glovers Bluff quartzite is a member of part of a pre-Cambian sequence which exists as an outlying fault block, cross faulted in several places and surrounded by rocks of Jurassic age and largely made up of dolerite.

The outcropping quartzite accounts for an area of approximately 45 hectares, approximate length being 4.5Km and width 100m.

strike is N 25°W and dip is near vertical.

Glovers Bluff itself is quartzite and is a topographic high some 180m above the Weld River and local plain level.

The quartzite was shown to be unconformably overlain to the South west by Permian Tillite.

The fact that this area has been eroded by the glaciation is taken to indicate that the pre-Cambian sequence now underlying the tillite is softer than that in the Glovers Bluff zone and therefore probably not orthoquartzite.

3.2 ECONOMIC GEOLOGY

The quartzite consists of beds of varying thickness, the maximum thickness of a single bed being only a few metres while more foliated sections may contain many individual beds of quartzite only millimetres thick.

In the latter circumstance, it was found that alumina values were high, reflecting interbedded sericitic schists.

The quartzite commonly shows original depositional features such as cross-bedding, ripple marks, etc., which are indications of deposition in a shallow sea, relatively high energy environment.

Petrological work has shown that a dark mineral commonly present on fractures within the quartzite is "Hellyerite" (NiCo_{3.6}H₂O). The amount present is considered to be insignificant. Some beds contain feldspar grains.

By far the worst contaminant appears to be the "sericitic" quartzite and schist beds which contain varying proportions of sericite

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and fuchsite micas as well as detrital grains of feldspar and other rock fragments.

Both micas are major contributors of aluminium - general formula $K_2 Al_4 (Si_6 Al_2) O_{20} (OH, F)_4$.

Fuchsite contains chromium ions and is therefore light green in colour.

Drilling has indicated the most likely place where an open cut operation could produce quartzite with a product grade as high as possible for the area.

There is insufficient drilling at this stage to carry out a pit planning exercise in detail, but the pit plan overlay (Appendix 5) and the pit profiles on the cross sections give some idea of the location and size of such a pit.

4. RESERVES

4.1 EXPLANATION OF RESERVE CALCULATION

The rough pit plan (Appendix 5) was designed after consideration of the following restraints:

(i) EXTENT OF DRILLING

It was considered that the drilling carried out is of a preliminary nature only so that the pit was restricted to the area of greatest information.

(ii) GRADE ATTAINABLE

From the cross-sections, it became obvious that a product grade conforming to $\text{SiO}_2 > 98\%$ $\text{Al}_2\text{O}_3 < 0.6\%$ could not be attained from a pit in the area drilled of practicable operating size.

However, it seemed reasonable, after bulking calculations across strike, that a grade of approximately 98% SiO_2 could be attained with Al_2O_3 approximately 1.0% in a reasonable size pit.

Therefore, the pit was designed with this product grade in mind.

(iii) WASTE TO ORE RATIO

In view of the fact that waste material from the pit would probably not find a ready market and that even the undersize quartzite screened out of the crushed ore would be an expensive by-product for sale as gravel etc., given the remote location of the mine, a waste to ore ratio of 0.5 to 1 was used as a guide to pit planning.

This ratio results in a pit to a depth coincident with known information.

(iv) All ramps and haul road gradients were aimed at 1 in 10 slopes.

(v) Allowance was made in the proposed road system for possible further development of the Glovers Bluff test pit without having a continuous pit to the north through a low quality crushed zone caused by cross faulting.

(vi) It was assumed that good grade quartzite does not continue to the South of the major cross fault which crosses the base line at approximately 1490m N.

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Further assumed or estimated limits to the high grade zone in the direction at right angles to the strike are as seen on cross-sections 1600m and 1700m North.

A high grade zone no greater than 80m wide is envisaged.

4.2 MINEABLE RESERVES

Taking all these restraints into account, it was calculated that a potential exists to mine approximately 1.5 mill. tonnes of quartzite with SiO₂ content \approx 98.0% and Al₂O₃ content \approx 1.0% and having acceptable physical and thermal properties. Yield of usable product after crushing, screening, washing and transport is estimated to be 900,000 tonnes. 60%₀

Outside this rough pit area there is further potential for similar grade quartzite both to the North through Glovers Bluff and into the Camels Back range on the North side of the Weld River and also below the designed pit depth if a greater waste to ore ratio is accepted.

It is considered doubtful whether an economic mining operation could extract quartzite with the preferred 0.6% Al₂O₃ content in view of the consistent nature of such deposits along strike.

4.3 UP-GRADING ON TREATMENT

It was claimed that the quartzite would up-grade on crushing, screening and washing due to its tendency to break on interfaces having high impurity mineral concentrations.

This was tested on a laboratory scale at Temco and it was found that SiO₂ content was increased by about 0.7% and Al₂O₃ content was decreased by about 0.19% for rock considered to be below grade specification but potentially beneficiable.

Because of the relatively shaky merits of the test, being on a laboratory scale, only four samples were tested.

Any increase in mineable reserves due to treatment up-grading is considered negligible at this time.

Results are listed in Appendix 3.

5. LOGISTICS5.1 TRANSPORT

The deposit is situated 43 road Km from Port Huon where "Lake" class vessels can be accommodated (approximately 15,000 tonnes capacity) at the bulk paper pulp loading complex at A.P.M.

Discussions were held with the Manager A.P.M. at Port Huon regarding the possible use of the loader for quartzite.

It was stated that:

1. The facility is owned by A.P.M. and operated by their own personnel and is subject to an agreement with the Waterside Workers Federation, whereby, if the facility is used in a greater capacity or for other materials then Waterside Workers Federation Workers must be employed for the work.
2. Under no circumstances would A.P.M. allow such a situation to eventuate for fear of union disruption causing their plant to become uncompetitive on the world market.
3. If the above difficulty could be overcome then absolutely no contamination of the pulp with quartzite would be tolerated.
4. At present there is no available space for stockpiling quartzite at the loader. Excavation of the hill at the back of the holding area would be required.

Failing transport by sea, the order of costs involved in road transport may be gauged by the quotes for delivery of a trial parcel to Temco - Appendix 6.

Thus road transport is out of the question and rail, although not investigated, is considered to be similarly unattractive due to the distances involved and the large capital expenditure necessary for loading and unloading facilities.

5.2 TREATMENT PLANT

The treatment plant site would need to have power and water readily available and these are not available at the quarry site.

Trucking to a treatment plant in a suitable location, possibly near an existing town, is considered undesirable because of the unnecessary transport of rock which would report as fines for which there is no market known at this stage.

5.3 ENVIRONMENTAL ASPECTS

The lease itself borders on a national park boundary and the proposal of mining has, in the past, caused rapid retaliatory action from the Department of the Environment and the National Parks & Wildlife Department.

A very detailed environmental impact report would be required prior to mining and the impression is that these Government Bodies concerned would do all in their power to impede progress toward mine establishment.

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6. CONCLUSIONS

The work carried out indicates that a small open cut mining operation with waste to ore ratio approximately 0.5:1, could yield approximately 900,000 tonnes of quartzite with a silica content of approximately 98% and alumina approximately 1.0% and of a suitable size range for use at Temco. A by-product of undersize would account for about 35% R.O.M. ore.

It is further recognised that this tonnage is limited because of the vertical penetration of the bores drilled and that more drilling and the tolerance of a w/o ratio of greater than 0.5:1 would increase the usable tonnage.

However, the grade of quartzite mined could not be expected to improve either with depth or with progression to the North where large tonnages are indicated by surface outcrop North of the Weld River.

The logistics of the deposit mean that it is not amenable to economic development for use at Temco at this time.

However, it is not impossible that these problems could be overcome at some future date.

RECOMMENDATIONS

When all factors pertaining to the Weld River deposit are considered, it is realised that although it is not immediately usable at Temco, it does have some value for future development.

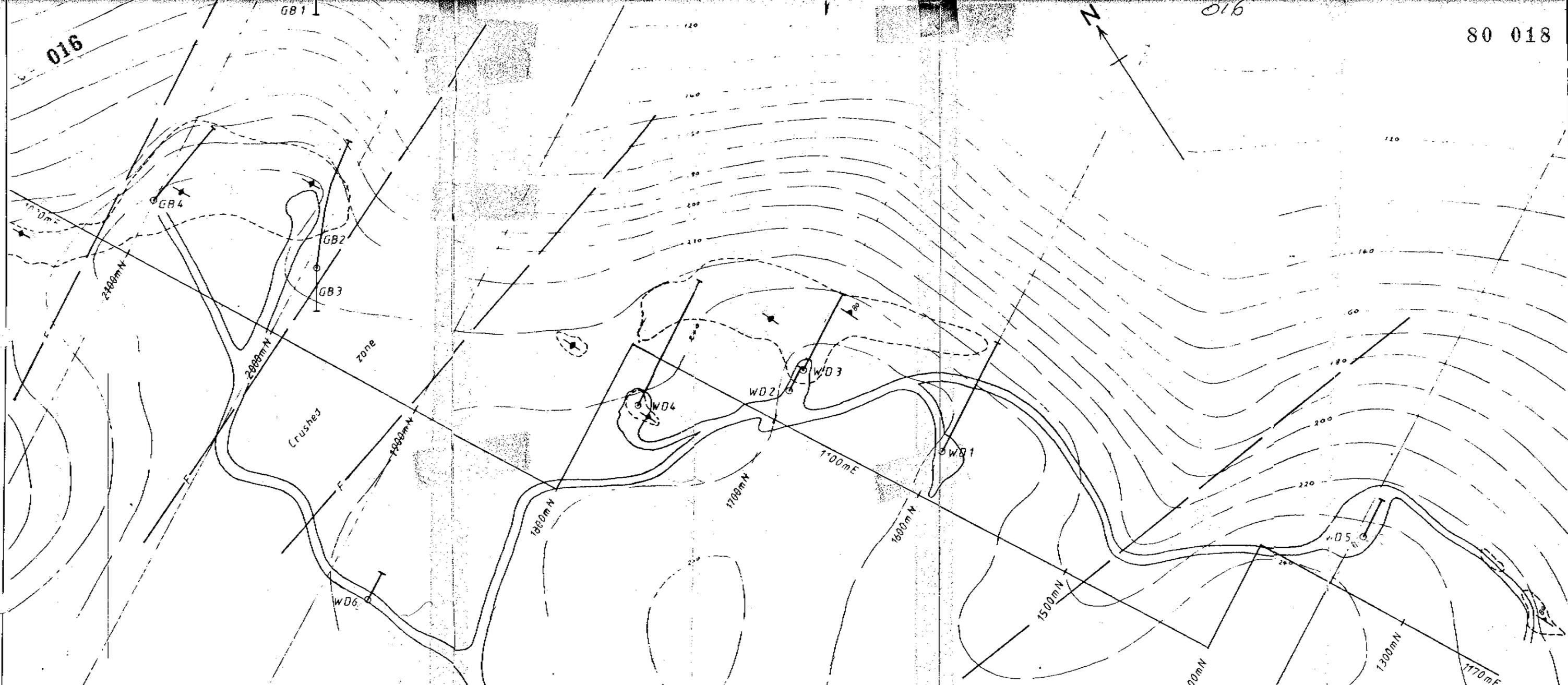
Factors which could greatly affect the future of the deposit are:

1. Joint development with another interested company.
It is known that Kaiser Aluminium Personnel have expressed interest in the deposit and have had some discussion with Mr Forster.
2. Cheap power becoming available in the Southern region of the state - this may or may not attract other electric arc smelting to the region.
3. Provision of a bulk ship loading facility in the region.
Sea transport is considered to be the only method of lowering the freight component of the cost of the quartzite if used at

another locality.

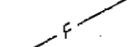
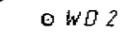
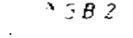
In view of the above considerations and the fact that the next option payment of \$10,000 is due on 31st December 1981, and thence \$15,000 on 31st December 1982, it is recommended that the value of the deposit to B.H.P. as a whole be carefully considered in terms of future needs and the appropriate action taken.

The deposit is considered to be of little or no use to Temco for many years to come, if at all, and therefore it is recommended that Temco regard the deposit as a long term backstop or emergency silica source only.



WELD RIVER QUARTZITE DEPOSIT

Surface plan

-  QUARTZITE OUTCROP BOUNDARY
 -  STRIKE & DIP
 -  FAULT LINE
 -  WD 2 DIAMOND DRILL HOLE - TEMCO
 -  GB 2 DIAMOND DRILL HOLE - CGA
- SCALE 1 : 2000 CONTOUR INT 10m



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APPENDIX 2.

BORE LOGS AND ANALYSES

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DRILL HOLE No. W.D.1LOCAL CO-ORDINATES 1600m N/1130m E/R.L. 249.4mANGLE OF DEPRESSION 46°BEARING (MAG) 60°

INTERVAL (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
0 - 2.95	N O	S A M P L E	
2.95 - 4.70	98.2	0.97	0.17
4.70 - 5.80	98.0	1.00	0.18
5.80 - 8.70	95.5	1.11	0.26
8.70 - 10.25	N O C O R E R E C O V E R E D		
10.25 - 12.17	98.4	0.96	0.22
12.17 - 12.95	N O C O R E R E C O V E R E D		
12.95 - 15.95	98.8	0.74	0.07
15.95 - 18.95	98.7	0.74	0.11
18.95 - 21.95	99.0	0.39	0.03
21.95 - 24.95	98.3	0.45	0.26
24.95 - 27.95	98.5	0.57	0.26
27.95 - 30.95	98.5	0.67	0.27
30.95 - 33.95	97.8	0.68	0.13
33.95 - 36.95	97.6	1.02	0.31
36.95 - 39.95	97.6	1.02	0.45
39.95 - 42.95	98.6	0.85	0.22
42.95 - 44.25	98.4	0.90	0.23
44.25 - 46.80	98.3	1.02	0.33
46.80 - 49.80	98.0	1.33	0.32
49.80 - 52.80	98.5	0.94	0.24
52.80 - 55.80	98.7	0.80	0.24
55.80 - 58.80	98.5	0.78	0.29
58.80 - 61.80	98.4	0.89	0.28
61.80 - 64.80	97.8	1.51	0.39
64.80 - 67.80	97.9	1.38	0.32
67.80 - 70.80	98.3	0.83	0.31
70.80 - 73.80	98.6	0.76	0.29
73.80 - 75.80	97.8	1.00	0.44
75.80 - 78.80	97.7	1.10	0.21
78.80 - 81.80	97.4	0.93	0.03

019

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DRILL HOLE No. W.D.1 continued

INTERVAL (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
79.20 - 79.30	96.1	2.30	0.40
79.30 - 82.30	98.3	0.69	0.14
82.30 - 83.20	98.5	0.83	0.18
83.20 - 86.20	98.7	0.54	0.18
86.20 - 89.20	98.7	0.73	0.19
89.20 - 92.20	98.7	0.69	0.17
92.20 - 95.20	98.8	0.43	0.09
95.20 - 96.40	98.2	0.85	0.22
96.40 - 99.40	98.8	0.49	0.13
99.40 - 102.40	98.6	0.64	0.22
102.40 - 104.00	98.4	0.90	0.23

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DRILL HOLE No. W.D.2

LOCAL CO-ORDINATES 1700m N/1121m E/R.L. 251.2

ANGLE OF DEPRESSION 45° BEARING (MAG) 60°

INTERVAL (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
G - 2.09	N O	S A M P L E	
2.09 - 2.79	98.4	0.81	0.23
2.79 - 3.64	97.4	1.50	0.54
3.64 - 6.64	98.1	1.10	0.37
6.64 - 9.64	97.8	1.49	0.38
9.64 - 12.64	97.7	1.59	0.39
12.64 - 15.64	97.8	1.66	0.33
15.64 - 18.64	97.7	1.85	0.29
18.64 - 19.07	98.5	1.10	0.18
19.07 - 20.70	96.9	2.30	0.30
20.70 - 23.60	98.5	0.92	0.19
23.60 - 24.92	98.6	0.86	0.17

021

DRILL HOLE No. W.D.3

LOCAL CO-ORDINATES

1700m N/1121m E/R.L. 251.2

ANGLE OF DEPRESSION

45°

BEARING (MAG)

60°

INTERVAL (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
0 - 0.93	N O S A M P L E		
0.93 - 3.93	98.4	0.71	0.12
3.93 - 5.30	97.24	0.99	0.14
5.30 - 8.30	97.6	1.66	0.09
8.30 - 9.30	97.8	1.29	0.17
9.30 - 12.30	98.2	1.10	0.13
12.30 - 15.30	98.0	1.40	0.15
15.30 - 18.30	98.0	1.10	0.24
18.30 - 20.63	98.2	0.91	0.23
20.63 - 21.13	94.5	1.10	0.24
21.13 - 22.91	98.1	0.90	0.22
22.91 - 25.91	98.4	0.79	0.22
25.91 - 28.91	98.4	0.96	0.29
28.91 - 31.91	97.7	1.01	0.58
31.91 - 34.91	98.2	0.83	0.25
34.91 - 35.90	98.1	1.09	0.40
35.90 - 38.23	97.7	1.61	0.28
38.23 - 41.23	97.7	1.31	0.28
41.23 - 44.23	98.2	0.98	0.24
44.23 - 46.30	98.3	0.93	0.20
46.30 - 49.80	98.1	1.34	0.26
49.80 - 52.80	97.6	1.59	0.43
52.80 - 53.43	97.7	1.44	0.33
53.43 - 56.43	97.7	1.31	0.29
56.43 - 59.43	97.8	1.09	0.37
59.43 - 62.43	97.8	1.16	0.51

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DRILL HOLE No. W.D.3 continued

INTERVALS (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
62.43 - 63.07	98.0	1.06	0.46
63.07 - 64.24	98.7	0.11	0.26
64.24 - 67.24	98.7	1.00	0.22
67.24 - 70.22	98.8	0.94	0.18

023

DRILL HOLE No. W.D.4

LOCAL CO-ORDINATES 1780m N/1069m E/R.L. 243.0

ANGLE OF DEPRESSION 45° BEARING (MAG) 60°

INTERVALS (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
0 - 0.75	N O S A M P L E		
0.75 - 3.75	96.2	0.53	0.42
3.75 - 6.75	95.0	0.74	0.88
6.75 - 7.58	94.2	0.90	1.20
7.58 - 9.54	95.7	0.57	0.60
9.54 - 12.54	91.6	1.27	1.34
12.54 - 13.60	94.3	0.84	0.83
13.60 - 16.60	92.9	6.30	1.20
16.60 - 18.19	93.0	6.68	1.24
18.19 - 20.26	86.7	11.45	1.07
20.26 - 21.00	93.3	4.91	0.81
21.00 - 23.74	86.3	11.95	1.21
23.74 - 25.45	89.1	6.9	1.29
25.45 - 26.02	89.9	5.2	1.01
26.02 - 29.02	90.5	5.9	1.24
29.02 - 29.65	90.1	6.5	1.14
29.65 - 32.65	89.8	7.1	1.37
32.65 - 35.65	92.8	6.1	1.25
35.65 - 38.65	91.2	5.2	0.92
38.65 - 41.65	95.1	4.2	0.77
41.65 - 44.65	89.1	7.7	0.45
44.65 - 47.65	92.7	5.6	1.05
47.65 - 49.10	92.7	6.2	1.11
49.10 - 52.06	95.6	2.8	0.45
52.06 - 55.06	95.0	3.5	0.63
55.06 - 55.30	95.9	1.8	0.86
55.30 - 58.30	96.2	2.3	0.97
58.30 - 59.00	95.5	2.8	0.65

024

DRILL HOLE No. W.D.4 continued

INTERVAL (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
59.00 - 62.00	94.0	3.0	0.30
62.00 - 63.08	96.3	2.9	0.55
63.08 - 66.08	95.0	3.2	0.60
66.08 - 66.85	97.21	2.0	0.50
66.85 - 69.85	97.3	1.9	0.54
69.85 - 72.85	97.1	2.0	0.53
72.85 - 75.85	97.1	2.0	0.49
75.85 - 78.85	97.7	1.5	0.36
78.85 - 80.00	97.3	1.1	0.31
80.00 - 81.64	94.0	3.2	0.57
81.64 - 84.64	96.7	2.3	0.34
84.64 - 87.64	95.6	3.2	0.60
87.64 - 90.64	95.9	2.7	0.45
90.64 - 92.41	96.2	1.8	0.26
92.41 - 95.41	96.4	1.8	0.29
95.41 - 97.20	97.2	1.5	0.20
97.20 - 100.20	97.3	1.4	0.30
100.20 - 100.90	97.5	0.94	0.33
100.90 - 103.90	98.3	0.60	0.17
103.90 - 106.90	98.3	0.45	0.42
106.90 - 109.90	98.0	0.68	0.27
109.90 - 110.60	98.2	0.60	0.30
110.60 - 113.60	97.9	1.06	0.37
113.60 - 114.84	97.9	1.13	0.39
114.84 - 115.09	98.4	0.76	0.37
115.09 - 116.51	98.2	0.68	0.30

025

- 1 -

80 027

DRILL HOLE No. W.D.5LOCAL CO-ORDINATES 1345m N/1205m E/R.L. 231.9ANGLE OF DEPRESSION 46° BEARING (MAG) 58°

INTERVALS (m)	ANALYSIS		
	SiO ₂	Al ₂ O ₃	L.O.I.
0 - 9.82	N O S A M P L E		
9.82 - 11.20	89.8	8.2	1.96
11.20 - 13.73	95.4	3.0	0.68
13.73 - 16.73	93.1	5.4	1.14
16.73 - 19.73	93.4	4.9	1.18
19.73 - 22.73	91.2	6.8	1.48
22.73 - 23.60	91.7	6.6	1.54
23.60 - 26.60	95.5	3.3	0.92
26.60 - 29.60	95.8	3.0	0.83
29.60 - 32.60	96.1	2.9	0.75
32.60 - 33.76	95.9	3.1	0.62
33.76 - 34.30	96.2	2.7	0.60
34.30 - 34.80	95.4	3.3	0.79

026

- 1 -

80 028

DRILL HOLE NO. W.D.6LOCAL CO-ORDINATES 187m N/886m E/R.L. 242.4ANGLE OF DEPRESSION 70° BEARING (MAG) 60°

INTERVALS (m)	ANALYSIS %		
	SiO ₂	Al ₂ O ₃	L.O.I.
0 - 35.20	N O S A M P L E		
35.20 - 45.07	P E R M I A N T I L L I T E		
45.07 - 47.80	P R E - C A M B R I A N S I L T S T O N E (N O A N A L Y S E S A V A I L A B L E)		

027

WASHING TEST

Results of the washing test on potentially beneficiable quartzite are tabulated below.

The results are as assessed on a laboratory scale and are an indication only of what may happen in a full scale operation.

BORE No.	INTERVALS (METRES)	ANALYSIS %				UP-GRADING %	
		BEFORE WASHING		AFTER WASHING		SiO ₂	Al ₂ O ₃
		SiO ₂	Al ₂ O ₃	SiO ₂	Al ₂ O ₃		
WD 3	38.23 to 41.23	97.7	1.31	98.4	1.15	0.7	0.16
WD 3	49.30 to 52.80	97.6	1.59	98.2	1.31	0.6	0.28
WD 3	59.43 to 62.43	97.8	1.16	98.2	1.07	0.4	0.09
WD 4	97.20 to 100.20	97.3	1.40	98.4	1.18	1.1	0.22

NOTE

Samples were crushed to minus 6.0mm and washed over a 1.0mm screen.

The material retained on the screen was re-analysed in duplicate to produce the "after" figures.

The "before" figures were obtained by analysis in duplicate of the original crushed sample.

028

80 030

THE BROKEN HILL PTY. CO. LTD. PROJECT WELD RIVER DRILL HOLE WD1
 LOCATION GLOVER'S BLUFF CO-ORDINATES - LOCAL 1600-N/1130-E/RL.249.4
 - A.M.G. -----
 ANGLE OF DEPRESSION 46° BEARING (MAG) 60°
 DRILLING CO. WALKER DRILLING DRILLER A. WALKER DRILL TYPE -----
 DATE COMMENCED ----- COMPLETED 8/5/80 -----

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY %		
			SiO ₂	Al ₂ O ₃	LOI
0 - 2.95	clay & conglomerate	0 - 2.95	NO	SAMPLE	
2.95 - 4.70	medium hard, fine to medium grained white quartzite with clay seams on joints, iron staining with possible minor clay on joints & bedding planes. Bedding crosses core axis at 45° indicating near vertical dip.	2.95 - 4.70	98.2	0.97	0.17
4.70 - 5.80	predominantly fine grained hard, well silicified white quartzite. Med grained band from 4.70 to 4.71	4.70 - 5.80	98.0	1.00	0.18
5.80 - 8.40	As above with fracture zones containing clay at 5.80 & 6.30 & 8.35				
8.40 - 8.70	Fine grained, hard white quartzite with iron staining on joints & fractures - broken core with minor clay on fracture faces.	5.80 - 8.70	95.5	1.11	0.26
8.70 - 10.25	No core recovered.				
10.25 - 10.95	Fine grained, well silicified, hard white quartzite - minor clay on joints.				
10.95 - 11.55	As above with iron staining on joints & bedding				
11.55 - 11.92	Fine grained hard white quartzite grading to coarser grained softer quartzite at 11.92	10.25 - 12.17	98.4	0.96	0.22
11.92 - 12.17	Probable iron stained				

029

80 031

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE *WD 1*

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY					
			SiO ₂	A/20 ₃	LOI			
12.17 - 12.95	No core recovered							
12.95 - 14.45	Fine grained white quartzite with minor fractures - becoming more highly silicified & harder towards 14.45	12.95 - 15.95	98.8	0.74	0.07			
14.45 - 17.20	Iron stained, medium to fine grained quartzite - close to fault zone.							
17.20 - 17.50	Broken, iron stained & vuggy Quartzite - main fault line at 17.30	15.95 - 18.95	98.7	0.74	0.11			
17.50 - 19.24	Fine to medium grained hard quartzite with quartz veinlets & sporadic iron staining - shears on bedding planes with clay at 18.70	18.95 - 21.95	99.0	0.39	0.03			
19.24 - 21.95	Fine grained, well cemented, hard quartzite with less iron staining & no quartz veinlets.							
21.95 - 24.20	Iron stained vuggy medium grained quartzite	21.95 - 24.95	98.3	0.45	0.26			
24.20 - 28.05	Fine grained, borders white quartzite - clay on partings between beds at 24.20	24.95 - 27.95	98.5	0.57	0.26			
		27.95 - 30.95	98.5	0.67	0.27			
28.05 - 32.70	More broken & iron-stained quartzite. Manganese? staining on shear at 28.50 - vuggy at 30.70 - med grain	30.95 - 33.95	97.8	0.68	0.13			
32.70 - 34.05	Medium grained, borders, cleaner quartzite - clay on bedding plane at 33.10	33.95 - 34.05	97.6	1.02	0.31			

080

80 032

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD 1

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY					
			SiO ₂	A/2O ₃	LOI			
34.05 - 44.25	Fine grained, very hard - well cemented quartzite. Shows random fracturing and mottled iron staining down to 35.80. & at 40.30. - occasional minor clay on bedding	36.95 - 39.95	97.6	1.02	0.45			
		39.95 - 42.95	98.6	0.85	0.22			
		42.95 - 44.25	98.4	0.90	0.23			
44.25 - 44.75	Fractured zone of medium grained quartzite with clay on partings.	44.25 - 46.80	98.3	1.02	0.33			
44.75 - 46.80	Less fractured, medium grained, softer, slightly iron-stained quartzite							
46.80 - 74.10	Thin to medium grained, strongly cemented, hard white quartzite - random fracture pattern & indistinct bedding. Quartz veining becoming more prevalent with depth - veins up to 5cm in thickness from 51.60 down	46.80 - 49.80	98.0	1.33	0.32			
		49.80 - 52.80	98.5	0.94	0.24			
		52.80 - 55.80	98.7	0.80	0.24			
		55.80 - 58.80	98.5	0.78	0.29			
		58.80 - 61.80	98.4	0.89	0.28			
		61.80 - 64.80	97.8	1.51	0.39			
74.10 - 75.53	Fault zone with secondary quartz veining & iron staining - some clay - very broken core.	64.80 - 67.80	97.9	1.38	0.32			
		67.80 - 70.80	98.3	0.83	0.31			
		70.80 - 73.80	98.6	0.76	0.29			
73.80 - 75.53		97.8	1.00	0.44				
75.53 - 79.20	Uniformly fine grained, very hard, white quartzite - minor shearing on bedding with clay, small quartz veinlet with pyrite at 77.46	75.53 - 78.53	97.7	1.10	0.21			
		78.53 - 79.20	97.4	0.93	0.03			

031

80 033

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD 1

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
79.20 - 79.30	Fine grained quartzite, very hard bit of dark coloration in seam like occurrence.	79.20 - 79.30	96.1	2.30	0.40
79.30 - 82.22	Fine grained, well cemented hard quartzite, more fractured than the previous section but re- cemented. Iron staining around small shear at 80.30	79.30 - 82.30	98.3	0.69	0.14
82.22 - 82.93	Very fractured zone - 0.70 m of core lost	82.30 - 83.20	98.5	0.83	0.18
82.93 - 83.20	Iron stained softer quartzite adjacent to above fault zone.				
83.20 - 86.50	Fine grained, well cemented white quartzite with re- cemented fractures & minor iron staining on fractures, - clay hard. 5cm thick at 84.50m	83.20 - 86.20	98.7	0.54	0.18
86.50 - 87.3	Hard, well cemented white quartzite - less fractured than above	86.20 - 89.20	98.7	0.73	0.19
87.3 - 89.40	Coarser grained, apparently more weathered & softer slite quartzite with iron staining on shears.				
89.40 - 92.20	Fractured & re-cemented hard, fine grained quartzite	89.20 - 92.20	98.7	0.69	0.17
	- minor iron staining in places, minor clay	92.20 - 95.20	98.8	0.43	0.09

032

80 034

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE

WD 1

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	Al ₂ O ₃	LOI
89.40 - 95.80 cont.	of green/yellow colour on bedding shears.	95.20 - 96.40	98.2	0.85	0.22
95.80 - 96.20	More fractured quartzite, — many more shears with minor clay.				
96.20 - 96.40	As above but coarser grained.				
96.40 - 97.85	Hard, well cemented, fine grained white quartzite - iron stained zone from 97.36 to 97.41	96.40 - 99.40	98.8	0.49	0.13
97.85 - 99.40	Softer, coarser grained, fractured & re-cemented quartzite alternating with more silicified sections.				
99.40 - 100.12	Fine grained, white, very hard quartzite with minor quartz veinlets - very well silicified	99.40 - 102.40	98.6	0.64	0.22
100.12 - 102.35	Less silicified, softer white quartzite				
102.35 - 102.80	Very fine grained, hard, white quartzite - fractured & re-cemented - slightly iron stained with some dark staining - variegated?	102.40 - 104.00	98.4	0.90	0.23
102.80 - 104.00	Very hard, fine grained, well cemented, white quartzite.				
	E.O.H.				

033

80 035

THE BROKEN HILL PTY. CO. LTD. PROJECT WELD RIVER DRILL HOLE WD 2
 LOCATION GLOVERS BLUFF CO-ORDINATES - LOCAL 1700 - N / 1121 - E / R.L. 251.2
 - A.M.G. -----
 ANGLE OF DEPRESSION 45° BEARING (MAG) 60°
 DRILLING CO. WALKER DRILLING DRILLER A. WALKER DRILL TYPE -----
 DATE COMMENCED 9/5/80 COMPLETED 14/5/80
 (HOLE VEERED OFF LINE - COULD NOT STRAIGHTEN)

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/20 ₃	LOI
0 - 2.09	Topsoil and very weathered crumbly quartzite	0 - 2.09	NO	SAMPLE	
2.09 - 2.79	Weathered, fine grained quartzite - brecciated & re-counted from 2.09 to 2.79 (Countcut with vally cutting quartzite at acute angle)	2.09 - 2.79	98.4	0.81	0.23
2.79 - 3.64	Less weathered, fine grained, badly fractured cream coloured quartzite	2.79 - 3.64	97.4	1.50	0.54
3.64 - 19.07	Fine grained, relatively unweathered, hard, white quartzite with minor fractures showing slight iron staining - greenish clay on bedding plane at 6.55 - approx. 1cm wide silty clay beds at 9.50 & 9.70	3.64 - 6.64	98.1	1.10	0.37
		6.64 - 9.64	97.8	1.49	0.38
		9.64 - 12.64	97.7	1.59	0.39
		12.64 - 15.64	97.8	1.66	0.33
		15.64 - 18.64	97.7	1.85	0.29
		18.64 - 19.07	98.5	1.10	0.18
19.07 - 20.70	As above but varying coloured beds from brown to cream (clay rich) - 1cm wide silt beds at 20.30 & 20.40	19.07 - 20.70	96.9	2.30	0.30
20.70 - 23.50	Fine grained, hard, white quartzite.	20.70 - 23.60	98.5	0.92	0.19
23.50 - 23.60	As above with blotchy iron staining				
23.60 - 24.93	Fractured & brecciated quartzite with secondary quartz veinslets - becoming more	23.60 -		0.86	0.17

034

80 036

THE BROKEN HILL PTY. CO. LTD.

PROJECT WELD RIVER

DRILL HOLE WD3

LOCATION GLOVER'S BLUFF

CO-ORDINATES - LOCAL

1698 - N / 1135 - E / 4.251.7

- A.M.G.

ANGLE OF DEPRESSION

45°

BEARING (MAG)

60°

DILLING CO

WALKER DRILLING

DRILLER

A. WALKER

DRILL TYPE

DATE COMMENCED

15/5/80

COMPLETED

CORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	Al ₂ O ₃	LOI
0 - 0.93	Broken quartzite & topsoil	0 - 0.93	NO	SAMPLE	
0.93 - 5.30	Fine grained, relatively soft, weathered quartzite. Brown stained uniformly to near black at 5.30 -	0.93 - 3.93	98.4	0.71	0.12
	fractured & reconstituted with quartz veinlets.	3.93 - 5.30	97.24	0.99	0.14
5.30 - 8.30	Fine grained, hard white quartzite with minor iron staining on fracture.	5.30 - 8.30	97.6	1.66	0.09
		8.30 - 9.30	97.8	1.29	0.17
		9.30 - 12.30	98.2	1.10	0.13
9.30 - 12.30	Hard, fine grained white quartzite - minor quartz stringers - peculiar (conglomerate?) weathered patch at approx 16.90 - medium grained zone at 14.10	12.30 - 15.30	98.0	1.40	0.15
		15.30 - 18.30	98.0	1.10	0.24
12.30 - 18.55	As above but more fractured - mainly shears on bedding - with iron staining - possibly brecciated & reconstituted zones at 18.55 to 18.65 & 20.00 to 20.12	18.30 - 20.63	98.2	0.91	0.23
18.55 - 20.12					
20.12 - 20.63	Fine grained, hard white quartzite	20.63 - 21.13	94.5	1.10	0.24
20.63 - 21.13	As above and silty clay beds - major one at 21.03 to 21.12 - hard massive part of				
21.13 - 21.63	Fine grained, hard, white quartzite	21.13 - 21.63		0.90	0.22

035

80 037

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE W03

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	A/2O ₃	LOI
22.71 - 22.91	Fractured zone with quartz veinlets and minor clay.				
22.91 - 26.97	Alternating fine & medium grained beds of hard, white quartzite - fractured zone from from 26.00 to 26.30 with quartz veinlets - Minor fracturing on bedding from 26.30 to 26.87	22.91 - 25.91	98.4	0.79	0.22
26.87 - 28.96	Predominantly medium grained zone of hard, white quartzite 0.5m bed of clayey siltstone at 27.63.	25.91 - 28.91	98.4	0.96	0.29
28.96 - 29.35	Fractured & recemented zone with quartz veinlets and greyish coloration randomly oriented.	28.91 - 31.91	97.7	1.01	0.58
29.35 - 32.10	Fine to medium grained, white quartzite - minor fracturing on bedding with minor clay on fractures				
32.10 - 32.87	Fine grained, hard, white quartzite with iron staining on bedding & fractures	31.91 - 34.91	98.2	0.83	0.25
32.87 - 35.90	As above but with less iron staining - fractured zone from 34.93 to 35.13 where quartz veins cross bedding of more impure quartzite bed.	34.91 - 35.90	98.1	1.09	0.40
35.90 - 38.23	Predominantly hard, fine grained quartzite with very				

036

80 038

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD3

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BURE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	Al ₂ O ₃	LOI
35.90 - 38.23 (continued)	small faults and fine beds of clayey nature showing bedding slip from stain at 38.23	35.90 - 38.23	97.7	1.61	0.28
38.23 - 46.80	Fine grained hard, white, massive quartzite - minor fractures on bedding mostly above very fine silty beds are located	38.23 - 41.23	97.7	1.31	0.28
		41.23 - 44.23	98.2	0.98	0.24
		44.23 - 46.80	98.3	0.93	0.20
46.80 - 46.95	Coarse grained, softer, more weathered quartzite bed.	46.80 - 49.80	98.1	1.34	0.26
46.95 - 47.70	Fine grained, hard quartzite with many fractures on bedding.				
47.70 - 48.60	Fine grained well cemented, hard white quartzite.				
48.60 - 50.53	As for the interval 46.95 to 47.70 - core has brownish translucent appearance when wet.	49.80 - 52.80	97.6	1.59	0.23
50.53 - 53.43	Fine grained, hard quartzite with small beds of cream coloured in pure quartzite, - largest approx 2 cm thick with with brown l. - fractured on bedding between	50.53 - 53.43	97.7	1.44	0.33
53.43 - 56.33	Preconia th bed grained well	53.43 - 56.33	97.7	1.31	0.29
		56.33 - 59.43	97.8	1.09	0.37
	massive fine fractured are so little coloration or staining - more common around some	59.43 - 62		1.16	0.51

037

80 039

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD3

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
62.52-63.07	Broken, fine grained, white quartzite with green/white clay on fractures.	62.43-63.07	98.0	1.06	0.46
63.07-63.55	Fine grained, hard, white quartzite with quartz veins.				
63.55-63.84	Very broken quartzite as above - minor clay on breaks.	63.07-64.24	98.7	0.11	0.26
63.84-64.24	As above but less broken.	64.24-67.24	98.7	1.00	0.22
64.24-66.12	Fine grained, very hard, well cemented white quartzite with quartz veins.				
66.12-66.37	As above but broken core.				
66.37-68.27	Predominantly pure white quartzite - fractured zones at 66.82 & 68.20 - slightly coarser grained from 67.37 to 68.20 - some shearing on bedding with				
	impure band of quartzite at 67.47.	67.24-70.22	98.8	0.94	0.18
68.27-70.22	Fine grained, hard, well cemented white quartzite with minor shearing on bedding - Hole deflected at 70.22 - could not core cut - abandoned at 70.22 E.O.H.				

038

80 040

HE BROKEN HILL PTY. CO. LTD.

PROJECT WELD RIVERDRILL HOLE WD 4LOCATION GLOVERS BLUFFCO-ORDINATES - LOCAL 1780-N / 1069-E / R.L. 2430

- A.M.G. -----

ANGLE OF DEPRESSION 45°BEARING (MAG) 60°DRILLING CO. WALKER DRILLINGDRILLER A. WALKER

DRILL TYPE -----

DATE COMMENCED -----

COMPLETED -----

f

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	A/20 ₃	LOI
0.00-0.75	Broken quartzite & topsoil	0-0.75	NO	SAMPLE	
0.75-6.23	Fine to medium grained, banded, weathered quartzite - light brown in colour & possibly containing weathered feldspar grains	0.75-3.75	96.2	0.53	0.42
		3.75-6.75	95.0	0.74	0.88
6.23-7.58	Weathered feldspathic? quartzite - minor quartz veinlets - very soft - broken core from 6.93 to 7.58.	6.75-7.58	94.2	0.90	1.20
7.58-9.54	Harder, less weathered quartzite showing many fine original sedimentary bands probably due to quartz rich / feldspar rich sand layers. Rock is fine grained	7.58-9.54	95.7	0.57	0.60
9.54-10.04	Very weathered, light green grey coloured, fine to medium grained feldspathic banded quartzite. Rock is weathered to almost separate sand grains resulting in core loss of 0.1m from 9.74 to 9.84m.	9.54-12.54	91.6	1.27	1.34
10.04-13.60	As above but less weathered - green/grey bands of impure quartzite becoming less prevalent with depth to 11.50 then increasing again to very impure weathered greenish rock at 13.40 to 13.60	12.54-13.60	94.3	0.84	0.83

039

E BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD4

CATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

ILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

CORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	Al ₂ O ₃	LOI
13.60 - 16.70	Alternating zones of relatively hard, fine grained slightly foliated quartzite with quartz veins and very weathered green/grey - probably lighter feldspar content quartzite with greenish/yellow clay on fractures. These zones mainly occurring at 15.25 to 15.30 & at approx 15.78	13.60 - 16.60	92.9	6.30	1.20
16.70 - 18.19	Harder, less weathered, predominantly brown colored, fine grained, relatively homogeneous impure quartzite	16.60 - 18.19	93.0	6.68	1.24
18.19 - 20.26	Very distinct banding of fine grained grey quartzite and green mudstone or clay. Bands alternate rapidly - may be 5 in (1m) to a separation of approx 2cm.	18.19 - 20.26	86.7	11.45	1.07
20.26 - 21.00	Fine grained, uniform brown coloured weathered quartzite with minor fractures on joints (As for interval from 16.70 to 18.19)	20.26 - 21.00	93.3	4.91	0.81
21.00 - 21.50	Fairly uniform, fine grained mixture of greenish clay & sand particles - fairly soft but unbroken.	21.00 - 23.74	86.3	11.95	1.21
21.50 - 21.90	As above but very broken core - minor pyrite at 21.90.				

040

80 042

THE BROKEN HILL PTY. CO. LTD.

PROJECT ----- DRILL HOLE WD 4

LOCATION ----- CO-ORDINATES - LOCAL -----
 - A.M.G. -----

ANGLE OF DEPRESSION ----- BEARING (MAG) -----

DRILLING CO. ----- DRILLER ----- DRILL TYPE -----

DATE COMMENCED ----- COMPLETED -----

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
21.90 - 23.40	Distinctly banded green clay/mudstone & grey/green impure, possibly feldspathic fine grained quartzite. (As for interval from 18.19 to 20.26m)				
23.40 - 23.74	Fine grained greenish, finely bedded quartzite.				
23.74 - 24.02	Hard, fine grained, well silicified, possibly feldspathic light grey to white quartzite	23.74 - 25.45	89.1	6.9	1.29
24.02 - 25.45	Uniformly fine grained, finely foliated beds of greenish clayey sand - silicified and weathered to wacke hardness - individual layers approx 1mm width.				
25.45 - 26.02	Brown, iron stained, fine grained, weathered quartzite	25.45 - 26.02	89.9	5.2	1.01
26.02 - 29.23	Fine grained weathered quartzite of greenish coloration with fine banding - iron stained brown from 26.48 to 27.03, at 27.39, 27.72 & 28.09 to 28.23 - black staining nodules on edges of brown zones & black stain (possibly very finely bedded pyrite) 1cm wide at 27.13	26.02 - 29.02	90.5	5.9	1.24
		29.02 - 29.65	90.1	6.5	1.14
29.65 - 29.65	Alternating bands of fine grained impure grey &				

041

80 043

THE BROKEN HILL PTY. CO. LTD. PROJECT DRILL HOLE WD.4
 LOCATION CO-ORDINATES - LOCAL
 - A.M.G.
 ANGLE OF DEPRESSION BEARING (MAG)
 DRILLING CO. DRILLER DRILL TYPE
 DATE COMMENCED COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/20 ₃	LOI
29.23-29.65 (continued)	brown iron stained quartzite with greenish clay rich beds at 29.33 and 29.65				
29.65-30.81	Predominantly brown-iron stained fine grained impure quartzite - pyrite on fractures	29.65-32.65	89.8	7.1	1.37
30.81-31.46	Finely banded fine grained gray/green quartzite and greenish silt & mud beds				
31.46-34.33	Grey/green slightly banded, fine grained quartzite - probably with foliation contact - varying degrees of iron staining from 33.10 to 34.33	32.65-35.65	92.8	6.1	1.25
34.33-34.40	Dark gray zone of fine grained, fairly hard impure quartzite				
34.40-38.63	Light green/gray coloured, fine grained quartzite with darker gray zones especially on joints and fractures on bedding (Possibly very finely divided disseminated pyrite) - Obvious pyrite on some fractures Broken core from 34.40 to 34.63 - sporadic iron staining with boundaries largely consistent with bedding - green silt bed at 36.60 - purple coloration at 37.33	35.65-38.65	91.2	5.2	0.92

042

80 044

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD4

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
38.63 - 42.10	Fine grained, fairly hard, light grey, probably fellopathic quartzite - iron staining on fractures.	38.65 - 41.65	95.1	4.2	0.77
42.10 - 42.70	Banded green siltstone, dark grey fine grained quartzite & iron stained fine grained quartzite.	41.65 - 44.65	89.1	7.7	0.45
42.70 - 49.10	Mainly consistently light grey/green, fine grained quartzite - fairly hard and containing fine (approx. 1mm) bands of greenish clay or mudstone at several places.	44.65 - 47.65	92.7	5.6	1.05
49.10 - 51.10	Fine grained, hard, light grey/white quartzite with quartz veinlets	47.65 - 49.10	92.7	6.2	1.11
51.10 - 52.06	As above but probably containing fellopathic	49.10 - 52.06	95.6	2.8	0.45
52.06 - 52.17	Grey/green, soft silty band - banded appearance with visible mica on siltstone shear at 52.17.	52.06 - 55.06	95.0	3.5	0.63
52.17 - 53.27	Fine grained, hard, whitish fellopathic quartzite				
53.27 - 53.31	Light band of green, fine grained, fellopathic quartzite matrix schist.				
53.31 - 55.30	Grey/green, banded bed of fine grained grey/green quartzite - probably beds thin - 1cm wide	55.06 - 55.30	95.9	1.8	0.86

043

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD 9

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	A/2O ₃	LOI
53.31-55.30 (continued)	green schist band at 54.34				
55.30-55.67	fine grained banded schist quartzite - feldspathic with minor iron staining on bedding planes.	55.30-58.30	96.2	2.3	0.97
55.67-59.00	As above but without iron staining and predominantly grey colours - iron green schist band at 58.69 - minor sericite visible on some bedding shear surfaces NOTE - low angle of bedding to core axis indicates flattening of hole.	58.30-59.00	95.5	2.8	0.65
59.00-60.75	Hard, fine grained, banded, grey coloured quartzite.	59.00-62.00	94.0	3.0	0.30
60.75-61.61	As above but with iron stained fracture running parallel to core axis				
61.61-63.08	Hard, more pure fine grained banded, probably feldspathic quartzite - grey/white in colour.	62.00-63.08	96.3	2.9	0.55
63.08-66.85	Predominantly grey, fine grained, banded and slightly fractured, reasonably hard quartzite. Slight iron staining on some shears on bedding - green clay on others	63.08-66.08	95.0	3.2	0.60
		66.08-66.85	97.21	2.0	0.50
66.85-67.80	Fractured and iron stained	66.85-69.85	97.3	1.9	0.54

044

80 046

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE ND4

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	Al ₂ O ₃	LOI
66.85-67.80 (continued)	quartzite - well silicified.				
67.80-68.80	fine grained well silicified, hard, probably foliated quartzite - broken on bedding in places - whitish in colour - grey band from 68.40 to 68.51 - thin sericite schist band at 68.54.				
68.80-79.40	fine grained, hard, well silicified, clean looking quartzite - some broken zones with minor iron staining - weathered band 2cm wide at 70.28.	69.85-72.85	97.1	2.0	0.53
		72.85-75.85	97.1	2.0	0.49
		75.85-78.85	97.7	1.5	0.36
78.85-80.00	fine grained, less well silicified, light grey quartzite, possibly foliated is.	78.85-80.00	97.3	1.1	0.31
80.00-80.15	light greenish, fine grained schistose band - possibly containing sericite	80.00-81.64	94.0	3.2	0.57
80.15-80.51	fine grained, hard, light grey/brown quartzite.				
80.51-81.64	As for interval from 79.40 to 80.00 - shear with clay & probable sericite at 80.93.				
82.91	fine grained, hard, well silicified grey quartzite with microfolding and	81.64-84.64	96.7	2.3	0.34

045

80 047

THE BROKEN HILL PTY. CO. LTD. PROJECT ----- DRILL HOLE WD4
 LOCATION ----- CO-ORDINATES - LOCAL -----
 - A.M.G. -----
 ANGLE OF DEPRESSION ----- BEARING (MAG) -----
 DRILLING CO. ----- DRILLER ----- DRILL TYPE -----
 DATE COMMENCED ----- COMPLETED -----

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
82.91-83.41	Banded fine grained grey quartzite and greenish siltstone - fairly hard and well silicified - shows zones with green schist at 83.37 to 83.41.				
83.41-92.41	Fine grained, well silicified grey quartzite, slightly banded with fine silty beds - minor quartz veins & microfracturing. 1 cm band of quartz schist at 86.67 & at 87.18 to 87.28. Broken core from 89.41 to 89.51.	84.64-87.64	95.6	3.2	0.60
		87.64-90.64	95.9	2.7	0.45
		90.64-92.41	96.2	1.8	0.26
92.41-94.12	Hard, fine grained, mottled brown, white quartzite - or change on bedding	92.41-95.41	96.4	1.8	0.29
97.20	As above but less brown - more whitish. thin white schist band at 96.56	95.41-97.20	97.2	1.5	0.20
97.20-100.20	Brecciated & recrystallized fine grained quartzite - trace of appearance in some areas due to complete induration of some large quartz into quartzite. dark - out infilling some of the silty areas greenish silty sandstone or quartzite veins.	97.20-100.20	97.3	1.4	0.30

046

80 048

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE WD 4

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	A/2O ₃	LOI
100.50 - 100.90	Fractured zone of broken core - similar description to above interval but less brecciated.	100.20 - 100.90	97.5	0.94	0.33
100.90 - 106.49	More solid, fine grained, well silicified, whitish quartzite - minor shearing with iron staining also iron stained associated with quartz veining	100.90 - 103.90	98.3	0.60	0.17
		103.90 - 106.90	98.3	0.45	0.42
106.49 - 110.60	As above - very hard and translucent appearance but containing black mineralization in veinlets and shows on bedding - also blue/green mineral	106.90 - 109.90	98.0	0.68	0.27
		109.90 - 110.60	98.2	0.60	0.30
	- main cross-cutting veins of this description at 108.61 (1m width) & 109.03				
110.60 - 114.84	Less indurated well cemented, hard, fine grained quartzite - light brown to whitish colour with minor shearing and minor quartz veinlets	110.60 - 113.60	97.9	1.06	0.37
		113.60 - 114.84	97.9	1.13	0.39
114.84 - 115.09	Zone of cross cutting black coloration associated with greenish mineral and partly infilled quartz veinlet at 115.06	114.84 - 115.09	98.4	0.76	0.37
115.09 - 116.51	Very hard, fine grained, translucent, whitish quartzite, cross-cutting with quartz veinlets - minor green mineralization on shears BOH	115.09 - 116.5		0.8	0.30

047

80 049

THE BROKEN HILL PTY. CO. LTD. PROJECT WELD RIVER DRILL HOLE WD 5
 LOCATION GLOVER'S BLUFF CO-ORDINATES - LOCAL 1345-N/1205-E/RL 231.9
 - A.M.G.
 ANGLE OF DEPRESSION 46° BEARING (MAG) 58°
 DRILLING CO. WALKER DRILLING DRILLER A. WALKER DRILL TYPE DB 1000
 DATE COMMENCED _____ COMPLETED _____

CORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	ASSAY			
		INTERVAL (METRES)	SiO ₂	Al ₂ O ₃	Fe
0 - 9.82	Orange clay & water worn pebbles - said to be Permian tillite.	0 - 9.82	NO	SAMPLE	
9.82 - 11.20	Thin grained, soft, weathered uniformly weathered iron quartzite mass	9.82 - 11.20	89.8	8.2	1.96
11.20 - 13.13	Harder fine grained silty quartzite. some iron on fractures along with limonite and some pyrite. some with iron staining and general primary concretions were present.	11.20 - 13.13	91.4	3.0	
13.13 - 16.73	Very fine grained, soft, greenish probably relict silty quartzite - minor faulting at 14.00.	13.73 - 16.73	93.1	5.4	1.14
16.73 - 19.73	Thin grained, fairly soft, banded green tuffal & micaceous quartzite with some pyrite as with an	16.73 - 19.73	93.4	4.9	1.18
19.73 - 22.73	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an	19.73 - 22.73	91.2	6.8	1.48
22.73 - 23.60	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an	22.73 - 23.60	91.7	6.6	1.54
23.60 - 25.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
25.00 - 26.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
26.50 - 28.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
28.00 - 30.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
30.00 - 31.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
31.50 - 33.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
33.00 - 34.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
34.50 - 36.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
36.00 - 37.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
37.50 - 39.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
39.00 - 40.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
40.50 - 42.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
42.00 - 43.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
43.50 - 45.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
45.00 - 46.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
46.50 - 48.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
48.00 - 49.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
49.50 - 51.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
51.00 - 52.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
52.50 - 54.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
54.00 - 55.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
55.50 - 57.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
57.00 - 58.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
58.50 - 60.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
60.00 - 61.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
61.50 - 63.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
63.00 - 64.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
64.50 - 66.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
66.00 - 67.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
67.50 - 69.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
69.00 - 70.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
70.50 - 72.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
72.00 - 73.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
73.50 - 75.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
75.00 - 76.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
76.50 - 78.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
78.00 - 79.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
79.50 - 81.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
81.00 - 82.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
82.50 - 84.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
84.00 - 85.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
85.50 - 87.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
87.00 - 88.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
88.50 - 90.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
90.00 - 91.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
91.50 - 93.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
93.00 - 94.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
94.50 - 96.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
96.00 - 97.50	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
97.50 - 99.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				
99.00 - 100.00	Thin grained, fairly soft, micaceous quartzite with some pyrite as with an				

048

80 050

THE BROKEN HILL PTY. CO. LTD.

PROJECT

DRILL HOLE W05

LOCATION

CO-ORDINATES - LOCAL

- A.M.G.

ANGLE OF DEPRESSION

BEARING (MAG)

DRILLING CO.

DRILLER

DRILL TYPE

DATE COMMENCED

COMPLETED

BORE INTERVAL (METRES)	GEOLOGICAL LOG & COMMENTS	INTERVAL (METRES)	ASSAY		
			SiO ₂	Al ₂ O ₃	LOI
23.60 - 33.76	As above but the quartzite is more white in colour and harder. Flung iron stained fractures still present causing short runs & broken core.	23.60 - 26.60	95.5	3.3	0.92
		26.60 - 29.60	95.8	3.0	0.83
		29.60 - 32.60	96.1	2.9	0.75
		32.60 - 33.76	95.9	3.1	0.62
33.76 - 34.30	CORE LOSS - very soft clay or sand.	33.76 - 34.30	96.2	2.7	0.60
34.30 - 34.80	Then total core loss - probably as above with quartzite blocks dislodged and surrounded by clay in what may be a major shear zone or bedding close to the edge of the border type quartzite. Hole abandoned due to complete loss of circulation & bad drilling conditions.	34.30 - 34.80	95.4	3.3	0.79
	E.O.H.				

APPENDIX 3.

PHYSICAL AND THERMAL PROPERTIES
(INCLUDING UP-GRADING TESTS)

PHYSICAL AND THERMAL TESTING

A bulk sample of quartzite was made up from exposures in the old quarry at Flowers Bluff and subjected to both tumble and decrepitation testing at 250

Results are summarised below:

SAMPLE	ANALYSIS %		DECREPITATION TESTS	
	SiO ₂	Al ₂ O ₃	Value "A" %	Value "B" %
Weld River	98.5	98.8	98.5	98.8
			>80%	>90%

The values in the "requirement" are considered to be characteristic of similar material. Value "A" is related to the degree of stability of the material during tumbling.

Value "B" is related to the degree of stability of the material during decrepitation.

Value "A" is +25mm material after tumbling.

Value "B" is +5mm material after decrepitation.

NOTE:

The near surface material is not included in the sample for the marginal tumble test.

WASHING TEST

Results of the washing test on potentially beneficiable quartzite are tabulated below.

The results are as assessed on a laboratory scale and are an indication only of what may happen in a full scale operation.

SAMPLE NO.	PERCENT QUARTZITE	ANALYSIS *				LOSS	
		BEFORE WASHING		AFTER WASHING		PERCENT	TONS
		SiO ₂	Al ₂ O ₃	SiO ₂	Al ₂ O ₃		
1	38.23 to 41.23	97.7	1.31	98.4	1.07	1.12	0.22
2	49.80 to 52.40	97.7	1.59	98.2	1.07	1.12	0.22
3	59.43 to 62.03	97.7	1.16	98.2	1.07	1.12	0.22
4	97.20 to 100.00	97.7	1.40	98.4	1.18	1.12	0.22

NOTE

Samples were crushed to 20 mesh and washed over a 20 mesh screen.

The material retained on the 20 mesh screen was re-analysed in duplicate to determine "after" analysis.

*The "before" analysis was determined by analysis in duplicate of the original uncrushed sample.

APPENDIX 4.

CROSS-SECTIONS

NOTE: DUE TO THE COMPLEXITY OF THE GEOLOGY CAUSED BY RAPID EROSION IN THE NATURE OF THE TERRITORY, THE RELATIVELY THIN BEDDED STRATA IN THESE SECTIONS ARE DRAWN AS "GRADE"

THESE SECTIONS ARE DRAWN AS "GRADE" BOUNDARIES
AND ARE NOT TO BE USED FOR ANALYSES OVER BEDS

A MORE DETAILED
ANALYSES.

054

054

WLU RIVER Section line 1350m North.

BOREHOLE

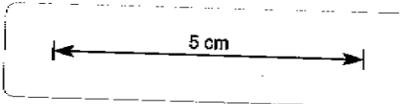
> 98% SiO₂ & /or < 0.8% Al₂O₃

< 98% SiO₂ & /or > 0.8% Al₂O₃

100% CAPPING QUARTZITE

75% PRIMARY (Inferred)

ASSUMED M OF SOIL COVER



RL (m)

250

200

150

100

50

RL

250

200

150

100

50

100m East

WD 5 (Proj 5m N)

PERMIAN TILLITE OR
WEATHERED AND RE-DEPOSITED
TILLITE

PRE CAMBRIAN SEDIMENTARY SEQUENCE

80 056

055

055

WELD RIVER Section line 1600 m North.

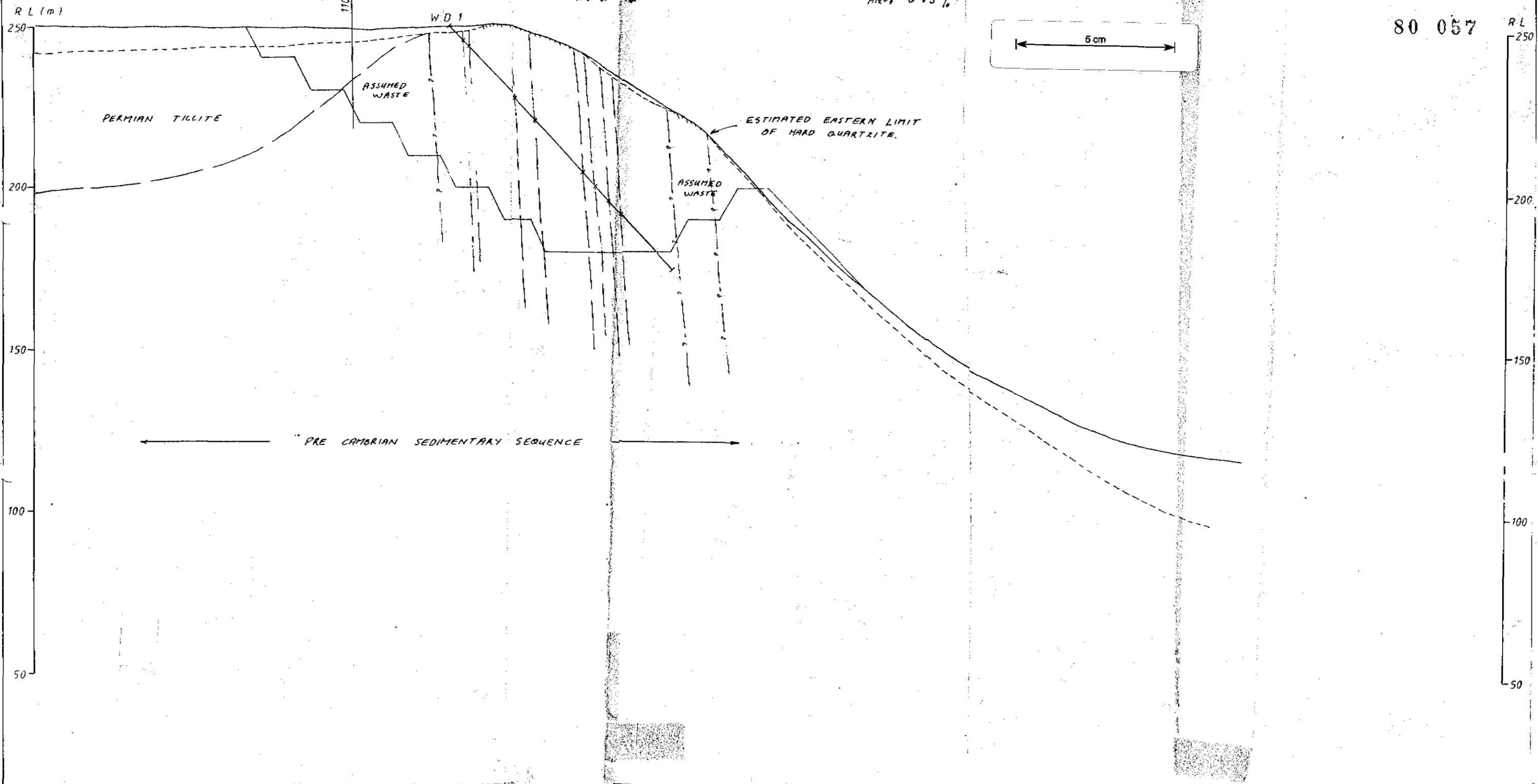
SCALE 1 1000

- BOREHOLE
- > 98% SiO₂ &/or < 0.8% Al₂O₃
- < 98% SiO₂ &/or > 0.8% Al₂O₃
- OUTCROPPING QUARTZITE
- GEOLOGICAL BOUNDARY (Inferred)
- ASSUMED LIMIT OF SOIL COVER

TYPICAL 10m BENCH FACE THROUGH STRATA DRILLED SHOWING BULKED ANALYSES

ANALYSIS OVERALL - SiO₂ 98.26%
Al₂O₃ 0.83%

Depth (m)	% Al ₂ O ₃	% SiO ₂
0.76	0.76	97.12
1.11	1.11	98.50
0.63	0.63	98.61
0.71	0.71	97.67
0.76	0.76	98.82
1.45	1.45	97.85
0.89	0.89	98.44
1.07	1.07	97.67
1.25	1.25	98.61
1.43	1.43	97.67
1.61	1.61	98.61
1.79	1.79	98.61
1.97	1.97	98.61
2.15	2.15	98.61
2.33	2.33	98.61
2.51	2.51	98.61
2.69	2.69	98.61
2.87	2.87	98.61
3.05	3.05	98.61
3.23	3.23	98.61
3.41	3.41	98.61
3.59	3.59	98.61
3.77	3.77	98.61
3.95	3.95	98.61
4.13	4.13	98.61
4.31	4.31	98.61
4.49	4.49	98.61
4.67	4.67	98.61
4.85	4.85	98.61
5.03	5.03	98.61
5.21	5.21	98.61
5.39	5.39	98.61
5.57	5.57	98.61
5.75	5.75	98.61
5.93	5.93	98.61
6.11	6.11	98.61
6.29	6.29	98.61
6.47	6.47	98.61
6.65	6.65	98.61
6.83	6.83	98.61
7.01	7.01	98.61
7.19	7.19	98.61
7.37	7.37	98.61
7.55	7.55	98.61
7.73	7.73	98.61
7.91	7.91	98.61
8.09	8.09	98.61
8.27	8.27	98.61
8.45	8.45	98.61
8.63	8.63	98.61
8.81	8.81	98.61
8.99	8.99	98.61
9.17	9.17	98.61
9.35	9.35	98.61
9.53	9.53	98.61
9.71	9.71	98.61
9.89	9.89	98.61
10.07	10.07	98.61



80 057

057

WELD RIVER Section line 1800m North

TYPICAL 10m BENCH FACE
THROUGH STRATA DRILLED
SHOWING BULKED ANALYSES

% Al_2O_3

% SiO_2

UNKNOWN

UNKNOWN

SCALE 1:10

BOREHOLE

> 98% SiO_2 &/or < 2% Al_2O_3

< 98% SiO_2 &/or > 0.8% Al_2O_3

SOFT QUARTZITE

AL BOUNDARY (inferred)

ASSUMED LIMIT OF SOIL COVER

R.L. (m)

250

200

150

100

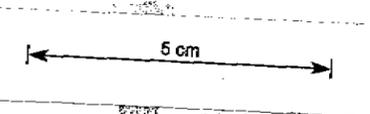
50

PERMIAN TILLITE

ASSUMED
WASTE

ESTIMATED EASTERN LIMIT
OF HARD QUARTZITE

← PRE CAMBRIAN SEDIMENTARY SEQUENCE →



80 059

0.5%
1.0%
1.5%

98.5%
99.0%
99.5%

058

258

WELD RIVER Section line 1900m North.

SCALE 1 100

BOREHOLE

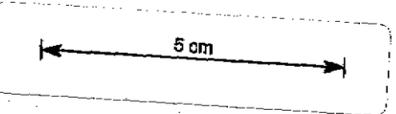
> 98% SiO₂ &/or < 0.8% Al₂O₃

< 98% SiO₂ &/or > 0.8% Al₂O₃

OUTCROPPING QUARTZITE

GEOLOGICAL BOUNDARY (Inferred)

ASSUMED LIMIT OF SOIL COVER



80 060

RL (m)

250

200

150

100

50

RL

250

200

150

100

50

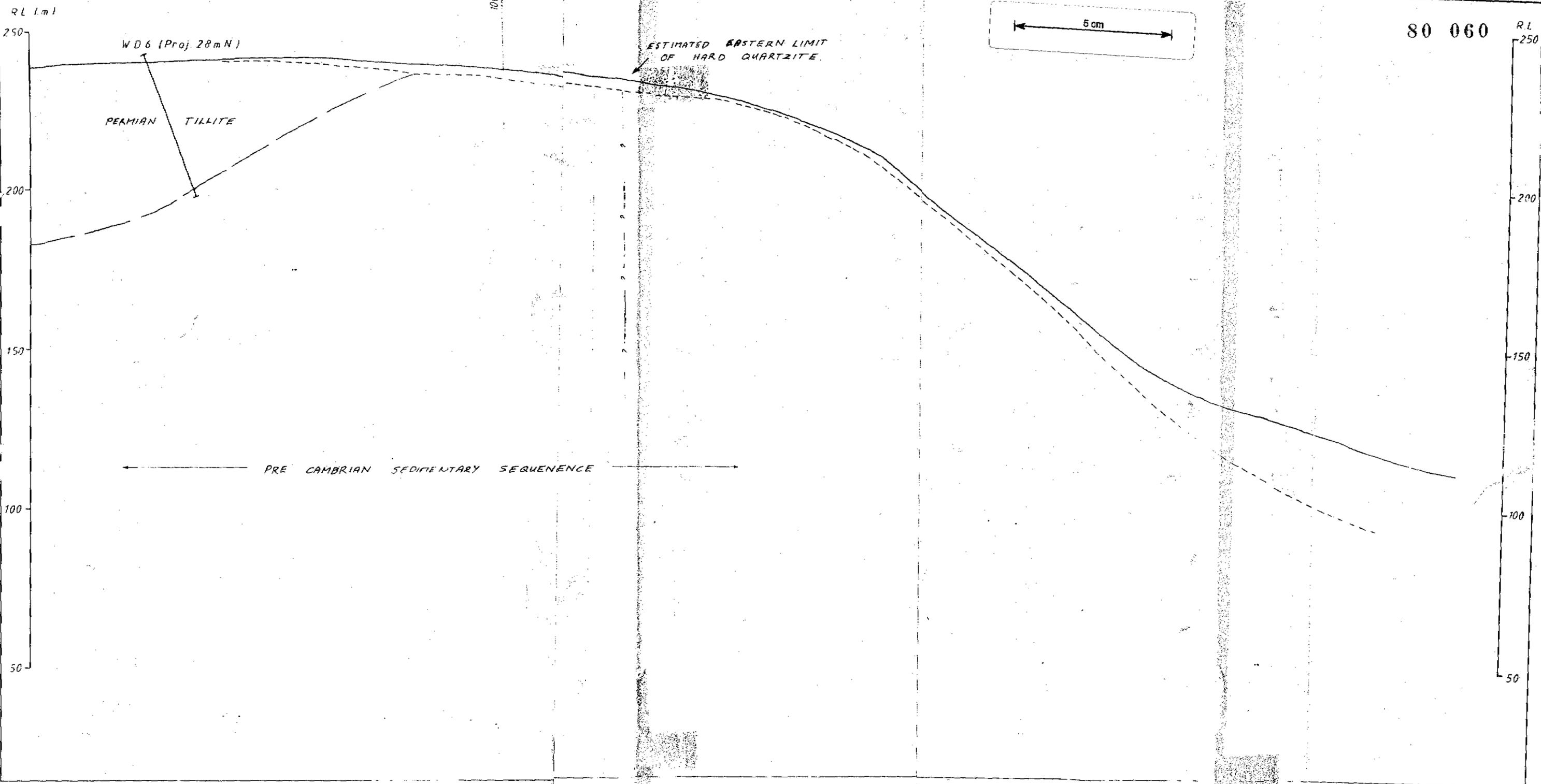
WD 6 (Proj. 28mN)

PERMIAN TILLITE

ESTIMATED EASTERN LIMIT OF HARD QUARTZITE

PRE CAMBRIAN SEDIMENTARY SEQUENCE

1000 m East



059

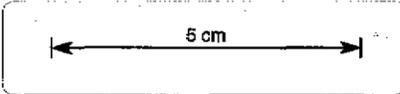
WELD RIVER Section line 2000m North.

SCALE 1:1000

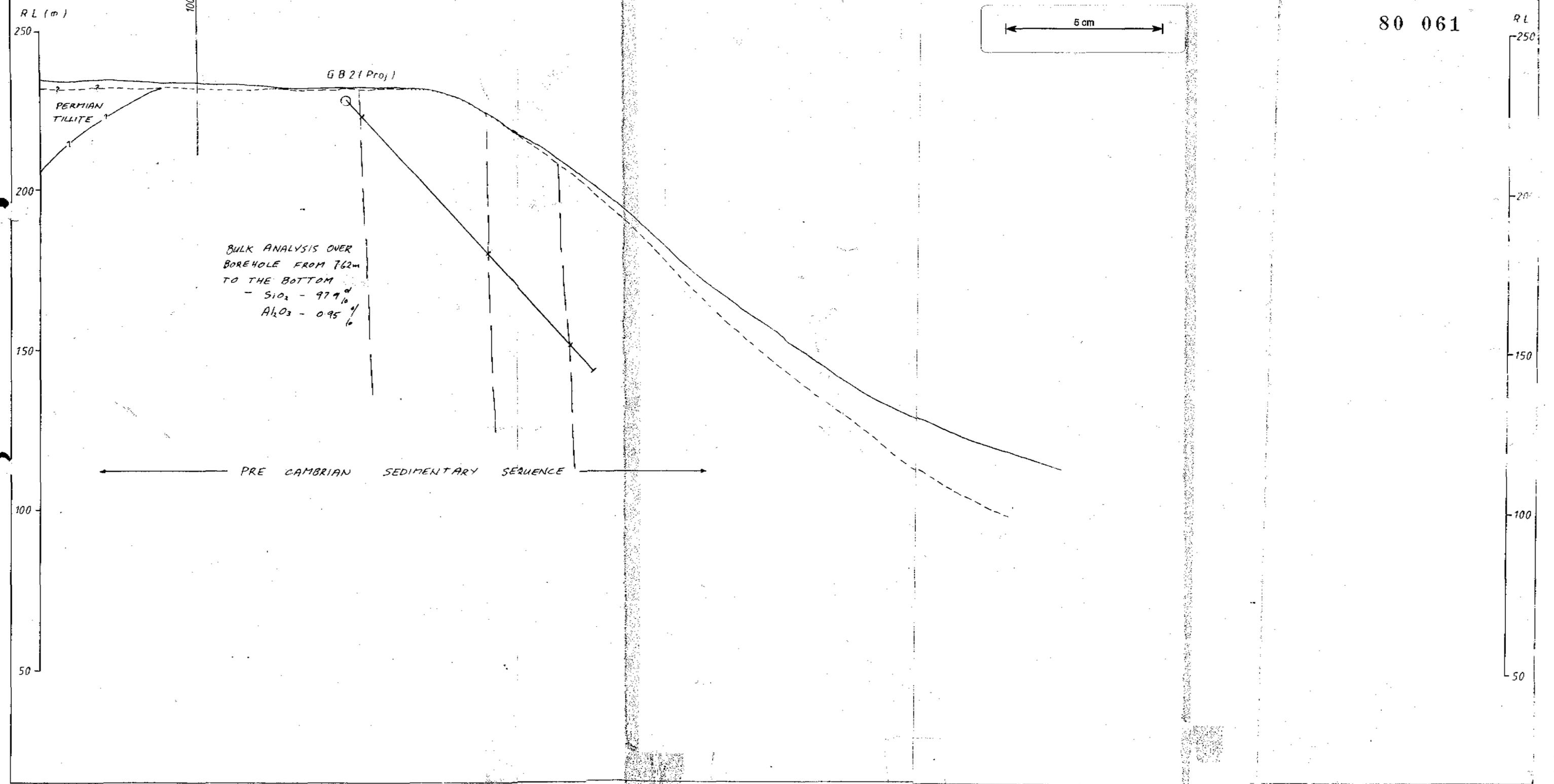
BOREHOLE

- / - > 98% SiO₂ &/or < 0.8% Al₂O₃
- / - < 98% SiO₂ &/or > 0.8% Al₂O₃

ASSUMED LIMIT OF COVER



80 061



060

060

WELD RIVER Section line 2100m North.

BOREHOLE

$> 98\% \text{ SiO}_2$ & $100\% \text{ Al}_2\text{O}_3$
 $< 98\% \text{ SiO}_2$ & $97\% \text{ Al}_2\text{O}_3$

5 cm

80 062

RL 250

RL (m)

250
200
150
100
50

1000m East

GB4

PERMIAN TILLITE

ASSUMED LIMIT OF HARD QUARTZITE

BULK ANALYSIS
 OVER ENTIRE
 BORE HOLE - $5.0\% \text{ Na}$
 Al_2O_3 1.02%

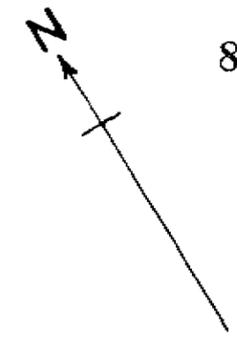
PRE CAMBRIAN SEDIMENTARY SEQUENCE

GB1 Pro.

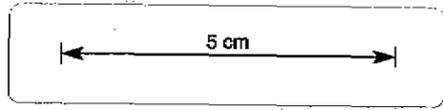
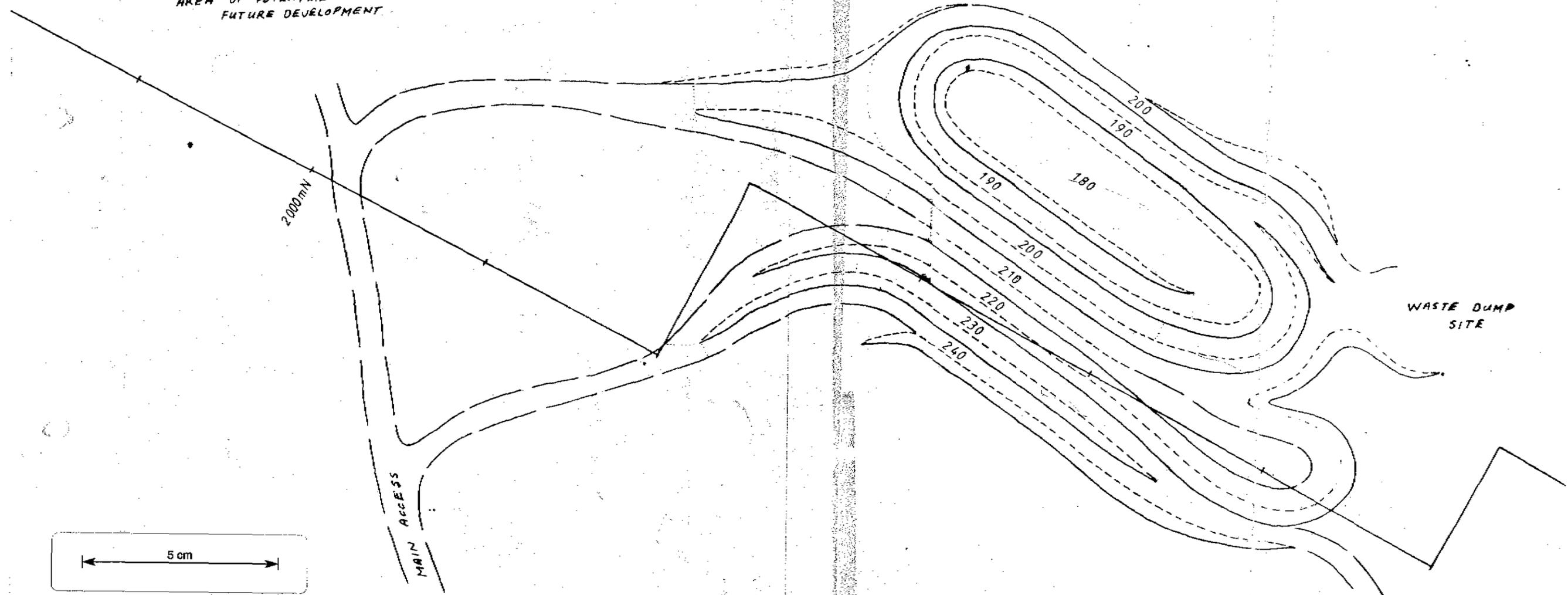
BULK ANALYSIS OVER
 ENTIRE BORE HOLE
 - $5.0\% \text{ Na}$ 89.79%
 Al_2O_3 5.9%

100

50



AREA OF POTENTIAL
FUTURE DEVELOPMENT



VELD RIVER QUARTZITE DEPOSIT

Pit plan

180 etc BENCH LEVELS - Metres above sea level (approx.)

INDICATES BEGINING & END OF HAUL RAMPS

MAIN ROADWAY

FOR PIT PROFILES SEE CROSS-SECTIONS 1600 & 1700 mN.

SCALE 1 2000 - OVERLAYS SURFACE PLAN

APPENDIX 6.

TRANSPORT COSTS

06
TEMCO

TASMANIAN ELECTRO METALLURGICAL CO. PTY. LTD.

(Incorporated in the State of Victoria)

OFFICE & WORKS : TEMCO ROAD, BELL BAY



80-065

MEMO TO: Operations Superintendent

OUR REF: DH/1kd

COPY TO: The Manager

DATE: 14th December, 1981

MEMO FROM Mining Supervisor

YOUR REF:

FILE:

DATE:

SUBJECT: G/18/6-7 WELD RIVER QUARTZITE - TRANSPORT

The possibility of shipping quartzite from the Weld River deposit out of Port Huon has been investigated and the relevant cost components are set out below:-

Please note the following:

1. It would appear that the Hobart Marine Board would have no objection to ships self loading with grabs off the Pt. Huon Wharf.

2. The study involves either the "Iron Kestrel" or "Iron Kerry" whose draft fully loaded (26,000T) is 10.8 metres. Either could handle up to 20000T at Port Huon.

A 10,000 tonne shipment has been used as a basis for the study because of space problems on the Temco plant and cost of stockpiling.

If larger tonnages could be handled there would be a corresponding decrease in costs.

3. It is assumed that crushing, screening and washing of the rock will be carried out at the mine site.

4. Capital cost of setting up the operation is not taken into account.

5. Possible reduction of cost due to a marketable by-product is not considered.

Costs are estimated as follows:

	<u>COST / T (\$)</u>	
<u>MINING AND TREATMENT</u>		
Drill and Blast	3.30	} From Hazell
Load Haul & dump into Treatment Plant	2.20	} Bros. quote
Crush, Screen & wash and reload	4.95	} 1980, + 10%
SUB TOTAL	\$10.45	

DEALT WITH

064

(2)

ROAD HAULAGE

Road Haulage to Port Huon est. 15c per T. Km.
over a distance of 43Km. 6.45

CUMULATIVE SUB TOTAL \$16.90

WHARF CHARGES

Stevedoring Cost Pt. Huon 3.50
Wharfage 1.30

Stevedoring Costs Bell Bay (Includes Transport from
Wharf to Plant - Based on Whyalla Quartz shipment
of 10,000T) 3.20

CUMULATIVE SUB TOTAL \$24.90

> FREIGHT

Assume ship going to Port Huon after discharge
of cargo at Bell Bay.

Case (i) Using 2 Grabs (5 day loading) 16.00
Case (ii) Using 1 Grab 22.00

No allowance has been made for breakdown time etc.
or other contingencies - we are advised that freight
costs could easily rise for various reasons and that
the estimates given are indicative only.
(Chief traffic Officer B.H.P. Melbourne).

∴ Allow \$22.00 per T.
Therefore total cost Per tonne delivered = \$46.90



MINING SUPERVISOR.

065

80 067

BRAMBLES TRANSPORT and PLANT SERVICES

TELEPHONES :

Main Office 31 6488
Burnie Quarry 31 1184
Operations 31 3844
Bell Bay Depot 82 1444

Division of Brambles Holdings Limited Incorporated in N.S.W.)

P.O. Box 580
BURNIE
Tasmania 7320

23rd June 1981

Tasmanian Electro Metallurgical Co. Pty. Ltd.
P.O. Box 164
George Town, Tasmania 7253

Re: G 18/5 (Quartzite - Weld River - Hunter Island)

Dear Sir,

We refer to your letter of the 24th March 1981 regarding the obtaining of quartzite from your Weld River leases.

We wish to submit our quotation of \$69.00 per tonne to win, crush, load and cart the material, as described in your letter, from Weld River to Bell Bay for bulk sample.

The above quote is based on current costs and would be subject to rise and fall.

We thank you for your enquiry and trust we may be of assistance in this new venture.

Yours faithfully,
BRAMBLES TRANSPORT & PLANT SERVICES



R.N. Bligh
COMMERCIAL MANAGER

PLANT HIRE — ALL EARTHMOVING EQUIPMENT
CIVIL ENGINEERING AND CONTRACTING
HEAVY HAULAGE AND TRUCK HIRE
ROAD TRANSPORT
CRANE HIRE
PROPERTIES

80 068



PHONE 67 2301
CDH/LKL

P.O. BOX 84, KINGSTON

16th January, 1981

Mr. Geoff Donnelly
Temco
BELL BAY

Re: Winning, Crushing, Screening and Transport of Silicon

Dear Sir,

Following our conversations with Mr Dave Hassel, we have pleasure in submitting a quote for the above work, that is winning etc of silicon rock at the Weld River and delivery of 1000 tonnes of minus 6" plus 1½" silicon to Temco Bell Bay.

We must firstly stress that the area from which the silicon is to come from is subject to extreme wet weather and when wet the transport of a limited amount of silicon can be a expensive operation. The following prices are quoted on the understanding that the complete job can be carried out before the end of the summer conditions.

- | | | |
|----|---|------------------|
| 1) | Estimate to upgrade the road to be able to cart out the required material subject to current weather conditions | \$3500.00 |
| 2) | Quote to drill and blast has not been confirmed but estimated cost would be | \$3.00 per tonne |
| 3) | To win with dozer and loader after blasting and load onto trucks | \$2.00 " " |
| 4) | To cart ex Quarry Weld to Crusher site at Leslievale | \$12.00 " " |
| 5) | To crush and screen, based on total material carted into site and reload material for delivery to Bell Bay. | \$4.50 " " |
| 6) | To cart ex Leslie Vale to Bell Bay. | \$17.50 " " |

Based on the above costs and allowing to cart and crush approximately 2000 tonnes of silicon to achieve approximately 1000 tonnes of minus 6" plus 1½" material for delivery to Bell Bay but total estimate costs would be \$62,500.00.

or \$ 62.50. per delivery tonne

067

-2- Cont'd

... effect of extremely good weather conditions
... job works out better than expected ...
... costs achieved would be passed on.

... payment under ...
... 1% would also apply.

... meets with your approval and ensure ...
... efficient service.

...

...

...

APPENDIX 7.

TEST RESULTS ON CONSOLIDATED

GOLDFIELDS DRILLING

TABLE 2

ASSAY RESULTS - GLOVER'S BLUFF GB2

FROM-T	FOR IN FE	SiO ₂	Fe	Al	Ca	Mg	Na	K	Ti	S	P	H ₂ O -ve	H ₂ O +ve	L.O.
25-70	45	97.4	0.06	0.65	0.05	0.040	0.02	0.32	0.05	0.01	0.015	0.12	0.08	0.30
70-140	70	98.0	0.06	0.55	0.015	0.035	0.01	0.25	0.045	0.01	0.003	0.09	0.05	0.32
140-215	75	97.9	0.06	0.51	0.01	0.035	0.01	0.22	0.04	0.01	0.001	0.08	0.12	0.33
215-260	45	98.2	0.05	0.40	0.01	0.035	0.01	0.20	0.015	0.01	0.001	0.04	0.21	0.31
260-305	45	98.2	0.05	0.44	0.005	0.045	0.01	0.20	0.015	0.005	0.004	0.05	0.23	0.29
305-345	40	98.2	0.04	0.40	0.01	0.040	0.01	0.21	0.015	0.005	0.002	0.05	0.17	0.29
345-380	35	97.7	0.05	0.57	0.015	0.055	0.01	0.29	0.02	0.005	0.003	0.05	0.16	0.39
25-380	355	97.9	0.05	0.50*	0.02	0.04	0.01	0.24	0.03	0.008	0.004	0.07	0.15	0.33

Fe and Al were assayed in 5' lengths before compositing.

* = 0.9484 Al₂O₃

ST.	TIME	TEMP.	WIND	SEA	REMARKS
1	00.0	10.0	0.0	0.0	
2	01.0	10.0	0.0	0.0	
3	02.0	10.0	0.0	0.0	
4	03.0	10.0	0.0	0.0	
5	04.0	10.0	0.0	0.0	
6	05.0	10.0	0.0	0.0	
7	06.0	10.0	0.0	0.0	
8	07.0	10.0	0.0	0.0	
9	08.0	10.0	0.0	0.0	
10	09.0	10.0	0.0	0.0	
11	10.0	10.0	0.0	0.0	
12	11.0	10.0	0.0	0.0	
13	12.0	10.0	0.0	0.0	
14	13.0	10.0	0.0	0.0	
15	14.0	10.0	0.0	0.0	
16	15.0	10.0	0.0	0.0	
17	16.0	10.0	0.0	0.0	
18	17.0	10.0	0.0	0.0	
19	18.0	10.0	0.0	0.0	
20	19.0	10.0	0.0	0.0	
21	20.0	10.0	0.0	0.0	
22	21.0	10.0	0.0	0.0	
23	22.0	10.0	0.0	0.0	
24	23.0	10.0	0.0	0.0	
25	24.0	10.0	0.0	0.0	
26	25.0	10.0	0.0	0.0	
27	26.0	10.0	0.0	0.0	
28	27.0	10.0	0.0	0.0	
29	28.0	10.0	0.0	0.0	
30	29.0	10.0	0.0	0.0	
31	30.0	10.0	0.0	0.0	
32	31.0	10.0	0.0	0.0	
33	32.0	10.0	0.0	0.0	
34	33.0	10.0	0.0	0.0	
35	34.0	10.0	0.0	0.0	
36	35.0	10.0	0.0	0.0	
37	36.0	10.0	0.0	0.0	
38	37.0	10.0	0.0	0.0	
39	38.0	10.0	0.0	0.0	
40	39.0	10.0	0.0	0.0	
41	40.0	10.0	0.0	0.0	
42	41.0	10.0	0.0	0.0	
43	42.0	10.0	0.0	0.0	
44	43.0	10.0	0.0	0.0	
45	44.0	10.0	0.0	0.0	
46	45.0	10.0	0.0	0.0	
47	46.0	10.0	0.0	0.0	
48	47.0	10.0	0.0	0.0	
49	48.0	10.0	0.0	0.0	
50	49.0	10.0	0.0	0.0	
51	50.0	10.0	0.0	0.0	
52	51.0	10.0	0.0	0.0	
53	52.0	10.0	0.0	0.0	
54	53.0	10.0	0.0	0.0	
55	54.0	10.0	0.0	0.0	
56	55.0	10.0	0.0	0.0	
57	56.0	10.0	0.0	0.0	
58	57.0	10.0	0.0	0.0	
59	58.0	10.0	0.0	0.0	
60	59.0	10.0	0.0	0.0	
61	60.0	10.0	0.0	0.0	
62	61.0	10.0	0.0	0.0	
63	62.0	10.0	0.0	0.0	
64	63.0	10.0	0.0	0.0	
65	64.0	10.0	0.0	0.0	
66	65.0	10.0	0.0	0.0	
67	66.0	10.0	0.0	0.0	
68	67.0	10.0	0.0	0.0	
69	68.0	10.0	0.0	0.0	
70	69.0	10.0	0.0	0.0	
71	70.0	10.0	0.0	0.0	
72	71.0	10.0	0.0	0.0	
73	72.0	10.0	0.0	0.0	
74	73.0	10.0	0.0	0.0	
75	74.0	10.0	0.0	0.0	
76	75.0	10.0	0.0	0.0	
77	76.0	10.0	0.0	0.0	
78	77.0	10.0	0.0	0.0	
79	78.0	10.0	0.0	0.0	
80	79.0	10.0	0.0	0.0	
81	80.0	10.0	0.0	0.0	
82	81.0	10.0	0.0	0.0	
83	82.0	10.0	0.0	0.0	
84	83.0	10.0	0.0	0.0	
85	84.0	10.0	0.0	0.0	
86	85.0	10.0	0.0	0.0	
87	86.0	10.0	0.0	0.0	
88	87.0	10.0	0.0	0.0	
89	88.0	10.0	0.0	0.0	
90	89.0	10.0	0.0	0.0	
91	90.0	10.0	0.0	0.0	
92	91.0	10.0	0.0	0.0	
93	92.0	10.0	0.0	0.0	
94	93.0	10.0	0.0	0.0	
95	94.0	10.0	0.0	0.0	
96	95.0	10.0	0.0	0.0	
97	96.0	10.0	0.0	0.0	
98	97.0	10.0	0.0	0.0	
99	98.0	10.0	0.0	0.0	
100	99.0	10.0	0.0	0.0	

071

II

80 073

<u>DEPTH</u>	<u>Al</u>	<u>Fe</u>
84.0 - 87.0	0.11	0.04
87.0 - 90.0	0.19	0.12
90.0 - 93.65	0.05	0.04
0 - 93.65	0.11 (2% Al ₂ O ₃)	

TESTS ON QUARTZITE

	<u>BEATING</u>	<u>+ 3/16 IN AFTER TUMBLING</u>
[Illegible]	[Illegible]	8
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	96
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	97
[Illegible]	[Illegible]	76
[Illegible]	[Illegible]	[Illegible]

07B

80 075