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AQUITAINE AUSTRALIA MINERALS PTY. LTD.

1981 ANNUAL REPORT ON MINERAL EXPLORATION
AND RE-INTERPRETATION OF THE GEOLOGY
ON MINERAL CLAIMS IN THE OCHRE MINE AREA
BONAPARTE GULF BASIN, NORTHERN TERRITORY

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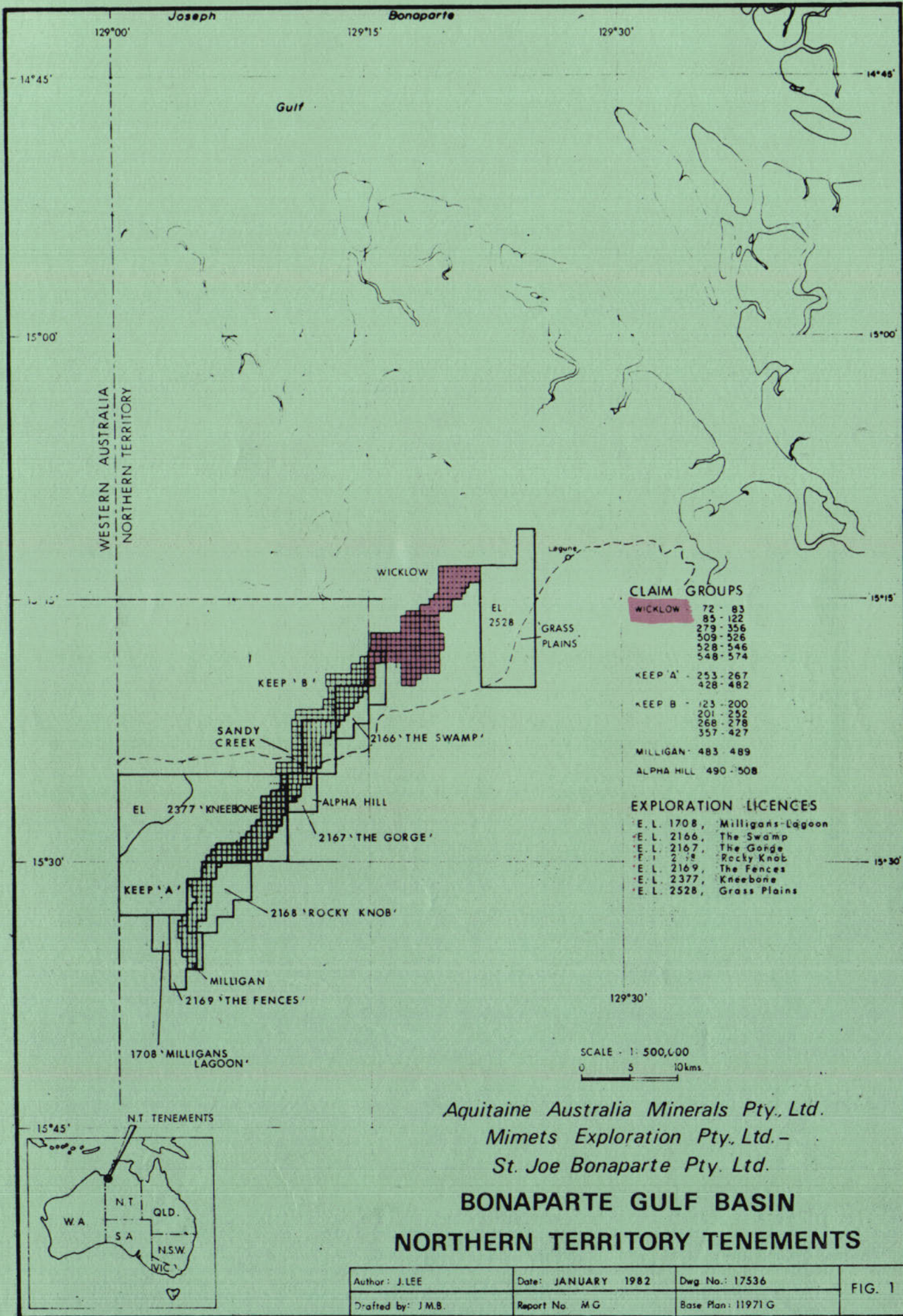
1.0 INTRODUCTION

A programme of re-interpretation of the geology of the eastern margin of the Bonaparte Gulf Basin in the Northern Territory was commenced in 1980 (Guy, 1980 and Cranney, 1981). During 1980 re-interpretation of the geology from Milligans Lagoon in the south to Winchrope Hill in the north was effectively completed. As a continuation of the programme this study was extended during 1981 to include the area from Winchrope Hill to north-east of the Ochre Mine. Most of this area lies within the Wicklow group of mineral claims (see Fig. 1).

The Ochre Mine study was directed mainly at the areas of known lead-zinc-silver mineralisation in an attempt to determine the stratigraphic and structural controls on this mineralisation and to establish the potential of the surrounding areas for additional mineralisation. Because of limitations on both time and personnel available during 1981, the re-evaluation of the Ochre Mine region is still incomplete but is programmed for further work during the 1982 field season.

A deep stratigraphic hole (NBO 1003) was drilled to the north-west of the Ochre Mine during the 1981 field season to assist in correlation of the Ochre Mine drill hole geology with the area further south around Winchrope Hill.

Geological supervision of the Ochre Mine drilling programme was carried out from the Sorby Hills exploration base.



Aquitaine Australia Minerals Pty., Ltd.
Mimets Exploration Pty., Ltd. -
St. Joe Bonaparte Pty. Ltd.

**BONAPARTE GULF BASIN
 NORTHERN TERRITORY TENEMENTS**

Author: J.LEE	Date: JANUARY 1982	Dwg. No.: 17536	FIG. 1
Drafted by: J.M.B.	Report No. MG	Base Plan: 11971 G	

2.0 LOCATION AND ACCESS

The Ochre Mine area is located near the north-eastern margin of the onshore Bonaparte Gulf Basin approximately 30 kilometres east of the Northern Territory-Western Australia border and approximately 20 kilometres south-west of Legune Station. Kununurra, the principal township in the region is located approximately 77 kilometres to the south-east of the Ochre Mine area.

Access to the Ochre Mine area is by the Kununurra-Legune Station road which is maintained as far as the W.A.-N.T. border by the Shire of Wyndham and East Kimberley and from the border towards Legune by the Commonwealth Road Department. From Kununurra, the first 20 kilometres of road is bitumen sealed and thereafter the road is a combination of raised gravel and black soil. From the Legune road access throughout the area is along station tracks and graded seismic lines.

3.0 STRATIGRAPHY

Because the Ochre Mine study is still in progress, detailed lithological description of the major stratigraphic units in the area is not yet complete. The major stratigraphic units recognised within the area are described briefly below and are shown as far as possible on the preliminary interpretation geological map. (Plate 1).

(1) Precambrian:

The Precambrian rocks in the area constitute the "basement" to the Devonian-Carboniferous sequences and around Ochre Mine they consist of a sequence of weakly metamorphosed micaceous siltstones, shales and quartzites. At the Ochre Mine outcrops, the Precambrian is represented by poorly exposed white siltstone.

(2) Upper Devonian-Cockatoo Formation (Duc):

In the immediate vicinity of the Ochre Mine, the Cockatoo Formation is separated from the Precambrian by a thin zone of oxidized, hematized and silicified volcanics which are included in the Antrim Plateau Volcanics by Veevers & Roberts (1968).

The Cockatoo Formation around the Ochre Mine is represented by the Ragged Range Member (Dur). It is comprised of a basal conglomerate containing slabs of siltstone, boulders of quartzite, interbeds of shaley siltstone containing clay pellets and pebbly quartz sandstone overlain by a fine siltstone composed mainly of red ochre, followed by a fine to medium grained red quartz sandstone.

To the south-east and east of the Ochre Mine, the Cockatoo Formation outcrops probably form part of the Kelly's Knob Member (Duk) which overlies the Ragged Range Member. The Duk member is mainly composed of white, friable, cross-bedded sandstone with some quartzitic pebbly horizons.

(3) Lower Carboniferous - Burt Range Formation (Clb):

The Burt Range Formation in the Ochre Mine area unconformably overlies the Cockatoo Formation and in places may be in faulted contact. The lowermost unit of the Burt Range Formation or Clb₁ unit as it is known in this area and elsewhere in the Northern Territory consists of a thinly bedded siltstone and silty dolomite to dolomitic siltstone sequence which is commonly interbedded with dolomites and sandy dolomites. In the Ochre Mine area the base of the Burt Range Formation is represented by a basal partly carbonate cemented quartzite conglomerate. The Clb₁ unit is seen only in drill holes and does not outcrop.

As shown in many of the deeper more basinward drill holes in the Ochre Mine area (e.g. NBO 1001, 1002, 1003 and NBO 1002) the lower Clb₁ silty dolomite unit is overlain by a more massive unit of fossiliferous sandy dolomite and dolomite sandstone. The contact with the underlying Clb₁ is often gradational. The Clb₁ and Clb₂ units generally display distinctive responses on the gamma ray logs. Differentiation of the Clb₁ and Clb₂ units in the Ochre Mine area is not clearly established at present and will need to be determined by further relogging of drill holes.

Outcrops of the Burt Range Formation forming low hills extend from near the Ochre Mine north-easterly towards Flapper Hill and Legune Station. The outcrops consist of white to purple flaggy laminated siltstone, fine - medium grained crinoidal quartz sandstone, coarse to medium grained fossiliferous reddish feldspathic sandstone, interbedded siltstone and sandstone and grey to brown silicified calcareous sandstone and limestone. Brachiopod fossils from these outcrops suggest a correlation with the upper part of the Burt Range Formation in the type area. (Veevers & Roberts, 1968)

It would appear from available drill hole evidence that Burt Range outcrops forming the low hills represent a younger unit than the Clb₂ and may possibly be equivalent to the Clm₁ unit of the Milligans Beds defined by B. Guy (1980) in the Winchrope Hill area to the

south. It is hoped that the remaining core logging and interpretation programme at Ochre Mine will clarify the Burt Range Formation stratigraphy.

(4) Lower Carboniferous - Milligans Beds (Clm):

The Milligans Beds typically consist of dark grey-black partly carbonaceous, fissile shales and dolomitic-calcareous siltstones with minor interbedded sandstones, dolomites and limestones. The Milligans Beds does not outcrop in the Ochre Mine area and has been intersected only in the more basinward holes (e.g. NBO 1003 and NBO 1002). A transitional unit between the predominantly shale-siltstone sequence (Clm₂ of Guy, 1980) of the Milligans Beds and the Burt Range Formation sandy dolomites (Clb₂) is present in many drill holes in the northern part of the area. This unit consisting mainly of dark siltstones, sandstone and sandy dolomite is equivalent to the Clm₁ unit as defined by Guy, 1980. It is still uncertain, however, whether this unit is part of the Milligans Beds or possibly equivalent to the upper part of the Burt Range Formation as seen in the Ochre Mine outcrops.

4.0 1981 DRILLING PROGRAMME

One stratigraphic diamond drill hole (NBO 1003) was completed in the Ochre Mine area during 1981. The hole was drilled under contract by Intairdril (Aust.) Pty. Ltd. using a Foxmobile rig. To a depth of 30.40 metres through the overburden and weathered bedrock the hole was drilled by rotary drilling, then cored in NQ core to 123.30 metres and finally cored in BQ core to the total depth of 261.40 metres.

Hole NBO 1003 was located at the National grid co-ordinates 8309000N 0528000E (see Plate I). The hole passed through a dark grey calcareous fissile shale from 24.0 metres to 55.00 metres then dark grey calcareous shale interbedded with medium grained sandstone (sandstone increases with depth) to 105.30 metres. These rocks are tentatively assigned to the Milligans Beds (Clm) with the Clm₂ unit to 55.00 metres and the Clm₁ unit from 55.00 to 105.30 metres.

From 105.30 to 149.90 metres the lithology is predominantly sandy dolosparite with abundant fossils (brachiopods and crinoid ossicles) and is included in the upper Burt Range Formation (Clb₂) unit. Oxidized zones often more than a metre in thickness were common throughout the sandy dolomite unit.

The basal Burt Range Formation unit (Clb₁) was intersected from 149.90 metres to the end of the hole. The Clb₁ consisted predominantly of silty (argillaceous) dolomite (often oxidized) with numerous sandy dolosparite interbeds.

Apart from minor pyrite around 105.30 metres at the Milligans Beds-Burt Range Formation contact no sulphide mineralisation was present in NBO 1003.

The descriptive log for NBO 1003 is included in Appendix I. A composite litholog and gamma ray log for the hole is also included. (Appendix II).

5.0 OCHRE MINE AREA MINERALISATION

Surface showings of secondary lead/zinc and zinc mineralisation were located in the Ochre Mine area during geological mapping in 1972. Three main prospects were located as shown on Plate I. These are the "Beta-Gap" Prospect, the "Alligator Prospect" and the "Ro I Prospect". Extensive surface mapping, geophysical surveys (Gradient Array and Dipole-Dipole I.P. and Magnetics) and rotary percussion and diamond drilling were carried out to investigate for extensions of the surface mineralisation at depth.

The drilling particularly in the "Beta-Gap" area showed the mineralisation at depth to be present in fractured and slump brecciated siltstone with combined lead-zinc grades often in excess of 5% over intervals of approximately 4.0 metres. Many problems were encountered with extremely poor core recovery in the mineralised intervals so that the true nature and width of the mineralised zones are not known. Faulting is evident from surface outcrops in the mineralised areas but the association of the faults with the mineralisation is not understood.

Re-examination of the geological and structural associations of the Ochre Mine mineralisation is presently in progress as part of the wider study of the Ochre Mine region. Preliminary work, however, suggests that the lead-zinc-silver mineralisation over much of the area is stratabound and occurs within a fractured and slump brecciated siltstone unit near the base of the Burt Range Formation. A selected east-west drill hole section has been drawn through holes DDH 10, DDH 11 and DDH 120 at the "Beta Prospect" to show the stratabound occurrence of the mineralisation (Fig. 2).

6.0 CONCLUSIONS AND RECOMMENDATIONS

Although considerable data is still to be examined as part of the re-interpretation of the geology and mineralisation of the Ochre Mine region, preliminary work indicates that mineralisation in the area is stratabound and that potential exists for the development of significant ore reserves in the area.

It is strongly recommended that the Ochre Mine study be continued during the 1982 Bonaparte exploration programme. Depending on the final results of this work, recommendations can then be made to follow-up selected areas of interest.

7.0 EXPENDITURE

Expenditure details for the 1981 exploration year on Mineral Claims in the Ochre Mine Area as given below.

	\$
Consumables	624.27
Field hand costs	2792.85
Repair and maintenance site buldings/equipment	1176.82
Repair and maintenance site vehicles	420.14
Hire helicopter and aircraft	10.00
Hire vehicles	43.25
Utilities	674.94
Permit fees and rentals	983.98
Travel and subsistence	711.50
Freight and cartage	281.07
Drilling contractor	20143.82
Site access and preparation	332.40
Lab. analysis	162.15
Communications	86.55
Mineral Dept. salary and associated costs	5576.25
Printing and Drafting salary and associated costs	909.05
Lands and Contract salary and associated costs	63.00
Depreciation site assets and equipment	2089.16
Overheads	4182.20
Joint venture contributions	1002.39
	<hr/>
TOTAL	42265.79
	<hr/> <hr/>

8.0 REFERENCES

- CRANNEY, P., 1981: Reinterpretation of the Geology of Milligans Lagoon - Cuesta Ridge - Rocky Knob Area, Northern Territory. Aquitaine Australia Minerals Pty. Ltd. MG Report No. 1082 (unpubl.).
- GUY, B.B., 1980: Reinterpretation of the Geology of the Alpha Hill - Sandy Creek - Winchrope Hill Area, Northern Territory. Aquitaine Australia Minerals Pty. Ltd. MG Report No. 1065 (unpubl.)
- RAMDOHR, R., 1973: Exploration Licence 675, Annual Report for the Period Ending 1st November, 1973. Aquitaine Australia Minerals Pty. Ltd. MG Report No. 341 (unpubl.)
- VEEVERS, J.J., and ROBERTS, J., 1968: Upper Palaeozoic Rocks, Bonaparte Gulf Basin of Northwestern Australia. Bur. Min. Resources Bull., 97.

APPENDIX I

Appendix I Descriptive Drill Hole Log - NBO 1003



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	0 - 32 METRES: PRECOLLAR - ROTARY MUD 32.00 - 123.30 METRES: NQ CORE 123.30 - 261.40 METRES: BQ CORE TOTAL DEPTH: 261.40 METRES			
0 - 24.00 m	<u>Overburden</u>			
24.00 - 105.30 m	<u>Clm - Milligans Beds</u> 24.32 metres - dark grey calcareous fissile shale. <u>32.00 - 52.65 m</u> : Fissile shale. Dark grey calcareous fissile shale. Random minor (1 - 10 cm) calcareous, medium grained quartz sandstone beds occur throughout. These bands usually contain shale rip-ups. CBA = 90° The unit has two fossiliferous bands 42.60 - 42.90 m and 49.40 - 51.45 m. Contain poorly sorted shell fragments - 1mm to 15 mm across. Minor fracturation is present throughout, with calcite infilling. 37.80 - 37.75 m have major (2 cm wide) calcite filled fracture. <u>52.65 - 53.60 m</u> : Shale Medium light grey, calcareous shale with minor silty bands. <u>53.60 - 62.05 m</u> : Fissile shale with siltstone interbeds. Dark grey calcareous fissile shale with minor 1 - 2 mm calcareous siltstone laminations. Trace biota exist in the initial 2 metres, small shell fragments and crinoid stems, 1 - 2 mm. 57.70 - 59.90 m - zone with open fractures which have calcite infilling. CFA = 40° <u>62.05 - 63.40 m</u> : Sandy sparite. Light grey, medium to coarse grained (25% quartz) sandy sparite contains some centimetric siltstone clasts.			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>63.40 - 79.10 m</u>: Fissile shale.</p> <p>Dark grey calcareous fissile shale.</p> <p>Some minor quartz sandstone units at the top of the unit. 90% of the unit is fissile shale with high biological content - mainly brachiopod fragments up to 4 cm across and some smaller 2 - 3 cm crinoid stems.</p> <p><u>79.10 - 80.25 m</u>: Sandstone.</p> <p>Light grey, medium grained, well sorted calcareous quartz sandstone.</p> <p>80.10 - 80.20 m - breccia with calcareous/silty clasts in a sand matrix.</p> <p><u>80.25 - 85.35 m</u>: Fissile shale.</p> <p>Dark grey fissile shale.</p> <p><u>85.35 - 87.50 m</u>: Interbedded sandy dolomite and siltstone.</p> <p>Light grey fine grained, sandy dolomite - 50% of the core interbedded with medium grey, wispy, silty beds.</p> <p>Open fractures occur some with pyrite lining the fractured edges. CFA = 40°</p> <p><u>87.50 - 90.75 m</u>: Fissile shale.</p> <p>Medium to dark grey, fissile shale.</p> <p>89.40 - 89.80 m - interbedded fine grained, sandy sparite and shale. Boundaries are often deformed by clastic deformation e.g. flame structures, load casts. CBA = 75°</p> <p><u>90.75 - 95.00 m</u>: Sandstone with siltstone laminations.</p> <p>Light grey fine grained quartz sandstone with abundant wispy siltstone laminae. Both the sand and silt are at times intermixed - probably by compaction pressure.</p> <p>2 - 5 mm brachiopods occur throughout at random intervals.</p> <p>Slight fracturation occurs - open fractures. CFA = 45° - trace pyrite in some of the fractures.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>95.00 - 105.30 m</u>: Fissile shale with sandstone interbeds.</p> <p>Dark grey fissile shale with bands of quartz sandstone. The sandstone bands vary in length and are from 96.95 - 95.55 m, 97.50 - 98.14m, 100.10 - 101.80 metres. Sandstone is light grey medium grained with a calcite cement. CBA = 50° - 90°. Galena crystal at 105 metres.</p> <p>C1m C1b₂</p>			
105.30 - 149.90m	<p><u>105.30 - 113.90 m</u>: Sandy dolobiosparite with silt laminations.</p> <p>Medium light grey, medium grained - 15% quartz - sandy dolobiosparite. Silt laminations occur throughout varying from millimetric wispy bands to bands of siltstone 3 cms thick. 112.20 m have a larger 30 cm silt band.</p> <p>The biota are composed primarily - 90% - of crinoid stems - 3 - 5 mm in diameter and some brachiopods - 2 - 4 mm across.</p> <p>Small open and closed fractures are present with some silt infilling and trace pyrite occurs in the fractures. CFA subparallel to core axis and 45°.</p> <p><u>113.90 - 114.50 m</u>: Interformational breccia.</p> <p>Light grey, sandy dolomite and dark grey shale clasts in a medium grey silty matrix.</p> <p>Clasts range from 1 - 4 cm in width and are subangular.</p> <p><u>114.50 - 115.10 m</u>: Sandy dolosparite.</p> <p>Light grey, medium - fine grained sandy (20% quartz)sparite. Unit is broken up with fine wispy silt bands.</p> <p><u>115.10 - 121.82 m</u>: Oxidized sandy dolosparite.</p> <p>As for 114.50 - 115.10 m - here the unit is heavily oxidized.</p> <p>This unit is rubbly and heavily fractured. CFA variable.</p> <p>116.30 - 117.20 m - cavity.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>121.82 - 125.90 m</u>: Sandy dolosparite.</p> <p>Light grey, medium grained, sandy (10% quartz) dolomite.</p> <p>Moderate fracturation is present. CFA = 20° - 25° with oxidized fractured edges. Some silicification along fractured edges.</p> <p>Small crinoids - 1 mm in diameter - and small brachiopods - 3 mm long - occur randomly throughout.</p>			
	<p><u>125.90 - 136.80 m</u>: Oxidized sandy dolosparite.</p> <p>Greyish orange, medium grained, sandy (10% quartz) dolosparite.</p> <p>The unit is slightly vughy - vughs after small 1 - 2 mm crinoid.</p> <p>Two degrees of fracturation occur. The majority of the unit has open fractures CFA = 45° and subparallel to core axis. This part of the core is moderately oxidized mainly along fractured edges. From 130.85 - 133.85 m and 138.50 - 140.05 m two zones with a high degree of fracturation, the core in these sections is a well oxidized rubble.</p>			
	<p><u>136.80 - 138.47 m</u>: Sandy dolosparite.</p> <p>Light grey, medium grained, sandy (10% quartz) dolosparite.</p> <p>Trace crinoid stems and small shell fragments are present as vughs throughout.</p>			
	<p><u>138.47 - 140.35 m</u>: Oxidized sandy dolosparite.</p> <p>As for 136.80 - 138.47 m except here the core is fractured and oxidized. CFA variable though predominantly 45° and subparallel to core axis.</p>			
	<p><u>140.35 - 141.35 m</u>: Dolosparite.</p> <p>Medium light grey, fine grained, less than 1% quartz dolosparite.</p> <p>Trace crinoids 1 mm occur throughout.</p> <p>140.80 m have cubic pyrite in a vugh, also occurs randomly in the matrix.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>141.35 - 144.60 m</u>: Oxidized sandy dolosparite</p> <p>Light greyish yellow, fine grained, sandy (5% quartz) dolomite.</p> <p>Some shale bands - up to 1 cm thick - occur.</p> <p>Abundant vughs exist - usually after biota mainly brachiopods 1 - 2 mm thick and some small crinoids. Some larger (centimetric) brachiopods are present.</p> <p>Small open fractures occur throughout. CFA predominantly subparallel to core axis.</p>			
	<p><u>144.60 - 149.90 m</u>: Sandy calcidolosparite.</p> <p>Light grey, fine grained, sandy (10% quartz) calcidolosparite with minor millimetric, wispy, silty laminae.</p> <p>Voids 1 - 3 cms long, after brachiopods exist randomly throughout. Some larger voids also occur and these have been infilled with calcite.</p>			
149.90 - 261.40m	<p><u>C1b₁</u></p> <p><u>149.90 - 151.05 m</u>: Sandy dolobiosparite with argillaceous bands.</p> <p>Light grey fine grained, sandy (10% quartz) dolobiosparite with 1 - 2 cm argillaceous bands.</p> <p>Biota consist of millimetric crinoid stems and shell fragments. Occasional larger (2 - 3 cm) calcite filled brachiopod casts also occur.</p> <p><u>151.05 - 156.75 m</u>: Interbedded silty dolomite and argillaceous silts.</p> <p>Light brown grey, silty dolomite interbedded with dark grey argillaceous silt bands. The argillaceous bands decrease in frequency and size with depth.</p> <p>Both millimetric crinoid stems and shell fragments occur - mainly in the argillaceous bands.</p> <p>Slight fracturation occurs, generally infilled with calcite. CFA variable.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/t
	<p><u>156.75 - 164.45 m</u>: Silty dolosparite with argillaceous laminae.</p> <p>Light brown grey, silty (5% quartz) dolomite with dark grey argillaceous laminae.</p> <p>160.85 - 162.95 m - portion of highly fractured core with 1 - 2 cm argillaceous bands.</p> <p>The whole unit contains random crinoid stems (1 - 3 mm in diameter) and some shell fragments.</p> <p>The unit has a high degree of fracturation - 158.25 - 160.85 m open fractures infilled with calcite. CFA variable - mainly subparallel to the core axis. 160.85 - 162.95 m abundant small open fractures - rubble core. Fractures here have both argillaceous silt and pyrite infill.</p> <p><u>164.45 - 171.05 m</u>: Silty calcidolomite with argillaceous bands.</p> <p>Light grey, silty (15% quartz) calcidolomite with medium grey, wavy, argillaceous bands. CBA = 85°</p> <p>165.95 - 166.15 m - intraformational breccia. Silty dolomite clasts (0.5 - 2.0 cm) in a dark grey silt matrix.</p> <p>Trace voids after crinoids (1 - 2 mm) and brachiopods (up to 3 cms) exist from 168.00 - 170.10 metres.</p> <p>Small open fractures with calcite and silt infilling occur throughout. CFA variable.</p> <p><u>171.05 - 173.75 m</u>: Oxidized silty dolomite.</p> <p>Dark yellowish orange, silty dolomite.</p> <p>Minor vugs appear after crinoid stems. The unit is highly fractured - open fractures, occasionally with oxidized silt infilling the fractures. CFA variable, mainly 30°.</p> <p><u>173.75 - 175.50 m</u>: Sandy sparite.</p> <p>Light grey, very fine grained, sandy (15% quartz) sparite, slightly pelloidal at the base.</p>			



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permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>173.75 - 175.50 m</u> cont'd:</p> <p>Calcite filled voids - possibly after brachiopods - occur throughout.</p> <p>Minor open fractures are also present, infilled with calcite and some trace pyrite. CFA subparallel to the core axis.</p> <p><u>175.50 - 178.15 m</u>: Oxidized, sandy calcidolosparite.</p> <p>Light brownyellow, fine grained, sandy (10% quartz) slightly calcareous dolosparite.</p> <p>Abundant vughy exist in the unit, these are generally after small crinoids and brachiopods.</p> <p>Open fractures exist throughout with the oxidation being strongest in and arounge fractures. CFA subparallel to core axis and 15°.</p> <p><u>178.15 - 182.85 m</u>: Sandy sparite with argillaceous laminae.</p> <p>Light grey, fine grained, sandy (15% quartz) sparite with wispy argillaceous laminae.</p> <p>Argillaceous laminae are banded around 181.30 - 181.50 metres.</p> <p>Voids exist after brachiopods, some being infilled with calcite.</p> <p>Slight calcite filled fracturation exists throughout. CFA subparallel to core axis.</p> <p><u>182.85 - 185.50 m</u>: Oxidized silty dolosparite.</p> <p>Light brown yellow, very fine grained, silty (15% quartz) dolosparite with occasional wispy silty argillaceous laminae.</p> <p>Vughs after crinoids occur throughout.</p> <p>Open fractures. CFA subparallel to the core axis, some calcite infilling of fractures.</p> <p><u>185.50 - 193.75 m</u>: Silty dolomite with argillaceous laminae.</p> <p>Light grey, fine grained, silty (10% quartz) dolomite with bands of wispy argillaceous laminae.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>185.50 - 193.75 m cont'd:</u></p> <p>Abundant vughs occur - after dissolution of carbonate.</p> <p>Minor trace crinoids (1 - 2 mm diameter) occur throughout.</p> <p>192.55 - 193.30 m - intraformational mud supported breccia - silty dolomite in a dark grey argillaceous silt.</p> <p><u>193.75 - 194.15 m:</u> Fractured silty dolomite.</p> <p>Light grey, silty (15% quartz) dolomite.</p> <p>Unit is heavily fractured. CFA subparallel to core axis. Oxidation occurs along the fractured edges.</p> <p><u>194.15 - 197.25 m:</u> Vughy, silty calcidolomite with argillaceous laminae.</p> <p>Light grey, fine grained, vughy, silty (5 - 10% quartz) calcidolomite with wispy argillaceous laminae.</p> <p>The vughs are after dissolved calcite.</p> <p>Random trace biota - millimetric crinoids are present throughout.</p> <p>Some open fractures, infilled with calcite are present. CFA = 40°</p> <p><u>197.25 - 202.75 m:</u> Oxidized vughy, silty dolomite.</p> <p>Light brown yellow, vughy, silty (10% quartz) dolomite with light brown argillaceous laminae.</p> <p>Vughs are after dissolved carbonate.</p> <p>A high degree of fracturation occurs, CFA subparallel to the core axis.</p> <p><u>202.75 - 207.20 m:</u> Silty dolomite with argillaceous laminae.</p> <p>Medium light grey, fine grained, silty (10% quartz) dolomite with medium dark grey, wispy argillaceous laminae.</p> <p>Voids after brachiopods and crinoids occur throughout.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>207.20 - 221.85 m</u>: Oxidized, vughy, silty dolomite.</p> <p>Light brownish yellow, vughy, fine grained, silty (10% quartz) dolomite. Trace wispy laminae occur in the upper part of the unit.</p> <p>Vughs are primarily after dissolution of carbonate, and secondarily after small (1 cm) brachiopods and crinoids.</p> <p>Fracturation is present over most of the unit with the main zone being from 214.20 - 218.50 metres - the oxidation is also greater here. CFA subparallel to core axis.</p> <p><u>221.85 - 227.10 m</u>: Interbedded oxidized and unoxidized silty dolomite with argillaceous laminae.</p> <p>The unoxidized zones occur from 222.40 - 222.50 m, 222.90 - 223.20 m, 223.40 - 223.60 m, 224.10 - 224.77 metres.</p> <p>Vughs after dissolved carbonate occur randomly throughout, also trace amount of vughs after small brachiopods and crinoids (1 - 2 mm).</p> <p>Slight fracturation occurs - open fractures, CFA subparallel to core axis and 30°.</p> <p><u>227.10 - 238.10 m</u>: Silty dolosparite with silty laminae.</p> <p>Light grey, fine grained silty (10% quartz) dolosparite with argillaceous laminae. The laminae are of varying thickness, mainly millimetric, from 231.00 - 231.55 m have bands of argillaceous silt up to 5 cms thick.</p> <p>Trace voids after biota occur randomly throughout.</p> <p>Slight fracturation is also present, closed fractures. CFA variable.</p> <p><u>238.10 - 240.10 m</u>: Oxidized silty dolomite.</p> <p>Light brown, fine grained, silty (15% quartz) dolomite with minor wispy, argillaceous laminae. CBA = 90°</p> <p>Open fracturation occurs throughout with the majority of the oxidation being around the fractures. CFA subparallel to core axis.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>240.10 - 243.98 m</u>: Silty dolomite with argillaceous bands.</p> <p>Light grey, fine grained, silty dolomite with bands of silty dolomite with wispy, argillaceous laminae and thinner argillaceous bands. CBA = 90°</p> <p>Minor open fractures - CFA subparallel to core axis.</p> <p><u>243.98 - 245.50 m</u>: Oxidized silty dolomite with argillaceous laminae.</p> <p>Light brown, silty dolomite with reddy brown argillaceous laminae.</p> <p>Voids after brachiopods at 245.10 - 245.20 m.</p> <p>Vughs after dissolved carbonate exists throughout.</p> <p>Open fractures are present for all the unit. CFA = 25°</p> <p><u>245.50 - 246.20 m</u>: Silty dolomite with argillaceous laminae.</p> <p>Light grey, silty dolomite with wispy, argillaceous laminae - CBA = 90°</p> <p>The laminae are occasionally deformed by soft sediment compaction i.e. small load casts.</p> <p><u>246.20 - 250.20 m</u>: Intraformational breccia.</p> <p>Light grey, fine grained, silty (15% quartz) dolomite in a dark grey, argillaceous, silt cement. Clasts are sub-angular and make up 90% of the unit ranging in size from 2 - 10 cms.</p> <p>249.10 metres have a calcite filled fracture CFA = 30°</p> <p><u>250.20 - 253.10 m</u>: Oxidized silty dolomite with argillaceous laminae.</p> <p>Light brown, fine grained, silty (10% quartz) dolomite with occasional reddy brown, wispy laminae.</p> <p>Fracturation occurs from 250.55 - 250.85 metres. CFA = 45°</p> <p>Some random vughs after small (2mm) brachiopods occur.</p>			



hole no. NBO 1003	location 8309000N 0528000E	drillers INTAIRDRIIL-FOXMOBILE
permit N.T. MINERAL CLAIMS	azimuth -	duration 30/8/81 - 6/9/81
state NORTHERN TERRITORY	declination VERTICAL	logged by G. PITHERS

depth	description	Pb %	Zn %	Ag gr/T
	<p><u>253.10 - 256.92 m</u>: Silty dolomite with argillaceous laminae.</p> <p>Light grey, fine grained, silty dolomite with bands of silty dolomite with argillaceous laminae - CBA = 85°</p> <p>Fossils are confined to trace brachiopods.</p> <p>A few vughy bands occur randomly in the unit.</p> <p><u>276.92 - 260.27 m</u>: Oxidized silty dolomite.</p> <p>Same as 253.10 - 256.92 metres only oxidized.</p> <p>This unit also is broken up by open fractures. CFA subparallel to core axis.</p> <p><u>260.27 - 261.40 m</u>: Sandy calcidolosparite.</p> <p>Olive grey, fine grained, sandy (5% quartz) slightly calcareous dolosparite.</p> <p>The unit is heavily fractured, (appearing as rubble) CFA subparallel to the core axis.</p> <p><u>END OF HOLE</u> T.D. 261.40 metres</p>			

CORE RECOVERY - NBO 1003

<u>DEPTH (METERS)</u>	<u>METERAGE</u>	<u>PERCENTAGE</u>	<u>+ OR -</u>
32.00 - 32.30	0.40	100	+0.10
32.30 - 32.80	0.50	100	-
32.80 - 35.80	2.80	93	-0.20
35.80 - 38.85	3.25	100	+0.20
38.85 - 41.90	3.00	98	-0.05
41.90 - 44.95	2.96	97	-0.09
44.95 - 48.00	3.05	100	-
48.00 - 51.05	3.04	99	-0.01
51.05 - 53.65	2.70	100	+0.10
53.65 - 56.70	3.00	98	-0.05
56.70 - 59.40	2.74	100	+0.04
59.40 - 62.40	3.13	100	+0.13
62.40 - 65.40	2.93	98	-0.07
65.40 - 66.90	1.90	100	+0.40
66.90 - 69.30	1.94	81	-0.36
69.30 - 72.30	3.10	100	+0.10
72.30 - 75.30	3.10	100	+0.10
75.30 - 78.10	2.77	99	-0.03
78.10 - 81.15	3.10	100	+0.05
81.15 - 84.20	3.05	100	-
84.20 - 85.25	0.95	90	-0.10
85.25 - 87.60	2.46	100	+0.11
87.60 - 90.30	2.70	100	-
90.30 - 91.95	1.60	97	-0.05 *
91.95 - 95.00	2.57	84	-0.48
95.00 - 96.00	1.00	100	-
96.00 - 98.00	1.80	90	-0.20 *
98.00 - 99.10	1.32	100	+0.12
99.10 - 101.80	2.20	81	-0.50 *
101.80 - 102.30	0.40	80	-0.10 *
102.30 - 103.10	1.12	100	+0.32 *
103.10 - 104.90	1.28	71	-0.52 *
104.90 - 108.30	2.90	85	-0.50 *
108.30 - 111.30	1.40	47	-1.60 *
111.30 - 113.90	2.50	96	-0.10 *

Core Recovery NBO 1003 cont'd:

<u>DEPTH (METERS)</u>	<u>METERAGE</u>	<u>PERCENTAGE</u>	<u>+ OR -</u>
113.90 - 116.20	1.90	83	-0.40 *
116.20 - 116.30	1.30	100	+0.20 *
116.30 - 117.20	0-cavity		
117.20 - 119.05	1.55	84	-0.30 *
119.05 - 120.85	1.55	86	-0.25 *
120.85 - 122.30	1.33	92	-0.12 *
122.30 - 122.80	0.50	100	-
122.80 - 123.30	0.48	96	-0.02
123.30 - 124.85	1.03	66	-0.52
124.85 - 125.10	0.22	88	-0.03 *
125.10 - 125.55	0.22	48	-0.23 *
125.55 - 125.90	0.25	55	-0.20 *
125.90 - 126.65	0.50	71	-0.20 *
126.65 - 127.00	0.16	39	-0.25 *
127.00 - 129.25	2.26	100	+0.01 *
129.25 - 130.85	1.70	100	+0.10 *
130.85 - 131.35	0.20	40	-0.30 *
131.35 - 132.25	0.82	91	-0.08 *
132.25 - 133.85	1.36	85	-0.24 *
133.85 - 135.95	2.33	100	+0.23 *
135.95 - 136.95	1.60	100	+0.60 *
136.95 - 139.35	2.84	100	+0.40 *
139.35 - 140.35	1.47	100	+0.47 *
140.35 - 143.40	3.21	100	+0.16
143.40 - 146.80	3.22	95	-0.18
146.80 - 149.90	3.14	100	+0.04
149.90 - 152.95	3.05	100	-
152.95 - 153.95	0.51	51	-0.49
153.95 - 156.95	2.50	83	-0.50
156.95 - 159.95	3.07	100	+0.07
159.95 - 161.50	1.76	100	+0.21
161.50 - 162.95	1.60	100	+0.15
162.95 - 165.95	3.03	100	+0.03
165.95 - 169.00	3.10	100	+0.05
169.00 - 172.05	3.16	100	+0.11 *

Core Recovery - NBO 1003 cont'd:

<u>DEPTH (METERS)</u>	<u>METERAGE</u>	<u>PERCENTAGE</u>	<u>+ OR -</u>
172.05 - 173.75	2.00	100	+0.30 *
173.75 - 174.35	0.30	50	-0.30 *
174.35 - 177.40	3.12	100	+0.07
177.40 - 180.35	3.06	100	+0.11
180.35 - 183.45	3.50	100	+0.40 *
183.45 - 186.55	2.13	69	-0.97
186.55 - 189.60	3.24	100	+0.19
189.60 - 192.70	3.05	98	-0.05
192.70 - 194.15	2.53	100	+0.08 *
194.15 - 197.25	3.10	100	-
197.25 - 200.35	3.32	100	+0.12 *
200.35 - 201.25	1.00	100	+0.10 *
201.25 - 203.25	2.20	100	+0.20 *
203.25 - 206.25	2.96	98	-0.04 *
206.25 - 208.20	1.75	90	-0.20 *
208.20 - 209.30	1.20	100	+0.10
209.30 - 209.70	0.50	100	+0.10
209.70 - 212.70	3.00	100	-
212.70 - 215.30	2.28	87	-0.32
215.30 - 218.40	3.30	100	+0.20
218.40 - 219.70	1.30	100	- *
219.70 - 221.20	1.60	100	+0.10 *
221.20 - 224.30	3.15	100	+0.05
224.30 - 226.20	1.70	89	-0.20 *
226.20 - 228.20	2.06	100	+0.06
228.20 - 231.20	2.94	98	-0.06
231.20 - 233.60	2.40	100	-
233.60 - 236.70	3.07	99	-0.03
236.70 - 239.80	3.16	100	+0.06
239.80 - 242.10	2.30	100	-
242.10 - 245.20	2.98	96	-0.12
245.20 - 248.20	3.23	100	+0.23
248.20 - 251.10	3.10	100	+0.20
251.10 - 254.10	2.19	73	-0.81
254.10 - 257.10	2.94	98	-0.06
257.10 - 259.40	2.30	100	-

Core Recovery - NBO 1003 cont'd:

<u>DEPTH (METERS)</u>	<u>METERAGE</u>	<u>PERCENTAGE</u>	<u>+ OR -</u>
259.40 - 260.20	1.00	100	+0.20
260.20 - 260.50	0.20	66	-0.10
260.50 - 261.00	0.28	56	-0.22
261.00 - 261.40	0.25	62	-0.15

261.40 METRES T.D.

*Denotes rubbly or heavily fractured core.

NBO 1003 - ASSAYS

<u>Depth (m)</u>	<u>Pb (ppm)</u>	<u>Zn (ppm)</u>	<u>Ag (ppm)</u>
103.10 - 103.90	65	0.16%	-
103.90 - 104.90	60	0.24 %	-
104.90 - 105.90	370	0.21 %	-
105.90 - 107.00	125	0.20 %	-

* Denotes value from re-assay

- Denotes not assayed

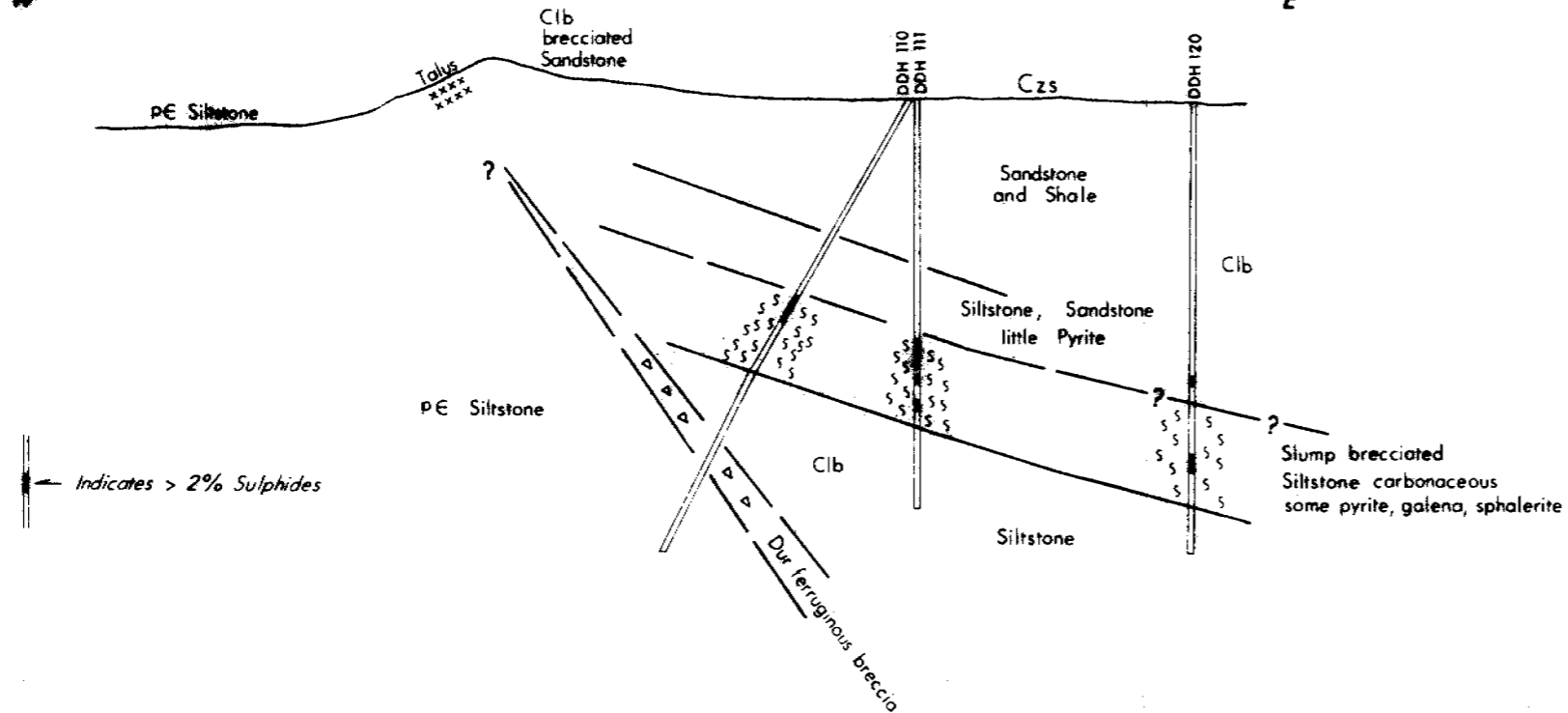
Analysts - Australian Laboratory Services, Brisbane.
Initial assay by Method 1 - perchloric acid digestion, A.A.S. determination.
Re-assay by Method 101-B - aqua-regia digestion. A.A.S. determination.

APPENDIX II

Appendix II Composite Drill Log - NBO 1003 (1:350)

W

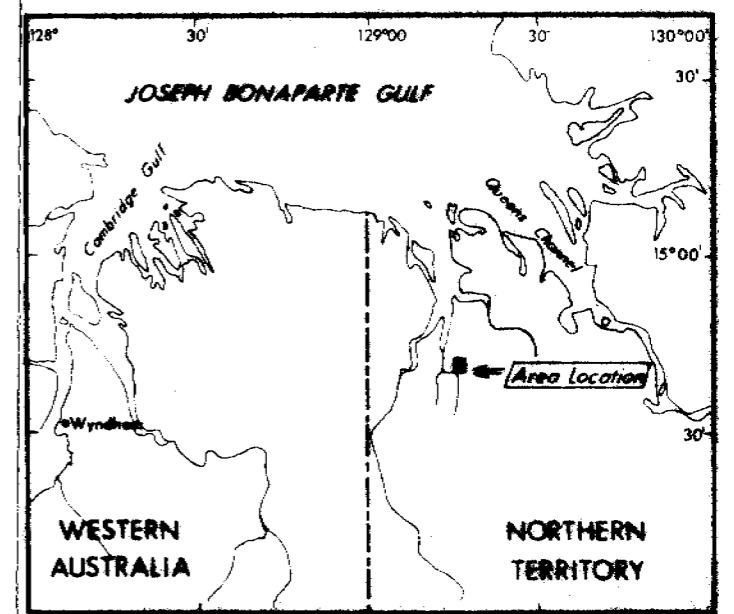
E



← Indicates > 2% Sulphides

ASSAY DATA

- DDH. 110 — 60.0-64.0m 4.4% Pb, 1.88% Zn, 27gm/t Ag
- D.D.H. 111 — 64.0-68.5m 1.8% Pb, 0.62% Zn, No Silver Assays
(Includes interval 64.0-67.0 assaying 2.54% Pb)
- DDH 120 — Not assayed - pyrite, galena and sphalerite recorded
in log from 74-100 metres



AQUITAINE - MIMETS - ST JOE

**Bonaparte Gulf Basin
NORTHERN TERRITORY**

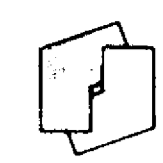
EAST-WEST DRILL HOLE SECTION

**'BETA PROSPECT'
Ochre Mine Region**

SCALE 1:2000



*N.B. Section modified after Ramdohr 1973



AQUITAINE AUSTRALIA MINERALS Pty. Ltd.
 MINIMETS EXPLORATION Pty. Ltd.
 ST JOE BONAPARTE Pty. Ltd.

BONAPARTE GULF BASIN

WINCHROPE - OCHRE MINE - NORTHERN TERRITORY

INTERPRETATIVE BEDROCK GEOLOGY

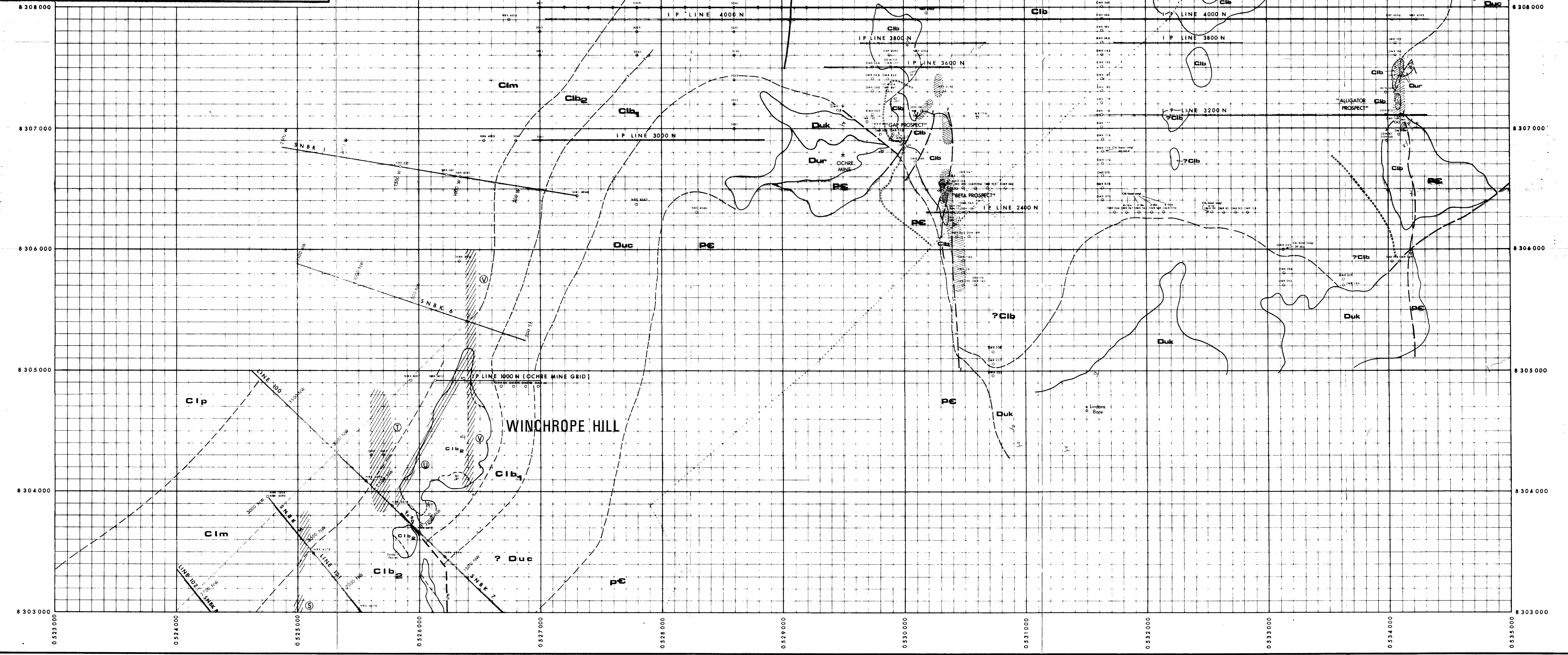
OVERBURDEN COVER REMOVED

Scale 1:10000

author: B. Guy / M. Rowley date: March 1982 dfg. n: 20345
 drafted: A. Spoonhose report n: MG 1141 base plan: 18545 **PI 1**

LEGEND

UPPER CARBONIFEROUS	Sander Creek Formation	Cib	Sandstone & Conglomerate	Outcrop boundary
	Point Spring Sandstone	Cip	Quartz Sandstone	Interpreted Geological Contact
LOWER CARBONIFEROUS	Millington Beds	Cim	Silty Shale, Calcarenite Quartz Sandstone	Faults
	Burr Range Formation	Cib ₁	Sandy Calcarenite	Strike and angle of dip
		Cib ₂	Silty Member	Drill hole location
UPPER DEVONIAN	Buttons Beds	Duc	Quartz Sandstone, Dolomite	Chargeability anomaly
	Kallias Knob Sandstone	Duk	Quartz Sandstone	Structural high
CAMBRIAN	Winnamatta Formation	Cib ₃	Sandy Calcarenite	Outcropping boundary No/No interpretation
PROTEROZOIC	Undifferentiated	PE		



CR 101/102

FORACOR **GARMA RAY LOG** 1:250

AAM - MIMETS - ST JOE

BONAPARTE GULF BASIN N.T.

OCHRE MINE

NBO 1003

NATIONAL GRID 8309000 4
6628000 4

APPROXIMATE COORDINATES

Final depth 261.40 m

Azimuth -

Declination Vertical

Elevation -

Date Completed 6.9.81

Logged by G. Pithers

Cored interval 32.00 - 261.40 metres

DEPTH (m)	DESCRIPTION	Pb%			Zn%		
		S0	S1	S2	S0	S1	S2
0 - 24	Overburden						
24 - 55	Shale. Dark grey, calcareous, fissile shale.						
55 - 56	★▽ Fissile shale with siltstone interbeds. × CFA = 40°						
56 - 64	× Sandy sparite. Shale Dark grey, calcareous, fissile shale.						
64 - 74	★ Sandstone. Shale.						
74 - 80	★ Interbedded sandy dolomite and siltstone. Shale.						
80 - 85	★ Sandstone with siltstone laminations. × CFA = 45°						
85 - 90	× Fissile shale with sandstone interbeds. CBA = 50° - 90°.						
90 - 105	★▽ Sandy dolobiosparite with silt laminations. ★ CFA = 0° - 45°						
105 - 110	★ ◇◇◇ Intraformational breccia. Sandy dolosparite. Oxidized sandy dolosparite.						
110 - 120	★ Sandy dolosparite. × CFA = 20°						
120 - 130	★ Oxidized sandy dolosparite. × ××						
130 - 140	★ Sandy dolosparite. Oxidized sandy dolosparite.						
140 - 145	★ Dolosparite. Oxidized sandy dolosparite. ▽ CFA subparallel to core axis.						
145 - 150	▽ Sandy calcidolosparite.						
150 - 155	★ Sand biodolosparite. ★▽ Interbedded silty dolomite and argillaceous silts. ★▽ CFA variable.						
155 - 160	★ Silty dolosparite with argillaceous laminae. ×× CFA variable.						
160 - 165	★▽ ×× ★						
165 - 170	★ Silty calcidolomite with argillaceous bands. × CFA = 85° × CFA variable.						
170 - 175	★▽ Oxidized silty dolomite. × CFA = 30°						
175 - 180	▽ Sandy sparite. × CFA variable. Oxidized sandy calcidolosparite.						
180 - 185	★ Sandy sparite with argillaceous laminae. ▽ Oxidized silty dolosparite. ★ CFA subparallel to core axis.						
185 - 190	★ Silty dolomite with argillaceous laminae.						
190 - 195	★ ◇◇ Intraformation mud supported breccia. ★ Vughy, silty calcidolomite with argillaceous laminae. CFA = 40°.						
195 - 200	★ Silty dolomite with argillaceous laminae.						
200 - 205	★ Silty dolomite with argillaceous laminae. ★▽						
205 - 210	★ Oxidized, vughy, silty dolomite. ▽ × ×						
210 - 215	★ ××× CFA subparallel to core axis. ×××						
215 - 220	★ ▽ ×						
220 - 225	★ Interbedded oxidized and unoxidized silty dolomite with argillaceous laminae.						
225 - 230	★ Silty dolosparite with silty laminae. ★▽						
230 - 235	★ Argillaceous bands. ★▽						
235 - 240	★ Oxidized silty dolomite. CBA = 90° Silty dolomite with argillaceous bands.						
240 - 245	★ Oxidized silty dolomite with argillaceous laminae. Silty dolomite with argillaceous laminae. ◇◇ argillaceous laminae.						
245 - 250	◇◇ Intraformational breccia. ◇◇ Oxidized silty dolomite with argillaceous laminae.						
250 - 255	★ Silty dolomite with argillaceous laminae.						
255 - 260	★ Oxidized. Sandy calcidolosparite.						

End of Hole 261.40 m