CR 77/148

Report on E.L. 1167.
The Broken Hill Proprietary Co.

FINAL REPORT

EXPLORATION LICENCE 1167

BOXHOLE BORE, NORTHERN TERRITORY

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FIGURES

FIG. 1

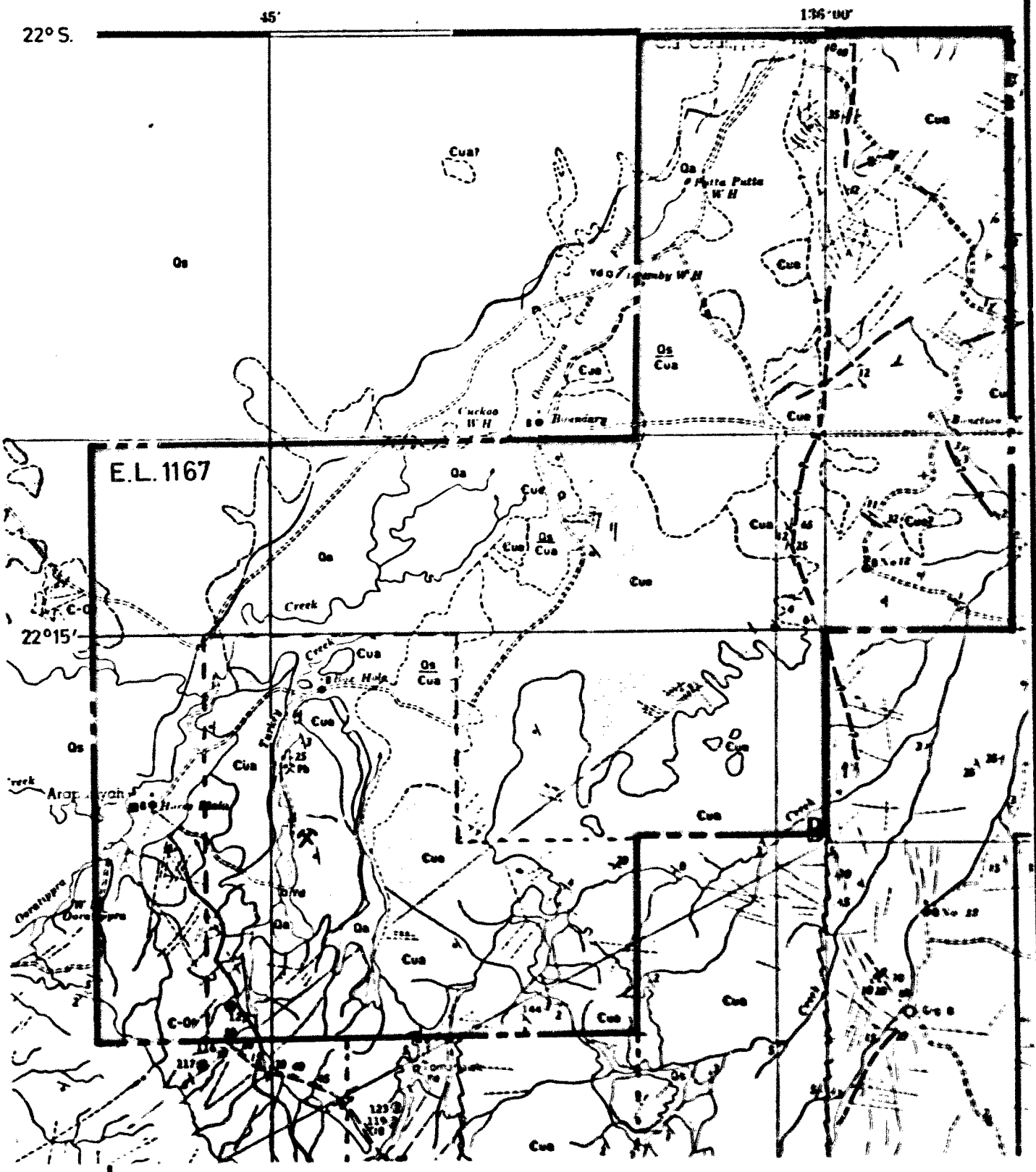


Photo copied from Huckitta 1:250,000. Geology

Centre Melbourne	THE BROKEN HILL PROPRIETARY CO. LTD	Project No.
Date 9 5 77	GEOLOGY AND LOCATION MAP E.L.1167-BOX HOLE, N.T.	Drawing No. A4

1. Title

Exploration Licence 1167 of 489.2 square miles, was granted to Dampier Mining Company Limited on 5th March, 1976, for one year. On 5th March 1977, E.L. 1167 was renewed for a further twelve months. After disappointing exploration results, E.L. 1167 was surrendered on 16th September, 1977.

2. Location and Access

E.L. 1167 is located in the vicinity of Arapunyah Station on the Huckitta 1:250,000 National Mapping Sheet Area (Fig. 1). The nearest major centre is Alice Springs, about 250 kilometres by air to the south-west. Surface access from Alice Springs is via the Stuart and Plenty River Highways. Alternate access is via the Sandover Highway to Ooratippra Station then south-west along station roads. A seldom used airstrip is located at the old Arapunyah Homestead site near Horse Plain Bore. Within the E.L. access is along graded tracks which service water bores and yards. Washouts occur on these tracks during the wet season. The country is gently undulating with moderate rock outcrop and is sparsely covered by low scrub (acacia). Watercourses are characteristically marked by euca'ypts.

3. Previous Work

Investigations in the area covered by the EL were concentrated in the Turkey Creek - Boxhole Bore vicinity where lead sulphides were located in silicified dolomites in 1959. A number of shallow pits were sunk on outcropping mineralisation over a 3 km strike length by the finder, Mr. W.H. King.

Enterprise Exploration drilled 8 core holes aggregating 439 m in 1960 to test the westerly (down dip) extension of mineralisation. Concurrently the area was mapped by the BMR both regionally and in the vicinity of the workings. Results of the drilling were not encouraging.

In 1971 Central Pacific Minerals undertook an induced polarisation programme followed by percussion drilling of 9 holes aggregating 337 metres close to outcropping mineralisation. Assay results suggested that no further work was warranted.

Australian Angle American conducted a gravity survey and undertook some detailed geological mapping during 1974. Follow-up work was not recommended.

In summary, previous workers recognised the stratabound nature of the mineralisation and tried various techniques to locate extensions down dip. Results were not considered sufficiently encouraging for further work.

4. Regional Geology

Units exposed in the area as defined by Bureau of Mineral Resources mapping are as follows :-

Quaternary	Sand, soil and alluvium
Lower Ordovician to Upper Cambrian	Tomahawk Beds - calcareous sandstone, green siltstone, brown dolomite, grey limestone, sandy dolomite, glauconitic sandstone.
Upper Cambrian	Arrinthrunga Formation - Brown massive dolomite, yellow flaggy dolomite, blue and purple oolitic limestone. Thin interbeds of sandstone and siltstone. Eurowie Sandstone Member - Brown quartz sandstone with halite pseudomorphs.

5. Work Done

The principal object of the exploration programme was to locate lead and zinc mineralisation in Cambrian carbonate rocks, ie mineralisation of the Mississippi Valley type. To this end the following work programmes were carried out.

(i) Inspection and analysis of cores and cuttings from available previous drilling to locate anomalous areas and to assist in interpretation of the stratigraphic sequence.

(ii) Interpretation on a regional basis of available geophysical data (gravity and aeromagnetics) in an attempt to define basement topography and subsequent fault structures.

(iii) Regional and photo-geological interpretation at 1:80,000 scale to aid surface mapping.

(iv) Reconnaissance prospecting using geochemical spot tests, and soil sampling to locate surface indications of mineralisation for more detailed work.

(v) Reconnaissance geological traversing and mapping to locate favourable lithological units and structures.

(vi) Drilling to test for mineralisation and to aid stratigraphic interpretation.

6. Results

Unfortunately cores from Enterprise Exploration drilling in 1960 were not available for inspection. Analysis results of samples taken from 3 Central Pacific Minerals percussion holes (WD4, WD5 and WD6) are included as Appendix 1.

Mapping was carried out at a scale of 1:20,000 over the mineralised area. A plan incorporating this work and previous geological mapping is shown as Fig. 2.

Also shown on Fig. 2 are soil sample traverse locations. Analysis results are plotted on Figures 3 to 7 inclusive.

Four diamond drill holes located on selected pointsof a 1600 m square grid (Fig. 2) failed to intersect sulphide mineralisation. Aggregate depth was 786.65 metres and analysis results for the interval 0 - 29 m of BHD1 are shown in Appendix 2. BHD1, 2 and 3 were logged in detail. Copies of these logs and a summary log for BHD4 are in Appendix 3. A correlation of lithologies intercepted in the 4 holes is shown on Fig. 8. Core is stored in a shed erected for the purpose (Fig. 2).

Interpretation of the regional geophysical data did not yield specific targets within the Exploration Licence.

No surface mineralisation was located away from the Boxhole Bore region during a reconnaissance prospecting programme.

7. Expenditure

Expenditure incurred on E.L. 1167 was :-

Wages and Salaries	$42,761
Messing and Accommodation	16,215
Fares and Mobilisation	1,768
Drilling	3,797
Transport	17,243
Aircraft Charter	4,391
Surveying/Aerial Photographs	82
Plant Services	1,936
Consultants	1,185
Mobilisation of Equipment	2,783
Sample Analysis	803
Occupancy/Location Expenses	2,239
Capital Items	9,885
Tenement Fees, Licences etc.	1,781
Vehicles	2,332
Other Items	233
	$109,434

This report is submitted to the Mines Branch as required by Condition 3 of Exploration Licence 1167.

APPENDIX 1

Analysis Results of

Percussion Chips from WD 4,5 and 6

of Central Pacific Minerals

Box Hole Bore - Assay Results (Drill Cuttings)

a) WD 4 (Located at 80N/36E on C.P.M's grid)

Sample No	Cu	Pb	Zn	F	Ba	Ag	Ca O*	Mg O*	Fe*	SiO_2*	Al_2O_3*
MI 15426	24	1400	2900	204	240	1.4	19.4	7.3	1.5	40.0	3.9
7	22	600	1900	414	260	1.2	21.5	11.3	1.4	31.5	3.2
8	28	9000	8800	354	250	2.4	20.5	12.4	1.4	28.5	2.8
9	26	2500	2900	204	320	1.6	22.5	13.6	1.4	24.5	[illegible]
30	21	680	1100	374	200	1.4	23.5	15.1	1.4	17.5	3.3
1	18	350	1000	484	330	1.2	24.0	14.9	1.4	21.0	3.4
2	26	300	600	794	700	1.2	18.2	11.6	1.4	36.0	5.1
3	20	350	920	780	370	1.4	19.4	12.6	1.5	32.5	5.4
4	14	250	510	820	370	1.4	21.0	13.3	1.6	26.5	4.7
5	18	230	480	780	410	1.6	22.0	14.6	1.5	24.0	3.9
6	8	120	250	820	420	1.2	21.0	13.9	1.6	26.5	4.2
7	16	400	490	1220	560	1.2	13.8	9.6	1.8	43.5	7.0
8	8	500	420	620	280	1.2	21.0	13.9	1.6	27.5	4.2
9	6	330	430	910	700	.8	18.2	12.1	1.9	33.0	5.6
40	4	140	200	1120	650	.6	15.6	11.3	2.2	37.0	7.2
1	16	150	350	1040	1250	1.4	15.0	10.3	1.9	41.5	7.0
2	26	340	250	535	600	1.4	21.0	13.9	1.6	25.5	5.0
3	14	340	330	620	410	1.2	16.8	11.3	1.5	41.5	4.7
4	6	300	270	250	220	1.0	12.6	8.3	1.0	59.0	1.8

(results in ppm unless otherwise stated)

* results reported in per cent

Note Sample MI 15426 is from 0-10, the remainder represent 5' intervals down the hole.

b) WD 5 (Located at 100N/240W on CPM's grid)

Sample No	Cu	Pb	Zn	F	Ba	Ag	Ca O*	Mg O*	Fe*	SiO_2*	Al_2O_3*
MI 15445	6	32	60	260	330	1.0	23.0	15.3	1.3	21.5	2.9
6	8	34	330	460	1000	-	17.6	11.2	1.9	38.5	3.9
7	30	60	430	1940	470	-	10.2	7.6	1.9	46.0	9.4
8	16	66	760	1540	470	[illegible]	12.2	9.0	1.8	44.5	7.2
9	54	3300	1.6%	650	250	-	14.6	10.3	1.2	39.5	4.5
50	100	2600	6.6%	450	200	1.2	5.4	3.6	1.1	63.0	3.4
1	26	450	1.1%	620	190	1.2	21.0	14.9	1.4	23.0	3.3
2	20	130	2000	560	280	1.4	20.5	14.4	1.4	19.5	3.7
3	16	58	980	440	600	1.2	19.6	14.3	1.3	27.0	3.6
4	20	62	880	840	450	.8	17.8	12.4	1.5	29.5	5.4
5	14	44	490	820	250	1.2	19.2	13.3	1.6	28.5	4.6
6	6	40	510	720	470	1.[illegible]	21.0	14.1	1.7	24.5	3.7
7	6	42	1020	1370	900	.8	13.8	10.3	1.8	38.5	7.4
8	4	36	400	780	300	1.[illegible]	20.5	13.9	2.0	23.0	4.4
9	4	44	980	840	650	1.2	16.0	11.8	2.1	24.5	6.0
60	2	32	270	1370	700	.8	13.4	10.3	2.1	39.5	7.5
1	4	50	500	650	1350	1.2	23.0	16.3	1.4	17.5	3.5
2	8	44	390	590	250	1.2	18.2	12.6	1.4	35.5	3.6
3	4	30	760	225	280	.8	12.2	8.5	1.0	55.0	1.4
4	6	38	420	340	230	1.0	11.8	8.1	1.0	55.0	2.6
5	4	34	500	240	770	.6	7.8	4.5	.7	64.8	2.3

(cont.../2)

Box Hole Bore - Assay Results (Drill Cuttings) (cont)

(results in ppm unless otherwise stated)

* results reported in per cent

b) WD 5 (Located at 100N/240W on CPM's grid) (cont)

Sample No	Cu	Pb	Zn	F	Ba	Ag	Ca O*	Mg O*	Fe*	SiO_2*	Al_2O_3*
MI 15466	10	36	240	720	550	1.0	14.6	10.6	1.5	41.5	5.8
67	10	36	1100	1120	700	1.2	11.0	7.8	1.5	41.7	6.2
68	20	38	1000	720	440	1.2	19.6	13.4	1.3	31.5	4.1
69	14	40	230	590	1250	.8	13.0	9.1	1.3	46.0	5.2
70	8	120	1200	320	350	.6	8.0	4.3	.9	62.0	3.1
71	6	36	680	180	220	.46	5.6	3.2	.5	62.0	1.7

Note Sample MI 15445 is from 0' - 10', the remainder represent 5' intervals down the hole.

c) WD 6 (Located at 100N/240E on CPM's grid)

Sample No	Cu	Pb	Zn	F	Ba	Ag	Ca O*	Mg O*	Fe*	SiO_2*	Al_2O_3*
MI 15398	40	760	4800	414	160	1.0	24.0	9.2	1.3	32.5	3.5
99	42	1300	1.7	223	480	1.0	10.4	4.3	1.3	64.0	3.0
400	22	940	3100	414	140	1.2	21.0	9.5	1.3	43.0	3.3
01	20	800	1900	464	110	1.0	21.0	12.9	1.5	35.0	3.9
02	18	600	820	564	340	1.2	20.5	13.6	1.5	30.0	4.1
03	26	180	780	754	390	1.2	17.2	11.9	1.4	38.5	4.8
04	16	100	370	874	200	1.0	19.6	13.6	1.6	29.0	5.8
05	10	72	600	684	290	1.0	22.0	15.3	1.5	25.5	4.4
06	8	42	220	924	250	1.0	22.5	15.6	1.6	24.5	4.7
07	6	40	620	964	490	.8	19.5	12.6	1.7	32.0	5.0
08	12	44	290	1514	650	1.0	15.5	10.9	1.8	39.5	7.3
09	6	38	290	794	270	1.2	22.0	14.9	1.7	24.5	4.9
10	4	34	180	964	500	1.2	20.0	13.8	1.9	31.0	5.5
11	6	30	350	1014	550	1.2	17.4	12.3	2.1	38.5	6.8
12	10	52	320	1374	700	1.0	15.2	10.9	1.8	42.5	7.2
13	6	42	300	834	1050	1.2	22.0	14.6	1.5	25.5	4.8
14	6	100	200	724	400	1.2	21.0	14.3	1.4	25.0	4.1
15	6	48	510	289	220	.4	11.4	7.3	1.0	59.5	1.8
16	4	28	220	159	110	.2	9.4	5.5	.8	56.0	1.0
17	10	44	500	484	240	.8	12.5	7.8	1.3	56.0	3.7
18	10	26	210	964	540	1.0	13.5	9.0	1.5	47.0	6.2
19	24	26	340	1124	390	.6	14.2	9.6	1.6	45.0	6.4
20	14	26	170	1064	800	1.0	12.4	8.0	1.4	43.5	5.6
21	18	38	400	1354	450	.8	15.4	10.6	1.7	44.5	6.4
22	48	30	210	834	850	1.4	17.0	11.3	1.4	36.0	4.3
23	24	28	340	624	1600	.4	19.0	12.3	1.3	32.5	3.7

Note Sample MI 15398 is from 0'- 10', the remainder represent 5' intervals down the hole

APPENDIX 2

Analysis Results BHD1

Depth (m)	Zn	Pb	Ag (p.p.m.)	Cu
2.45-5.72	8	26	1.0	4
5.72-7.32	24	28	1.4	6
7.32-9.95	190	48	1.6	10
9.95-11.00	80	38	1.2	4
11 - 12	38	34	1.0	8
12 - 13	36	40	1.4	8
13 - 14	38	40	2.0	4
14 - 15	24	28	0.6	4
15 - 16	40	30	1.4	6
16 - 17	44	40	1.8	4
17 - 18	24	40	1.0	14
18 - 19	18	36	1.4	8
19 - 20	32	36	0.6	4
20 - 21	24	24	0.6	10
21 - 22	10	40	1.6	6
22 - 23	18	38	1.8	32
23 - 24	36	38	1.6	14
24 - 25	28	32	0.8	6
25 - 26	28	40	1.2	10
26 - 27	20	28	1.0	18
27 - 28	16	34	1.0	20
28 - 29	18	38	0.8	10

APPENDIX 3

Geological Logs BHD1-BHD4

PROJECT Pb/Zn CARBONATE E.L. 1167 N.T. BOXHOLE
BHD1 895E/468ON T.D. 220.65m
DATE DRILLED: 30/6/76 - 19/7/76
DRILLERS: K.D. BOTTGER, K.M. SNEYD. PAGE 1

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
0.00	2.45	2.45	0.82	--	SOIL, red, sandy, massive	--
2.45	5.72	3.27	1.92	80-90	SANDSTONE, cream to pale yellow medium to fine grained coarser towards top. Even bedded, massive appearance composed of sub-rounded to rounded quartz grains in a calcareous matrix. Thin bands of dolomitic sandstone and green shale are present. A joint at 25° to core axis, near the top, is filled with silicified calcareous material contains a few vuggy dolomitic patches.	7401
5.72	7.32	1.60	1.60	70.85	SHALE, light green to pink interbedded in laminae from 1 to 12mm thick, often with irregular surfaces. A joint near the top contains dolomitic material. Rare dolomite beds are present.	
7.32	9.95	2.63	1.83	70-80	DOLOMITE, cream to yellow medium to fine grained. Bedding is regular in places massive in others. Silicification present in the form of druzy quartz and silica in vughs. Weathered in appearance broken and fractured Some green shale partings. Vughs up to 2cm wide occur Fault plane at 25° to core axis occurs at base. Manganese common.	
9.95	33.77	23.82	23.57	70-90	SHALE light green and pink, interbedded with grey and pink shales. Laminae from </mm to 30mm. Interbedded with quartz sandstone, dolomites and thin cherts bands. Shales are sometimes broken by worm tubes? or small faults. Dolomite bands are usually massive to finely banded with interbeds of green shale Dolomites are often very vuggy with holes up to 15mm present and are sometimes fractured. Sandstones are massive	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
					to finely banded with clay matrix and are sometimes vuggy. Chert bands are generally very vuggy and silicified with irregular bedding. Sandstones of 0.23m, 0.48m, 0.81, 0.71m, 0.13m, 0.78, 0.56m, 0.54, 0.24m, thickness, at depths of 10.99m, 13.93m, 19.62m, 24.14m, 25.86m, 26.17m, 30.18m, 31.77m and 33.05m oocur respectively. Dolomite of 0.88m, 0.72, 0.54m at depths of 13.05m, 16.15m, and 31.00m occur respectively. Cherts of 0.09m, 0.05m and 0.06m occur at depths of 17.92m, 18.19m and 29.09m occur respectively. Manganese demotes and spots present Gypsum is present in a vugh of 10mm size at 28.24m in shale.	
33.77	36.01	2.24	2.00	75-80	SANDSTONE cream to pale brown medium grained quartzose with clay and dolomitic matrix. Gypsum crystals 10mm wide occur in a vugh or band at 33.88mm. Sandstone is usually quite porous with both vughy porosity and intergranular porosity well developed in beds. Shale beds occur throughout. Some sandstone beds contain thin shale bands up to 5cm thick. A shale band of 0.18m occurs at a depth of 35.43m. A chert band of about 0.40m (0.11m recovered) occurs at 35.61. Shales are green and pink with interbedded sandstone. Bedding is disrupted.	
36.01	38.68	2.67	2.67	80	SHALE green and pink with disrupted bedding. Sandy.	
38.68	39.55	1.13	1.13	80	SANDSTONE quartzose. cream to pale brown. dolomitic.	
39.55	45.76	6.21	6.21	75-80	SHALE green to pink and orange. This beds from 1-25mm occur. A bed of 0.63m fine sandstone occurs at 43.62m. A coarse quartz sandstone of 0.87m thickness occurs at 44.75m It is very vugghy and porous.	
45.76	49.13	3.37	3.37	75-85	LIMESTONE oolitic vugghy and stylolitic, shaley from 46.60m to 47.00m. A shale of 0.20m occurs at 47.62m.	

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
49.13	51.35	2.22	2.22	80	SANDSTONE quartzose fine and coarse grained dolomitic shale bands of 0.22m and 0.23m occur at 50.23m and 50.81m respectively.	
51.35	53.44	2.09	1.94	80-85	DOLOMITE silty, pale grey. Contains many stylolites. Quite commonly has vughs showing oolitic grains. Silty with clay and mica towards top. Grades into next unit. Large 12x4mm crystal of gypsum at 51.37m depth.	
53.44	54.52	1.08	1.08	80-85	SHALE composed of green micaceous clayey bands of thickness <1mm up to 15mm, sometimes with irregular surfaces and dolomitic sandstone interbeds from 1mm to 50mm.	
54.52	55.61	1.09	1.09	85	DOLOMITE light brown to cream consisting of coarse oolites cemented with dolomitic clay. Slightly banded in places.	
55.61	58.33	2.72	2.72	75-85	DOLOMITE grey consisting of thinly bedded shaley rock often with small 2mm carities, occasional stylolites. A slickensided joint at 30° to core axis occurs at 56.35m. Irregular bedding common.	
58.33	70.62	12.29	12.24	75-85	SHALE indurated dolomitic pale to dark grey often finely banded. Interbedded with fine dolomitic sandstone. A vugh 20x10mm contains a PYR cube of pyrite at 68.88m and a bleb of pyrite 4x1mm occurs parallel to lamination at 69.78m. Large rounded clasts of sandstone 50x30mm occur contains four dolomite bands of 0.70m, 0.43m, 0.92m, and 0.52m thickness at 59.28m, 62.10m, 62.64m, and 64.95m, respectively. These are often very broken, vugghy, silicified and cavernous. Thin bands of very vugghy dolomitic shale occur mainly in upper to middle section of bed. Gypsum occurs in a vugh at 68.13m.	
70.62	76.34	5.72	5.72	70-85	DOLOMITE pale brown to cream broken, vugghy, sometimes finely banded,	

FROM	TO	DRILLED	REC	△°	LOG	MINZ
					silicified. Rare stylolites. Weak breccia zones 0.12m and 0.35m thick at 71.15m and 71.65m, probably small faults or joints. Dolomitic shale bands 0.59m, 0.83m and 0.89m thick occur at 72.29m 7403 and 75.45m. The upper one consists of dark grey laminae broken in places by small compaction features interbedded with medium grained dolomite whilst the lower one consists of indurated grey shale and dolomite.	
76.34	81.30	4.96	4.96	80-85	DOLOMITE pelletal light grey consisting of fine and medium grained laminae up to 30mm thick but generally 10mm. Contains 0.31m vugghy dolomite with pelitic grains up to 1mm at top. Contains two shale bands 0.84m and 0.39m thick at depths of 78.07 and 80.10m respectively.	
81.30	82.55	1.25	1.25	80	SHALE dark grey finely laminated with minor sandstone lenses. Contains a joint plane at 8° to core axis at 82.45m.	
82.55	84.48	1.93	1.93	70-75	DOLOMITE light grey medium grained stylolitic vugghy with thin shale bands. Minor calcite occurs in vughs which are up to 20mm in diameter. Contains an 0.40m thick shale band at 83.40m.	
84.48	85.55	1.07	1.07	80-87	SHALE light to dark grey and green to pale brown consisting of shale and sandstone laminae. Thin stylobreccia of 0.21m thickness at 84.60m.	
85.55	87.30	1.75	1.75	78-82	SANDSTONE light orange brown medium grainsize quartzose with dolomitic matrix. Thinly bedded vugghy, porous. Contains thin bands of green shale.	
87.30	88.98	1.68	1.68	80	SHALE as above from 84.48m to 85.55m Minor small vughs.	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
88.98	91.15	2.17	✓	80-90	DOLOMITE grey-white medium to fine grained very vugghy in places and shaley. Has 2 joints in central section at 15° to CA Irregular bedding common. A shale bed 0.30m thick occurs at 89.58. At its base is a stromatolite bed 0.14m thick.	
91.15	92.91	1.76	✓	80-85	SHALE grey black limy dolomitic finely bedded and banded with occasional vugghy patches in dolomitic/zones. Two cubic holes occur at 91.45m depth in a dolomitic zone.	tve Pb tes
92.91	106.05	13.14	✓	75-90	DOLOMITE as above only less vugghy & coarser grainsize stylolites present. Yellow-orange over bottom two-thirds From 102.20m to 103.25m very coarse grained and silicified. Sometimes oolitic, shale bands of 0.23m 0.68m and 0.95m occur at 96.41m 98.26m and 101.55m A coarse siliceous rock 0.25m thick occurs at 98.30m. It may contain bante. A sandstone 0.24m occurs at 99.00m	
106.05	111.45	5.40	✓	70-85	SHALE grey and black banded. Disrupted bedding common showing slumping and/or bioturbution. Coarse grained vugghy dolomite limestones occur of 0.66m and 0.88m thickness respectively at depths of 107.40m and 108.90m.	
111.45	114.80	3.35	✓	75-85	DOLOMITE grey coarse grained slightly vugghy. Shaley in places contains 0.39m and 0.60m shale bands at 113.30m and 114.05.	
114.80	116.18	1.38	✓	80-90	SHALE black and grey dolomitic. Disrupted bedding bioturbution.	
116.18	117.85	1.67	✓	60-70	DOLOLUTITE yellow & grey banded fine dolomitic siltstone. Small faults (compaction) disrupt bedding. Coarse oolitic unit 0.20m thick at top.	
(below 117.85 LIMESTONE)						

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
117.85	120.88	3.03	✓	70.85	LIMESTONE grey-white with shaley parting. Stromotolite bed 0.77m thick occurs at 118.30m Stylolites strongly developed over bottom two-thirds of section.	
120.88	122.65	1.77	✓	75	CALCARENITE orange coarse grained. Vughs occur filled with calcite	
122.65	127.35	4.70	✓	75-80	SHALE green and orange at top passing down into grey and black. Disrupted bedding common. Thin bands present. One 0.52m thick occurs at 124.73m. Some peloidal like textures visible at 126.53m and imbricated pelletals visible at 126.08m	
127.35	135.09	7.74	✓	75-80	LIMESTONE grey shaley and oolitic at top passing down through shaley, stylolitic vugghy to massive with shaley partings and large vughs. Shale bands 0.30m and 0.30m occur at 132.65m and 133.75m. Disrupted bedding occurs and pellets visible at 133.70m	
135.09	137.63	2.54	✓	80	SHALE grey and black limy. Vugghy in places. Contains an 0.94m limestone bed at 136.05m. Lower shale unit is red/brown and grey.	
137.63	145.25	7.62	✓	80	LIMESTONE grey coarse and fine grained shaley partings present. Stylolites also occur and lower section is oolitic. Shale beds of 0.70m 0.67m and 0.36m occur at 140.93m, 141.75m and 144.72m.	
145.25	152.15	6.90	✓	70-80	SHALE red/brown grey and grey/green with numerous thin limestone beds. Some of these are red brown and vugghy others grey and vugghy and oolitic. Bioturbution present.	
152.15	157.15	5.00	✓	80-90	LIMESTONE brown/red at top passing down to grey at base. Coarse grained oolitic in places, shaley at top and base, some stylolites developed. A breccia zone with vughs developed of 0.72m thickness occurs at 153.73m	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
157.15	162.33	5.18	✓	80-90	SHALE grey/green grey/limy with thin limestone bands. One coarse yellow/brown limestone contain large calcite filled vugh occurs of 0.93m thickness at 158.15m	
162.33	168.77	6.44	✓	80	LIMESTONE grey & brown oolitic at top and very vugghy. Contains slab bands and coarse sections. Gypsum in a vugh occurs at 166.15m. Stylolites present	
168.77	172.05	3.28	✓	75-80	SHALE grey/light green disrupted bedding, limy. Contains a coarse oolitic limestone of 0.40m thickness at 170.35m.	
172.05	179.78	7.73	✓	75.80	LIMESTONE grey shaley oolitic in places and stylolitic. Contains a calcalutite of about 0.53m thickness at 174.75m and a shale band of 0.34m thickness at 176.88m.	
179.78	185.28	5.50	✓	70-90	SHALE limy/grey/green banded and red/brown containing thin stylolitic limestone bands Disrupted bedded present. Limestones sometimes vugghy. Lower 0.65m of shale chocolate brown. Limestones of 0.55m, 0.40m and 0.78m occur at 180.72m, 183.00m and 183.63m. The 0.78m limestone is orange/pink in part and has pellets developed and is probably a calcalutite in part.	
185.28	189.79	4.51	✓	75-85	LIMESTONE grey orange pink vugghy in places & stylolitic in others. Some disrupted bedding Coarse red calcarenite occurs over 0.30m at 186.46m Shale bands of 0.26m and 0.52m occur at 186.76m and 188.13m.	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
189.79	191.04	1.25	✓	75.85	SHALE grey and black thinly banded	
191.04	192.08	1.04	✓	80	LIMESTONE/CALCILUTITE orange shaley. Disrupted bedding near top, passes down into thinly bedded stylolitic limestone.	
192.08	200.17	8.09	✓	70.85	SHALE grey, black pale grey, with limy bands. Contains one 0.43m thick at 193.22m. From 193.65m to 195.31m the bedding is very irregular and wary. A 0.23m limestone occurs at 196.35m and a 0.20m dolomite at base.	
200.17	205.10	4.93	✓	75-85	SHALE green grey changing to red and chocolate brown thinly bedded, dolomitic/limy containing thin limestone bands, some of coarse grainsize. Disrupted bedding present and some pebbles appear Vugghiness common in limestones. Dolomite/ limestones of 0.35m 0.20m, 0.30m and 0.27m thickness occur at 200.38m 201.90m, 202.40m and 203.01m.	
205.10	211.73	6.63	✓	70-85	SHALE grey and grey brown and pale grey. limy containing thin limestone bands of 0.25m, 0.21m, 0.36m, 0.55m, 0.38m and 0.51m thickness at 205.14m, 205.82m, 206.53m, 207.27m 209.24m and 210.95m.	
211.73	213.09	1.36	✓	80	SHALE and CALCARENITE red, grey and pale grey, with chocolate brown bands. A 0.60m coarse red calcarenite with chocolate brown shale bands occurs at base.	
213.09	220.65	7.56	✓	75-85	SHALE grey light grey & light brown, limy. Contains thin limestone bands of 0.25m 0.34m and 0.38m thick at 213.09m, 213.96m and 215.02m. Calcarenite consisting of hard quartzose rocks with carbonate matrix coarse grained of 0.94m and 0.30m thickness occur at 215.66m & 217.75m. Vughs occur in limestones.	

END OF HOLE 220.65m

PROJECT Pb/Zn CARBONATE E.L. 1167 N.T. BOXHOLE
BHD2 800W/4800N T.D. 193.80m
DATE COMMENCED 20/7/76 COMPLETED 17/8/76
DRILLERS: K.D. BOTTGER, K.M. SNEYD. PAGE 1

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
0.00	20.93	20.93	12.27	75-80	DOLOMITE light grey fine grained oxidised. Contains clayey patches in places often yellow/orange and very vugghy where so Towards base yellow dololutite bands become common. Silicified at about 16.50m depth.	
20.93	29.17	8.24	6.38	75-90	DOLARENITE yellow medium grained, containing many finer bands of dololutite. Some porous coarser bands are present. Thin clayey shales and some clay bands also present.	
29.17	32.70	3.53	2.73	65.90	SHALE chocolate brown with some green bands.	
32.70	36.50	3.80	3.40	80-90	DOLARENITE yellow coarse to medium grained thin bands of shale	
36.50	40.70	4.20	1.52	75-85	SHALE green and chocolate brown with a pink coarser dolarenite at base.	
40.70	44.26	3.56	2.86	80	DOLARENITE medium to coarse yellow and pale yellow and green. Vugghy and porous in places. Manganese on joints.	
44.26	50.55	6.29	5.62	85	SHALE green with some brown and grey. Some coarser bands present. A few instances of disturbed bedding. A yellow dolarenite 0.50m thick occurs at 49.70m depth. A stromatolite 0.12m occurs at 45.74m depth.	
50.55	52.25	1.70	1.70	80-90	SHALE green and chocolate brown alternating. Some vughs.	
52.25	54.03	1.78	1.78	80	SHALE chocolate brown with a 0.90m vugghy porous dolonite at base.	

FROM	TO	DRILLED	REC	△°	LOG	MINZ
54.03	58.82	4.79	4.79	80-85	SHALE chocolate brown and grey with green shale bands up to 0.55m thick. Disrupted bedding common.	
58.82	67.67	8.85	✓	70-80	SHALE brown and green separate passing down to green at base. Contains porous coarse grained dolomitic or dolarenites, of 0.60m, 0.41m, 0.51m, 0.43m, 0.35m, and 0.34m thickness at 59.32m, 60.44m, 62.01m, 63.91m, 65.35m, and 66.16m.	
67.67	75.50	7.83	✓	70-85	SANDSTONE yellow to light orange medium to coarse well bedded, siliceous with clay. carbonate matrix. Contains a 0.20m green shale at 74.30m.	
75.50	78.54	3.04	✓	80-90	SHALE brown and grey, green and grey and brown and green, containing thin sandstone bands. Disturbed bedding present. A dolomite band somewhat silicified of 0.52m occurs at 76.92m.	
78.54	80.02	1.48	✓	85	DOLOMITE hard, silicified? near top with thin shale bands passing down into yellow ?? silicified dolomite.	
80.02	82.23	2.21	✓	75-85	SHALE grey, b wn, green and grey with thin bands of porous dolomite. A 0.28m thick band occurs at 81.95m.	
82.23	83.64	1.41	✓	80-85	DOLOMITE coarse to medium grained containing thin shale bands. Silicified in places.	
83.64	88.19	4.55	✓	85	SHALE green and orange with thin bands of coarse dolomite. Contains a 0.78m thick band of silicified fine dolomite at 85.14m.	
88.19	90.28	2.09	✓	85-90	SANDSTONE yellow, coarse contains a 0.56m dolomite at 88.19m.	
90.28	93.00	2.72	✓	80-90	SHALE green and grey with thin bands of sandstone and dolomite Contains a 0.37m thick coarse porous dolomite at 90.92m.	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
93.00	94.18	1.18	✓	85-90	SANDSTONE coarse well bedded containing a thin green shale at base.	
94.18	97.02	2.84	2.84	75-85	SHALE green and grey containing thin sandstone and dolomite bands. A stromatolite 0.30m thick occurs at 94.18m. A 0.20m green shale occurs at 94.48m and a 0.40m coarse dolomite occurs at 94.68m. A 0.23m fine sandstone occurs at 96.02m.	
97.02	98.20	1.18	✓	85	DOLOMITE yellow with fine green shale partings. Contain a 0.16m thick stromatolite at 97.50m. Also contains three 0.05m thick chert bands over 0;40m from 97.80m to 98.20m.	
98.20	102.00	3.80	✓	85-90	SHALE grey, green containing thin dolomite bands. A 0.99m sandstone band with chert near its base occurs at 98.98m. A 0.68m thick dolomite at 100.30m..Contains large vughs filled with quartz. Becomes decidedly rich in dolomite toward base.	
102.00	103.60	1.60	1.60	80	SANDSTONE quartzose pale yellow with thin bands of green shale.	
103.60	107.50	3.90	3.85	80-90	DOLOMITE pale grey and light orange. Contains thin bands of green shale and silicified zones. In places vugghy with quartz fillings, other places quite coarse in grainsize. Shales of 0.30m and 0.60m occur at 104.75m and 106.35m. A silicified zone 0.60m thick occurs at 104.10m.	
107.50	109.25	1.75	1.70	85	SHALE green and grey containing thin sandstone bands. One 0.22m thick at 107.72m contains large vughs of quartz crystals.	
109.25	110.55	1.30	1.30	75.85	SANDSTONE yellow, coarse quartzose with thin laminae of green shale.	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
110.55	112.71	2.16	2.16	80-85	SHALE grey with a thin band of pink dololutite and a 0.56m thick band of fine siltstone at 111.19m. Becomes greener near base.	
112.71	114.00	1.29	1.29	75-80	SANDSTONE yellow coarse overtop grading to fine near base. Massive at top, thin bedded & interbedded with thin green shale laminae near base.	
114.00	122.18	8.18	8.18	75-80	DOLOMITE pale grey, pale orange grey, very stylolitic in places, fine and with small vughs. Contains many thin shale bands shales of 0.29m, 0.40m, 0.25m, 0.22m and 0.46m at depths of 114.74m, 118.65m, 120.10m, 121.14m, 121.40m. Becomes very shaley near base.	
122.18	124.47	2.29	2.29	75-80	SANDSTONE coarse, yellow quartz-ozer felspathic. Containing thin green shale bands. One 0.69m thick occurs at 12.25m.	
124.47	134.44	9.97	✓	75-85	DOLOMITE pale grey, light green containing many thin shale bands. In places broken & silicified. In others large vughs contain gypsum, stylolitic also over bottom half. Contains shale bands of 0.40m, 0.53m, 0.28m and 0.20m at depths of 126.27m, 128.70m, 131.15m and 132.80m.	
134.44	137.93	3.49	3.49	70-85	SHALE grey and pale grey, green and orange containing thin dolomite bands of 0.23m and 0.36m at depths of 134.64m and 135.05m.	
137.93	148.55	10.62	10.62	75-85	DOLOMITE pale grey and dark grey mainly fine grained. Stylolitic in places. Contains a breccia zone 0.66m thick at 138.57m. Also shale bands of 0.58m, 0.34m, 0.78m, 0.30m, 0.35m, and 0.26m at depths of 139.48m, 141.28m, 142.45m, 145.29m, 147.00m and 145.03m. A coarse/medium quartz sandstone of 0.55m occurs at	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
					140.06m. Irregular bedding common. Calcite together with gypsum sometimes occurs parallel to bedding in the dolomite.	
148.55	159.74	11.19	✓	70-87	SHALE dark grey to green and orange containing many thin bands of dolomite. some quite coarsely grained. Irregular bedding present. Dolomite usually vugghy sometimes with gypsum and/or calcite. One contains large vughs of gypsum and another carbonate or sulphate could be barite or barium carbonates at 156.93m. Dolomite of 0.50m, 0.80m, 0.60m, 0.22m, 0.49m and 0.88m occurs at 149.80m, 153.70m, 155.61m, 156.48m, 156.82m and 157.55m.	
159.74	169.27	9.33	✓	75-85	DOLOMITE pale grey, fine, medium and coarse often with stylolites. Commonly banded towards base. Contains shale bands of 0.35m, 0.20m, 0.20m, and 0.94m at depths of 162.80m, 164.01m, and 165.36m. A conglomerate of 0.22m with flattened pebbles up to 10x20mm and vughs occurs at 163.17m. at the top of dolomite bed.	
169.27	170.37	1.10	1.10	80	SHALE dark and light grey disrupted bedding.	
170.37	174.05	3.68	3.68	80-85	DOLOMITE light grey mainly medium to coarsely grained oolitic and stylolitic in places. Oxidised in places.	
174.05	183.29	9.24	✓	80-85	SHALE dark grey and grey with much disturbed bedding. Contains numerous thin limestone bands. Some coarse and oolitic, others vugghy and stylolitic. Limestones of 0.84m, 0.38m, 0.36m and 0.25m thickness occur at depths of 177.10m, 179.35m, 180.92m and 181.47m.	
183.29	185.75	2.46	✓	80-85	LIMESTONE light grey coarse to medium grained with stylolites and small and basal breccia at 185.20m.	

FROM	TO	DRILLED	REC	△°	LOG	MINZ
185.75	189.05	3.30		80-85	SHALE grey and green and dark grey. Contains a pink shaley calcarenite of 0.22m thickness at 186.72m depth. Contains a 0.70 m limestone at 188.35m depth.	
189.05	192.05	3.00	3.00	80-85	CALCARENITE pink/orange medium to coarse grained. Massively bedded. Small vughs of calcite.	
192.05	193.80	1.75	1.75	80-85	SHALE orange and green at top and grey/dark grey at base. Contains two limestone bands of 0.20m and 0.22m thickness at depths of 192.97m and 193.42m.	

END OF HOLE.

PROJECT Pb/Zn CARBONATE E.L. 1167. N.T. BOXHOLE

BHD3 00E/3200N T.D. 190.75m

DATE COMMENCED: 25/8/76 COMPLETED: 16/9/76

DRILLERS: K.D. BOTTGER K.M. SNEYD

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
0.00	9.25	9.25	3.52	70-80	DOLOMITE grey and light orange grey. Broken and oxidized silicified. Fine grained. Some manganese visible.	
9.25	16.70	7.45	7.40	40-80	BRECCIA composed of dolomite fragments cemented together. Very broken and in places quite stylolitic. At 9.30m and 13.80m bedding is at an angle to core axis of 40^{o}, indicating possible faults. Shales of 0.30m, 0.38m occur at 9.30m and 11.30m depths. Decomposed rock in the form of clay of thicknesses 0.30m and 1.00m occur at 14.90m and 15.70m.	
16.70	31.93	15.23	15.13	75-85	DOLOMITE light grey to grey, very disrupted bedding near top. Very stylolitic and fractured. Contains many shale bands usually green and grey. A very oxidized band of dolomite 0.62m thick occurs at 19.40m. Shales of 0.20m, 0.48m, 0.52m 0.22m 0.25m occur at depths of 25.92m, 27.20m, 28.80m, 29.50m and 30.80m depths.	
31.93	34.85	2.92	2.92	85	SHALE green and mostly grey, with a dolomite band showing disrupted bedding. A dolomite band of 0.90m occurs at 32.93m.	
34.85	37.65	2.80	2.80	80-85	DOLOMITE grey fine grained vugghy in places. Has disrupted bedding throughout. Contains a shale band of 0.20m thickness at 35.15m depth.	
37.65	42.30	4.65	4.65	80	SHALE grey green over top half passing down into chocolate shale and brown and green shale. Contains thin bands of dolomite of 0.60m and 0.25m thickness at 40.55m and 41.47m depths. Upper dolomite band is vugghy.	

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
42.30	47.05	4.75	4.75	80-85	DOLOMITE grey and pale grey. Very vugghy at top and stylolitic towards base. Disrupted bedding throughout. Contains a 0.20m thick stromatolite band at 42.30m a 0.80m band of grey shale at 43.90m and a 0.34m band of shale at 45.97m depth.	
47.05	49.23	2.18	2.18	85	SHALE green and grey over top half passing down into chocolate brown at base. Disrupted bedding. bioturbation and jointing common Gypsum occurs in a vugh at 48.43m in depth.	
49.23	57.60	8.37	8.37	80-85	DOLOMITE grey and pale grey. Very vuggy towards top, broken and with disrupted bedding. Contains many shaley partings and bands and stromatolite horizons. Stylolitic over lower three quarters. Shale bands of 0.20m, 0.22m, 0.44m and 0.32m thickness occur at depths of 50.88m, 53.10m 55.20m 56.54m. Stromatolites of 0.35m and 0.10m thickness occur at depths of 51.50m and 55.75m.	
57.60	72.67	15.07	15.07		SHALE grey and green passing down to chocolate brown & grey and chocolate brown & green. Contains numerous thin dolomite bands. Bioturbation present over top half. sandstone bands of 0.35m and 0.36m occur at 58.07m and 60.30m.oDolomite bands nearly always vugghy of thickness 0.20m, 0.36m, 0.20m, and 0.83m occur at 61.75m 62.28m, 65.65m and 66.84m depths. Shales are vugghy over interval 69.70-70.25m.	
72.67	74.95	2.28	2.28	80	DOLOMITE grey to light grey. Vugghy and broken oxidised. Stylolites present contains thin shale bands.	
74.95	80.51	5.56	5.56	85	SHALE brown and grey and dark green, containing numerous thin dolomite and sandstone bands Interbedded sandstones and shales of 0.58m, and 0.30m, thickness occur at 78.53m and 79.95m. A very vugghy dolomite of 0.26m	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
					thickness occurs at 80.25m	
80.51	83.33	2.82	2.82	85	SANDSTONE AND SHALE interbedded containing 0.85m of sandy shale at 82.48m depth.	
83.33	93.20	9.87	9.87	75-85	SANDSTONE pale grey coarse to medium grained quartoze. Cross bedded. Contains green, grey and brown shale bands of 0.66m, 0.87m, and 0.60m thickness at 88.60m, 90.05m and 92.23m. Sandstone vugghy in quartz at 84.05m.	
93.20	94.75	1.55	1.55	85	SHALE grey with thin sandstone bands.	
94.75	96.30	1.55	1.55	85	DOLOMITE shaley, with vughs.	
96.30	99.60	3.30	3.30	85	SHALE grey, dolomitic and sandy. Contains a sandstone of 0.40m thickness at 97.40m and a vugghy dolomite of 0.77m thickness at 97.80m depth. Sandy over bottom metre.	
99.60	101.00	1.40	1.40	85	DOLOMITE grey, vugghy with thin shale bands.	
101.00	102.15	1.15	1.15	85	SANDSTONE coarse massive quartzose. Vugghy at 101.16m in gypsum.	
102.15	103.44	1.29	1.29	80-85	SANDSTONE and SHALE shale as thin bands and partings. Sandstone fine to medium grained. Very sandy over lower 0.40m.	
103.44	107.27	3.83	3.83	75-85	SHALE green and grey with thin sandstone bands. Contains a 0.45m thick red sandstone band at 105.43m and a 0.54m thick shaley sandstone at 106.98m. Brecciated and recemented over 0.40m thickness at 105.88m.	
107.27	108.80	1.53	1.53	75-85	SANDSTONE light grey fine to coarse grained with thin shale bands.	

FROM	TO	DRILLED	REC	△ °	LOG	MINZ
108.80	111.48	2.68	2.68	75-85	SANDSTONE and SHALE interbedded with disrupted bedding. Contains a 0.41m thick dolomite and a 0.30m thick shale at depths fo 111.35m and 111.15m.	
111.48	116.83	5.35	5.35	85	SANDSTONE grey, mainly medium grained with thin shale bands. Contains two shale bands of 0.24m and 0.33m thickness at 113.30m and 114.24m depths. Contains a dolomite of 0.24m thickness at 113.54m depth, an interbedded sandstone & shale band of 0.94m thickness at 114.68m and a shaley dolomite of 0.84m at 116.00m. A bedded gypsum band 0.05m thick occurs at 116.58m depth.	
116.83	121.20	4.43	4.43	80	SANDSTONE and SHALE interbedded consisting of thin grey shale bands and medium to coarse sandstone bands. A coarse shaley sandstone of 0.89m thickness occurs at 118.90m and a shale of 0.60m thickness at 120.60m depths.	
121.20	124.55	3.35	3.35	80	SANDSTONE coarse, quartzose with thin shale bands one of 0.21m thickness at 123.28m depth.	
124.55	126.20	1.65	1.65	80	SHALE dark grey and dark green containing numerous thin sandstone bands. One of 0.40m thickness occurs at 124.87m depth.	
126.20	127.33	1.13	1.13	80	SANDSTONE coarse to medium grained quartzose vugghy near top. A shaley band of 0.48m thickness occurs at 126.85m depth.	
127.33	132.75	5.42	5.42	80	DOLOMITE light grey vugghy. Contains an oolitic band of 0.20m at 129,10m depth. Also two shale bands of 0.20m and 0.73m thickness at 129.75, and 131.00m. Stylolitic over lower half.	

FROM	TO	DRILLED	REC	Δ^{o}	LOG	MINZ
132.75	134.44	1.69	1.69	85	SHALE light and dark grey disrupted bedding over lower 0.40m. Quartz filled vugh at 134.05m	
134.44	135.60	1.12	1.12	85	DOLOMITE oolitic coarse grained light grey and brown. Shaley in places.	
135.60	136.85	1.25	1.25	85	SANDSTONE and SHALE grey and dark grey. Contains a shale band of 0.36m at 136.42m.	
136.85	144.45	7.60	7.60	85	DOLOMITE light brown and grey. In places vugghy and oolitic, coarser grained. Many thin shale bands present. Shale bands of 0.30m 0.20m, 0.34m, 0.20m and 0.30m occur at depths of 137.20m 137.80m, 140.60m 141.75m 143.40m.	
144.45	148.90	4.45	4.45	85	SILTSTONE and fine sandstone containing a shale band of 0.20m thickness at 146.00m depth and a slightly vugghy dolomite of 0.53m, thickness at 146.20m depth. Gypsum occurs in a vugh at 146.64m and also at 147.00m.	
148.90	152.00	3.10	3.10	80	SILTSTONE and SHALE consisting of dark and light grey bands. Contains a siltstone of 0.53m thickness at 149.91m depth and a siltstone of 0.70m at 151.10m depth.	
152.00	158.64	6.64	6.64	85	DOLOMITE light grey fine to coarse grained containing thin shale bands. A shale band of 0.66m, occurs at 154.00m depth. Shale and siltstone bands interbedded of 0.38m and 0.73m thickness occur at 156,99m and 157.35m, depths. A band of very vugghy silicified dolomite of 0.30m thickness occurs at 157.10m depth.	
158.64	163.50	4.86	4.86	85	SILTSTONE grey to dark grey shaley and dolomitic containing thin shale bands and two siltstone and interbedded shale bands of 0.56m and 0.80m thickness at depths of 160.25m and 162.44m.	

FROM	TO	DRILLED	REC	Δ°	LOG	MINZ
163.50	168.20	4.70	4.70	85	SILTSTONE and SHALE interbedded light and dark grey containing a siltstone band of 0.68m thickness at 164.80m depth.	
168.20	170.10	1.90	1.90	85	DOLOMITE light to pale grey very vugghy slightly shaley. Coarse grained in places.	
170.10	171.25	1.15	1.15	85	SHALE light and dark grey with thin bands of siltstone.	
171.25	173.00	1.75	1.75	85	DOLOMITE light and pale grey with thin shale bands. Coarse grained in places and slightly silicified in others. Vugghy also. Contains a 0.37m thick shaley siltstone band at 171.65m.	
173.00	174.60	1.60	1.60	88	SHALE grey and dark grey containing a 0.60m thick band of siltstone and shale at 173.00m depth.	
174.60	177.70	3.10	3.10	85	DOLOMITE grey and pale grey coarse to fine grained. Stylolitic vugghy in places. Contains a 0.50m thick shale band at 176.40m depth.	
177.70	178.80	1.10	1.10	85	SHALE grey and dark grey consisting of siltstone and shale bands.	
178.80	187.06	8.26	8.26	85	DOLOMITE grey and light grey fine thin bedded to coarse grained and massive with stylolites. over lower 2.20m mottled grey with thin veinlets. Contains two shale bands of 0.70m and 0.84m thickness at depths of 180.85m and 183.05m. Gypsum occurs in a vugh at 182.50m and pyrite on a joint plane at 184.15m depths.	
187.06	190.75	3.69	3.69	85	SHALE and SILTSTONE grey and dark grey disrupted bedding dolomitic.	

END OF HOLE

BHD 4 1600W/1600S TD 181.45 m

Drillers - K.D. Bottger, K.M. Sneyd

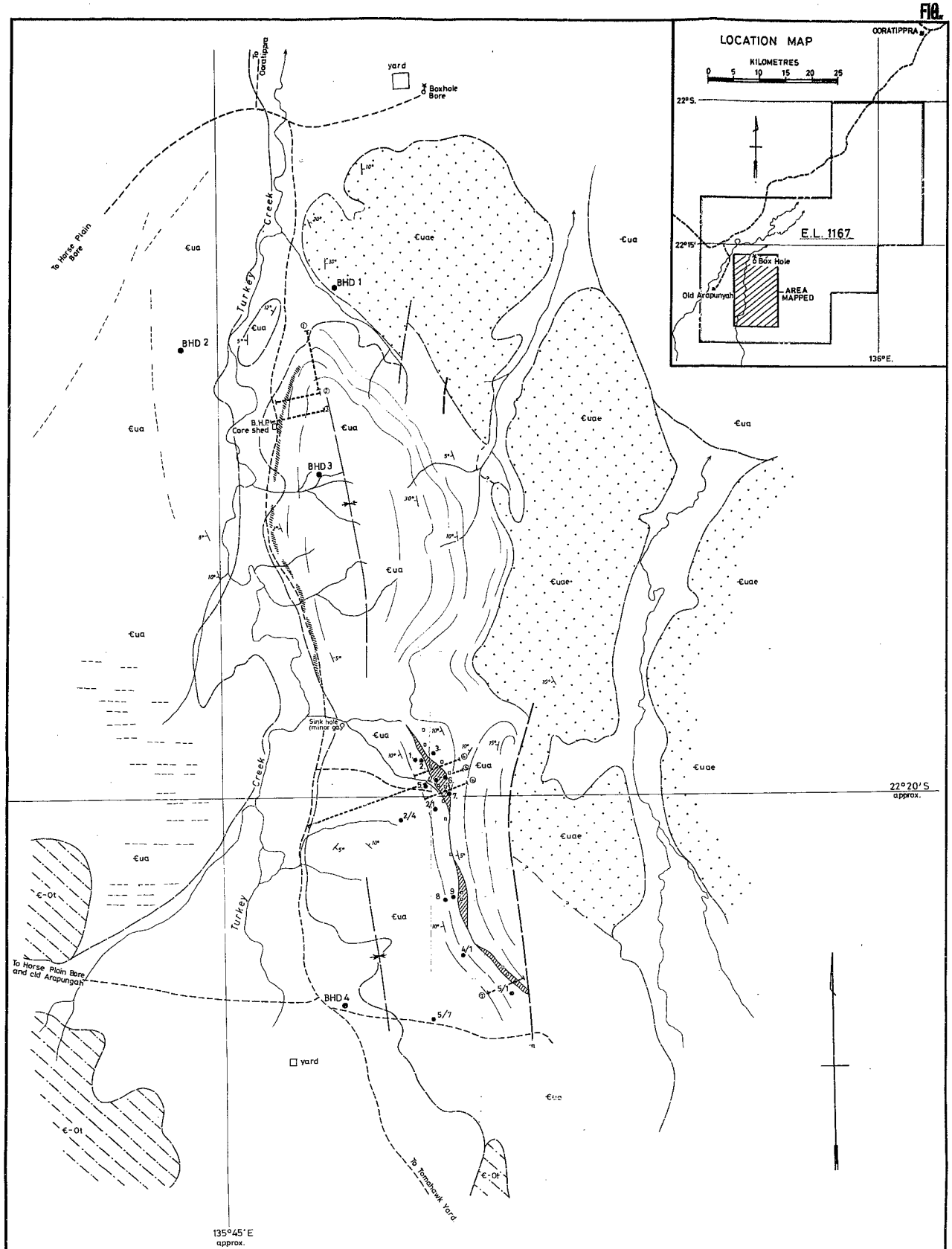
From (m)	To (m)	Description
0	2	Brown and grey massive recrystallised dolomite.
2	6	Brown laminated calcareous siltstone.
6	29	Brown massive recrystallised and dolomitised calcarenite and minor siltstone. Locally containing up to 5% quartz grains.
29	32	Dolomitised oolite band overlying partly brecciated dolomite.
32	74	Interbedded grey and green laminated calcareous siltstone and shale with massive recrystallised dolomite and minor thin sandstone.
74	95	Brown and grey medium bedded recrystallised dolomite with interbeds of siltstone and shale.
95	141	Interbedded shales, siltstones and recrystallised dolomite. Shale and siltstone are grey, green and maroon, thin bedded and dolomitic. Thin beds of stromatolites and oolites occur intermittently. A 15cm band of pyritic gossanous material occurs at approximately 119m.
141	148	Red, green and black thin bedded shale and siltstone.
148	149	Yellow brown quartz sandstone.
149	181.45	Interbedded quartz sandstone with laminated calcareous green grey siltstone and shale.

End of Hole

CR 77/148

Continuation on Microfiche No. 3
Figure 2-8.

FIG. 2



€-Ot Tomahawk Beds.

€ua Arrinthrungra Formation.

€uae Eurowie Sandstone Member.

Principal outcrop of galena mineralization and silicification.

Trace of barite (± galena) horizons in stromatolites.

BHD 3 ● B.H.P. diamond drill hole.

5/7 ● Enterprise Exploration drill hole.

3 ● Central Pacific drill hole. Nº prefixed WD.

▫ Shallow pit.

F Fault

Syncline

Geological boundary

Air photo trend.

Soil sample traverse.

Interpreted geology from 1976 drilling programme and photo interpretation.

KILOMETRES
0 1 2

Scale 1: 25,000

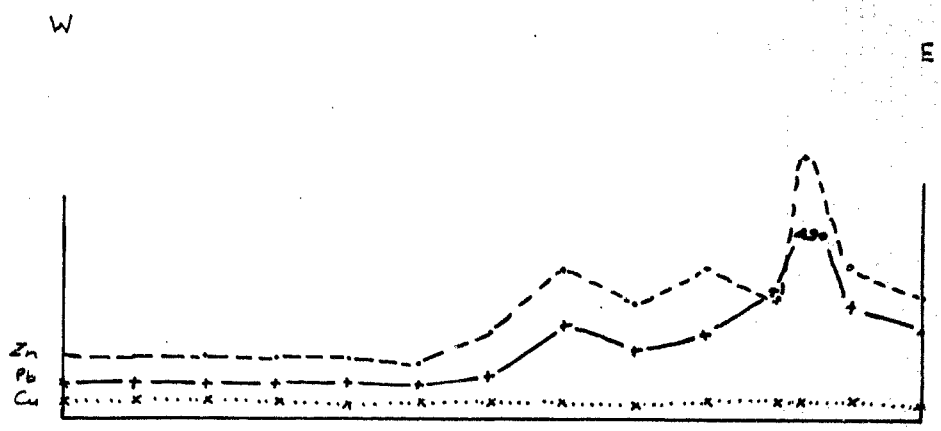
Fig. No.
To accompany
Dated

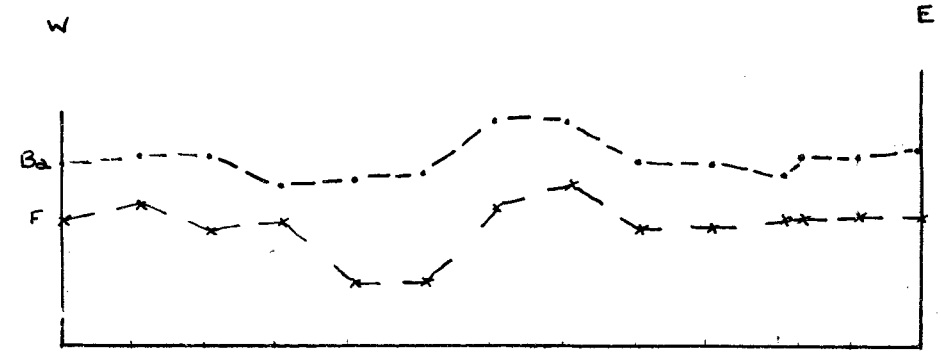
THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

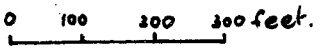
E.L.1167 BOXHOLE BORE, N.T.
GEOLOGY AND DRILLING.

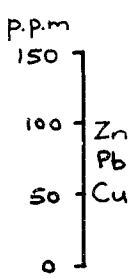
Revisions:	Drawn: P.J.P.	Date: 15-6-77	Centre: Melbourne
	Traced: G.B.	Project No.:	Drawing No.: A2-1209
	Checked:		

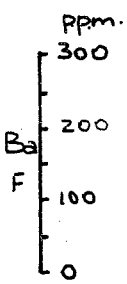
Fig. 3.







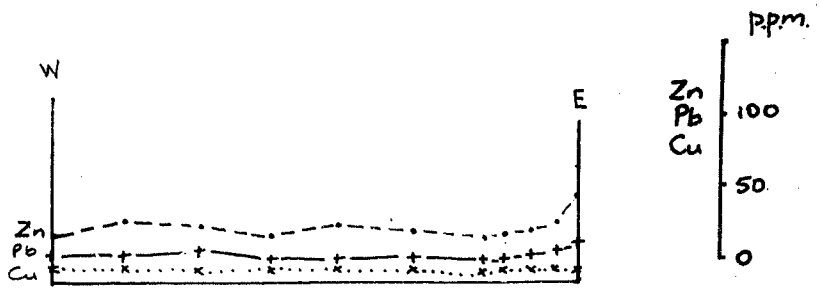


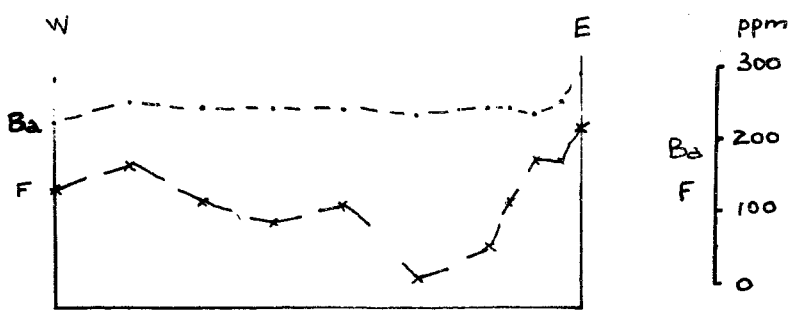


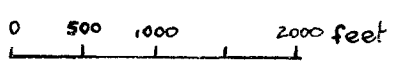
TRAVERSE 7

Centre	THE BROKEN HILL PROPRIETARY CO. LTD. GEORGINA BASIN, N.T.– QLD. SOIL SAMPLE (–80#) PROFILE ACROSS SOUTHERNMOST BOX HOLE LEAD OCCURRENCE	Project No.
Date		Drawing No. A4.

Fig. 4.







TRAVERSE 5

Centre	THE BROKEN HILL PROPRIETARY CO. LTD.	Project No.
Date	GEORGINA BASIN, N.T. — QLD.	
	WESTERLY EXTENSION OF GRID LINE 100N	Drawing No.
	BOX HOLE LEAD OCCURRENCE	A4.

Centre

Date

THE BROKEN HILL PROPRIETARY CO. LTD.

GEORGINA BASIN, N.T.–QLD.

GEOLOGICAL & GEOCHEMICAL CROSS SECTION

LINE 100N, BOX HOLE LEAD OCCURRENCE

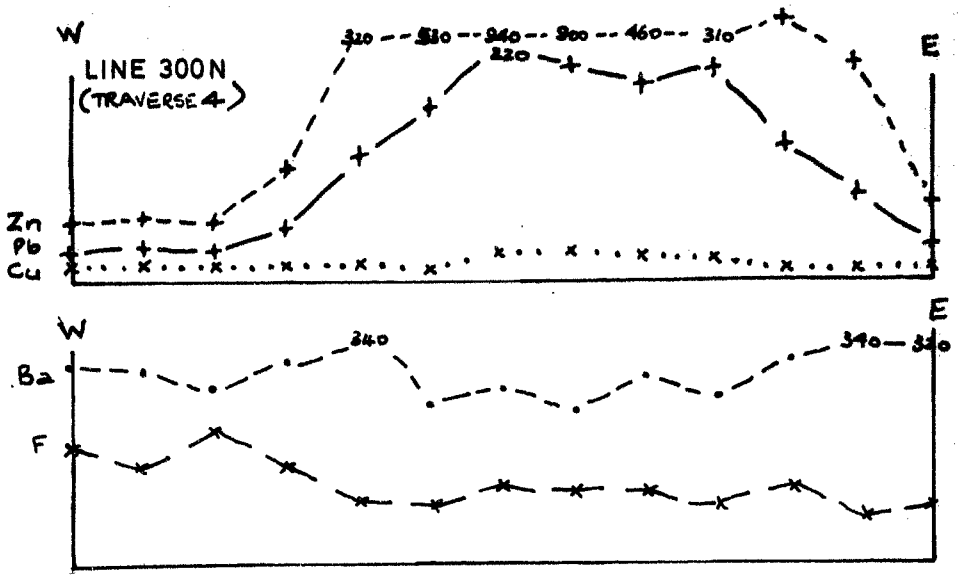
TRAVERSE 5

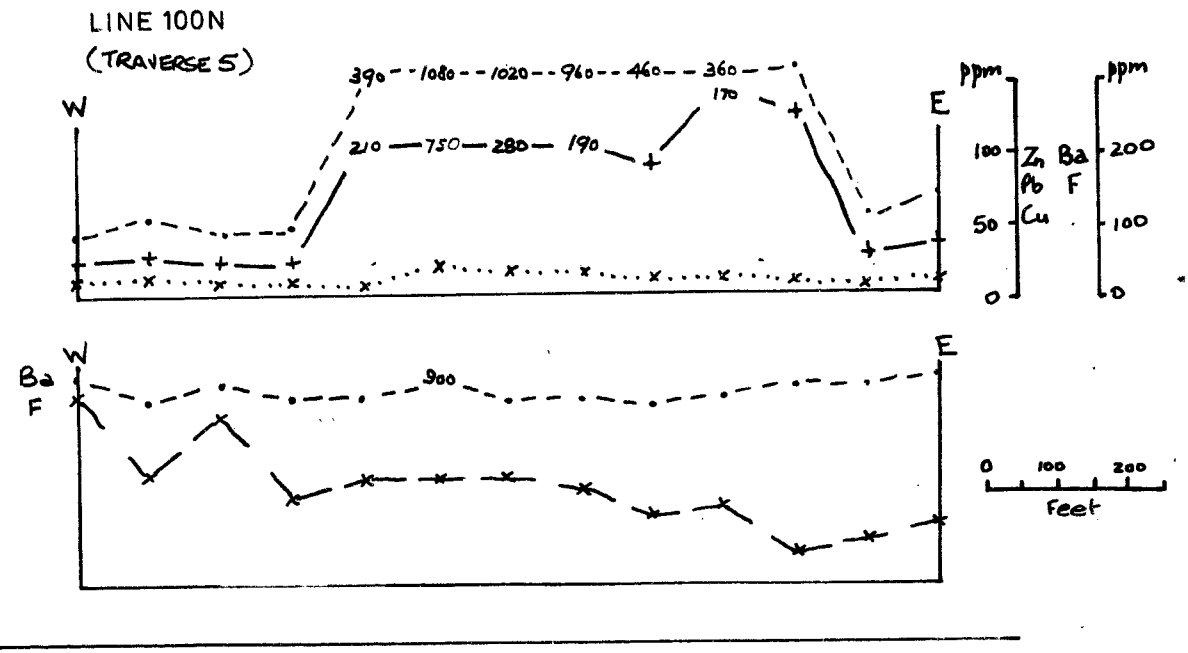
Drawing No. A4–

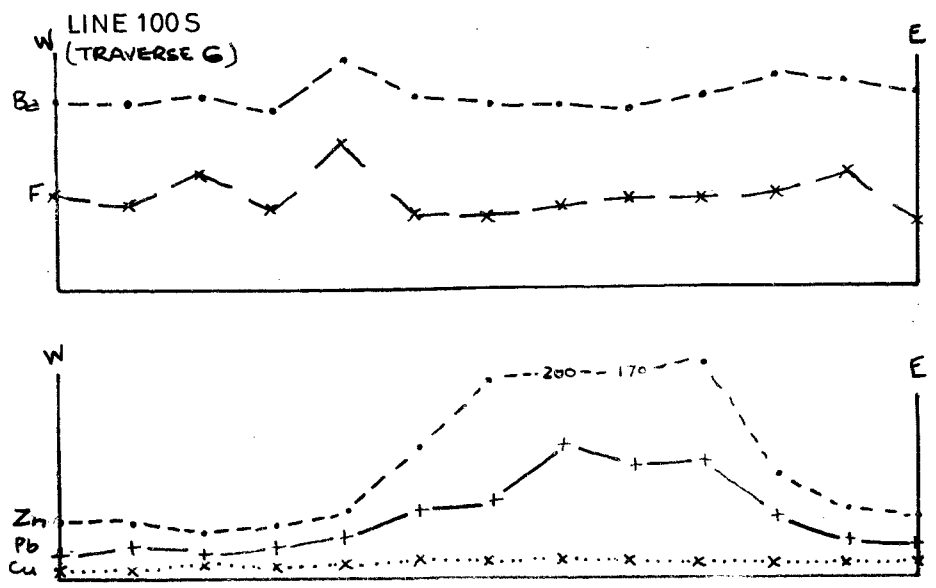
Project No.

Fig.5.

Fig. 6.

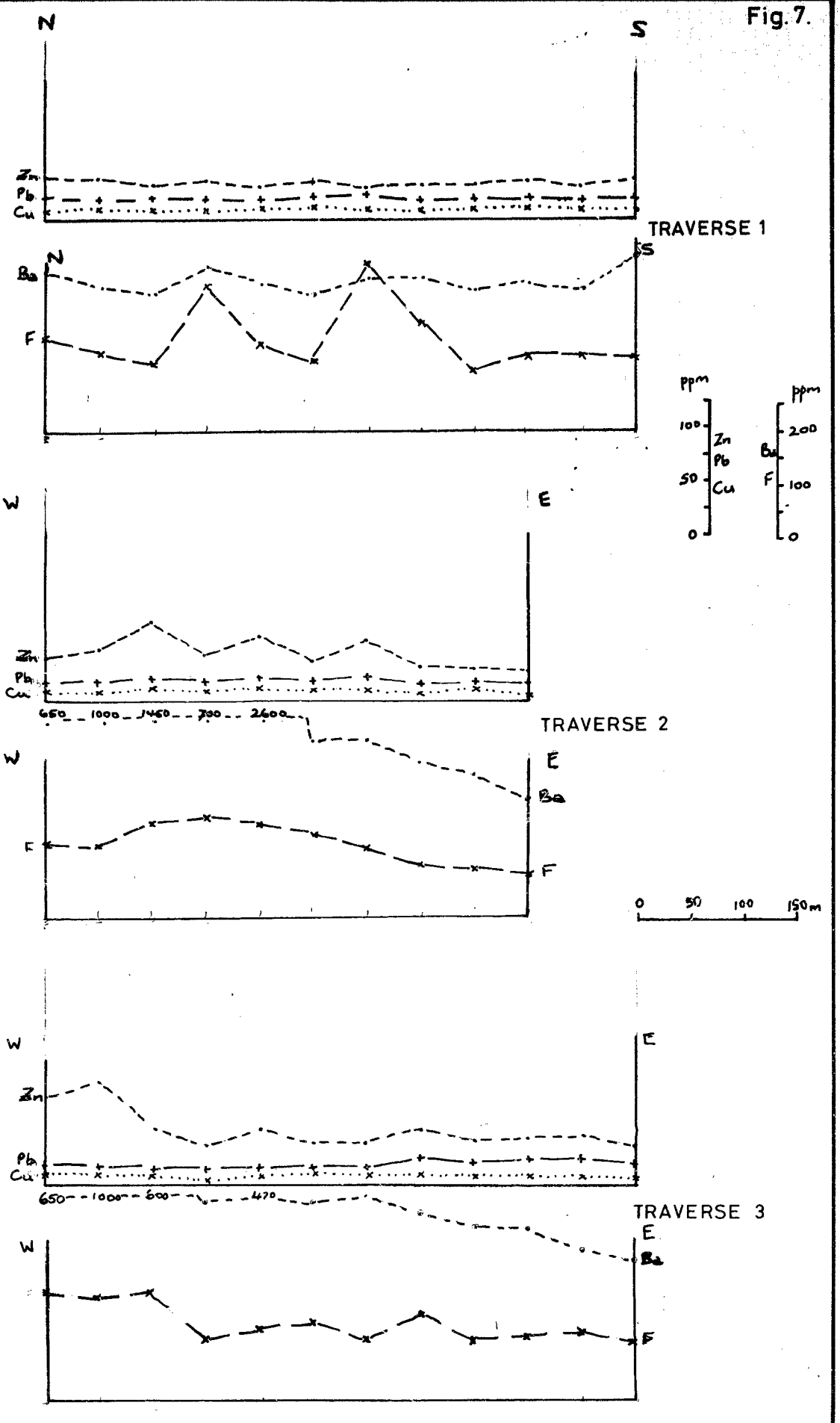






Centre	THE BROKEN HILL PROPRIETARY CO. LTD. GEORGINA BASIN, N.T.–QLD. SOIL SAMPLE (–80#) PROFILES LINES 300N, 100N & 100S BOX HOLE LEAD OCCURRENCE	Project No.
Date		Drawing No. A4.

Fig. 7.



Centre	THE BROKEN HILL PROPRIETARY CO. LTD.	Project No.
Date	GEORGINA BASIN, N.T.–QLD.	
	SOIL SAMPLE (–80#) PROFILES TRAVERSE 1,2,3.	Drawing No.
	NORTH OF MAJOR WORKINGS BOX HOLE LEAD OCCURRENCE	A4.

Fig. 8

BHD 1

BHD 2

BHD 3

BHD 4

limestone bands
calcareous shale, silst.

dolomitised calcarenites, locally re-crystallised

dolomitised

chert

chert

black shale bands and pyrite

stromatolite & barite overlying a leached qtz. sst.

micritic limestone overlying leached, oxid. qtz. sst. and halite crystals

interformational breccia? massive oolite

calc. qtz. sandstone and disseminated pyrite

T.D. 220·65m

two bands of finely bedded red shale. siltstone

15cm stromatolite

varied coloured shale/siltst.

chert

chert

oolitic calcarenite grading into calc. qtz. sst.

local laminated black shale and pyrite

oolitic bands

leached oxid. qtz. sst.

T.D. 193·8 m

T.D. 190·75m

Upper Arrinthrunga Formation

massive, recryst. dolomitized calcarenite and micaceous, silty calcarenite interbedded laminated calcar. siltstone and shale, some oolite, locally bands of structureless recrystal. massive dolomite which could be algal mattes

stromatolites occur around the level of red beds, but obviously peter out further west from the Boxhole mineralised trend

Eurowie Sandstone Member

qtz. sandstone bands with interbedded laminated calc. siltstone, shale, commonly with some percentage of quartz grains and lenses of qtz. sandstone

Lower Arrinthrunga Formation

5% quartz grains oolite

lens of micritic dolomite 15cm of py. gossan

grey, green, fine bedded dolomitic shale, siltstone

T.D. 181·45m

Scale 1:1000

0 10 20 30 40 50 Metres

Fig. No. .....
To accompany .....
Dated .....

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L.1167 BOXHOLE BORE, N.T.
CORRELATION DIAMOND DRILL HOLES

Revisions:

Prepared by: J.A.Smit	Centre: Melbourne	
Date: 15 · 6 · 77	Project No:	Drawing No: A3-1362
Drawn:		