APPENDIX 7

AIRBORNE EM SPECIFICATIONS

GEOTEM®

GEOTEM® (GEOTERREX TRANSIENT ELECTROMAGNETIC SYSTEM)

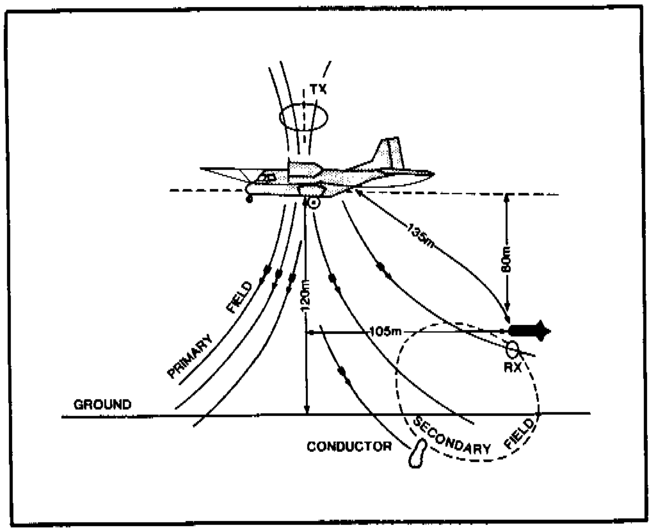
GEOTEM®

GEOTEM is a **digital time domain electromagnetic system** offered by GEOTERREX and CGG to the exploration community. GEOTEM is the product of years of experience in time domain electromagnetic acquisition, processing and interpretation and our dedication to continuing research in this field.

TRANSMITTER LOOP ON CASA AIRCRAFT

The transmitted primary field is discontinuous with each pulse lasting about one millisecond followed by a two millisecond "off-time". Present peak current through the loop is 600A resulting in a primary dipole moment of 4.5 x 10^5Am^2.

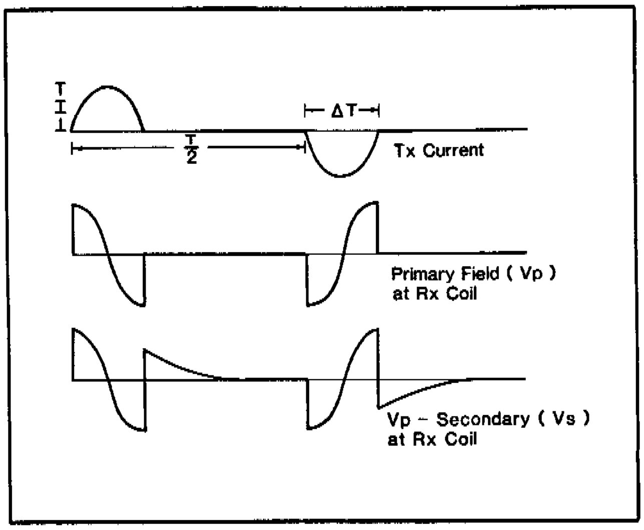
The receiver incorporates a coil with a ferrite core mounted in a "bird" towed on a 135 metre cable. The cable is demagnetized to reduce noise levels.



SYSTEM GEOMETRY

The GEOTEM system is installed in a CASA C212-200 twin turbo prop STOL aircraft whose extraordinary climb and descent capabilities enable it to be employed in areas which previously would have excluded a fixed wing platform.

GEOTEM is a towed bird electromagnetic system incorporating a high speed digital EM receiver. The EM primary field is created by current pulses fed into a three turn, low impedance transmitting loop surrounding the aircraft and attached at the nose, wing tips and tail.



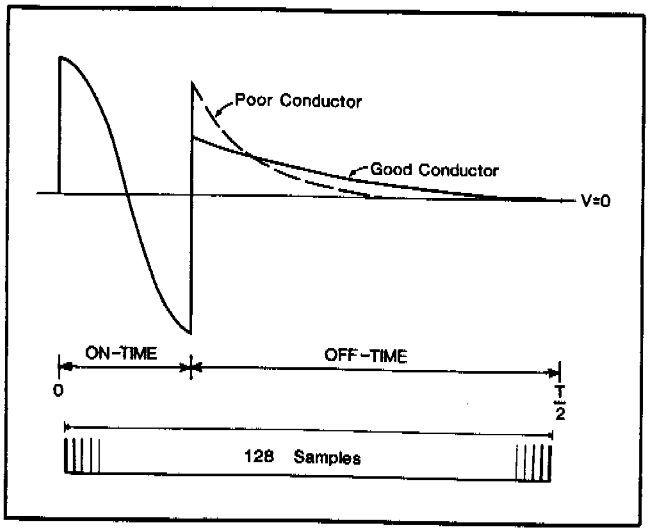
GEOTEM WAVE FORM

The mean terrain clearance of the aircraft is 120 metres with the bird situated 80 metres below and 105 metres behind the aircraft.

The basis of transient EM prospecting relies on the premise that changes in the primary field produced in the transmitter loop will result in eddy currents being generated in any conductive material in the ground. The eddy currents then decay to produce a secondary electromagnetic field which may be sensed as a voltage in the receiver coil.

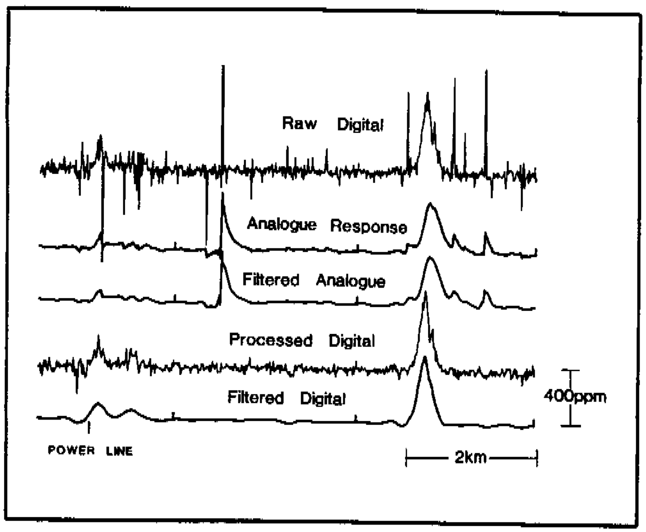
GEOTERREX TRANSIENT ELECTROMAGNETIC SYSTEM

The receiver digitizes each half period into 128 digital samples which are binned into 20 time gates whose centres and widths are **software selectable** and may be positioned anywhere inside or outside of the transmitter pulse. The sampling scheme is inverted every half-cycle to ensure a consistent polarity for subsequent stacking. Stacking is carried out to produce several operator defined stacked transients per second.



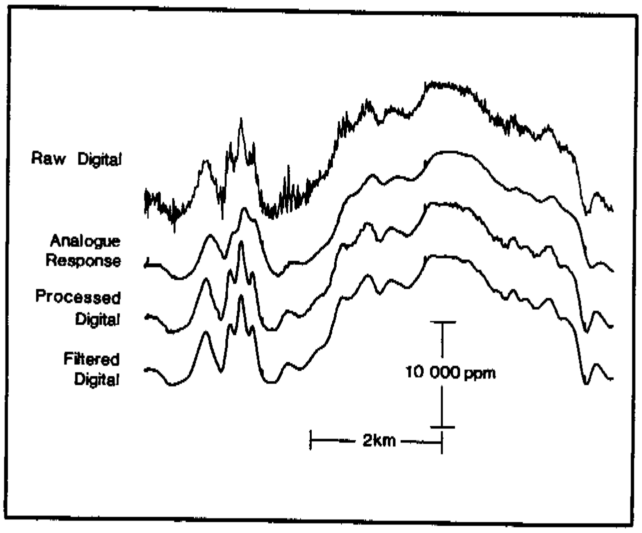
SAMPLING

In the diagram on the right, a typical analogue system response is seen to attenuate anomalous peak amplitudes resulting in poor resolution of multiple conductors. The processed digital trace shows the digital data after processing to remove system noise. The last trace represents the digital data after filtering of external noise. Note the dramatic **increase in resolution** of the multiple conductors as compared with the analogue response.



NOISE REJECTION

The nature of digital data is fundamentally different from that obtained from analogue receivers. In analogue systems the incoming signal is continuously smoothed, noise is not distinguished from signal, and the smoothing process merely serves to spread out the noise. At the same time, signal from geological sources is attenuated and spatial resolution suffers. Digital samples, however, are recorded independently of one another. This process **preserves the fidelity** of both the signal and the noise. Computer processing is then used to separate the signal and noise components.

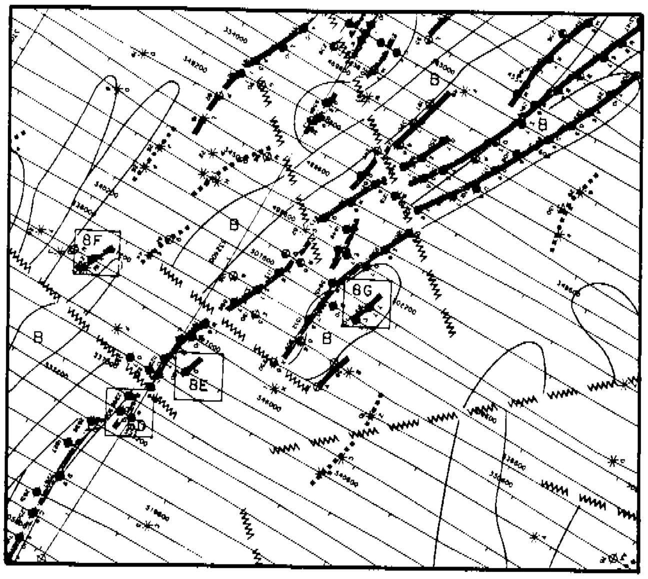


RESOLUTION

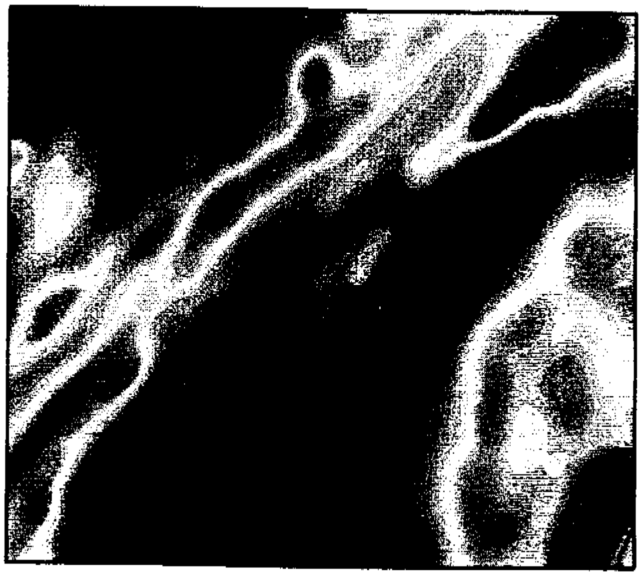
Another advantage of a digital system is the ability to **reject noise** during the processing phase. On the left, the first trace contains a large component of spheric noise as evidenced by the numerous spikes. The analogue trace has clearly reduced the low amplitude "hash" but it has also created false anomalies out of the large spikes while attenuating the only real anomaly on the line. Subsequent smoothing further attenuates the real anomaly while making false anomalies look more real. With digital data the spherics may be removed to produce the fourth trace. Spectral analysis of the data set in the frequency domain then permits the design of a valid filtering process to limit high frequence noise.

GEOTEM®

To take advantage of the improved data quality available with GEOTEM, Geoterrex has developed a suite of **software algorithms** designed to recover and present more information than has ever been possible with airborne transient EM. In addition to the standard EM anomaly map style of presentation, digital data is amenable to evaluation in the decay domain, signal enhancement and a wide variety of filtering techniques to isolate those parameters of a particular data set which best differentiate between targets and background responses. A few typical products are shown below.

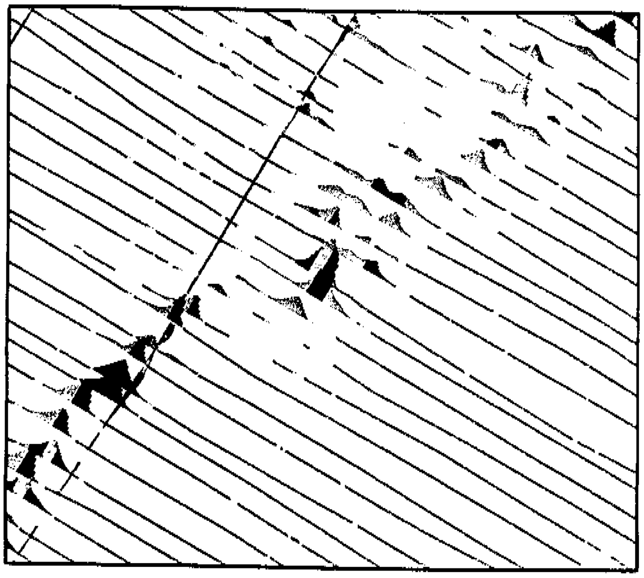


GEOTEM INTERPRETATION MAP



HIGH RESOLUTION AEROMAGNETIC MAP

DECAY CONTOUR MAP



DECAY AMPLITUDE PROFILES

GEOTEM®

FEATURES:

DIGITAL RECEIVER — State-of-the-art hi speed digital receiver.

ENHANCED RESOLUTION — significantly mor resolution, for multiple and short strike lengt conductors.

INCREASED SIGNAL-TO-NOISE RATIO

DEEP PENETRATION — over twice the depth o penetration of helicopter frequency domain systems.

MODERN NAVIGATION AIDS — for tight lin spacing and accurate ground positioning.

CESIUM VAPOUR MAGNETOMETER — bett magnetic data than previously available with an airborne EM system.

MULTI METHOD PLATFORM — Casa C-21 STOL aircraft can carry a large volume spectrometer in addition to GEOTEM and a magnetometer.

GMAPS — a complete suite of processing software for EM, magnetics and radiometrics.

EXPERIENCE — we have flown, processed and interpreted more than 1,500,000 kms continuous since 1966.

APPLICATIONS:

* Massive sulphide base metals * Precious metals
* Kimberlites * Paleochannels * Uran
* Geothermal * Geological mapping *
* Groundwater

APPENDIX 8

1992 DRILL LOGS AND ASSAYS

CR92/643D

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP8
Page No. 1 of 3

E.L. 6808 **Prospect** 'LORELLA' **Drilling Type** RC PERCUSSION
Co-ordinates 602712 **mE** 8278977 **mN** **R.L.** 1025m
Inclination -90° **Azimuth** - **Start Date** 18-8-92 **Finish Date** 19-8-92
Driller GADEN DRILLING **Logged By** DCK **Total Depth** 100m

Log	Depth	Description	Sample No.
	0-1m	BROWN-YELLOW QUARTZ SAND WITH 2% LATERITE AND 10% WHITE CLAY	
	1-2m	WHITE-YELLOW QUARTZ CLAY (DECOMPOSED SANDSTONE ?)	
	2-3m	AS 1-2m WITH 5% CLEAR QUARTZ, 10% RED-BROWN LATERITE AND 5% WHITE QUARTZ SANDSTONE	
	3-7m	WHITE-GREY QUARTZ CLAY (DECOMPOSED SANDSTONE?) WITH 35% RED-ORANGE-WHITE QUARTZ SANDSTONE AFTER 5m	
	7-10m	BROWN-ORANGE CLAY WITH 30% RED-ORANGE-WHITE QUARTZ SANDSTONE, 5% CLEAR QUARTZ AND 5% LATERITE	
	10-12m	AS 7-10m BUT 60% RED-ORANGE-WHITE QUARTZ SANDSTONE	
	12-15m	AS 7-10m BUT <10% RED-ORANGE-WHITE QUARTZ SANDSTONE WITH 5-10% LATERITE	
	15-20m	BROWN-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE ?) WITH TRACE CLEAR QUARTZ AND LATERITE.	
	20-22m	AS 15-20m WITH 5% WHITE QUARTZ SANDSTONE, 5% LATERITE AND TRACE CLEAR QUARTZ	
	22-24m	90% YELLOW-BROWN-WHITE QUARTZ CLAY WITH 10% WHITE QUARTZ SANDSTONE + TRACE LATERITE.	
	24-26m	WHITE TO RED QUARTZ SANDSTONE WITH 25% WHITE CLAY *WATER*	
	26-28m	AS 24-26m WITH 30% WHITE SILTSTONE	
	28-31m	WHITE-RED DOLOSILTSTONE WITH 20% WHITE CLAY AND 2% WHITE QUARTZ SANDSTONE WITH SMALL LITHIC(?) FRAGMENTS.	
	31-33m	RED-ORANGE DOLOSILTSTONE WITH 5% WHITE DOLO-SILTSTONE WITH GREEN SOLUTION ALTERATION	

Notes : COMPOSITE SAMPLES EVERY 2m WATER AT 24m
DRILLERS COMMENTS: GROUND SLIGHTLY BROKEN

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Percussion Drill Log

Hole No. LP8
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Log	Depth	Description	Sample No.
		PATCHES AND BLACK CHERT NODULES AND 5% WHITE QUARTZ SANDSTONE WITH LITHIC (?) FRAGMENTS	
	33-34m	AS 31-33m BUT 20% BLACK CHERT NODULES	
	34-40m	WHITE, RED AND ORANGE DOLOSILTSTONE WITH 10% CLEAR QUARTZ	
	40-42m	AS 34-40m WITH 5% WHITE DOLOSILTSTONE WITH CHERT NODULES	
	42-44m	AS 34-40m	
	44-46m	AS 34-40m WITH 5% WHITE DOLOSILTSTONE WITH CHERT NODULES	
	46-53m	AS 34-40m. AT 49-50m >1% CHALCEDONY	
	53-54m	AS 34-40m WITH 5% WHITE DOLOSILTSTONE WITH CHERT NODULES AND 1% CHALCEDONY WITH PYRITE PSEUDOMORPHS	
	54-57m	AS 34-40m	
	57-58m	WHITE DOLOSILTSTONE WITH 30% CHERT NODULES	
	58-87m	AS 34-40m.	
		AT 60-61m - 25% GRITY CLAY ALTERED QUARTZ SANDSTONE (DOLARENITE?)	
		,62-63m - 20% CHERT NODULES	
		,67-68m - >1% CHALCEDONY	
		;72-74m - 5% BLACK CHERTY FRAGMENTS AND >1% CHALCEDONY	
		;79-81m - 30% BROWN QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
		;84-85m - AS 79-81m	
	87-89m	AS 34-40m WITH 20% LIGHT-GREEN GREY DOLOSILTSTONE	
	89-90m	AS 34-40m	
	90-91m	AS 34-40m WITH 35% BROWN QUARTZ CLAY (DECOMPOSED SANDSTONE)	
	91-96m	AS 87-89m. AT 95-96m 20% BROWN QUARTZ SANDSTONE	
	96-97m	AS 34-40m	
	97-99m	AS 34-40m WITH 20% WHITE QUARTZ SANDSTONE	

Notes :

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Percussion Drill Log

Hole No. LP8
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Log	Depth	Description	Sample No.
		AND 5% LIGHT GREEN-GREY DOLOSILTSTONE.	
	99-100m	AS 34-40m WITH 40% LIGHT GREEN-GREY	
	EOH	DOLOSILTSTONE.	

Notes :

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP9
Page No. 1 of 2

E.L. 6808 **Prospect** 'LORELLA' **Drilling Type** RC PERCUSSION
Co-ordinates 602750 **mE** 8278479 **mN** **R.L.** 1025m
Inclination -90° **Azimuth** - **Start Date** 19-892 **Finish Date** 20-8-92
Driller GADEN DRILLING **Logged By** DCK **Total Depth** 100m

Log	Depth	Description	Sample No.
	0-2m	QUARTZ SAND, BROWN-GREY CLAY AND 15% FERRUGINOUS QUARTZ SANDSTONE.	
	2-3m	ORANGE-WHITE CLAY WITH TRACE CLEAR QUARTZ AND FERRUGINOUS QUARTZ SANDSTONE	
	3-4m	FERRUGINOUS QUARTZ SANDSTONE + 20% ORANGE-WHITE QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
	4-12m	ORANGE-WHITE QUARTZ CLAY (DECOMPOSED SANDSTONE?) WITH 10% FERRUGINOUS QUARTZ SANDSTONE.	
	12-14m	AS 4-12m BUT NO SANDSTONE	
	14-20m	AS 4-12m BUT NO SANDSTONE, HAS 10-20% ORANGE-RED SILTSTONE.	
	20-23m	GREY-WHITE DOLO(?) SILTSTONE WITH MnO2 VEINLETS AND 10% BROWN QUARTZ CLAY ALTERED SANDSTONE.	
	23-26m	AS 20-23m BUT 40% BROWN QUARTZ CLAY ALTERED SANDSTONE *WATER AT 24m*	
	26-27m	GREEN-WHITE QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
	27-31m	WHITE CLAY ALTERED QUARTZ SANDSTONE WITH 2% BROWN DOLO(?) SILTSTONE	
	31-36m	WHITE CLAY WITH 5% BROWN-RED DOLOSILTSTONE	
	36-39m	AS 31-36m BUT 30% BROWN-RED DOLOSILTSTONE AT 36-37m POSSIBLE PSEUDOMORPHS AFTER PYRITE IN DOLOSILTSTONE	
	39-41m	RED, WHITE AND ORANGE DOLOSILTSTONE	
	41-43m	AS 39-41m WITH 65% GREEN DOLOSILTSTONE	
	43-47m	AS 34-41m	
	47-49m	AS 39-41m WITH 50% BROWN CLAY	
	49-63m	LIME GREEN CLAY ALTERED DOLOSILTSTONE WITH	

Notes : COMPOSITE SAMPLES EVERY 2m

WATER AT 24m

DRILLERS COMMENTS, GROUND SLIGHTLY BROKEN

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Percussion Drill Log

Hole No. LP9
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Log	Depth	Description	Sample No.
		2% CHALCEDONY AND 10% RED-WHITE DOLOSILTSTONE	
		AT: 56-57m - 2% WHITE CLAY	
		60-61m - 2% WHITE CLAY ALTERED DOLO-	
		SILTSTONE WITH CHERT NODULES.	
	63-65m	AS 49-63m BUT WITH 20% WHITE-RED	
		DOLOSILTSTONE.	
	65-70m	AS 49-63m	
	70-92m	WHITE, GREEN, RED, BROWN AND ORANGE DOLO-	
		SILTSTONE	
	92-93m	AS 70-92m WITH 5% BLUE-GREY DOLOSILTSTONE	
	93-94m	AS 70-92m WITH 50% BLUE-GREY DOLOSILTSTONE	
	94-96m	AS 70-92m WITH 70% BLUE-GREY DOLOSILTSTONE	
	96-100m	BLUE-GREY DOLOSILTSTONE WITH MINOR WHITE-	
	EOH	RED DOLOSILTSTONE AND AT 99-100m TRACE	
		CHALCEDONY	

Notes : COMPOSITE 2m SAMPLES

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD10
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E.L. 6808 **Prospect** 'LORELLA' **Co-ordinates** 603629 **mE** 8277961 **mN**
Core Size NQ **Precollar Depth** 115 **m Inclination** -90° **Azimuth** - **Collar R.L.** 1025m
Driller WADEN DRILLING **Logged By** DCK **Start Date** 20-8-92 **Finish Date** 24-8-92 **Total Depth** 220m

From	To	Recovery	Description
			PERCUSSION PRE-COLLAR LOG: 0 - 115 m
0m	1m		YELLOW - BROWN SAND
1m	6m		RED-ORANGE FERRUGINEOUS QUARTZ RICH SANDSTONE WITH 10% LATERITE AND 2% CLEAR QUARTZ
6m	7m		AS 1-6m PLUS 55% YELLOW-WHITE CLAY
7m	20m		YELLOW-WHITE CLAY WITH 15% RED-ORANGE FERRUGINEOUS QUARTZ RICH SANDSTONE
20m	21m		AS 7-20m WITH 5% RED SILTSTONE (LEACHED)
21m	23m		AS 7-20m
23m	24m		RED-ORANGE - WHITE CLAY WITH 30% RED-ORANGE SILTSTONE
24m	26m		RED-ORANGE SILTSTONE + 15% WHITE CLAY ALTERED QUARTZ SANDSTONE
26m	28m		WHITE CLAY ALTERED SILTSTONE AND QUARTZ SANDSTONE (50% EACH)
28m	30m		KHAKI CLAY ALTERED QUARTZ SANDSTONE
30m	42m		ORANGE CLAY ALTERED QUARTZ SANDSTONE
42m	45m		KHAKI CLAY ALTERED QUARTZ SANDSTONE WITH 5% KHAKI SILTSTONE
45m	47m		WHITE-GREY DOLOSILTSTONE WITH 5% WHITE CLAY ALTERED QUARTZ SANDSTONE
47m	52m		GREY-YELLOW DOLOSILTSTONE
52m	57m		GREY-DOLOSILTSTONE WITH 20% BLACK CHERT NODULES
57m	62m		YELLOW-WHITE DOLOSILTSTONE WITH 20% BLACK CHERT NODULES
62m	64m		AS 57-62m BUT 30% BLACK CHERT NODULES

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Core Drill Log

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From	To	Recovery	Description
64m	68m		AS 57-62m BUT 10% BLACK CHERT NODULES
68m	70m		ORANGE-WHITE-BROWN DOLOSILTSTONE WITH 1% BLACK CHERT NODULES
70m	77m		GREY-BROWN DOLOSILTSTONE WITH 5% BLACK CHERT NODULES
77m	85m		LIGHT GREY DOLOSILTSTONE WITH 10% BLACK CHERT NODULES
85m	92m		LIGHT GREY-ORANGE DOLOSILTSTONE WITH 5% BLACK-GREY CHERT NODULES
92m	96m		DARK GREEN-GREY AND ORANGE DOLOSILTSTONE
96m	97m		ORANGE DOLOSILTSTONE
97m	100m		AS 92-96m
100m	102m		ORANGE DOLOSILTSTONE
102m	115m		AS 92-96m - END OF PERCUSSION PRE-COLLAR.
			NQ CORE LOG 115-220m
115m	116·42m	100%	MEDIUM GREEN-GREY CLAY ALTERED DOLOCLAYSTONE WITH OCCASIONAL MEDIUM GRAINED GREEN-GREY QUARTZ RICH DOLARENITE BANDS. AT:- 115·23-115·24m, 115·27-115·28m, 115·65-115·66m, 115·69-115·76m (NUMEROUS 1mm THICK BANDS), 115·82-115·83m, 115·85-115·88m, 115·94-115·96m, 116·11-116·12m AND 116·16-116·17m. CORE IS VERY HYDROSCOPIC AND THE DOLARENITES ARE VERY WASHED OUT. GRADATIONAL CONTACTS BETWEEN DOLOSILTSTONES AND DOLARENITES. NUMEROUS DARK BROWN-RED BANDS WHICH ARE FERRUGINEOUS AND MAY BE THE REMANENT OF MASSIVE PYRITE BEDS. THESE BANDS HAVE SHARP CONTACTS WITH BOUNDING LITHOLOGY AND OCCUR AT:- 115·03-115·04m, 115·09-115·11m, 115·15-115·17m 115·18-115·19m (HAS DARK GREY DOLOSILTSTONE BAND WITHIN BEING SOLUTION ALTERED TO DOLOCLAYSTONE), 115·23-115·24m, 115·28-115·30m, 115·36-115·39m, 115·45-115·46m, 115·53-115·54m, 115·63-115·66m AND 115·94-115·95m. THE DOLOCLAYSTONE IS VERY WELL LAMINATED. AFTER 115·85m THE CORE HAS NUMEROUS PLATY TO OVAL, SHAPED BROWN CLAY ALTERED MATERIAL THROUGH

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Core Drill Log

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From	To	Recovery	Description
			IT. SOME HAVE VERY HARD SILICEOUS(?) CORES AND MAY BE REMANENT CHERT NODULES, LITHIC MATERIAL OR DEVITRIFIED TUFFACEOUS MATERIAL. THE BLEBS ARE RANDOMLY ORIENTATED AND SCATTERED IN THE ROCK, AFTER 116·21m ALL FRACTURES IN THE DOLOCLAYSTONE HAVE BLADED ANHYDRITE(?) CRYSTALS ALONG THE OPEN FRACTURES MICROFAULTING OCCURS AT 115·09 - 115·13, 115·26 - 115·33m AND 115·64 - 115·76m. BCA MEASUREMENTS:- 115 - 116·13m : 85° FCA MEASUREMENTS:- 115·11m = 40°, 116·17m = 30°, 116·13 - 116·42m : 90° 115·51m = 25°, 116·30m = 40°, 115·72m = 25°, 116·38m = 25°
116·42m	116·94m	100%	VERY LIGHT WHITE-GREEN (BLEACHED) DOLARENITE WHICH IS QUARTZ RICH, CLAY ALTERED AND HAPHAZARDLY FRACTURED (FCA 10-40°). MINOR DARK GREEN-GREY DOLARENITE BANDS WHICH ARE SOLUTION ALTERING TO THE LIGHT WHITE-GREEN DOLARENITE. SMALL FRACTURES THROUGH THE GREEN-GREY HAVE HALOES OF WHITE-GRE AND HAVE STARTED TO GIVE CAULIFLOWER ALTERATION STYLE AFTER 116·66m. ANHYDRITE (?) CRYSTALS ALONG MANY OF THE FRACTURES AND THE CORE IS PITTED, POROUS AND HYDROSCOPIC. NO BEDDING HAS BEEN PERSERVED IN THE WHITE-GREEN DOLARENITE ONLY THE GREEN-GREY ZONES (BCA = 85-90°) ONE TINY FERRUGINEOUS RED CLAY BAND - PYRITE(?) AT 116·71 - 116·715m. MINOR DARK GREEN-GREY DOLOCLAYSTONE INTERBEDS DO OCCUR AFTER 116·81m, THEY ARE > 2mm WIDE AND RELATIVELY SMOOTH SURFACED COMPARED TO THE DOLARENITE GRADATIONAL CONTACTS. FROM 116·77 - 116·78m IS A DARK GREY DOLARENITE AND DOLOSILTSTONE BAND OF REMNENT ROCK. SOLUTION ALTERATION ALONG SMALL STRINGY FRACTURES AND PATCHES OCCUR THROUGH-OUT BAND. GREY TO WHITE-GREY.
116·94m	128·96m	100%	ALTERNATING SEQUENCES OF DARK GREEN-GREY CLAY ALTERED DOLOCLAYSTONE AND DARK GREEN-BROWN CLAY ALTERED DOLOCLAYSTONE. IT WOULD APPEAR THAT THE GREEN-GREY IS SOLUTION ALTERING TO GREEN-BROWN AS FRACTURES THROUGH THE GREEN-GREY HAVE HALOES OF GREEN-BROWN AND THIS COLOURATION HAS

M.I.M. EXPLORATION PTY. LTD.
Core Drill Log

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From	To	Recovery	Description
			PERVADED ALONG BEDDING/CLEAVAGE TRACES OF THE GREEN-GREY DOLOCLAYSTONE. FRACTURES THROUGH THE
			GREEN-BROWN DOLOCLAYSTONE HAVE A YELLOW SOLUTION ALTERATION HALO. THE CORE IS HYDROSCOPIC.
			NUMEROUS DOLARENITE BANDS OCCUR AND HAVE BEEN JUST AS AFFECTED BY THE SOLUTION ALTERATION AS THE DOLO-
			CLAYSTONES. ALSO DARK BROWN, RED CLAY RICH BANDS ARE PRESENT THROUGHOUT. THESE ARE MOST PROBABLY CLAY
			ALTERED MASSIVE PYRITE BANDS AND ARE HIGHLY FERRUGINOUS AND PITTED. SOME HAVE POSSIBLE
			REMANENT PYRITE CORES. ON AVERAGE THERE ARE 22 x 1-2cm WIDE BANDS PER 1m.
			WASHED OUT AND PITTED ZONES OCCUR THOUGHOUT AND SOME ARE RELATED TO THE GRADATIONAL CONTACTS
			BETWEEN THE DOLARENITE BANDS AND DOLOCLAYSTONE. MAJOR DOLARENITE BANDS OCCUR AT:- 117.04-117.05m,
			117.16-117.22m (NUMEROUS BANDS), 117.82-117.83m, 118.03-118.05m, 118.35-118.37m, 121.82-121.86m, 123.08-
			124m, 124.05-124.06m (oval-shape bleb), 126.39-126.47m, 127.62-127.67m, 127.88-128.14m
			(NUMEROUS BANDS), 128.17-128.23m, 128.36-128.56m AND 128.74-128.96m.
			AT 117.90m TWO BLACK ELLIPTICAL CHERT NODULES CONFORMING TO BEDDING BCA=80°
			FROM 118.35-118.57m NUMEROUS PLATY, RANDOMLY ORIENTATED AND SIZED (<1mm TO 2mm ACROSS) CLAY ALTERED
			BLEBS. POSSIBLE CHERT, LITHIC OR DEVITRIFIED VOLCANIC MATERIAL SEEMINGLY ASSOCIATED WITH THE
			DOLARENITE BANDSAND LESS OFTEN WITH REMANENT PYRITE BANDS.
			TWO FRACTURE BRECCIAS FROM 119.13-119.23 (FCA = 20°) AND 120.11-120.21m (FCA = 20°). FILLED
			WITH DOLOCLAYSTONE AND REMANENT PYRITE BANDS IN A GREEN CLAY MATRIX. SOLUTION ALTERATION ALONG
			THE SIDES OF THE FRACTURES AND RADIATING OUT ALONG MANY STRINGER FRACTURES. - YELLOW-RED HALOES AND
			SOLUTION FRONTS. CLASTS HAVE RAGGED AND EMBAYED EDGES. THE REMANENT PYRITE BANDS WITHIN THE BRECCIA HAVE
			RED SOLUTION BOUNDARIES AND YELLOW CORES
			THE DIVISIONS BETWEEN THE DARK GREEN-GREY AND GREEN-BROWN DOLOCLAYSTONE ARE AS FOLLOWS:-
			NOTE: G/G = GREEN-GREY DOLOCLAYSTONE G/B = GREEN-BROWN DOLOCLAYSTONE
			116.94-118.81m G/G

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Core Drill Log

Hole No. LD10

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From	To	Recovery	Description
			118.81 - 119.16m G/B BCA + FCA MEASUREMENTS:-
			119.16 - 120.47m G/G m BCA FCA
			120.47 - 120.82m G/B 116.94 - 118.00 85°
			120.82 - 121.00m G/G 118.00 - 118.81 80°
			121.00 - 121.65m G/B 118.81 - 119.92 90°
			121.65 - 122.10m G/G 119.92 - 121.64 85° AFTER 124m - 20°
			122.10 - 122.73m G/B 121.64 - 121.73 -
			122.73 - 124.52m G/G 121.73 - 128.96 80° 10° (RARE)
			124.52 - 125.68m G/B
			125.68 - 128.96 - G/G
128.96m	129.40m	100%	SIMILAR TO 116.42 - 116.94m. BLEACHED WHITE DOLARENITE WITH REMANENT DARK GREEN-GREY BANDS AND PATCHES OF DOLARENITE. HYDROSCOPIC, POROUS AND LITTLE CLAY WITH FRACTURES HAPHAZARD AND VERY BROKEN UP. ANHYDRITE(?) ALONG FRACTURES. BEDDING PERSERVED ONLY IN REMANENT GREEN-GREY BANDS - BCA = 85°.
			A FRACTURE (FCA = 20°) FROM 129.05 - 129.14m A SMALL 0.5mm WIDE FRACTURE WITH FRESH PYRITE AND BLEBS TO ROUNDED BALLS OF ANHYDRITE(?)
			FROM 129.37 - 129.39m A BAND OF CHERTY SANDSTONE WITH ROUNDED BLEBS OF GREEN CLAY.
129.40m	131.63m	100%.	INTERBEDDED DARK GREEN-GREY DOLOCLAYSTONE AND GRITTY, PITTED, QUARTZ RICH GREEN-GREY DOLARENITE WITH LITHIC FRAGMENTS OF OVAL SHAPE TO RECTANGULAR IN THE DOLARENITE. THE FRAGMENTS ARE SLIGHTLY EMBAYED AND SOLUTION ALTERED. THERE ARE GRADATIONAL CONTACTS BETWEEN THE TWO ROCK TYPES. THROUGHOUT DOLOCLAYSTONE BROWN-RED CLAY ALTERED FERRUGINEOUS BAND - REMANENT MASSIVE PYRITE BANDS(?)

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From	To	Recovery	Description
			FROM 130.76 - 130.98 m REMANENT DARK GREY TO BLACK DOLOSILTSTONE SOLUTION ALTERED TO GIVE GREEN-GREY DOLOCLAYSTONE. THE REMANENT PYRITE BANDS HAVE ALTERED TO A YELLOW CLAY. SHARP CONTACTS BETWEEN REMANENT PYRITE BANDS AND DOLOCLAYSTONE. FRACTURE BRECCIAS AT 130.25 - 130.30m AND 131.20 - 131.39m. BOTH HAVE FCA = 0°. SCATTERED DOLOCLAYSTONE AND REMANENT PYRITE BAND PIECES IN A GREEN CLAY MATRIX. CLASTS ARE FRACTURE WITH SOLUTION ALTERATION. WHITE-CREAM MINERAL IN CAVITIES AND SOME FRACTURES - LATER STAGE(?). ALL FRACTURES CARRY YELLOW CLAY AND MINUTE YELLOW HALOES. BCA FCA 129.40 - 130.25m 75° - 130.25 - 130.30m - BRECCIA 130.30 - 131.20m 80° 30° 131.20 - 131.34m - BRECCIA 131.34 - 131.63m 70° 10°
131.63m	132.29m	100%	DARK GREEN-GREY DOLARENITE, HYDROSCOPIC, POROUS WITH SEVEN TINY <5mm THICK CLAY BANDS AND ONE REMANENT PYRITE BAND FROM 131.71 - 131.73m (BCA = 80°). IRON STAINING ALONG CLEAVAGE BREAKS. MUCH FRACTURING WITH WIDE (UP TO 10mm) GAPS INFILLED INPART BY ANHYDRITE (?) - PLATY, LIGHT CREAMY-BROWN CRYSTALS FORMING LITTLE FLAKY CLUSTERS AND MINOR BOTRYODIAL MASSES. CHERT BANDS (<5mm) FROM 132.14 - 132.24m SMALL CIRCULAR GREEN CLAY BLEBS ASSOCIATED. 131.63 - 131.71m BCA = - FCA = - 131.71 - 131.73m = 80° = 20° 131.73 - 131.98m = - = 10-20° 131.98 - 132.29m = 85° = 20-30°

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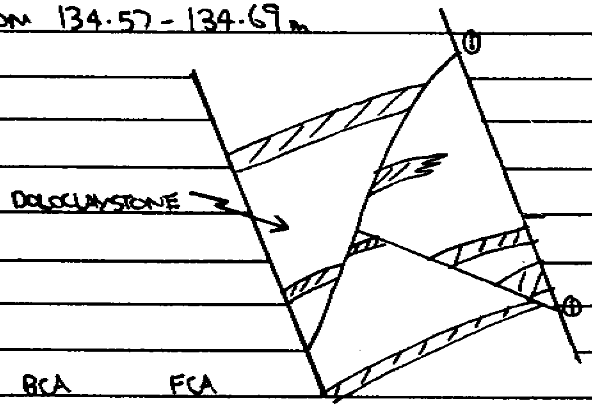
From	To	Recovery	Description
132.29m	137.82m	100%	AS 129.40 - 131.63m.

FROM 132.31 - 132.37m REMANENT DARK GREY TO BLACK DOLOSILTSTONE WITH SOLUTION ALTERATION TO YELLOW-BROWN DOLOCLAYSTONE. FRACTURES AND BEDDING/CLEAVAGE TRACES HAVE SOLUTION FRONTS RADIATING FROM THEM. THE DOLARENITE BANDS HAVE LITHIC FRAGMENTS. THE GRITTY DOLARENITE BANDS AS A RULE OCCUR JUST BELOW THE REMANENT PYRITE BANDS. THE MAJOR OCCURRENCES AT:- 132.62-132.67m, 133.07 - 133.10m, 133.40 - 133.43m, 133.51-133.53m, 133.69 - 133.72m, 133.78 - 133.81m, 134.27 - 134.33m, 134.48 - 134.50m, 134.99 - 135.03m, 135.27 - 135.30m, 135.57-135.59m, 135.88 - 135.90m, 136.09 - 136.11m, 136.55 - 136.62, 136.78 - 136.84m, 136.90 - 136.95m, 137.07 - 137.12m, 137.28-137.33m AND 137.52 - 137.56m. THE DOLARENITE IS MUCH HARDER THAN THE DOLOCLAYSTONE. SMALL ELLIPTICAL CLAY (WHITE) CLOT IN DOLARENITE AT 137.45m.

TWO FAULT ZONES FROM 134.57 - 134.69m



① MICROFAULTS

▨ REMANENT PYRITE BANDS

THE FAULT TRACES HAVE MINUTE RED SOLUTION ALTERATION FRONTS.

		BCA	FCA
132.29 -	133.10m	80°	40°
133.10 -	133.27m	-	10° (MICROFAULT)
133.27 -	133.71m	80°	45°
133.71 -	134.17m	90°	-
134.17 -	137.82m	80°	10-50° (HAPHAZARD)

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From	To	Recovery	Description
137.82m	139.88m	100%	CREAMY-WHITE (BLEACHED) DOLARENITE WITH REMANENT GREEN-GREY DOLARENITE BANDS FROM 139.25 - BCA=70°. VERY PITTED AND POROUS. REMANENTS HAVE CREAMY-WHITE SOLUTION ALTERATION AS PATCHES OR ALONG BEDDING/CLEAVAGE TRACES. RADIATING CAULIFLOWER ATERATION PATTERNS FROM FRACTURES AND TRACES. VERY BROKEN UP AND SCATTERED, HIGHLY HAPHAZARD FRACTURING. CHERT BANDS AT 138.40m, 139.20-139.24m AND 139.72-139.74m. THEY ARE MAUVE-BROWN, EMBAYED AND SOLUTION ALTERED. BAND HAVE SMALL OVAL CLOTS OF CLAY ALTERED FLAKY MATERIAL. POSSIBLY TUFFACEOUS IN ORIGIN(?). BCA FCA* — *UNDETERMINABLY AS CORE SCATTERED + BROKEN UP. 137.82 - 139.25m — - — - 139.25 - 139.88m — 70° — -
139.88m	140.00m	100%	TWO FRACTURE BRECCIAS 139.88 - 139.92m AND 139.96 - 140.00m SEPARATED BY A 2cm WIDE DIRTY GREEN-GREY-WHITE, CLAY ALTERED DOLARENITE. THE CORE OF THE DOLARENITE IS YELLOW BY SOLUTION ALTERATION. BRECCIA HAS CLASTS OF GREEN DOLOCLAYSTONE IN RED CLAY MATRIX. FCA=60°.
140.00m	146.84m	100%	INTERBEDDED DARK GREEN-GREY DOLARENITE AND DOLOCLAYSTONE WITH GRADATIONAL CONTACTS. MUCH IRON STAINING ALONG FRACTURES WITH SOME FRACTURES AFTER 144.50m HAVE AQUA COLOURED CLAY ALONG PLAINS. AFTER 141.48m CYCLIC CLAY ALTERED REMANENT PYRITE BANDS - RED, YELLOW AND KHAKI - ARE COMMON FROM 140 - 141.18m DOLARENITE WITH MINOR DOLOCLAYSTONE BANDS (<5mm WIDE). CHERT BANDS IN DOLARENITE AT:- 140.31m, 141.37 - 141.40m AND 142.94m. ALL RED-GREY WITH A WISPY SMOKEY APPEARENCE. DARK GREY BANDED CORES. - BCA=80° INTENSE FRACTURE ZONE FROM 141.70 - 141.95m. FCA= 30-40°. ALL HAVE WHITE CLAY INFILL AND WHITE-CREAMY PLATY MINERAL - VERY HARD.

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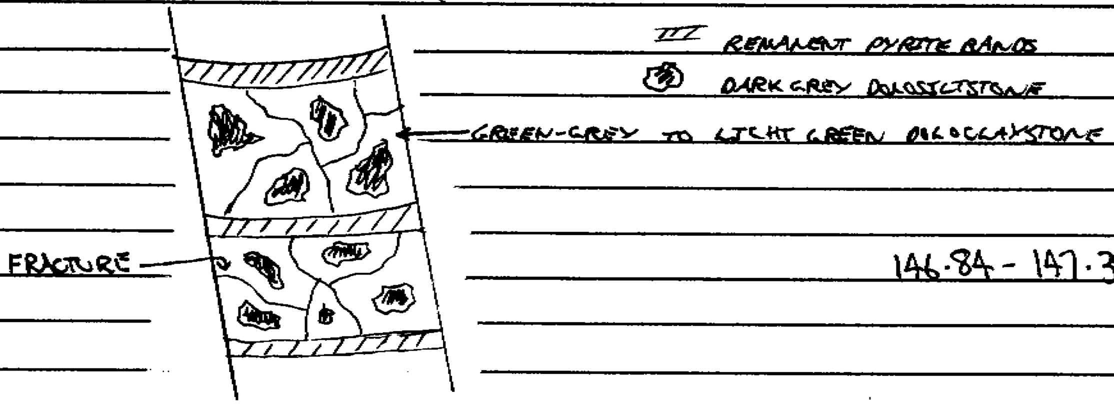
From	To	Recovery	Description
146·84m	147·38m	100%.	A ZONE OF LIGHT GREEN DOLOCLAYSTONE WITH DARK GREY TINGED REMANENT DOLOSILTSTONE, MANY RED-BROWN, FERRUGINEOUS CLAY ALTERED REMANENT PYRITE BANDS. CRIS-CROSSING FRACTURES HAVE SOLUTION ALTERATION FRONTS - ORANGE IN COLOUR IN THE GREEN GREY DOLOSILTSTONE. CAULIFLOWER HALOES AND RADIATING SOLUTION FRONTS COMMON.

	BCA	FCA	
140·00 - 140·20m	90°	10-20°	(INTENSELY FRACTURED)
140·20 - 140·72m	70°	20°	
140·72 - 141·70m	85°		
141·70 - 141·95m	-	30-40°	
141·95 - 142·33m	80°	30°	
142·33 - 142·38m	75°	20°	
142·38 - 142·38m	80°	20°	
146·44 - 146·84m	85-90°	20°	



	BCA	FCA
146·84 - 147·38m	80°	20°

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From	To	Recovery	Description
147·38m	156·89m	100%	DARK GREEN-GREY DOLOCLAYSTONE WITH BROWN-RED CLAY REMANENT MASSIVE PYRITE BANDS. BOTH HAVE MODERATE
			SOLUTION ALTERATION. ONLY OCCASIONAL DOLARENITE BANDS AT:- 148·28 - 148·30m, 148·43 - 198·98m, 148·91 - 148·93m,
			149·32 - 145·34m, 149·78 - 149·80m, 149·82 - 149·89m, 150·28 - 150·31m, 151·07 - 151·13m, 151·18 - 151·21m, 152·74 -
			152·77m, 153·75 - 153·79m, 154·34 - 154·39m, 154·82 - 154·87m, 154·93 - 155·49m, 156·78 - 156·83m, 155·94 -
			155·97m AND 156·09 - 156·08m. CHERT BANDS IN DOLARENITE AT 156·01m, 156·80m AND 157·41 - 157·43m
			MUCH IRON STAINING ALONG FRACTURES. AFTER 154·93m DOLARENITE BANDS HAVE REMANENT DARK GREY DOLARENITE
			PATCHES.
			THROUGHOUT THE DARK GREEN-GREY DOLOCLAYSTONE HAS CREAM-WHITE SOLUTION ALTERATION AFFECTS ALONG
			TINY FRACTURES, BEDDING AND CLEAVAGE TRACES. EXAMPLE 152·70 - 152·80m.
			BCA FCA
			147·38 - 151·18m 85° 10°
			151·18 - 151·45m ? -
			151·45 - 152·89m 85° 10°
			152·92 - 156·89m 80° 10°
156·89m	158·90m	100%	LIGHT CREAM-GREEN CLAY ALTERED INTERBEDDED DOLOCLAYSTONE AND DOLARENITE - GRADATIONAL CONTACTS. THE CORE
			IS VERY HYDROSCOPIC AND THE DOLOCLAYSTONE IS HAPHAZARDLY FRACTURE FROM 156·89 - 157·00m FCA-50°.
			OCCASIONAL FERRUGINEOUS RED CLAY BANDS (REMANENT MASSIVE PYRITE BANDS) BEST EXAMPLE AT 157·50m
			A SMALL FRACTURE WHICH CROSSES THIS BAND HAS ALLOWED A RED SOLUTION ALTERATION FRONT
			TO HALO THE FRACTURE INTO THE DOLOCLAYSTONE INFILLTRATING ALONG BEDDING/CLEAVAGE TRACES.
			THE DOLARENITE BANDS ARE HAPHAZARD IN SIZE ie THE BANDS DO NOT ALWAYS GO ALL THE WAY AROUND.
			- HAS SEGMENTS MISSING
			AFTER 158·63m THE CORE BECOMES MUCH LEST CLAY ALTERED AND EVEN SILICEOUS (?) IN PARTS, ALTHOUGH THE

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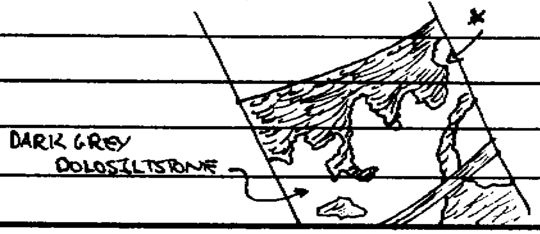
From	To	Recovery	Description
			DOLOCLAYSTONE REMAINS RELATIVELY SOFT, THE DOLARENITE IS HARD AND BRITTLE AND HAS SLIGHT CHERTY COMPOSITION WITH IRON STAINING AND TINY RED CLAY FLAKES ← ALTERED LITHIC FRAGMENTS OR PYRITE GRAINS (PROBABLY FORMER). IN CONTRAST THE CLAY ALTERED DOLARENITE BANDS ARE MISSING THESE RED FLAKES, BUT CAVITIES THEY ONCE FILLED STILL PERSIST. CORE IS VERY BROKEN FROM 157.00 - 158.63m
			FROM 158.75 - 158.77m CHERTY DOLARENITE BAND WITH CAVITIES COATED (LINED) WITH A SUGARY WHITE MINERAL WHICH IN SOME INSTANCES HAS CLEAR CONCENTRIC ZONES THEN INTO WHITE AREAS AND SO ON. POSSIBLY CHALCEDONIC (?). VERY HARD AND HAS KNIFE EDGE CONTACTS, DOES NOT SCRATCH.
			BCA FCA
			156.89 - 157m 80° 50°
			157 - 158.63m - - BROKEN UP
			158.63 - 158.90m 80°
158.90m	173.98m	97%	DARK GREEN-GREY SOLUTION ALTERED DOLOSILTSTONE WITH ABUNDANT DARK GREY TO BLACK REMANENT SECTIONS AND BROWN - KHAKI SOLUTION ALTERATION ZONES. MUCH HAPHAZARD FRACTURING WITH GREEN-GREY, BROWN, KHAKI AND WHITE CLAY IN FRACTURES AND AS SOLUTION ALTERATION HALOES AROUND THEM AND ALSO PERVASIVELY ALONG BEDDING/CLEAVAGE TRACES. CAULIFLOWER SOLUTION ALTERATION FRONTS* COMMON. NUMEROUS RED-BROWN FERRUGINOUS CLAY ALTERED BANDS POSSIBLY REMANENT MASSIVE PYRITE BANDS(?). TEND TO BE MORE HYDROSCOPIC THAN THE DOLOSILTSTONE. FERRUGINOUS CLAY ALONG BEDDING/CLEAVAGE TRACES. THE BLACK DOLOSILTSTONE HAVE WEAK HCl REACTION AND MAYBE WEAKLY MINERALIZED WITH <1% DISSEMINATED PYRITE. 

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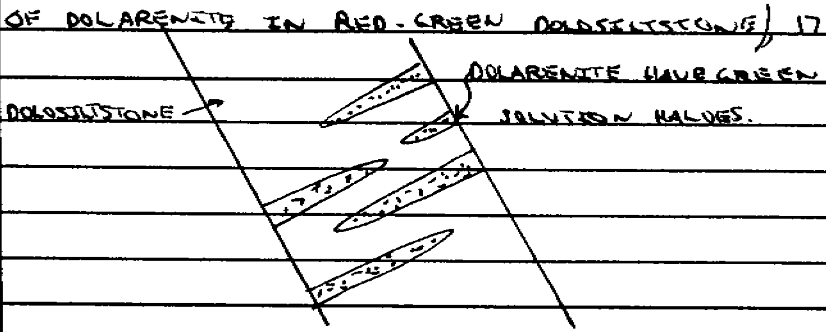
From	To	Recovery	Description

DOLARENITE BANDS FOLLOW THE SAME SOLUTION ALTERATION PATTER AS THE DOLOSILTSTONE. THEY ARE OFTEN PITTED AND THE CORE IS A SMALLER DIAMETER AS SOME HAS BEEN WASHED OUT. QUARTZ, LITHIC FRAGMENTS AND RED-BROWN FLAKES AND LATHS OF CLAY FOLLOWING BEDDING/CLEAVAGE TRACES.

SOLUTION ALTERATION SEQUENCE : DARK GREY TO BLACK → DARK GREE-GREY → DARK GREEN-BROWN → KHAKI → WHITE. ALTHOUGH THIS SEQUENCE IS NOT ALWAYS THE CASE, IT IS GENERALLY TRUE.

AT THE END OF THE SOLUTION ALTERATION STAGE THE DOLOSILTSTONE IS INTENSELY CLAY ALTERED AND BASICALLY A DOLOCLAYSTONE. IT IS OFTEN DIFFICULT TO TELL THESE ZONES FROM DOLARENITE BANDS. MAJOR DOLARENITE BANDS OCCUR AT:- 160.09 - 160.11m, 160.29 - 160.31m, 161.17 - 161.18m, 164.52 - 164.54m, 165.02 - 165.03m, 165.24 - 165.28m (CHERT BAND, 5mm WIDE, VERY PITTED AND CLAY ALTERED, PITS POSSIBLY PYRITE PSEUDOMORPHS), 165.42 - 165.45m, 165.51 - 165.60m (MANY SMALL <1mm BROWN CHERT BANDS), 165.62 - 165.74m (AS PREVIOUS), 165.77 - 165.85m (AS PREVIOUS), 165.87 - 165.97m (AS PREVIOUS + AT 165.93m BAND OF RED CHALCEDONIC (?) MATERIAL WITH ROUND BLEBS OF CLEAR SILICA (?) WITH GREEN DOLOSILTSTONE IN CORES), 165.98 - 166.00m, 167.00 - 167.03m (HAS A 5mm BAND OF KHAKI DOLOSILTSTONE IN MIDDLE), 167.59 - 167.62m (SIGAR SHAPED LENSES OF DOLARENITE IN RED-GREEN DOLOSILTSTONE) 171.34 - 171.37m (WHITE, CLAY ALTERED, VERY POROUS. HYDROSCOPIC) AND 173.26 - 173.32m.



FROM 171.37 - 171.74m COMPLETELY CLAY ALTERED WHITE DOLOCLAYSTONE, ONE SMALL PATCH OF DOLOSILTSTONE (DARK GREEN-GREY) REMAINS. BROKEN UP AND WASHED OUT

FROM 172.50 - 172.77m FRACTURE (FA=10°) WITH LINING OF ANHYDRITE (?) AS WALLS 2mm HIGH BOTRYOIDAL CRYSTALS.

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From	To	Recovery	Description
			BCA FCA
			158.90 - 171.37m 80° 40-45°
			171.37 - 171.74m - BROKEN
			171.74 - 173.98m 80° 35°
173.98m	176.57m	100%.	WHITE - LIGHT BROWN-WHITE PITTED, BRITTLE, POROUS, HYDROSCOPIC, CLAY ALTERED DOLARENITE. MEDIUM-GRAINED AND BROKEN WITH FACTURING (FCA 0-10°) THROUGHOUT. LIMONITIC CLAY ALONG BREAKS AND CLEAVAGE TRACES, ALL BEDDING PERSERVED IN DOLARENITE, BUT CHERT BANDS HAVE BCA = 80°. THE LIGHT BROWN-WHITE IS BEING SOLUTION ALTERED TO WHITE - SPREADING OUT FROM FRACTURES. PATCHES OF GREY DOLARENITE, ALONG CORE, EMBAYED-RAGGED EDGES ARE BEING REPLACED. LIGHT BROWN CHERT BANDS WITH DARK BROWN CORES AT: 174.96 - 179.98m, 175.16 - 175.20m (NUMEROUS TINY BANDS), 175.54 - 175.99m, 176.20 - 176.21m AND 176.29 - 176.35m (NUMEROUS TINY BANDS). ALL BANDS HAVE OVAL - ROUNDED BLEBS FILLED WITH CREAMY MATERIAL, THE PITS AWAY FROM THE CHERT BANDS HAVE CLAY-FLAKY MATERIAL IN THEM. OR JUST WEATHERED OUT COMPLETELY. THESE ZONES HAVE A GRADATIONAL CONTACT WITH THE DOLARENITE AND MAY REPRESENT VOLCANIC MATERIAL DEVITRIFIED. SOME HAVE BE CRUSHED AND EXTENDED. MAJOR ZONES AT:- 174.33 - 174.52m, 175.08 - 175.23m, 175.51 - 175.60m, 175.68 - 175.18m, 176.14 - 176.27m AND 176.31 - 176.50m.
176.57m	179.56m	100%.	AS 158.90 - 173.98m, ABSENCE OF DOLARENITE BANDS. FROM 176.57 - 176.60m A SEDIMENTARY BRECCIA, CLASTS OF DOLOSILTSTONE (GREEN-GREY, WHITE + RED) IN GREEN CLAY. FROM 176.57 - 177.80m NUMEROUS PATCHES AND ALONG BEDDING/CLEAVAGE TRACES OF FERRUGINOUS RED CLAY. THE PATCHES ARE SURROUNDED BY CREAMY-GREEN SOLUTION HALOES THE SAME AS THE FRACTURE HALOES. FROM 177.80 - 177.92m A BROKEN ZONE OF WHITE DOLOCLAYSTONE - NO BEDDING TRACES PERSERVED.

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From	To	Recovery	Description
			NUMEROUS RED-BROWN CLAY ALTERED REMNANT PYRITE BANDS. WITH SHARP CONTACTS WITH DOLOSILTSTONE. TWO CHERT (?) BANDS AT 179·38m AND 179·43m. BOTH ARE <3mm WIDE, BROWN, FRACTURES WITH MINUTE YELLOW HALOES.
179·56m	181·52m	100%	1st CONDUCTOR - DARK GREY DOLOSILTSTONE WITH 1-2% DISSEMINATED PYRITE AND NUMEROUS LIGHT GREY 1mm THICK POSSIBLE LITHIC BANDS. POSSIBLE SPECKS OF SPHALERITE AT 181·10m. NO SOLUTION ALTERATION PRESENT OCCASIONAL WISPY PYRITE BANDS (<1% OVERALL), VERY SMALL <1mm. BCA= 80° FCA= NO FRACTURES
181·52m	181·92m	100%	DARK GREY DOLOSILTSTONE WITH MINOR FRACTURING (FCA=30°) WHICH ALLOWED SOLUTION ALTERATION TO A DARK GREEN-GREY TO PERVADE ALONG BEDDING/CLEAVAGE TRACES AND RADIATE LATERALLY OUT FROM THEM. NO PYRITE OBSERVED. BCA=80°. WHITE CLAY ALONG FRACTURES THE BROWN-CREAM HALO THEN DARK GREEN-GREY.
181·92m	183·31m	100%	2nd CONDUCTOR - AS 179·56 - 181·52m. FROM 181 - 181·17m NUMEROUS WHITE (TUFF?) BAND WITH SMALL LITHIC FRAGMENTS AND MINOR YELLOW-BROWN SPHALERITE (?) OR TARNISHED PYRITE. UP TO 5% DISSEMINATED PYRITE HERE BCA=80°.
183·31m	183·64m	100%	AS 181·52 - 181·92m. BCA=80° MINOR RED-BROWN PATCHES
183·64m	184·00m	100%	3rd CONDUCTOR - AS 179·56 - 181·52m. SLIGHT SOLUTION ALTERATION ALONG BEDDING/CLEAVAGE TRACES AT 183·84m, 183·92 and 183·99m. LIGHT GREEN-GREY - RESULT OF FRACTURING. DISSEMINATED PYRITE <1%. BCA=80°.
184·00m	186·04m	100%	AS 181·52 - 181·92m BCA=80°, FCA=30°. RED, KHAKI AND GREEN-GREY SOLUTION ALTERATION ALONG BEDDING/

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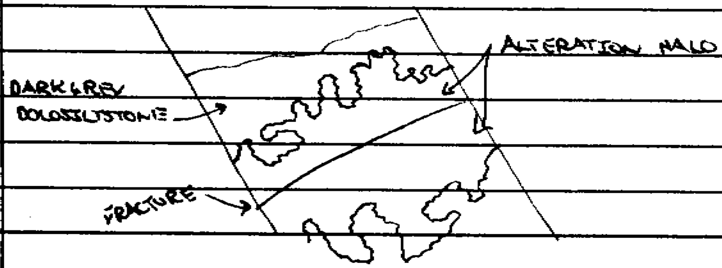
From	To	Recovery	Description
			CLEAVAGE TRACES AND FRACTURES. ALL FRACTURES HAVE CREAMY-GREEN CORES AND RED-BROWN OR GREEN-BROWN SOLUTION ALTERATION HALOES. CAULIFLOWER ALTERATION PATTERN COMMON. 
186.04m	190.50m	100%	4th CONDUCTOR - DARK GREY DOLOSILTSTONE WITH <1% PYRITE AND MINOR WHITE LITHIC BANDS. A NUMBER OF SOLUTION ALTERED PATCHES AND ALONG BEDDING/CLEAVAGE TRACES AT: 188.20 - 188.37m, 189.21 - 189.45m AND 190.26 - 190.50m. BETWEEN 188.28 - 188.31m CHERTY BANDS, POSSIBLY SILICEOUS DOLARENITES - YELLOW-ORANGE WITH BLACK DOLOSILTSTONE BETWEEN. BCA = 80°, FCA = 30-35°.
190.50m	195.43m	100%	AS 181.52 - 181.92m. BCA = 80°. FCA = 30°. LARGE FRACTURES WITH CREAM CLAY OR GREEN CLAY CORES AND GREEN SOLUTION HALOES. SOME DOLARENITE BANDS WITH BROWN-RED CHERT BANDS AND PYRITE PSEUDOMORPHS FROM 191.91 - 192.13m (NUMEROUS CHERT BANDS), 193.72 - 193.75m, 194.09 - 194.10m AND 194.46 - 194.72m. FROM 193.02 - 193.04m SMALL PIECES OF PYRITE WITH PEACOCK COLOURING.
195.43m	196.46m	100%	CREAMY BROWN TO DARK BROWN PITTED DOLARENITE WITH CHERT BANDS AND BANDS OF CLAY ALTERED FLAKY MATERIAL, OVAL - CIRCULAR BLEBS. SOME HAVE WEATHERED OUT. CHERT BANDS ARE THIN AND OCCUR AT 195.51m, 195.80m, 195.98m, 196m, 196.22m, 196.31m, 196.33m - 196.35m. CLAY BLEBS AT 195.97 - 195.98m, 196.19 - 196.27m, 196.31 - 196.33m, 196.36 - 196.38m, 196.40 - 196.42m AND 196.44 - 196.46m. BCA = 80° FCA = 10° - MAJOR/45° - MINOR.

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From	To	Recovery	Description
			AT 195.92m A FRACTURE HAS A LAYER OF ANHYDRITE (?) ALONG IT APPROX 1mm THICK AND KHAKI COLOUR SOLUTION ALTERATION OF THE DOLARENITE FROM DARK BROWN TO LIGHT BROWN TO WHITE ALONG FRACTURES, AND IN MOST CASES THE BEDDING/CLEAVAGE TRACES HAVE DISSAPPEARED OR ARE VERY FAINT.
196.46m	206.44m	100%	AS 181.52-181.92m, BCA: 80°, FCA: 20-45°. DOLARENITE BANDS AT 197.20-197.25m, 201.05-201.10m, 202.11-202.25m, 203.80-203.83m, 204.04-204.06m AND 204.76-204.82m. CHERT BANDS AT 199.73-199.76m, 200.16-200.18m, 200.60m, 200.91-200.94m AND 203.83-203.84m. DOLARENITE HAS OCCASIONAL FERRUGINOUS RED CLAY BANDS - REMANENT PYRITE BANDS(?). THE REMANENT DARK GREY DOLOSILTSTONE HAS DECOMPOSSED BY 140.61m BEING COMPLETELY SOLUTION ALTERED TO DARK GREEN-GREY DOLOSILTSTONE.
206.44m	209.11m	100%	A FRACTURE HOSTED SEDIMENTARY BRECCIA BOUNDED BY HIGH ANGLE FRACTURES - UPHOLE FCA= 25°, DOWN HOLE FCA=10°. - TO COMPARE WITH THE BCA=80° OF SURROUNDING DOLOSILTSTONES PIECES OF SOLUTION AND CLAY ALTERED DOLOSILTSTONE IN A MATRIX OF RED-GREEN CLAY + HYBROSCOPIC. THE LAST 1.83m OF THE PREVIOUS INTERVAL (ie 204.61-206.44m) SHOULD BE DESCRIBED AS A DOLOCLAYSTONE AND MAY BE RELATED TO PROXIMITY OF FAULT ZONE. THE CLASTS RANGE IN SIZE FROM A FEW mm ACROSS TO 11cm ACROSS. THE CLASTS ARE LAMINATED WITH RED MATRIX CLAY INVADING ALONG LAMINATIONS. NOT A SOLUTION BRECCIA AS LAMINATIONS DO NOT LINE UP ACROSS MATRIX. THE SMALLER CLASTS HAVE RAGGED/EMBAYED EDGES AND ARE LESS DISTINCT THAN THE LARGER CLASTS (ie >1cm) WHICH HAVE KNIEF EDGE CONTACTS. MINOR CHERTY DOLARENITE CLASTS (5% OF CLASTS) WITH KNIEF EDGE CONTACTS WITH MATRIX, BUT SHOW SOME SOLUTION ALTERATION EFFECTS - ie RED TINGES THROUGHOUT CLASTS.
209.11m	210.00m	100%	AS FROM 204.61-206.44m COMPLETELY CLAY ALTERED DOLOCLAYSTONE - DARK GREEN-WHITE. HYDROSCOPIC AND

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Core Drill Log

Hole No. LD10

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From	To	Recovery	Description
			VERY BROKEN UP, CORE IS VERY SOFT.
210.00m	210.20m	100%	AS 206.49 - 209.11m. SUGARY, PLATY CREAM CALCITE AS A MINOR (2%) CLAST IN MATRIX. COULD BE GROWTHS IN
			CAVITIES (?). HCl REACTIVE.
210.20m	220.00m	71%	AS 181.52 - 181.92m, WITH MINOR REMANENT DARK GREY DOLOSILTSTONE PATCHES → MORE CLAY ALTERED.
	EOH		FROM 210.20 - 211.50m AS 204.61 - 206.44m COMPLETELY CLAY ALTERED DOLOCLAYSTONE – ALTHOUGH CLAY ALTERATION
			NOT AS STRONG.
			FRACTURE BRECCIAS FROM - 210.53m, 2cm WIDE FCA= 40°
			- 217.85 - 217.97m FCA= 30°
			AFTER 217.97m CORE VERY BROKEN UP AND 2.8m LOST. CLAY CONTENT AND ALTERATION INCREASES. SOME
			DOLOCLAYSTONE LENGTHS MIXED WITH DOLOSILTSTONE LENGTHS. BCA= 80°, FCA= 25-45°.

Notes :

Camera Shots :

Depth	Inclination	Azimuth	Depth	Inclination	Azimuth
124m	-87°	259°	217m	-86.2°	270°
175m	-86.5°	263°			

MIM EXPLORATION P/L

PAGE..1...OF 1.

BASIC GEOTECHNICAL LOG

HOLE No. L.D.19...
LOGGED BY. G. B...
DATE 24-8-92

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
115.00	118.00	-130			R2	80°	15	25° 30° 40°	12	BROKEN	
118.00	121.00	-220			R2	85° 80°	10	40° 85° 20°	5	BROKEN	
121.00	124.00	—			R2	80° 85°	17	25°	2	SEMI BROCKEN	
124.00	127.00	—			R2	80° 85°	14	25° 30°	3	SEMI BROCKEN	
127.00	130.00	-30			R2	85° 80°	13	25° 10° 20°	4	BROKEN	
130.00	133.00	+80			R2 R3	80° 85°	10	20° 25°	3	BROCKEN	
133.00	136.00	-40			R2	80° 85°	11	30° 15° 50°	8	BROKEN	
136.00	139.00	+200			R2 R3	80° 85°	16	20° 25°	8	RUBBLE	
139.00	142.00	+60			R2 R3	70° 85°	22	25° 30°	13	BROKEN	
142.00	145.00	-60			R2	80° 85°	12	50° 10° 55°	4	BROKEN	
145.00	148.00	+150			R2 R3	80° 85°	15	25° 30° 15°	10	BROKEN	
148.00	151.00	+120			R2 R3	80° 85°	9	20° 30° 35°	8	SEMI BROKEN	
151.00	154.00	+50			R2 R3	80° 85°	15	20° 25°	10	BROKEN	
154.00	157.00	+300			R2 R3	75° 80°	16	15° 20°	14	BROKEN	
157.00	160.00	-90			R2 R3	80° 85°	16	25° 30°	11	BROKEN RUBBLE	
160.00	163.00	—			R3	75° 80°	7	25° 30°	6	SEMI BROKEN	
163.00	166.00	+40			R3 R4	80° 85°	5	35°	4	SEMI BROKEN	
166.00	169.00	+10			R3 R4	80° 85°	8	10° 25°	5	SEMI BROKEN	
169.00	172.00	-10			R3 R4	75° 80°	9	30° 35°	8	SEMI BROKEN	
172.00	175.00	+120			R3 R4	75° 80°	14	30° 35° 18°	13	BROKEN	
175.00	178.00	+30			R3 R4	80° 85°	17	25° 30° 35°	11	BROKEN	
178.00	181.00	+90			R3 R4	80° 85°	15	15° 26°	5	SEMI BROKEN	
181.00	184.00	+20			R3 R4	80° 85°	9	40°	—	SEMI BROKEN	
184.00	187.00	+30			R3 R4	20°	3	30° 35°	3	SEMI BROKEN	
187.00	190.00	+30			R4	80°	10	25°	2	SEMI BROKEN	
190.00	193.00	+20			R3 R4	80°	17	35°	2	SEMI BROKEN	
193.00	196.00	—			R3 R4	80° 85°	11	30° 35°	7	BROKEN	
196.00	199.00	+20			R3 R4	80° 85°	25	40° 45° 30°	6	BROKEN	
199.00	202.00	+40			R3	80° 85°	9	20° 40°	8	BROKEN	
202.00	205.00	+80			R2 R3	80° 85°	16	25° 30° 35°	6	BROKEN	
205.00	208.00	-20			R2 R3	80° 85°	6	20° 25° 30°	8	BROKEN	
208.00	211.00	+60			R2 R3	75° 80°	20	30° 35°	5	BROKEN	
211.00	214.00	+60			R2 R3	80° 85°	16	15° 35°	7	BROKEN RUBBLE	
214.00	217.00	-1000			R2	85°	8	20°	8	RUBBLE	
217.00	220.00	-1000			R2	85°	17	15° 20°	6	RUBBLE	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD11
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E.L. 6808 Prospect 'LORELLA' Co-ordinates 603844 mE 8277427 mN

Core Size NQ Precollar Depth 108·30 m Inclination -90° Azimuth - Collar R.L. 1025m

Driller GADEN DRILLING Logged By DCK Start Date 24-8-92 Finish Date 7-9-92 Total Depth 526m

From	To	Recovery	Description
			PERCUSSION PRE-COLLAR LOG: 0-108·30m
0m	2m		BROWN QUARTZ SAND WITH 20% RED-ORANGE LATERITIC QUARTZ SANDSTONE
2m	3m		BROWN-ORANGE-RED CLAY ALTERED LATERITIC QUARTZ SANDSTONE
3m	5m		GREY-RED-ORANGE CLAY LATERITIC QUARTZ SANDSTONE
5m	8m		WHITE-RED PITTED QUARTZ CLAY ALTERED SANDSTONE WITH 30% WHITE CLAY
8m	10m		AS 5-8m WITH 20% IRON STAINED RED-ORANGE LATERITIC QUARTZ SANDSTONE.
10m	24m		ORANGE-WHITE CLAY ALTERED QUARTZ SANDSTONE WITH 20% IRON STAINED RED-ORANGE LATERITIC QUARTZ
			CLAY SANDSTONE.
24m	26m		AS 10-24m WITH 20% WHITE CLAY ALTERED SILTSTONE
26m	30m		WHITE CLAY ALTERED SILTSTONE WITH 40% ORANGE-WHITE QUARTZ RICH CLAY (DECOMPOSED QUARTZ SANDSTONE?)
30m	34m		AS 26-30m WITH 2% CHERTY SILTSTONE
34m	37m		ORANGE-RED-WHITE IRON STAINED SILTSTONE WITH 30% ORANGE-YELLOW CLAY. AFTER 36m 5% CLEAR QUARTZ
			AND 10% ORANGE-RED CLAY ALTERED QUARTZ SANDSTONE.
37m	38m		LIGHT GREY CLAY WITH 5% RED-ORANGE SILTSTONE
38m	40m		GREY-KHAKI CLAY ALTERED QUARTZ SANDSTONE WITH 30% GREY CLAY
40m	41m		PINK QUARTZ SANDSTONE WITH 5% GREY CHERTY SANDSTONE AND 40% YELLOW CLAY
41m	42m		YELLOW-WHITE-GREY CHERTY SILTSTONE WITH 25% PINK QUARTZ SANDSTONE
42m	67m		RED-YELLOW-WHITE-GREY CHERTY SILTSTONE - IRON STAINING ALONG FRACTURES COMMON WITH 2% PINK
			QUARTZ SANDSTONE. AT 53-55m PSEUDOMORPHS AFTER PYRITE

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Core Drill Log

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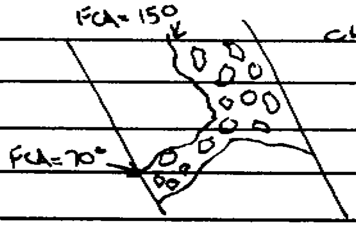
From	To	Recovery	Description
67m	78m		LIGHT GREEN-GREY DOLOSILTSTONE, SLIGHT CLAY ALTERATION AND MINOR IRON STAINING. PYRITE PSEUDOMORPHS OCCASIONAL 1-2%.
78m	108·30m		DARK GREEN-GREY DOLOSILTSTONE, CLAY ALTERED AND MINOR IRON STAINING. EXAMPLE OF SOLUTION ALTERATION BETWEEN 85-86m DARK GREEN-GRY ROCK HAS RED-BROWN PATCHES EMBAYED AND RAGGED EDGES. AT 96-97m 10% RED DOLOSILTSTONE - END OF PERCUSSION PRE-COLLAR
			NQ CORE LOG: 108·30 - 526 m
108·30m	108·50m	100%	LIGHT GREY DOLOCLAYSTONE - VERY CLAY ALTERED AND HYDROSCOPIC. HIGHLY FRACTURED WITH ANHYDRITE (?) OR BARYTE(? ALONG SOME FRACTURES, MINOR IRON STAINING THROUGHOUT. FROM 180·35 - 180.45m FRACTURE BRECCIA WITH CLASTS OF LIGHT GREY DOLOCLAYSTONE IN WHITE CLAY - VERY WASHED OUT. 
108·50m	146·87m	71%	WHITE, LIGHT GREY AND KHAKI INTERBEDDED DOLOCLAYSTONE AND DOLARENITE WITH ABUNDANT OVAL, ROUNDED, ELLIPTICAL, ANGULAR AND IRREGULAR-SHAPED BLACK - LIGHT GREY CHERT NODULES. THE NODULES RANGE IN SIZE FROM 1-2mm ACROSS TO FRAGMENTS UP TO 5cm ACROSS. WHERE BEDDING IS PERSERVED IN HOST ROCK IT BENDS AROUND THE NODULES. THE CHERT IS RANDOMLY ORIENTATED AND DISTRIBUTED. BOTH CHERT BANDS AND DOLARENITE BANDS ARE VERY BROKEN UP. SOME NODULES LOOK AS IF CRUSHED AND ROLLED - DEVITRIFIED VOLCANIC MATERIAL (?). WHERE BEDDING PERSERVED BCA: 80-85° AS THE CHERT BANDS.

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD11

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From	To	Recovery	Description
			CONTACTS BETWEEN CHERT BANDS AND DOLOCLAYSTONE/ARENITE ARE ERODED, BUT CLEAR. CONTACTS BETWEEN THE DOLOCLAYSTONE AND DOLARENITE ARE GRADATIONAL.
			SOLUTION ALTERATION THROUGHOUT ROCK. CHERT BANDS PARTLY AFFECTED WITH RED-WHITE CORES. NODULES HAVE BLACK FRINGES AND LIGHT GREY CORES. FRACTURES HAVE WHITE, RED OR KHAKI CLAY INFILL AND HALOES.
			CHERT NODULES CONSTITUTE ABOUT 20% OF EACH METRE.
			DOLARENITE BANDS AT:- 111·04 - 111·13m, 112·27 - 112·38m, 112·98 - 113·05m, 113·21 - 113·24m, 113·86 - 113·94m, 114·49 - 114·55m, 115·05m, 116·65 - 117·09m, 118·25 - 118·35m (MANY CHERT FRAGMENTS), 118·54 - 118·60m, 121·18 - 122·70m*, 124 - 124·50m*, 127·39 - 127·46m*, 133·29 - 133·61m, 137·10 - 137·19m, 140·15 - 140·28m, 142·54 - 143·10m, 145·79 - 146·24m AND 146·39 - 146·83m
			* = MUCH IRON STAINING - PYRITE PSEUDOMORPHS INBETWEEN FRACTURED DOLARENITE AND CHERT FRAGMENTS.
			CHERT BANDS FROM:- 109·05 - 109·07m, 109·51 - 109·52m, 111·04 - 111·10m, 112·09 - 112·11m, 112·23 - 112·24m, 117·04 - 117·05m, 117·12m, 117·26 - 117·27m, 117·43 - 117·44m, 118 - 118·05m, 124·95 - 124·96m, 127 - 127·02m, 127·48 - 127·49m, 141·40 - 141·45m, 142 - 142·38m (BROKEN UP - ALMOST ENTIRELY CHERT), 142·48 - 142·54m, 145 - 145·32m (BROKEN UP) AND 146·38 - 146·37m.
			IRON RICH ZONES FROM:- 109·30 - 109·90m, 110·72 - 110·85m, 112·05 - 112·37m, 121·18 - 122·70m, 124 - 124·50m, 127 - 127·36m, 138·13 - 138·30m, 139 - 139·53m, 139·92 - 140·46m AND 145·84 - 146·27m.
			CORE IS VERY HYDROSCOPIC, POWDERY AND VERY WASHED OUT. SOME HAS BEEN REDUCED IN DIAMETER BECAUSE OF WATER IN DRILL PIPES. VERY BROKEN. CORE LOSS BETWEEN:-
			119·40 - 121·00m = 1·6m 134 - 136m = 2m
			122·70 - 124·00m = 1·3m 138·30 - 139m = 0·7m TOTAL CORE LOSS = 11m
			124·50 - 127·00m = 2·5m 143·10 - 145m = 1·9m
			128·20 - 130·00m = 0·2m 147·20 - 148m = 0·8m

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Core Drill Log

Hole No. LD11

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From	To	Recovery	Description
146.87m	149.69m	72%	DARK GREEN-KHAKI DOLOCLAYSTONE WITH MUCH CLAY ALTERATION. CORE LOSS FROM 147.20 - 148.00m = 0.8m. THE CORE IS VERY HYBROSCOPIC AND POWDARY. ONE DOLARENITE (WHITE-GREY) BAND FROM 149.36 - 149.69m (NUMEROUS KHAKI CHERT BANDS FROM 149.36 - 149.49m). THE DOLOCLAYSTONE HAS OCCASIONAL FERRUGINEOUS RED CLAY BANDS - REMANENT PYRITE BANDS, MINOR FRACTURING (FCA=30°) WITH RED SOLUTION ALTERATION HALO - MINUTE. CHERT NODULES 1% OF LENGTH AND CHERT BANDS* AT :- 148.01 - 148.02m, 148.04 - 148.06m, 148.08 - 148.085m* (CLEAR CHALCEDONY), 148.16 - 148.17*m, 148.40 - 148.42m, 148.58 - 148.59m AND 149.25 - 149.26m. NODULES CONFORM TO BEDDING/CLEAVAGE TRACES in BCA=80°. CHERT IS LIGHT GREY, CLAY ALTERED, PITTED AND ALMOST ERODED OUT.
149.69m	158.25m	100%	DARK GREEN-KHAKI TO GREEN-GREY-KHAKI DOLOCLAYSTONE WITH NUMEROUS DOLARENITE BANDS. CORE IS HYDROSCOPIC. NUMEROUS RED CLAY FERRUGINEOUS BANDS - REMANENT PYRITE BANDS. THE LIGHT-GREY-KHAKI ZONES FROM 154.48 - 155.00m, 156.31 - 157.23m, 157.28 - 157.34m AND 158.17 - 158.24m ARE SLOWLY ALTERING TO GREEN-KHAKI. OCCASIONAL ANGULAR CLOTS OF RED FERRUGINEOUS CLAY WITH LIGHTER RED SOLUTION ALTERATION HALOES. BCA: 75-80°. FCA: 20-30° HAIR-LIKE FRACTURES WITH RED CLAY AND MINUTE RED HALOES, NOT INVADING CLAYSTONE VERY MUCH. FRACTURE IN DOLARENITE (CLAY ALTERED) FROM 156.87 - 157.00m HAS ANHYRITE(?)/BARYTE(?) INFILL AS BLADED FLAKES
158.25m	159.47m	100%	INTERBEDDED DARK GREEN-GREY DOLOCLAYSTONE AND WHITE-RED-BROWN DOLARENITE AND THIN, <1cm, FERRUGINOUS RED CLAY BANDS - REMANENT PYRITE BANDS. THE DOLARENITE IS FERRUGINEOUS, PITTED, WASHED OUT AND CLAY ALTERED. SOLUTION ALTERATION OF DOLARENITE BANDS WITH FRACTURES INTO THE DOLOCLAYSTONE - WHITE-CREAM HALOES. BCA=80° FCA=30°.
159.47m	160.14m	100%	AS 158.25 - 159.47m, BUT DOLOCLAYSTONE HAS REMANENT DARK GREY-BLACK DOLOSILTSTONE SOLUTION ALTERED TO DARK GREEN-GREY ALONG BEDDING/CLEAVAGE TRACES BCA=80°. FEW DOLARENITE OR PYRITE

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Core Drill Log

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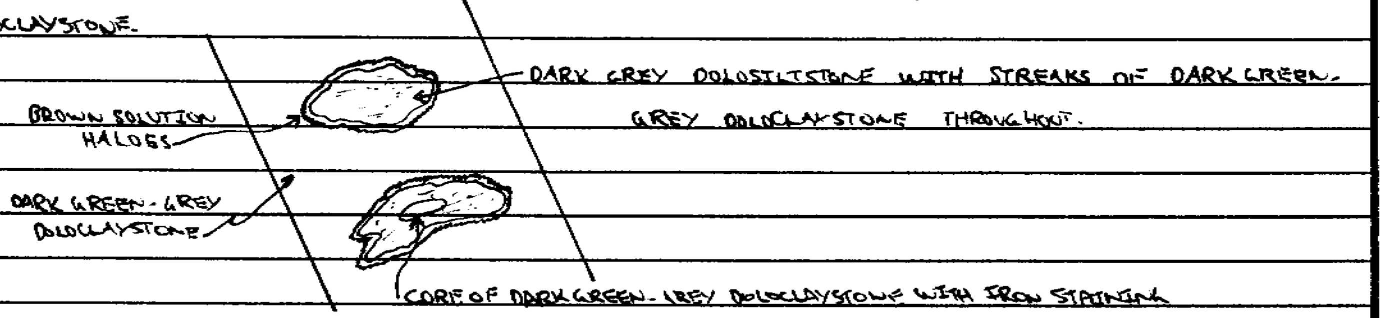
From	To	Recovery	Description
			BANDS. MAJOR FRACTURE FROM 159.71 - 159.87, FCA=20°, WITH WHITE CLAY AND CLEAR QUARTZY MINERAL INFILL WITH LIGHT BROWN SOLUTION ALTERATION HALO. FROM 159.95 - 159.98m THERE ARE TWO PATCHES OF DARK GREY DOLOSILTSTONE WITH BROWN HALOES IN DARK GREEN-GREY DOLOCLAYSTONE.
			
160.14m	160.34m	100%	AS 158.25 - 159.47m. POSSIBLY WHITE CLAY ALTERED CHERT BANDS AT 160.17m, 160.18m, 160.23 - 160.28m (NUMEROUS), 160.29m, 160.30m AND 160.31 - 160.32m. - DEVITRIFIED VOLCANIC MATERIAL (?)
160.34m	162.73m	100%	DARK GREEN-GREY DOLOCLAYSTONE WITH MINOR CLAY ALTERATION AND ABUNDANT REMANENT DARK GREY-BLACK DOLOSILTSTONE WITH MUCH SOLUTION ALTERATION THROUGHOUT. CAMOUFLAGE ALTERATION PATTERN. FRACTURES HAVE AQUA COLOURED CLAY ALONG THEM. VERY MINOR DARK CREAMY BROWN SOLUTION ALTERATION PATCHES IN DARK GREEN-GREY. AT 161.63m IRON HALO, AT 161.76m SMALL OVAL CLAST, 5mm ACROSS OF BROWN CLAY WITH DARK GREEN-GREY HALO IN DARK GREY-BLACK DOLOSILTSTONE.
162.73m	163.17m	100%	A DARK GREEN-GREY DOLARENITE, VERY PITTED, CLAY ALTERED AND WITH NUMEROUS PINK-RED CHERT BANDS (<1mm) THROUGHOUT. THE BANDS HAVE SMALL PIT INFILLED WITH DARK GREEN CLAY. TWO DARK GREEN-GREY DOLOSILTSTONE BANDS AT 163.02 - 163.04m AND 163.12 - 163.14m. FRACTURE FROM 162.82 - 162.90m LINED WITH CREAMY

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Core Drill Log

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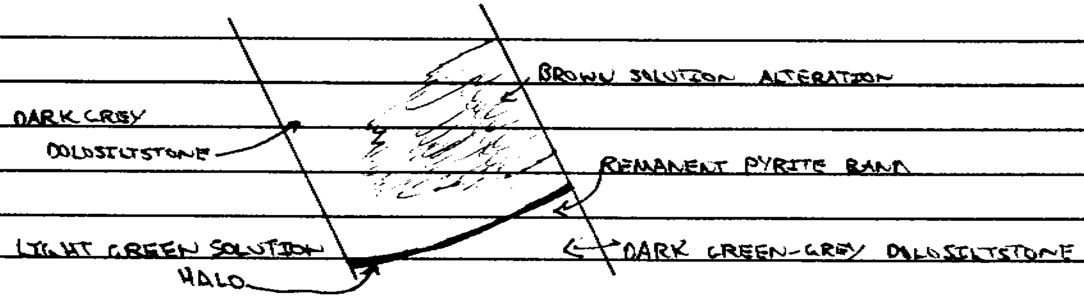
From	To	Recovery	Description
			ANHYDRITE(?)/BARYTE(?). GRIT BAND (?) WITH WHITE LITHIC FRAGMENTS AT 162·28m. BCA=80°.
163·17m	166·02m	100%	AS 160·34 - 162·73m. BCA: 80° = 163·17 - 166m FCA: 20-40° 85° = 166 - 166·02m : - FRACTURES HAVE GREEN HALOES THIN BROWN SECONDARY HALOES, NO DOLARENITES. AFTER 166m A NUMBER OF THIN (<1mm) RED-BROWN CLAY BANDS - REMANENT PYRITE BANDS. 
166·02m	211·60m	100%	INTERBEDDED DARK GREEN-GREY DOLOSILTSTONE SOLUTION ALTERED TO BROWN DOLOSILTSTONE AND DARK GREEN-GREY-BROWN DOLARENITE BANDS. RED-BROWN FERRUGINOUS CLAY REMANENT PYRITE BAND ARE NUMEROUS THROUGHOUT ALTHOUGH NOT IN DOLARENITE. ALL BANDS ARE CLAY ALTERED WITH SOME DOLOSILTSTONE BANDS NOW DOLOCLAYSTONE. THE DOLARENITES ARE PITTED, WASHED OUT, GRITTY, POROUS AND BRITTLE. CORE IS HYPROSCOPIC. MOST DOLARENITE BANDS ARE FERRUGINOUS IN PART WITH WISPY RED CLAY FLAKES. DOLARENITE BANDS OCCUR AT:- 167·85 - 168·15m, 175·46m, 175·60m, 175·61 - 175·63m, 175·83 - 175·92m, 176·59 - 176·63m, 177m, 180·32 - 180·39m, 180·42 - 180·44m, 180·72 - 180·77m, 183·50 - 183·52m, 183·76 - 183·85m, 184·06m, 184·15 - 184·16m, 184·51 - 189·59m, 185·05 - 185·09m, 185·44 - 185·45m, 186·83 - 186·35m, 187·28 - 187·35m, 187·57 - 187·88m, 188·04 - 188·06m, 188·38 - 188·41m, 188·78 - 188·90m, 189·67 - 189·73m, 191·19m, 191·65 - 191·69m, 192·99 - 193·01m, 193·44 - 193·45m, 194·02m,

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Core Drill Log

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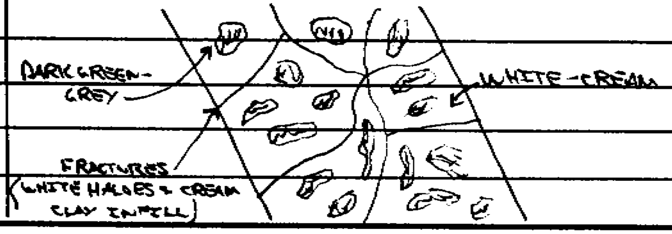
From	To	Recovery	Description
			194.41 - 194.42m, 195.33 - 195.36m, 196 - 196.07m, 196.11 - 196.24m, 197.57 - 197.59m, 197.84 - 197.86m, 197.88m,
			197.91 - 197.94m, 198.36 - 198.38m, 199.28 - 199.29m, 199.36 - 199.38m, 199.62 - 199.64m, 199.81 - 199.83m, 200.85 -
			200.88m, 201.08 - 201.12m, 201.31 - 201.34m, 201.71 - 201.74m, 201.81 - 201.83m, 201.88 - 201.91m, 202.06 -
			202.73m, 202.76 - 202.78m, 203.04 - 203.11m, 203.30 - 203.32m, 203.38 - 203.41m, 203.61 - 203.69m,
			204.43 - 204.46m, 204.70 - 204.73m, 204.85 - 204.92m, 205.10 - 205.13m, 205.21 - 205.46m,
			205.49 - 205.87m, 206.27 - 206.29m, 206.70m, 206.82 - 206.85m, 206.88m - 206.90m, 206.93 - 206.94m, 207.44 -
			207.46m, 207.73 - 207.75m, 208.38m, 208.42 - 208.43m, 208.65 - 208.69m, 210.46 - 210.50m, 210.56 - 210.59m,
			210.73 - 210.77m, 210.78 - 210.99m, 210.84 - 210.88m, 211.32 - 211.35m AND 211.42m.
			TINY 1mm CHERT FRAGMENTS, NO DISTINCT ORIENTATION OR DISTRIBUTION SCATTERED, OCCUR AT:- 176.92m, 177.11 -
			177.23m, 179.85 - 179.87m AND 181.83 - 181.97m.
			FROM 196.12 - 196.92m FRACTURED AND BROKEN UP DOLARENITE AND DOLOSILTSTONE IN A LARGE FRACTURE BRECCIA
			AND SEDIMENTARY BRECCIA (FCA = 10-20°). DARK GREEN-GREY DOLOSILTSTONE + DOLARENITE CLASTS SOLUTION ALTERED TO KHAKI-BROWN
			FROM 196.12 - 196.37m ANHYDRITE(?)/BARYTE(?) ALONG FRACTURES.
			BCA: 80° (SMALL SECTIONS 80-85°) FCA: 10 - 40°.
211.60m	214.00m	100%	LIGHT GREEN-WHITE TO WHITE-CREAM, BRITTLE, GRITTY DOLARENITE. VERY BROKEN UP.
			FROM 211.52 - 211.55m RED FERRUGINEOUS CLAY BAND - REMANENT PYRITE BAND (?) SLIGHT GREENISH TINGE - COULD BE DOLOCLAYSTONE(?)
			FROM 213.51 - 214m DOLARENITE WITH MANY PATCHES OF DARK GREEN-GREY SOLUTION ALTERING TO WHITE-CREAM.
			 MINOR CHERTY BANDS FROM 212.86 AND 213.48 - 213.59m
			MAUVE - BROWN COULD BE JUST CHERTY SEGMENTS OF THE DOLARENITE.
			RAGGED EDGES, INCURSIONS OF WHITE SOLUTION ALTERATION.
			BEDDING PERSERVED WHERE CHERTY BCA = 80°. FCA = 0-20°.

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From	To	Recovery	Description
214.00m	235.96m	100%	AS 166.02 - 211.06m BCA = 80-85° FCA = 10-40°. VERY BROKEN.
			BOTH DOLOSILTSTONE AND DOLARENITE HAVE REMANENT DARK GREY-BLACK PORTIONS. THESE SECTIONS ARE ABUNDANT.
			WELL FRACTURED WITH WHITE AND GREEN CLAY AND SOLUTION ALTERATION THROUGHOUT. MOSTLY ALONG BEDDING/CLEAVAGE TRACES
			AND MINOR CAULIFLOWER SOLUTION FRONTS RADIATING OUT. THE DARKGREY-BLACK SECTIONS ARE VERY HARD. MINOR IRON
			STAINING ALONG FRACTURES AND PARTINGS. TRACE PYRITE PSEUDOMORPHS.
			DOLARENITE BANDS FROM:- 214.99 - 215.03m, 215.51 - 215.68m, 215.74 - 215.87m, 215.91 - 215.92m, 216.21 - 216.25m, 216.73 -
			216.86m, 216.96 - 217.00m, 217.18 - 217.23m, 220.08 - 220.12m, 220.97 - 221.06m, 221.73 - 221.78m, 221.91 -
			221.94m, 222.13 - 222.16m, 223.74 - 223.79m, 225.55 - 225.68m, 228 - 228.12m, 229.28 - 229.32m, 232.34m -
			232.36m, 232.55 - 232.57m, 234 - 234.19m, 234.21m, 234.29m, 239.28 - 232.31m, 234.48 - 234.53m AND 235.05 -
			235.26m.
			FROM 215.81 - 215.92m OPEN CAVITIES 4cm LONG x 1cm WIDE WITH BLADED AND BOTRYOIDAL MASSES OF KHAKI
			ANHYDRITE(?)/BARYTE(?).
			FROM 216.22 - 216.30m FRACTURE (FCA = 10°) OPEN TO 1cm WIDE FILLED WITH DARK GREEN CLAY AND SMALL ANGULAR
			CLASTS OF SOLUTION ALTERED DOLOSILTSTONE. NO RAGGED EDGES NO SOLUTION ALTERATION BEFORE EVENT. - MINOR FRACTURE
			BRECCIA
			FROM 218.43 - 218.56m DARK GREEN-GREY CLAY ALTERED DOLOSILTSTONE WITH YELLOW-WHITE RADIATING RINGS -
			LIKE LIESEGANG RINGS IN APPEARENCE.
			FROM 219.16 - 219.24m A GOOD EXAMPLE OF DARK GREY DOLOSILTSTONE BEING SOLUTION ALTERED. A FRACTURE
			(FCA = 10°) WITH CAULIFLOWER SOLUTION ALTERATION HALOES. FRACTURE HAS WHITE CLAY → YELLOW HALO → LIGHT
			GREEN HALO → TINY WHITE HALO IN CONTACT WITH DOLOSILTSTONE.
			FROM 225.56 - 225.66m A BAND OF DOLARENITE HALF ALTERED TO LIMONITIC - GREEN CLAY. NO SOLUTION ALTERATION
			HALO IN DOLARENITE, BUT IS STREAKED BY IRON STAINING.
			FROM 235.23 - 235.26m DARK GREEN CLAY BAND WITH OVAL SHAPED BLEBS WITH DARK GREEN CLAY CORES.

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235.56m	235.97m	100%	DARK GREY - BLACK DOLOSILTSTONE WITH SLIGHT CLAY ALTERATION AND KHAKI CLAY BANDS - REMANENT PYRITE BANDS THREE DOLARENITE BANDS, VERY DARK GREEN-GREY, PITTED. 235.75 - 235.77m 235.86 - 235.89m AND 235.91 - 235.93m. AFTER 235.75m, MINOR DARK GREEN CLAY BANDS. BCA = 80° FCA = 15° & NO SOLUTION ALTERATION. CONTACTS OF DOLARENITE AND DOLOSILTSTONE ARE SHARP. GRADATIONAL CONTACTS WITH UPPER & LOWER INTERVALS AND DOLOSILTSTONE.
235.97m	252.41m	97%	AS 214 - 235.96m BCA = 80°. FCA = 20-45°. NO CHERT BANDS. CORE LOSS 243.50 - 244.00m = 0.5m. DOLARENITE BANDS FROM:- 236.17 - 236.23m, 236.35 - 236.58m (anhydrite (?)/BARYTE(?) ALONG FRACTURE FCA = 15°), 236.76 - 236.80m, 236.85 - 236.87m, 237.04 - 237.07m, 287.76 - 288.78m, 238.81 - 238.86m, 240.21 - 240.24m, 240.30 - 240.32m, 240.62 - 240.69m, 244.52 - 244.54m, 245.89 - 245.91m, 245.92 - 245.94m, 246.16 - 246.22m, 248.07 - 248.19m, 248.28 - 248.34m AND 248.48 - 249.15m. CHERT FRAGMENTS AT 248.04m, AND 248.97 - 249.15m (NUMEROUS). MANY FRACTURES HAVE ANHYDRITE(?)/BARYTE(?) ALONG THEM. SOME SECTIONS OF DOLOSILTSTONE HAVE ALTERED TO DOLO-CLAYSTONE - UP TO 60% CLAY. USUALLY THESE ZONES ARE STARTING TO CRUMBLE AND WASH OUT. IRON STAINING PERVASSIVE THROUGHOUT ALONG BEDDING/CLEAVAGE TRACES AND AS RED-BROWN CLAY BANDS - REMANENT PYRITE BANDS.
252.41m	252.97m	100%	DARK GREY DOLOSILTSTONE WITH LIGHT GREY BANDS - SLIGHTLY COARSER-GRAINED, HAVE GRADATIONAL CONTACTS. MINOR RED-BROWN CLAY BANDS - REMANENT PYRITE BANDS. BCA = 80°. FCA = 10-35°. WISPY LITHIC BANDS FROM 252.17 - 252.21m AND A 252.61m. THE DOLOSILTSTONE SHOWS MODERATE HCL REACTIVE. FRACTURES HAVE YELLOW-GREEN CLAY ALONG THEM WITH WIDE LIGHT GREEN SOLUTION ALTERATION HALOES & CAULIFLOWER PATTERN. SOLUTION ALTERATION QUITE PERVASSIVE THROUGHOUT.
252.97m	258.53m	100%	AS 214 - 235.96m. BCA = 80°. FCA = 30°. NO CHERT. DOLARENITE BANDS AT:- 254.75 - 254.77m, 254.83 -

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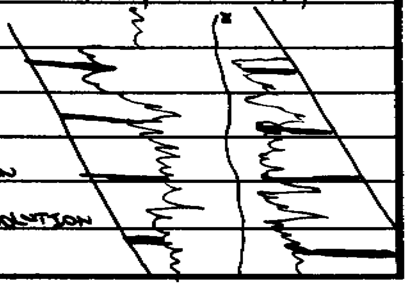
From	To	Recovery	Description
			254.85m, 255.01m, 255.03 - 255.05m, 255.06 - 255.08m, 255.47m, 256.58m, 256.60m, 256.63 - 256.65m, 257.80-257.84m, 258.11 - 258.17m, 258.37- 258.41m AND 258.51- 258.53m.
258.53m	261.49m	100%	CREAMY BROWN TO DARK BROWN DOLARENITE. HYDROSCOPIC, POROUS, PITTED, BRITTLE AND CLAY ALTERED. SOLUTION ALTERATION OF LIGHT GREEN DOLARENITE TO CREAMY BROWN. ANHYDRITE(?)/BARYTE(?) ALONG FRACTURES. MINOR CHERTY HORIZONS THROUGHT, ESPECIALLY ATERE 261.25 - 261.49m. MINOR IRON STAINING THROUGHOUT.

	BCA	FCA	
258.53 - 258.70 m	-	10°	NO BEDDING PERSERVED
258.70 - 259.11 m	80°	0-10°	
259.11 - 259.32 m	-	-	COMPLETELY CLAY ALTERED, VERY SOFT CORE.
259.32 - 259.79 m	80°	-	
259.79 - 261.25 m	-	10°	
261.25 - 261.49 m	80°	10°	

From	To	Recovery	Description
261.49m	281.02m	100%	AS 214 - 235.96m BCA = 80° FCA = 30° DOLARENITE BANDS HAVE CREAMY CHERTY BANDS IN THEM:- 265.13 - 265.25m, 267.71m, 267.78m, 270.79 - 270.83m, 270.85 - 270.94m, 270.96 - 207.98m, 277.27 - 277.30m, 277.33 - 277.45m, 277.47 - 277.50m, 277.56 - 277.61m, 277.63 - 277.64m, 277.68 - 277.72m, 279.89m, 279.99 - 280.00m, 280.02 - 280.03m, 280.30 - 280.36 AND 280.97m. IRON STAINING THROUGHOUT ALONG BEDDING/CLEAVAGE TRACES AND MINOR ON FRACTURES



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281·02m	282·35m	100%	DARK GREEN-GREY-KHAKI MOTTLED DOLARENITE. PITTED, POROUS, MINOR CLAY ALTERATION AND BRITTLE. HEAVILY SOLUTION ALTERED. NUMEROUS CHERT BANDS ESPECIALLY BETWEEN 281·53-281·57m, 281·63-281·67m, 282·08-282·11m, 282·16-282·18m AND 282·21-282·35m. BCA=80° SOME CHERT BANDS ARE WAVEY AND CONTORT REMANENT BEDDING IN DOLARENITE. SOLUTION HALOES OF LIGHT WHITE-GREEN. MINOR BLEBS WITH WHITE CHERT RIMS AND CLAY CORES AT:- 281·71-281·79m, 281·06-281·99m, 282·09-282·20m AND 282·22-282·25. MINOR BANDS OF SLIGHTLY COARSER-GRAINED DOLOSILTSTONE BANDS PERHAPS DOLOMUDSTONE (?) - GRADATIONAL CONTACTS.
282·35m	320·41m	100%	DARK GREY DOLOSILTSTONE WITH OCCASIONAL DARK GREY, GREEN AND CREAMY-BROWN BANDED DOLARENITE AND RED-BROWN FERRUGINEOUS CLAY BANDS - REMANENT PYRITE BANDS. BCA= 80°, FCA= 20-35°. MUCH SOLUTION ALTERATION ALONG FRACTURES AND BEDDING/CLEAVAGE TRACES WITH RADIATING CAULIFLOWER PATTERNS BEING NUMEROUS. THESE ARE A LIGHT GREEN COLOURATION. GREEN-WHITE CLAY ALONG MOST FRACTURES. DOLARENITE BANDS FROM:- 286·26-298·29m, 286·71-286·73m, 287·77-287·81m, 288·89-288·92m, 290·43-290·57m, 294·07-294·08m, 294·44-294·63m, 301·06-301·12m, 307·49-307·57m, 309·63-309·73m, 314·55-314·57m AND 314·54-314·71m.
			SOME FRACTURES HAVE ANHYDRITE (?)/BARYTE(?) INFILL AND TWO FRACTURE FROM 286·15-286·54m (FCA=20°), AND 293·37-293·87m (FCA=10°) HAVE CLOTS OF PYRITE ALONG THE FRACTURE WITH ANHYDRITE(?)/BARYTE(?) AS RIMS.
			MINOR WHITE COARSER-GRAINED LITHIC FRAGMENTS BANDS RARELY > 1-2mm WIDE THROUGHOUT.
			FROM 301·12-301·27m GRITTY DOLOSILTSTONE WITH 2-5% DISSEMINATED PYRITE AND TINY <1mm WIDE WISPY PYRITE BANDS AND WHITE LITHIC FRAGMENT BANDS. NO SOLUTION ALTERATION. WAVEY BEDDING.
			FROM 302·34-305·86m CORE IS VERY BROKEN UP AND SHATTERED, BUT NO CORE LOSS.

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			FROM 318.49 - 318.50m, 318.55 - 318.56m AND 320.39 - 320.41m BEDDING HOSTED BRECCIAS. CLASTS OF GREEN
			DOLOSILTSTONE IN A RED-GREEN MATRIX. CLASTS WHERE SOLUTION ALTERED BEFORE BRECCIATION.
320.41m	414.06m	100%	DARK GREY DOLOSILTSTONE WITH LIGHT GREEN AND RED SOLUTION ALTERATION ALONG FRACTURES AND BEDDING/CLEAVAGE TRACES.
			THROUGHOUT LENGTH. CAULIFLOWER SOLUTION FRONTS RADIATING OUT FROM FRACTURES AND BEDDING/CLEAVAGE TRACES ARE
			COMMON. OCCASIONAL FERRUGINOUS RED-BROWN CLAY BANDS - REMANENT PYRITE BANDS.
			CORE IS BROKEN UP WITH AQUA COLOURED CLAY ALONG BREAKS. SOME HAVE SMALL CLOTS OF PYRITE-GALENA AND MINOR
			LIMONITIC-HAEMATITIC PATCHES. OCCASIONAL WHITE LITHIC BANDS WITH GRADATIONAL CONTACTS WITH DOLOSILTSTONE
			DOLARENITE BANDS AT: 334.38 - 334.58m, 339.78m, 351.80 - 351.86m, 357.86 - 357.88m, 358m, 358.06 - 358.10m, 358.15 - 358.20m, 358.22 - 358.25m, 358.38 - 358.57m
			GALENA (?) GRAINS AT:- 320.76m, 322.56m, 326.12 - 326.29m, 332.12 - 332.22m, 332.92m, 336.57 - 336.61m, 337.63 - 337.76m, 344.12 -
			344.17m, 345.24m, 353.87 - 353.91m, 359.07m, 370.62 - 370.64m, 371.52 - 371.55m, 377.17 - 377.30m, 391.92 - 392.00m, 397.43 -
			397.48m AND 409 - 409.05m.
			ZONE OF BLACK DOLOSILTSTONE, NON-SOLUTION ALTERED WITH SMALL OCCASIONAL WHITE LITHIC BANDS FROM:- 397.17 -
			397.57m AND 398.22 - 398.66m. THE ZONES HAVE 1-2% DISSEMINATED PYRITE AND UP TO 10% PYRITE AS CLOTS
			ALONG FRACTURE BREAKS. THE IS NO SOLUTION ALTERATION ALONG THE FRACTURES. REASONABLY COMPETENT CORE.
414.06m	427.14m	100%	BLACK NON-SOLUTION ALTERED DOLOSILTSTONE WITH 1-2% DISSEMINATED PYRITE AND UP TO 15% PYRITE AS CLOTS
			ALONG FRACTURE BREAKS. OCCASIONAL WHITE LITHIC BANDS THROUGHOUT LENGTH AND HAVE GRADATIONAL
			CONTACTS WITH DOLOSILTSTONE. BCA = 80° FCA = 30° (MAJOR), 60° (MINOR).
			ONE FRACTURE AT 417.90m HAS LIGHT GREEN SOLUTION ALTERATION HALO. MOST FRACTURES HAVE AQUA COLOURED CLAY
			ALONG THEM. A BLACK CARBONACEOUS (?) CLAY BAND FROM 422.81 - 422.815m. AT 422.99m A WHITE CHALCEDONIC
			QUARTZ (?) MASS ALONG A FRACTURE.
			FROM 442.85 - 442.99m A FRACTURE WITH DIAMOND SHAPED PYRITE MASSES A LARGER PYRITE MASS IS

From	To	Recovery	Description
			SHAPED LIKE A CAT FACE →  THE FRACTURE HAS MULTILAYERS AND IS VERY IRREGULARLY-SHAPED.
427.14m	429.72m	100%	BLACK DOLOSILTSTONE WITH OCCASIONAL DARK GREEN-BROWN AND LIGHT GREEN SOLUTION ALTERATION ALONG FRACTURES. MINOR IRON STAINING ALONG SOME FRACTURES AND 1-5% CLOTTED PYRITE. BCA= 80°. FCA: 0-20°. BEDDING/CLEAVAGE TRACES ALSO HAVE SIGNS OF SOLUTION ALTERATION. FROM 428.66 - 428.71m GREEN CLAY BANDS, POSSIBLE REMANENT PYRITE BANDS AS SLIGHT SULPHUR SMELL. FROM 428.90 - 428.91m BCA= 80° - MASSIVE PYRITE BAND, SLIGHT GREEN CLAY ALTERATION, WAVEY CONTACT WITH DOLOSILTSTONE, NOT ALWAYS SHARP. FUNCTION OF CLAY ALTERATION AND HOW MUCH.
429.72m	433.35m	100%	AS 414.06 - 427.74m. FROM 430.90 - 431.24m, 5-10mm THICK WHITE LITHIC BANDS WITH CLAY BANDS IN THE DOLOSILTSTONE. DISSEMINATED PYRITE - 2-5%. BCA= 80°. FCA= 0-10°.
433.35m	435.09m	100%	AS 427.14 - 429.72m. BCA= 80°. FCA: 0° + 40°.
435.09m	436.65m	100%	INTERBEDDED BLACK-GREEN DOLARENITE AND 10% DOLOSILTSTONE. BOTH ARE CLAY ALTERED AND EXHIBIT MUCH SOLUTION ALTERATION. THE DOLARENITE IS PITTED (GREEN CLAY INFILL), BRITTLE AND HAS GRADATIONAL CONTACTS WITH DOLOSILTSTONE. FIVE BRECCIA ZONES WHICH CONFORM TO BEDDING (BCA= 80°). 429.80 - 429.81m, 429.86 - 429.87m, 430.51 - 450.54m, 436.20 - 436.30m AND 436.58 - 436.63m. MOST CLASTS ARE ROUNDED TO SUB-ANGULAR GREEN-RED DOLOSILTSTONE WITH OCCASIONAL WHITE-CREAM DOLARENITE. THE MATRIX IS A RED-GREEN CLAY. MINOR CAVITIES IN MATRIX INFILLED BY WHITE CHALCEDONIC QUARTZ(?).
436.65m	437.95m	100%	A YELLOW-GREEN, MUCH CLAY ALTERED AND SOLUTION ALTERED DOLOSILTSTONE. REMANENT PATCHES OF DARK GREY-

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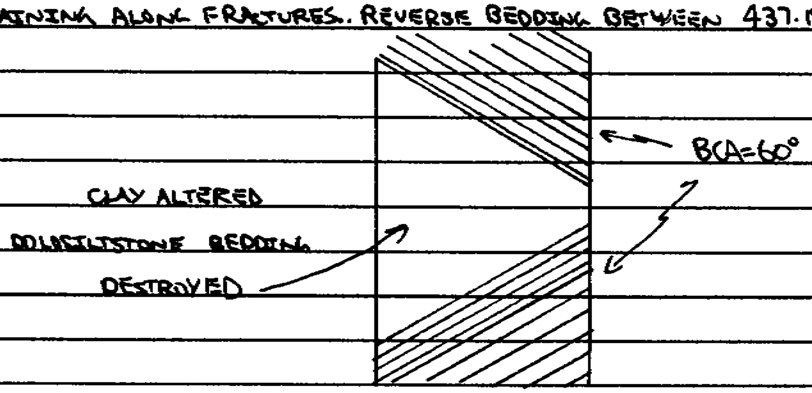
			BLACK DOLOSILTSTONE THROUGHOUT LENGTH, MINOR BLEBS AND STRINGERS OF BLACK-RED, METALLIC PYRITE - OVERALL 1%. BCA = 80°. IRON STAINING ALONG FRACTURES. REVERSE BEDDING BETWEEN 437.18 - 437.40 m, ON EITHER SIDE OF THIS ZONE ARE AMORPHOUS CLAY ALTERED DOLOSILTSTONE THEN BACK IN TO BCA = 80°. MINOR IRON STAINING ALONG FRACTURES. 
437.95m	454.03m	100%	AS 427.14 - 429.72 m. BLACK CARBONACEOUS (?) CLAY BANDS AT 440.17 - 440.18m, 443.70 - 443.72m, 444.25 - 444.30m, 446.78 - 446.79m, 448.60 - 448.67 m AND 451.38 - 451.46m. MANY FRACTURES, HAVE SLICKEN SIDES ALONG THEIR BREAKS. FRACTURES (FCA 10-40°) HAVE CAUSED THE CORE TO BE VERY BROKEN AND SCATTERED. BCA = 80°. MINOR PYRITE CLOTS, 2-5%, ALONG FRACTURES.
454.03m	477.52m	100%	AS 427.14 - 429.72 m, BUT 75% OF CORE IS VERY BROKEN AND SCATTERED WITH ABUNDANT GREEN, BROWN AND RED SOLUTION ALTERATION. CLAY ALTERED WITH OCCASIONAL RED CLAY BANDS AND MINOR BRECCIAS. RED-GREEN MOTTLED, COMPLETELY CLAY ALTERED DOLOSILTSTONE FROM 472 - 473.38 m. VERY BROKEN UP WITH SLICKEN SIDES BEING COMMON.

	BCA	FCA		BCA	FCA		BCA	FCA
454.03 - 460 m	80°		461.80 - 466.22	60-70°	35°	468.40 - 470.10 m	55°	
460 - 461.20 m	65°		466.22 - 467.35	-		470.10 - 472 m	50°	
461.20 - 461.80 m	-		467.35 - 468.40	50°		472 - 473.38 m	55°	

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From	To	Recovery	Description
			BCA FCA
			473.38 - 473.70m 65°
			473.70 - 474.40m 60°
			474.40 - 477.52m 50-60°
477.52m	481.89m	100%	KHAKI-GREEN SOLUTION ALTERED HIGHLY HAPHARDLY FRACURED, CLAY ALTERED DOLOSILTSTONE. PATCHES OF REMANENT BLACK DOLOSILTSTONE THROUGHOUT (25%) LENGTH. SOLUTION ALTERATION ALONG BEDDING/CLEAVAGE TRACES AND FRACTURES. FRACTURES HAVE LIGHT BROWN CLAY INFILL AND SOLUTION HALOES. MUCH IRON STAINING ALONG FRACTURES AND CLOTS OF PYRITE FLANKED BY IRON STAINING. 1-2% DISSEMINATED PYRITE IN REMANENT BLACK DOLOSILTSTONE ONLY. BEDDING, DISJOINTED AND NUMEROUS ORIENTATIONS - POSSIBLY LARGE FRACTURE AND THESE BROKEN UP DOLOSILTSTONE FRAGMENT - TECTONIC BRECCIA (?). BCA(GENERALLY) = 50-65°. CORE IS REASONABLY COMPETENT AND ONLY SEMI-BROKEN.
481.89m	483.60m	100%	BLACK CARBONACEOUS DOLOSILTSTONE WITH MINOR BROWN SOLUTION ALTERATION ALONG FRACTURES AND BEDDING/CLEAVAGE TRACES. VERY BROKEN CORE AND CLAY ALTERED. 1-2% DISSEMINATED PYRITE (?). NO PYRITE CLOTS ON FRACTURE BREAKS. AQUA CLAY ON FRACTURES IN CONJUCTION WITH SLICKEN SIDES. SMALL CLOT OF CHALCOPYRITE AT 483.52m. BCA = 55-65°
483.60m	484.59m	100%	BLACK CARBONACEOUS DOLOSILTSTONE WITH NO SOLUTION ALTERATION AND 2-5% DISSEMINATED PYRITE AND 10-20% PYRITE ALONG FRACTURES AND BEDDING/CLEAVAGE TRACES. MINOR CLAY ALTERATION. THE CORE IS VERY BROKEN. MINOR WISPY PYRITE INCLUSIONS RIMED BY IRON STAINING. NO PYRITE BANDS. BCA = 85-90°

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From	To	Recovery	Description
484·59m	487·12m	100%	AS 477·52- 481·89m OVAL PYRITE CLOTS THROUGHOUT (5-10%), SLIGHTLY SCOLLOPED OUT AND MORE CLAY ALTERED THAN DOLOSILTSTONE, BUT ABUNDANT PYRITE. 2-5% DISSEMINATED PYRITE. HAPHAZARDLY FRACTURED, BUT CORE COMPETENT AND NOT BROKEN UP. BEDDING ON THE WHOLE IS NOT PERSERVED, BUT PYRITE CLOTS GENERALLY LINE UP ON BCA = 55-65° POSSIBLY REFLECTING BEDDING/CLEAVAGE PLAINS.
487·12m	498·46m	100%	BLACK CARBONACEOUS DOLOSILTSTONE WITH 5-10% DISSEMINATED PYRITE AND 10-20% PYRITE AS CLOTS ALONG FRACTURE PLANES. NO BEDDING OBSERVED. TWO 5mm PYRITE BANDS AT 490·08m AND 497·03m. ZONES OF PARTIAL SLATEY CLEAVAGE FROM 490·90 - 494m. NO SOLUTION ALTERATION. ON SOME FRACTURE AND CLEAVAGE PLANES SLICKEN SIDES AND THEN VENEER OF WHITE CLAY. CORE IS VERY BROKEN UP AND MODERATELY WELL CLAY ALTERED.
498·46m	519·52m	96%	LIGHT CREAM-GREEN DOLOSILTSTONE WITH MUCH HAPHAZARD FRACTURING WITH BROWN CLAY INFILL AND HALOES. DOLOSILTSTONE HAS BROWN SOLUTION ALTERATION. MINOR PYRITE CLOTS IN LENGTH, ABOUT 1% AND MINOR IRON STAINING ON FRACTURES AND CLEAVAGE TRACES. MUCH CLAY ALTERATION AND REMANENT PYRITE CLOTS WHICH HAVE ALTERED TO REDDY-BROWN CLAY MASSES. ON THE WHOLE BEDDING HAS NOT BEEN PERSERVED, SMALL PATCHES MEASURE BCA= 60-70°. MANY FRACTURES HAVE TINY BRECCIAS ALONG THEM WITH SOLUTION ALTERATION OVERPRINTING. POSSIBLE THE THIS WHOLE LENGTH HAS BEEN MOVED AROUND AS REMANENT BCA MEASUREMENTS ARE NOT ALWAY CONSISTANT ALL THE WAY AROUND THE CORE USUALLY SEPARATED BY FRACTURE. ie LARGE PIECES IN A BRECCIA(?). BECAUSE OF SOLUTION ALTERATION IT IS DIFFICULT TO TELL WHAT HAS HAPPENED. FCA = 10-90° (MAJOR). MANY MINOR FCA THROUGHOUT GOOD EXAMPLES OF BRECCIA ZONES OCCUR AT:- 505.87-505.91m, 513·87-513·92m, 514·93-516·24m*, 517·05-517·09m AND 518·53-518·58m. *: SEDIMENTARY BRECCIA WITH SOLUTION ALTERATION OVERPRINTING. 514·93m CONTACT PARTLY BCA=65°, BUT ABOUT 2/3 HAS BEEN SCOLLOPED OUT TO FORM AN IRREGULAR GRADATIONAL CONTACT WITH DOLOSILTSTONE AND THE

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			516.24m CONTACT DISAPPEARS INTO RUBBLE.
			BRECCIAS ON WHOLE:- CLASTS OF SOLUTION ALTERATION (CREAM-BROWN-GREEN) DOLOSILTSTONE IN GREEN CLAYMATRIX.
			- CLASTS HAVE RAGGED EDGES
			- CLASTS FROM FEW MILLIMETRES TO 15cm ACROSS
			- MINOR IRON STAINING OF CLASTS AND IN MATRIX
			- CONTACTS OF BRECCIAS USUALLY IRREGULAR FRACTURES WITH SOME SCOLLOPING OUT OF CONTACT ZONE.
519.52m	526m	46%	WHITE CREAM-BROWN, GREEN SOLUTION ALTERED DOLARENITE, HAPHAZARDLY FRACTURED AND CRACKED. NO BEDDING
	(EOH)		PERSERVED, PITTED AND BRITTLE. DOLARENITE IS ALTERING TO A DARK GREEN CLAY.
			1% PYRITE PSEUDOMORPHS (?) THROUGHOUT, LIMONITE ALONG FRACTURES + MINOR ANHYDRITE(?)/BARYTE(?).
			STYOLITES WITH LIGHT GREEN-WHITE SOLUTION ALTERATION FRONTS FROM:- 519.90m (BCA= 60°), 523.05-523.19m
			(BCA= 10°), 523.37-523.41m (BCA=0°) AND 523.53-523.75m (BCA=0°). MINOR BLACK-GREEN-BROWN CARBONACEOUS(?
			CLAY ALONG SOME STYOLITES.
			CORE LOSS:- 521-521.50m = 0.5m
			522-523 m = 1.0m NOTE: DUE TO CAVITIES IN LAST LENGTH (519.52-526m) HOLE
			524-526 m = 2.0m WAS STOPPED. LD11 HAS COLLASPED FROM
			TOTAL LOSS = 3.5m ABOUT 126m DOWN.

Notes :

Camera Shots :

Depth	Inclination	Azimuth	Depth	Inclination	Azimuth
115m	-80.2°	177°	364m	-79.9°	234°
163m	-80°	223°	415m	-79.2°	237°
214m	-80°	224°	466m	-79.1°	241°
265m	-80°	225°	517m	-79.5°	244°
316m	-79.9°	232°			

MIM EXPLORATION P/L

PAGE. 1 ...OF 6

BASIC GEOTECHNICAL LOG

HOLE No. LB11...

LOGGED BY. BD.....

DATE. 23-8-92..

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
108.3	109.0	-195	—	—	R2	70°-75°	8	—	—	BROKEN	
109.0	112.0	+175	-	—	R2	60°-75°	18	50°-130°	4	SEMI BROKEN	
112.0	114.9	-70	-	-	R2 R3	80°-85°	25	35°	3	BROKEN	
114.9	118.0	-25	-	-	R2 R2	75°-85°	30	30°	5	BROKEN	
118.0	121.0	-1600	-	—	R2 R2	85°	13	48	1	BROKEN RUBBLE	
121.0	124.0	1200 -~~2500~~	-	-	R2 R3	80°	10	-	—	BROKEN RUBBLE	
124.0	127.0	-2800	-	-	R3	—	5	—	—	RUBBLE	
127.0	130.0	+200	-	—	R2 R3	80°	26	-	—	BROKEN	
130.0	133.0	+700 -~~1000~~	-	-	R2	90°-80°	40	—	—	~~BRO~~	
133.0	136.0	-2000	—	-	R2 R3	90°	10	-	-	RUBBLE	
136.0	139.0	-700	-	-	R2	90°	20	-	-	~~BRO~~	
139.0	142.0	+910	-	-	R2 R3	90°	33	-	—	BROKEN RUBBLE	
142.0	145.0	-1900	-	-	R2 R3	75°-90°	9	—	—	RUBBLE	
145.0	148.0	-800	-	—	R2 R3	80° 75°	27	45°	4	RUBBLE BROKEN	
148.0	151.0	+280	-	-	R2	85°-80°	28	40°	3	BROKEN	
151.0	154.0	+135	-	—	R2	70°	30	35°	2	BROKEN	
154.0	157.0	+110	-	-	R2 R3	75°-60°	31	30°	3	BROKEN	
157.0	160.0	+130	-	—	R2 R3	70°-80°	21	40°	4	SEMI BROKEN	
160.0	163.0	+90	-	-	R3	75°-60°	19	30° 35°	4	SEMI BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

PAGE. 2 ..OF 6

BASIC GEOTECHNICAL LOG

HOLE No. LD11

LOGGED BY. GJB

DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
157.8	160.0	+630mm	—	/	R3R4	85°	11	/	/	SEMI BROKEN	
160.0	163.0	-650mm	—	/	R4	60°-80°	36	25°-30°	2	SEMI BROKEN	
163.0	166.0	-1170mm	—	/	R3 R4	80°	32	20°-30°	/	SEMI BROKEN	
166.0	169.0	-300mm	—	/	R4	80°	19	30°	1	SEMI BROKEN	
169.0	172.0	+100 mm	—	/	R4	80°	10	10°	—	SEMI BROKEN	
172.0	175.0	+110mm	—	/	R4	80°	7	50°	1	SEMI BROKEN	
175.0	178.0	+10mm	—	/	R4	85°-80°	10	/	/	SEMI BROKEN	
178.0	181.0	+80mm	—	/	R4	85°-80°	13	/	/	SEMI BROKEN	
181.0	184.0	+70mm	—	/	R4	80°	16	/	/	SEMI BROKEN	
184.0	187.0	+70mm	—	/	R4	80°	18	/	/	SEMI BROKEN	
187.0	190.0	+90mm	-	/	R4	85°-80°	18	20°	2	SEMI BROKEN	
190.0	193.0	-60mm	—	/	R4	85°-80°	11	20°	1	SEMI BROKEN	
193.0	196.0	+80mm	—	/	R4	80°-85°	11	30°	2	SEMI BROKEN	
196.0	199.0	+30mm	—	/	R4	75°-80°	15	/	/	BROKEN FRACTURES	
199.0	202.0	+90mm	—	/	R4	80°-85°	7	/	/	SOLID	
202.0	205.0	+110mm	—	/	R4	75°-80°	12	20°	2	SEMI BROKEN	
205.0	208.0	+70mm	—	/	R4	80°-85°	13	10°	1	SEMI BROKEN	
208.0	211.0	-80mm	—	/	R4	45°-75	12	40°	3	SEMI BROKEN	
211.0	214.0	+400mm	—	/	R4	75°-80°	14	60°	4	BROKEN RUBBLE+	
214.0	217.0	+30mm	—	/	R4	75-80°	19	30°	3	BROKEN+ FRACTURES	
217.0	220.0	+300MM	—	/	R4	75-80°	14	/	/	SEMI BROKEN	
220.0	223.0	+80 mm	—	/	R4	75-80°	9	/	/	SEMI BROKEN	
223.0	226.0	+300mm	—	/	R4	75-80°	12	185°	1	BROKEN + FRACTURES	
226.0	229.0	+40mm	—	/	R4	75-80°	7	/	/	SEMI BROKEN	
229.0	232.0	+100mm	—	/	R4	75-80°	5	/	/	SEMI BROKEN	
233.5	235.0	+150mm	/	/	R3R4	75-80°	9	35°	2	SEMI BROKEN	
235.0	238.0	+110mm	/	/	R3R4	75-85°	10	15°	2.	BROKEN + FRACTURES	
238.0	241.0	+100mm	/	/	R4	80°	13	20°	1	SEMI BROKEN	
241.0	244.0	-450mm	/	/	R3R4	70-75°	11	40°	1	SEMI BROKEN	
244.0	247.0	+50mm	/	/	R4	50°-75°	12	/	/	SEMI BROKEN	
247.0	250.0	+80mm	/	/	R4	75°-85°	19	25°	1	SEMI BROKEN	
250.0	253.0	+110mm	/	/	R4	85°	10	40°	1	SEMI BROKEN	
253.0	256.0	NO LOSS	/	/	R4	80°-85°	16	/	/	SEMI BROKEN	
256.0	259.0	+140mm	/	/	R4	80°-85°	21	10°	1	SEMI BROKEN	
259.0	262.0	+170mm	/		R3R4	75°-80°	15	15°	2	SEMI BROKEN	
262.0	265.0	+40mm	/	/	R4	75°-80°	28	25°	1	BROKEN	
265.0	268.0	-400mm	/	/	R4	75°-85°	19	10°	1	BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

PAGE. 3 ..OF. 6

BASIC GEOTECHNICAL LOG

HOLE No. LD 11

LOGGED BY GJB

DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
269.0	271.0	+160mm	/	/	R4	75-80°	20	/	/	SEMI BROKEN	
271.0	274.0	+150mm	/	/	R3 R4	70-80°	28	30°	1	SEMI BROKEN	
274.0	277.0	-110mm	/	/	R4	75°-80°	21	40°	1	SEMI BROKEN	
277.0	280.0	+35mm	/	/	R3 R4	75°-80°	11	40°	1	SEMI BROKEN	
280.0	283.0	+150mm	/	/	R4	70-75°	19	15°	1	SEMI BROKEN	
283.0	286.0	+100mm	/	/	R4	75°-85°	16	/	/	SEMI BROKEN	
286.0	289.0	-10mm	/	/	R4	75°-95°	16	20°	/	SEMI BROKEN	
289.0	292.0	+140mm	/	/	R4	80-85°	17	/	/	SEMI BROKEN	
292.0	295.0	+75mm	/	/	R4	75°-80°	15	10°	/	SEMI BROKEN	
295.0	298.0	NO LOSS	/	/	R4	35°-80°	14	/	/	SEMI BROKEN	
298.0	301.0	-100mm	/	/	R3 R4	75°-80°	14	20°	1	SEMI BROKEN	
301.0	304.0	-50mm	/	/	R3 R4	75°-80°	22	30°	1	SEMI BROKEN + RUBBLE	
304.0	307.0	+210mm	/	/	R3 R4	75-80°	26	20°	1	SEMI BROKEN + RUBBLE	
307.0	310.0	+170mm	/	/	R4	75°-80°	29	/	/	SEMI BROKEN	
310.0	313.0	+140mm	/	/	R4	75°-80°	21	/	/	SEMI BROKEN	
313.0	316.0	+120mm	/	/	R4	75°-80°	18	25°	2	SEMI BROKEN	
316.0	319.0	+260mm	/	/	R4	75°-80°	31	/	/	SEMI BROKEN	
319.0	321.6	-30mm	/	/	R4	75°-85°	26	15°	1	SEMI BROKEN	
321.6	323.0	-50mm	/	/	R3 R4	70°-80°	10	20°	2	SEMI BROKEN	
323.0	325.0	-10mm	/	/	R4	75°-80°	16	35°	1	SEMI BROKEN	
325.0	328.0	+520mm	/	/	R4	75°-85°	33	15°	2	SEMI BROKEN	
328.0	331.0	+80mm	/	/	R4	70°-80°	23	40°	2	SEMI BROKEN	
331.0	334.0	+40mm	/	/	R4	75°-85°	29	10°-55°	3	SEMI BROKEN	
334.0	336.4	+70mm	/	/	R4	75-80°	33	25°	1	SEMI BROKEN	
336.4	337.5	-70mm	/	/	R4	75-80°	12	30°	1	SEMI BROKEN	
337.5	340.0	+170mm	/	/	R4	80°-85°	36	25°	2	SEMI BROKEN	
340.0	343.0	+150mm	/	/	R4	70°-80°	29	/	/	SEMI BROKEN	
343.0	345.4	+110mm	/	/	R4	70°-75°	26	25°	2	SEMI BROKEN	
345.4	348.5	+340mm	/	/	R4	75°-80°	33	15°	3	SEMI BROKEN	
348.5	351.5	+140mm	/	/	R4	75°-80°	29	50°	2	SEMI BROKEN	
351.5	353.5	+150m	/	/	R4	75°85°	14	/	/	SEMI BROKEN	
353.0	355.0	-160mm	/	/	R4	65°-80°	10	10-20°	3	SEMI BROKEN	
355.0	358.0	-60mm	/	/	R4	80°	18	20-50°	10	SEMI BROKEN	
358.0	361.0	NO LOSS	/	/	R4	70-80°	21	10°	8	SEMI BROKEN	
361.0	364.0	-100mm	/	/	R4	80°	23	55-75°	4	SEMI BROKEN	
364.0	367.0	-20mm	/	/	R4	80°	38	30-50°	9	SEMI BROKEN	
367.0	369.0	-120mm	/	/	R4	80°	26	0-10°	6	SEMI BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

PAGE 4 OF 6

BASIC GEOTECHNICAL LOG

HOLE No. LD11

LOGGED BY GJB

DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
369.0	370.4	-20mm	/	/	R4	80°	16	30°	4	BROKEN	
370.4	372.5	NO LOSS	/	/	R4	80°	25	10°	7	BROKEN	
372.5	375.5	-200mm	/	/	R4	80°	35	10°	7	SEMI-BROKEN	
375.5	377.0	NO LOSS	/	/	R4	80°	11	25°	4	SEMI-BROKEN	
377.0	379.0	-500mm	/	/	R4	80°	18	10-20°	5	SEMI BROKEN	
379.0	382.0	+50mm	/	/	R4	80°	23	30°	4	SEMI BROKEN	
382.0	385.0	NO LOSS	/	/	R4	80°	37	30°	2	SEMI BROKEN	
385.0	387.5	-450mm	/	/	R4	80°	32	15°	1	RUBBLE	
387.5	388.7	-250mm	/	/	R4	80°	13	10°	2	RUBBLE	
388.7	390.7	-300mm	/	/	R4	80°	19	10°	3	BROKEN	
390.7	393.8	-600mm	/	/	R4	80°-75° 80°	44	20°	6	SEMI-BROKEN	
393.8	396.9	+250mm	/	/	R4	80°-75°	23	40°	2	SEMI BROKEN	
396.9	398.0	+250mm	/	/	R4	80°	3	20°	1	BROKEN	
398.0	399.8	-180mm	/	/	R4	70-80°	14	15°	1	SEMI BROKEN	
397.8	402.9	+180mm	/	/	R4	75-80°	23	5°	1	SEMI BROKEN	
402.9	404.4	+280mm	/	/	R4	75-80°	24	/	/	SEMI BROKEN	
404.4	405.9	+380mm	/	/	R4	70°	16	5°	1	SEMI BROKEN	
405.9	408.3	+120mm	X	X	R4	70-75°	28	40°	0	SEMI BROKEN	
408.3	409.5	+190mm	X	X	R4	70°	9	25°	2	SEMI BROKEN	
409.5	411.8	+390mm	/	/	R4	65°-75°	19	40°	2	SEMI BROKEN	
411.8	413.8	+20mm	/	/	R4	75°	13	50°	1	SEMI BROKEN	
413.8	414.8	+270mm	/	/	R4	75°	6	10°	2	SEMI BROKEN	
414.8	416.0	+150mm	/	/	R4	75°-80°	8	30°	1	SEMI BROKEN	
416.0	418.0	+70mm	/	/	R4	70-75°	10	30°	4	SEMI BROKEN	
418.0	420.1	+270mm	/	/	R4	75°	12	40°	3	SEMI BROKEN	
420.1	421.0	+120mm	/	/	R4	75°	7	25°	2	SEMI BROKEN	
421.0	422.5	NO LOSS	/	/	R4	70-75°	6	35°	2	SEMI BROKEN	
422.5	423.8	+270mm	/	/	R4	75°	13	10°	1	SEMI BROKEN	
423.8	425.0	+180mm	/	/	R4	75-80°	8	15°	2	SEMI BROKEN	
425.0	426.2	+190mm	/	/	R4	75-80°	12	20°-40°	4	SEMI BROKEN	
426.2	427.4	+20mm	/	/	R4	75-80°	7	30°	3	SEMI BROKEN	
427.4	429.3	+520mm	/	/	R4	75-80°	15	20°	1	SEMI BROKEN	
429.3	431.8	+100mm	/	-	R4	75-85°	18	25°	2	SEMI BROKEN	
431.8	433.4	+120mm	/	/	R4	75-80°	7	10°	1	SEMI BROKEN	
433.4	434.4	+170mm	/	/	R4	75°	8	20°	1	SEMI BROKEN	
434.4	437.4	+180mm	/	/	R4	75°	33	/	/	BROKEN	
437.4	439.0	+160mm	/	/	R4	75-80°	15	20°	1	SEMI BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

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BASIC GEOTECHNICAL LOG

HOLE No. LD 11
LOGGED BY GJB
DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
439.0	441.0	+90mm	/	/	R4	75°-80°	10	20°	2	SEMI BROKEN	
441.0	442.4	+26mm	/		R4	75°	13	35°	1	SEMI BROKEN	
442.4	444.3	-130mm	/	/	R4	75°-80°	20	20°	1	SEMI BROKEN	
444.3	446.4	+10mm	/	/	R4	75°-80°	14	15°	1	SEMI BROKEN	
446.4	448.9	+100mm		/	R4	80°	17	20°	1	SEMI BROKEN	
448.9	450.2	+120mm		/	R4	75°-80°	13	/	/	SEMI BROKEN	
450.2	451.9	+340mm		/	R4	80°-85°	12	45°	6	SEMI BROKEN	
451.9	453.3	+40mm	/	/	R4	75°-80°	10	10°	2	SEMI BROKEN	
453.3	456.0	+230mm	/	/	R4	60-75°	17	25°	1	SEMI BROKEN	
456.0	457.4	-140mm	/	/	R4	70°-80°	11	25°	1	SEMI BROKEN	
457.4	460.0	+20mm	/	/	R3R4	70°-80°	14	/	/	BROKEN	
460.0	461.2	-20mm	/	/	R2R4	60-75°	7	/	/	BROKEN	
461.2	462.6	+250mm	/	/	R2 R3	75°-80°	8	30°	2	BROKEN	
462.6	464.1	NO LOSS		/	R2 R3	75°-80°	8	/	/	BROKEN	
464.1	465.5	+190mm		/	R4	70°-80°	15	/	/	BROKEN	
465.5	467.0	-10mm		/	R4	60°	6	35°	2	SEMI BROKEN	
467.0	468.7	-150mm		/	R4	50°	8	35°	2	BROKEN	
468.7	470.4	-40mm		/	R4	50-60°	11	50°	2	BROKEN	
470.4	472.0	-100mm		/	R4	50°	8	10-20°	3	BROKEN	
472.0	474.4	-150mm		/	R3-R4	50-65°	23	70°	1	BROKEN	
474.4	476.8	-200mm		/	R4	50-60°	22	20-30°	2	BROKEN	
476.8	479.5	-50mm		/	R4-R3	60°	16	0-20°	5	BROKEN	
479.5	482.5	NO LOSS		/	R3	65°	18	30°	2	SEMI BROKEN	
482.5	483.7	-110mm		/	R4	55°	12	0°	2	BROKEN	
483.7	484.5	-120mm		/	R4	85-90°	9	40°	1	BROKEN	
484.5	487.0	-120mm		/	R4-R3	60°(?)	17.	10°	1	SEMI BROKEN	
487.0	488.5	-100mm		/	R4	85-90°	16	20°	1	BROKEN	
488.5	489.6	+180mm		/	R4	75°-85°	10	20°	1	BROKEN	
489.6	490.9	+130mm		/	R4	80°	9	/	/	BROKEN	
492.4	493.2	+30mm		/	R4	75°-80°	11	35°	1	BROKEN	
493.2	496.0	+320mm		/	R4	80°-85°	21	50°	2	SEMI BROKEN	
496.0	499.0	+290mm	/	/	R4	75°-80°	30	10°	2	SEMI BROKEN	
499.0	502.0	+140mm	/	/	R4	75°-	19	20°	1	SEMI BROKEN	
502.0	505.0	+100mm	/	/	R4	65°-75°	20	25°	2	SEMI BROKEN	
505.0	508.0	+140mm	/	/	R4	65°-75°	20	40°-50°	3	SEMI BROKEN	
508.0	511.0	+70mm	/	/	R4	75°-80°	16	60°	3	SEMI BROKEN	
511.0	514.0	+120mm	/	/	R4	75°-80°	13	55°	3	SEMI BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

BASIC GEOTECHNICAL LOG

PAGE..6..OF.6

HOLE No. #LD11

LOGGED BY. GJB

DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
514.0	517.0	-260mm	/	/	R4	80°	13	30°	2	SEMI BROKEN	
517.0	520.0	-760mm	/	/	R4	75°	12	20°	1	SEMI BROKEN	
520.0	521.5	-500mm	/	/	R4	75°-80°	7	/	/	SEMI BROKEN	
521.5	523.0	-1.0m	/	/	R4	50°	4	/	/	SEMI BROKEN	
523.0	526.0	-2.0m	/	/	R4	30° 80°	7	50°	1	SEMI BROKEN	
	EOH										

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH: R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP12
Page No. 1 of 1

E.L. 6808 **Prospect** 'LORELLA' **Drilling Type** RC PERCUSSION

Co-ordinates 596678 **mE** 8276193 **mN** **R.L.** 1033m

Inclination -90° **Azimuth** - **Start Date** 8-9-92 **Finish Date** 9-9-92

Driller GADEN DRILLING **Logged By** DCK **Total Depth** 100m

Log	Depth	Description	Sample No.
	0-3m	RED, CLAY ALTERED QUARTZ SANDSTONE WITH 35% WHITE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE ?)	
	3-4m	AS 0-3m WITH 75% WHITE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE ?)	
	4-7m	GREY-WHITE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
	7-11m	GREY-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
	11-12m	ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE ?)	
	12-13m	GREY-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE?) WITH 2% LATERITIC RED SANDSTONE	
	13-24m	WHITE-YELLOW CLAY WITH 10% WHITE SILTSTONE	
	24-26m	WHITE SILTSTONE + ORANGE CLAY (25%) AND 10% LATERITE	
	26-31m	BROWN-GREY DOLOSILTSTONE WITH 20% BROWN-GREY CLAY	
	31-32m	AS 26-30m WITH 5% BROWN-GREY CLAY	
		BLACK DOLOSILTSTONE WITH 10% BROWN-GREY DOLOSILTSTONE. END OF OXIDISATION ZONE.	
	32-42m	BLACK DOLOSILTSTONE WITH MINOR IRON STAINING AT: 39-40m + 2% BROWN-GREY DOLOSILTSTONE	
	42-72m	AS 32-42m WITH MINOR DARK BROWN SOLUTION ALTERATION AND 1-2% DISSEMINATED PYRITE.	
	72-73m	DARK GREY DOLOSILTSTONE WITH 20% DARK GREEN-GREY DOLOSILTSTONE	
	73-100m	AS 42-72m	
	(EOH)	AT: 92-93m + 5% LIGHT GREEN DOLOSILTSTONE	

Notes : COMPOSITE 2m SAMPLES

DRILLERS COMMENTS: VERY HARD, STABLE GROUND

NO WATER

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Core Drill Log

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E.L. 6808 Prospect 'Lorella' Co-ordinates 596834 mE 8276193 mN

Core Size NQ Precollar Depth 72·2 m Inclination -90° Azimuth — Collar R.L. 1033m

Driller Gaden Drilling Logged By MMcG Start Date 10/9/92 Finish Date 23/9/92 Total Depth 421m

From	To	Recovery	Description
0m	4m		Dolosiltstone, orange and white coloured, fine-grained with abundant manganese dendrites
4m	7m		Dolosiltstone, orange, white and grey, fine-grained with manganese dendrites.
7m	25m		Dolosiltstone, brown, orange and grey, fine-grained with manganese dendrites.
25m	72·2m		Dolosiltstone, khaki and brown coloured, fine-grained angular pieces, manganese dendrites are common throughout on rare planes, cracks and through each chip. Oxidised to 72m rare traces of limonite.
			From 49m very strong water flow around 1500 gallons an hour
			53-72m Abundant manganese dendrites probably 1-2% Mn, rare pink and grey chert pieces and occasional finely laminated brown siltstone/shale.
			Percussion pre-collar finished at 72·2 due to excessive water flow and minor cave ins around 69m.
72·2m	76·03m	100%	Dolosiltstone (as above), fine-grained recrystallised grey/khaki coloured dolomicrite. About 1-2% Mn staining on joint planes and as disseminated grains. Silicified and calcareous with jointing FCA 10°-15°. No bedding preserved. Rare horizontal stylolites as at 73·7m. Limonite coated fracture planes.
76·03m	76·3m	100%	Dolosiltstone (calcareous), generally fine-grained grey coloured with dark grey

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From	To	Recovery	Description
			arenite and clay interbeds. Fine quartz veining 1mm to 2mm wide becomes common. Strong silicification. Carbon content increasing, seen on joint planes and as isolated angular fragments.
			BCA's around 85°
76·3m	77·65	100%	Dolarenite, coarse/medium-grained, recrystallised and very hard. Gradational top and bottom. Dark grey coloured, very uniform.
			77·6m Tension gash calcite filled FCA 10°
77·65m	85·0m	100%	Dolosiltstone, fine-grained, light grey coloured with darker grey bands and washouts of arenite and carbonaceous clay. Calcite veinlets parallel to core are common. Fine black clay laminations are close to 80° BCA. Minor pyrite, galena and probable sphalerite often in coarser arenitic pieces.
			79·9m stylolite 85° BCA.
			81·5m-81·8m Khaki coloured oxidation along fractures with Mn staining on joint planes. Fine clay laminations have been disjointed by this micro-fracturing. Coarser rounded siliceous pebbles have 75° BCA.
			82·6m-83·3m Fine calcite films on core and planes.
			83·54m-83·57m Arenite band with 1mm galena and pyrite.
			83·61m-83·62m Hazy quartz band with 1mm galena. Possibly recrystallised arenite.
			83·68m-83·78m Claystone with silica replaced pyrite (cubic forms)
			84·1m-84·5m Highly fractured joint plane 10° FCA. BCA here 78°
			84·7m-84·75m 2cm arenite rounded clasts with minor fine pyrite and clay laminations

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From	To	Recovery	Description
85.0m	88.4m	100%.	Dolosiltstone, fine-grained, black to dark grey coloured. More carbonaceous and calcareous, less silicified. Slight increase in fine-grained pyrite and traces of galena. Core less fractured, with minor disruption of clasts. 86.3m 5mm to 2cm wide calcite healed tension fracture, minor rolling of angular black claystone fragments. Common 2mm wide galena cubes. Pyrite associated with galena and along micro fractures. 10° FCA. 88.16m 3mm calcite vein with pyrite 62°FCA
88.4m	89.8m	100 %.	Dolosiltstone, fine-grained light grey with grey rounded arenite pieces. Strongly silicified. Core fractured with FCA's ranging from 5° to 60° most are close to 60°. Irregular upper contact marked by thin calcite vein.
89.8m	90.7m	100 %	Dolomudite, coarse-grained, grey coloured with pink and yellow clasts. Recrystallised and silicified. Moderately calcareous. Most clasts 1m to 2m oblong subrounded and disordered. Slight preferred orientation towards base. Upper contact 20°BCA. Lower contact 58°BCA.
90.7m	103.26m	100%	Dolosiltstone, fine-grained, generally light grey coloured with grey arenite bands and clasts. Core is more disrupted almost brecciated with strong silicification and is mostly calcareous. 92.15m 10cm broken limonite stained fractures. 94.4m - 94.85m Disrupted resilicified core. Light grey sub-rounded oblong to oval 2mm clasts in darker clay matrix some tension gashes calcite healed. Possible dark

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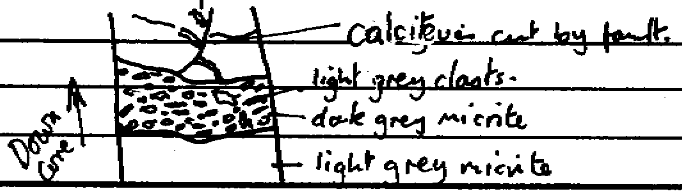
From	To	Recovery	Description
			algal mats. No visible sulphides. 96·4m - 97m Fine 1mm calcite veinlets parallel to core with slight movement on fine dark grey laminations. 96·4m - 96·5m Light grey 1-2mm clasts in black fine matrix minor calcite healed tension gashes. 96·85m 1cm wide calcite filled fracture 5° FCA through to 97·3m 101·2m 10cm of coarse chert spheroids 1-2cm across highly silicified. BCA of fine wavy laminations around 80°-75°
103·26m	110·12m	100%	Dolosiltstone, breccia conglomerate, fine grained silty micrite cement with mostly rounded large clasts generally 2cm to 3cm up to 6cm Tending to fine upwards and become more brecciated and calcite healed Upper contact about 90° BCA very disrupted, lower contact is very sharp 87° BCA. Slight oxidation on fault planes in upper metre or so then no more oxidation. Minor pyrite mostly in brecciated fault zones which have been silicified. 103·26m to 103·92m Healed breccia of dolosiltstone clasts in calcite matrix. Very common chalcedonic infill of vughs. Lower contact 52° BCA. 104·95 to 105·23m 2-3cm calcite filled fracture with trace of pyrite 10° FCA. 106·1m Start of more common interbeds of chert spheroids small only 1-2cm across. 

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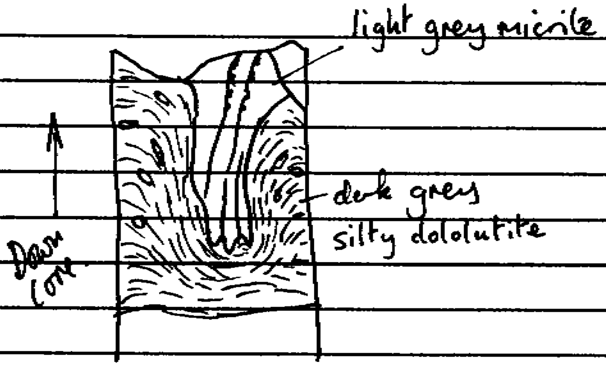
From	To	Recovery	Description
			107·5m Probable tepee structure
			
			107·73m Chalcedonic vugh with black carbonaceous filling Pyrobitumen (name?)
			109·78m to 110·12m Much coaser dolomicrite pieces in lutite cement. Up to 6cm clasts. Isolated straw coloured sphalerite.
110·12m	111·5m	100%	Dolosiltstone, fine-grained dark grey carbonaceous laminated lutite. Minor pyrite and calcite veining. Laminations 90°-80° BCA.
			110·5m Bleb of pyrite 3cm across.
111·5m	124·6m	100%	Dolosiltstone, fine-grained, light grey in colour. Minor conglomerate interbeds and rare carbonaceous shale. Calcareous. Slight oxidation on two joint breaks. Minor dark grey arenite lenses. Stylolites mostly have 90°BCA some are irregular and parallel to core. Traces of pyrite, sphalerite and galena

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From	To	Recovery	Description
			112·52. Sphalerite straw coloured in 1^{cm} wide vein with possible weathered galena. Conglomerate bands at 113·4 to 113·5^{m}, 113·98^{m} to 114·34^{m}, 116·62^{m} to 117·68^{m} and 118·93^{m} to 119·35^{m}. From 122·12 Micrite with slight dislocation.
124·6^{m}	189·68^{m}	100%	Dolosiltstone, fine-grained grey with common fine <1^{mm} laminations usually dark grey coloured. BCA 80° with some more oblique to core cross-cutting core 40° BCA. Core less disrupted less silicified and calcareous. Increased pyrite as fine grains or blebs. Common fine light grey quartz laminae and fractures. Some quartz laminae up to 5^{mm} with dusty pyrite. Upper contact 10° BCA probably a fault. 127·9^{m} Fault filled by calcite and minor pyrite. 128·22^{m} Blebs of pyrite. 147·25^{m} to 147·35^{m} breccia filled calcite with 5^{cm} of black carbonaceous claystone above and below 80° BCA From 151·5^{m} more common fine 1^{mm} to 1^{cm} grey calcareous bands. 151·72^{m} Small slump breccia filled with calcite 154·48^{m} to 155·26^{m} calcite filled fracture 10° FCA approx tensional gash with more than one stage of calcite crystallisation. 156·75^{m} calcite filled two stage breccia with parallel quartz crystallisation near edges and massive in the centre. 162·88^{m} Small 2^{mm} mud volcano into coarser silt. 164·5^{m} to 166^{m} Common calcareous fragments. 173·65^{m} 5^{cm} calcite vein with sparse pyrite and straw coloured sphalerite. Slight brecciation

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From	To	Recovery	Description
			179·5m to 179·7m 20cm of calcite vein with slight brecciation and pyrite. CALCITE veining cuts pyrite.
186·68m	249m	100%	Dolosiltstone fine-grained alternating light grey and grey bands and laminations More calcareous and generally less carbonaceous. Thin bedded with common wavy laminations. Minor cross-bedding, flakes of calcareous films. Pyrite is less common mostly very fine-grained. Very fine calcite veinlets become common. BCAs range from 90°-70° with rare lenses of grey arenite. Some fining up cycles becoming calcareous at top. Slight increase in grain-size down hole. BCAs gradually changing from 90°-80° range to more commonly 60°-50°
			207·9m 5cm of wavy light grey bands folded in on themselves.
			208m BCA 80°
			211·34m to 212·84m Lack of layering, more blotches of light grey and gray siltstone. Very calcareous (really a muddy limestone, wackestone). Pyrite is present in rounded quartz arenite pebbles sometimes with sphalerite and rare galena
			From 212·84m increasing fine 1m to 2mm veinlets of calcite.
			214·1m to 214·17m calcite filled breccia with common pyrite associated with calcite, minor sphalerite and galena. A couple of possible oxidised chalcopyrite.
			215m 60° BCA
			215·95m Fracture, graphite coated 20° FCA
			216·8m Fracture, graphite coated 18° FCA
			217·22m Fracture graphite coated irregular surface about 11° FCA
			217·62m to 217·82m Breccia zone filled with calcite

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From	To	Recovery	Description
			Upper contact is 52° FCA, lower is 11° FCA.
			218^m 46° BCA
			219.4^m 58° BCA
			220.95^m Possible stromatolite with 1^{cm} wide conformable pyrite
			225^m 36° BCA
			228^m to 229^m Increased slumping and disturbance of grey and dark grey layers.
			228.8^m 2^{cm} x 3^{cm} round sub lithic arenite lens.
			230.55^m 3^{cm} arenite band cut by calcite vein with normal fault movement 67° BCA.
			230.55^m to 234^m highly disturbed bedding.
			235.6^m small tension gash filled breccia with minor carbonate, with relict gypsum casts.
			236.85^m 3^{cm} zone showing sharp basal contact and fining upwards sequence to black claystone from fine arenite. 74° BCA
			238.96^m to 239.06^m Zone of calcite filled breccia and veining with 5^{mm} x 2^{mm} sphalerite towards base.
			240.6^m to 240.72^m About calcite veinlets with minor galena and sphalerite.
			243^m to 244.87^m Very common fine 1^{mm} to 3^{mm} quartz veins with minor brecciations stromatolites and steeper BCA angles (60°-40° range). Basal contact marked by 2^{cm} calcite filled breccia and fracture 24° FCA.
			245.2^m 30° BCA
			246.7^m coarse silt grain size from here, reduced light grey bands but still calcareous 62° BCA
			247.3^m calcite vein 1^{cm} wide 80° BCA.

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From	**To**	**Recovery**	**Description**
249m	282.9m	100%	Dolosiltstone with about 20% Dolarenite and minor claystone. Mostly coarse-grained siltstone to fine-grained arenite. Grey coloured with lighter grey more calcareous bands, lamination and altered matrix. Abundant fine calcite veinlets. Carbonaceous claystone bands have very minor pyrite are mostly finely bedded and broken. BCAs regularly change from 80° to 40° over lengths of about 1m. Arenite bands grade into siltstone often with a sharp contact at base. These are up to 1m wide. Pyrite is mostly associated with arenites and some quartz veining. Rare galena and sphalerite in veinlets. Minor cross-bedding and calcite infill breccia.
			250m 60° BCA
			250m to 252.7m Fine-grained carbonaceous claystone mostly broken with common 40° FCA planes. Calcareous and finely laminated. Grades up and down into siltstone.
			251.6m to 252m Broken core minor pyrite
			253.5m 70° BCA
			254.1m to 254.35m calcite veined carbonaceous band with 1cm calcite vein above and below. both contacts 45° BCA. Above this fine bedding laminations are contorted then change to 75° BCA.
			255.88m to 255.96m Arenite band upper contact 48° lower 42°.
			258.36m to 258.74m Common 30° FCA quartz veins about 1cm wide, often with carbon filling open spaces
			259.8m to 262.6m Calcareous light grey arenite.
			263.2m to 263.68m calcite infill breccia with carbonaceous clay clasts, minor pyrite upper contact 35° BCA, lower 28° BCA (faulted contact).
			270.45m to 270.94m Carbonaceous claystone with low angle calcite veining 10° FCA.

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From	To	Recovery	Description
			271.75m to 273.06m Similar carbonaceous claystone with 10°FCA planes. 273.7m 5cm arenite band with pyrite 60°BCA. 274.23m to 274.36m Arenite band, coaser grained top and lower contacts 72°BCA 274.4m to 274.62m calcite veining varying from 1mm to 3m wide at 20°FCA at base widens out with cavities. At top one 1mm galena cube in crest. 279.1m to 282.40m Finer siltstone and carbonaceous claystone, also calcareous with very minor films of pyrite. At 280.63m 10cm of fault vugh very carbonaceous 75°FCA.
282.9m	316m		Dolosiltstone, coarse-grained almost a fine arenite light grey bands and grey bands. A few lenses and bands of arenite Minor wavy laminations and fine cross-bedding. Pyrite is more common. Alternating light grey and grey bands have BCAs which change from 90° to 40° over about 1 metre of length. Still calcareous both grey and light grey beds. less carbonaceous claystone. Coarser arenite beds at 282.9m to 282.92m, 283.43m to 283.46m, 283.5m to 283.78m and 285m to 285.4m. 290.44m Disorganised pyrite up to 1cm wide in probable stylolite. From 286m fine arenite bands up to 2cm to 3cm wide become common. 291.75m 1cm arenite band 60°BCA 293.1m Thin 2mm calcite vein 2°BCA with minor pyrte. 298m 64°BCA 298.75m to 299.21m Disturbed bedding, silicified with abundant calcite veining and minor pyrite, slight brecciation 300m calcite vein 21°BCA 5mm wide with pyrite some is oxidised and could have

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From	To	Recovery	Description
			been chalcopyrite. Bedding now around 32° BCA
			303·86m to 303·9m Wavy, disturbed bedding
			304·12m 5mm calcite vein 3° BCA slightly dislocated.
			305·26m Trough with cross-bedding. 54° BCA
			307·15m 49° BCA
			308·09m to 308·30m Brecciated zone filled with quartz and minor pyrite, BCA below
			this is 45°
			309·7m calcite vein, conformable looks to have replaced a carbonate or gypsum.
			Slightly calcareous 48° BCA
			311·13m Slump bedding over 2cm
			312·46m 5cm with cross-bedding.
			313m 38° BCA
			313·47m 36° BCA
			314·32m 34° BCA
			315·44m to 315·65m Cross-bedded light and grey bands. BCA 24°
			315·9m 25° BCA
316m	32936m		Dolosiltstone with minor dolarenite, medium to coarse-grained siltstones and very fine
			arenites. Grey and light grey coloured laminations and bands. Calcareous and slight
			silicification with carbonaceous joints and partings. Bedding is disrupted either
			by alteration or concretionary growths. May also be stromatolitic. Abundant 1mm
			to 2mm calcite veins which are irregular, orthagonal and semi-conformable. Very
			minor pyrite mostly associated with calcite breccia. Rare green chloritic residue

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From	**To**	**Recovery**	**Description**
			associated with some of the brecciated zones. Core is distinctively different from before
			39·32m to 319·40m Broken carbonaceous claystone
			From 321·2m most bands and laminations in 0°-5° range B.C.A.
329·36m	373·78m		DOLOSILTSTONE with minor coarse silty or fine arenaceous bands. Most original bedding is gone, with relict bedding much disturbed and BCAs in the 5°-40° Range. Grey coloured with lighter grey and white more calcareous bands and lenses. Core has distinctive abundant calcite veins and veinlets. In places this is dense enough to be like a stockwork. Could possibly be calcite infill due to dolomite shrinkage. Common brecci often infill with calcite but movement of clasts is slight. Fine veinlets of calcite often cut pyrite and are then dislocated by later movements. Pyrite is not common and confined mostly to the larger 1cm to 2cm calcite veins. Rare very small chalcopyrite in small calcite veins. Minor graphite on joint planes
			330·8m Probable slump breccia 12° BCA
			331·5m Concentric laminations, ovoid bedding or concretionary growth?
			332·6m Fine chalcopyrite in calcite with pyrite.
			333·7m to 335·75m Coarse grained, finer arenaceous with bedding preserved, some cross-bedding with light grey and grey bands which are calcareous (grainstone).
			341·9m Calcite vein 5mm wide with disseminated fine chalcopyrite 35° BCA plus cross vein at 90° to this vein.
			342·25m Slump breccia, calcite filled 36° BCA

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From	To	Recovery	Description
			345.3m 20cm of twisted core due to diamond bit problems.
			346m to 346.6m Brecciated zone with veining parallel to core. From 346.6m to 369.34m light grey fine micrite
			352.5m to 353.05m Fracture through brecciated core with no calcite veining and minor graphite
			355.2m to 355.8m Brecciated zone filled with calcite veins and veinlets.
			357.1m to 357.95m Similar breccia with little movement, some factures at 10°BCA and isolated pyrobitumen.
			360m Rolled breccia 2cm wide with no calcite FCA 15° carbonaceous.
			366.53m to 366.75m abundant pyrite difused though the core.
			367.05m 22°FCA fault between two styles of calcite veined altered breccia.
			367.35m Calcite filled vugh with minor pyrite.
			367.55m 5°-10° FCA breccia 1cm wide runs through core to 368.05m, with rare pyrite.
			369.20m Fracture coated with calcite, graphite and minor pyrite irregular 5°-10° FCA.
			372.14m Pyrite associated with calcite over 8cm.
			372.72m FCA 14° 1cm irregular calcite vein with pyrite and minor galena.
			373.15m Dislocated 5mm calcite vein 50°BCA minor pyrite, one speck of chalcopyrite in centre of vein.
373.78m	402.2m	95%-100%	Fault Zone:
			Dolosiltstone ..... fine-grained, graphitic and weakly calcareous extensively brecciated with less calcite veining. Graphite is very common as infill for breccia and on joint, fault planes. Minor pyrite and galena on graphitic planes often associated with calcite and a light green possible clay. Fractures are commonly

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From	To	Recovery	Description
			in the 40° - 50° Range. Core is mostly broken with some schlickensides on planes
			with graphite. The galena appears to have also have been smeared. Core recovery
			arond 95%-100%. Upper fault contact is 26°BCA. Lower contact is broken and disrupted
			373·78m to 374·53m 80% graphitic clay 20% siltstone fragments common pyrite.
			374·53m to 378·1m Highly brecciated fine siltstone (micrite) with abundat graphite often with
			minor pyrite and rare galena, core is very factured.
			378·1m to 379·3m less brecciated, fine calcite veining.
			379·3m to 381·5m Crackle breccia with much less graphite.
			381·5m to 384·9m More competent core with fine veinlets of calcite
			384·9 to 385·4m Brecciated with abundat graphite.
			385·4m to 385·8m Abundat calcite veining one vein has almost rosy calcite in the
			centre at 385·45m and one isolated sphalerite grain.
			385·8m to 389·4m More competent core with fine abundat 1-2mm calcite veins.
			389·4m to 402·2m High brecciated with abundat graphite, minor calcite veining. Pyrite
			is common on graphite planes where associated with galena and chalcopyrite and
			green coloured calcite. (could be green clay with calcite).
			391·1m 2cm calcite vein multi stage growth 35°FCA no visible sulphides.
402·2m	421m		Dolosiltstone. fine-grained grey coloured with light grey/white calcite veining.
			Graphite is very abundat on fracture planes often with grey/white, green or
			white calcite veins, sometimes galena and pyrite is present. Galena found on
			graphite planes on its own. Fractures commonly 45°-50° FCA. Grey-white residue
			may be a lead carbonate. From 405m galena and pyrite are commonly

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From	To	Recovery	Description
			smeared out on graphitic planes. No visible sulphides within rock. Fractures are common but the core is not brecciated.
			T.D. 421 metres – casing pulled.

Notes : Water flow around 2000 gallons a hour at 48m.

Camera Shots :

Depth	Inclination	Azimuth	Depth	Inclination	Azimuth
82m	81°	171° M	322m	79.5°	189° M
120.9m	81°	172° M	373m	80.0°	193° M
169m	81°	176° M	421m	80.0°	186° M
220m	81°	180° M			
271m	80.5°	186° M			

MIM EXPLORATION P/L

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BASIC GEOTECHNICAL LOG

HOLE No. LD13
LOGGED BY GJB
DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
72.2	73.0	-400mm	/	/	R4	85°	3	10°	1	SEMI BROKEN	
73.0	76.0	+350mm	/	/	R4	85°	19	10°	2	SEMI BROKEN	
76.0	79.0	NO LOSS	/	/	R4	85°	13	20°	1	SEMI BROKEN	
79.0	82.0	+100mm	/	/	R4	85°	14	10°	2	SEMI BROKEN	
82.0	85.0	-30MM	/	/	R4	80°-85°	17	10°	5	SEMI BROKEN	
85.0	86.5	+40mm	/	/	R4	85°	2	/	/	SEMI BROKEN	
86.5	88.0	+50mm	/	/	R4	80°-85°	7	/	/	SEMI BROKEN	
88.0	91.0	+150mm	/	/	R4	75°-80°	15	20°	4	SEMI BROKEN	
91.0	93.0	+40mm	/	/	R4	70°-80°	19	20°	/	SEMI BROKEN	
93.0	94.0	+30MM	/	/	R4	75°-85°	6	/	/	SEMI BROKEN	
94.0	97.0	+110	/	/	R4	75°-85°	18	/	/	SEMI BROKEN	
97.0	98.2	+60mm	/	/	R4	85°	2	/	/	SEMI BROKEN	
98.2	100.0	NO LOSS	/	/	R4	85°	10	15°	1	SEMI BROKEN	
100.0	102.8	+120mm	/	/	R4	75°-80°	12	15°	4	SEMI BROKEN	
102.8	105.9	+10mm	/	/	R4	75°-80°	10	10°-30°	2	SEMI BROKEN	
105.9	109.0	+20mm	/	/	R4	80°-85°	8	15°	5	SEMI BROKEN	
109.0	112.0	+100mm	/	/	R4	70°-80°	12	40°	1	SEMI BROKEN	
112.0	114.7	+60mm	/	/	R4	80°-85°	10	25°	4	SEMI BROKEN	
114.7	117.8	NO LOSS	/	/	R4	75°-80°	8	/	/	SEMI BROKEN	
117.8	120.9	+340mm	/	/	R4	80°	9	15°	2	SEMI BROKEN	
120.9	124.0	-30mm	/	/	R4	85°	6	30°	2	SEMI BROKEN	
124.0	127.0	-90mm	/	/	R4	80°-85°	13	10°	1	SEMI BROKEN	
127.0	130.0	+80mm	/	/	R4	80°-85°	12	25°	1	SEMI BROKEN	
130.0	133.0	+190mm	/	/	R4	80°-85°	14	15°	1	SEMI BROKEN	
133.0	136.0	NO LOSS	/	/	R4	75°-80°	13	30°	1	SEMI BROKEN	
136.0	139.0	+110mm	/	/	R4	75°-80°	21	/	/	SEMI BROKEN	
139.0	142.0	NO LOSS	/	/	R4	75°-80°	24	/	/	SEMI BROKEN	
142.0	145.0	+50mm	/	/	R4	80°-85°	15	30°	3	SEMI BROKEN	
145.0	148.0	+90mm	/	/	R4	80°-85°	18	/	/	SEMI BROKEN	
148.0	151.0	+120mm	/	/	R4	80°-85°	33	45°	1	SEMI BROKEN	
151.0	154.0	-60mm	/	/	R4	80°-85	29	40°	1	SEMI BROKEN	
154.0	157.0	+60mm	/	/	R4	75°-80°	23	15	2	SEMI BROKEN	
157.0	160.0	+140mm	/	/	R4	70°-80°	17	/	/	SEMI BROKEN	
160.0	163.0	NO LOSS	/	/	R4	70°-80°	22	10°	1	SEMI BROKEN	
163.0	166.0	+50mm	/	/	R4	80°-85°	25	/	/	SEMI BROKEN	
166.0	167.1	+20mm	/	/	R4	85°	27	/	/	SEMI BROKEN	
167.1	169.0	+50mm	/	/	R4	75°-85°	12	15°	1	SEMI BROKEN	

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

MIM EXPLORATION P/L

PAGE..2..OF 2

BASIC GEOTECHNICAL LOG

HOLE No. LR 13...
LOGGED BY. B.D...
DATE..........

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
370·0	373·0	No Loss			R4	—	—	40°-50°	9	SEMI BROKEN	
373·0	376·0	—			R4, R3	—	—	40°	—	BROKEN CORE	
376·0	379·0	—			R3 R4	—	—	40°	—	BROKEN CORE	
379·0	382·0	—			R4	—	—	45°	—	BROKEN CORE	
382·0	383·7	—			R4	—	—	45°	—	BROKEN CORE	
383·7	385·0	No Loss			R4	—	—	45°	8	BROKEN CORE	
385·0	387·5	No Loss			R4	—	—	40	16	SEMI BROKEN	
387·5	390·6	-40			R4	—	—	45°	14	SEMI BROKEN	
390·6	393·6	+20			R4 R3	—	—	45°	17	SEMI BROKEN	
393·6	396·7	—			R4 R3	—	—	40°	—	BROKEN CORE	
396·7	399·8	—			R4 R3	—	—	45°	—	BROKEN CORE	
399·8	402·9	+50			R4 R3	—	—	45°	16	SEMI BROKEN	
402·9	406·0	—			R4	—	—	45°	—	BROKEN CORE	
406·0	409·0	+40			R4	—	—	40°-58	12	SEMI BROKEN	
409·0	412·0	—			R4	—	—	—	—	BROKEN CORE	
412·0	415·0	+100			R4	—	—	40°	17	SEMI BROKEN	
415·0	418·0	+100			R4	—	—	45°	11	SEMI BROKEN	
415·0	421·0	+30			R4	—	—	55°		SEMI BROKEN	

WEATHER : CW comp.weather H part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH: R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP14
Page No. 1 of 2

E.L. 6808 **Prospect** 'LORELLA' **Drilling Type** RC PERCUSSION

Co-ordinates 595224 **mE** 8276238 **mN** **R.L.** 1033m

Inclination -90° **Azimuth** - **Start Date** 25-9-92 **Finish Date** 28-9-92

Driller WADEN DRILLING **Logged By** DCK **Total Depth** 76m

Log	Depth	Description	Sample No.
	0-2m	WHITE-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
		WITH BROWN-RED LATERITIC SANDSTONE (10%)	
	2-3m	WHITE QUARTZ CLAY (DECOMPOSED SANDSTONE?) WITH 20%	
		BROWN-RED LATERITIC SANDSTONE.	
	3-6m	AS 2-3m WITH 30% RED-WHITE-ORANGE SILTSTONE	
	6-13m	WHITE-ORANGE DOLOSILTSTONE WITH MnO_2 DENDRITES.	
	13-15m	AS 6-13m WITH 3-5% PINK DOLOSILTSTONE.	
	15-17m	GREY DOLOSILTSTION WITH 5-10% PINK DOLOSILTSTONE	
	17-20m	AS 15-17m WITH 35% PINK DOLOSILTSTONE	
	20-22m	MEDIUM GREY DOLOSILTSTONE	
	22-26m	KHAKI-GREEN-BROWN DOLOSILTSTONE WITH MnO_2 DENDRITES	
		AND IRON STAINING PERVASSIVE. * 25m WATER *	
	26-28m	AS 22-26m WITH MINOR CHERTY BANDS, <1mm THICK.	
	28-34m	ORANGE-BROWN DOLOSILTSTONE WITH TRACE MnO_2	
		DENDRITES AND VERY MINOR CHERTY BANDS.	
	34-36m	AS 28-34m WITH 40% MnO_2 DENDRITES AND	
		EXTENSIVE IRON STAINING.	
	36-46m	AS 28-34m	
	46-47m	AS 28-34m WITH NO MnO_2 DENDRITES, 35%	
		IRON STAINING AND DOLOSILTSTONE HAS GREEN	
		TINGE.	
	47-54m	AS 46-47m WITH 5% LIGHT GREY CHERT FRAGMENTS	
		AND 5% PYRITE PSEUDOMORPHS.	
	54-55m	AS 47-54m WITH 2% LIGHT GREY CHERT FRAGMENTS	
	55-58m	CHERTY DOLOSILTSTONE - GREY, PURPLE, RED, ORANGE +	
		WHITE. MUCH IRON STAINING - POSSIBLE SOLUTION	
		ALTERATION PERVASSIVE.	
	58-59m	AS 55-58m WITH 40% YELLOW DOLARENITE - BRITTLE,	
		PITTED + CLAY ALTERED AND DOLOSILTSTONE WITH	
		MnO_2 DENDRITES AND PYRITE PSEUDOMORPHS.	

Notes : COMPOSITE 2m SAMPLES WATER AT 25m

HOLE STOPPED DUE TO WATER BACK PRESSURE.

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP14
Page No. 2 of 2

Log	Depth	Description	Sample No.
	59-60m	AS 58-59m WITH ONLY 15% YELLOW DOLARENITE AND DOLOSILTSTONE	
	60-67m	AS 46-47m WITH TRACE PYRITE PSEUDOMORPHS AND MnO_2 DENDRITES. 10% CHERT FRAGMENTS.	
	67-69m	AS 60-67m WITH 40% DARK BROWN-GREY DOLOSILTSTONE WITH MUCH MnO_2 DENDRITES AND IRON STAINING.	
	69-72m	AS 60-67m WITH 10% DARK BROWN-GREY DOLOSILTSTONE AS 67-69m.	
	72-74m	ORANGE-GREY CHERTY DOLOSILTSTONE WITH 25% CHERT NODULES - OVAL, ORANGE RIMS, DARK GREY SILICEOUS CORES.	
	74-76m	AS 72-74m WITH 5% CHERT NODULES AS IN 72-74m	
	EOH		

Notes :

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP15
Page No. 1 of 2

E.L. 6808 **Prospect** 'LORELLA' **Drilling Type** RC PERCUSSION
Co-ordinates 596502 **mE** 8277059 **mN** **R.L.** 1033 m
Inclination -90° **Azimuth** - **Start Date** 1-10-92 **Finish Date** 1-10-92
Driller WADEN DRILLING **Logged By** DCK **Total Depth** 80 m

Log	Depth	Description	Sample No.
	0-1m	BROWN SAND AND CLAY	
	1-6m	WHITE CLAY WITH 30% WHITE DOLOSILTSTONE WHICH IS MUCH CLAY ALTERED	
	6-8m	AS 1-6m WITH 20% ORANGE CLAY ALTERED DOLOSILTSTONE	
	8-12m	ORANGE-BROWN CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT MnO_2 DENDRITES	
	12-17m	ORANGE-BROWN CLAY WITH ORANGE-BROWN CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT MnO_2 DENDRITES. AT. 15-16m 1% ROUND PISOLITE.	
	17-19m	ORANGE-BROWN PARTLY SILICEOUS CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT MnO_2 DENDRITES.	
	19-23m	BROWN PARTLY SILICEOUS CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT MnO_2 DENDRITES.	
	23-26m	DARK GRAY BROWN PARTLY SILICEOUS CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT MnO_2 DENDRITES.	
	26-27m	DARK GREY DOLOSILTSTONE WITH 20% TAN DOLOSILTSTONE WITH SLIGHT SILIFICATION AND TRACE MnO_2 DENDRITES AND CLAY ALTERATION.	
	27-30m	TAN DOLOSILTSTONE WITH CLAY ALTERATION.	
	30-37m	DARK GREY LAMINATED IRON STAINED DOLOSILTSTONE WITH 20% TAN CLAY ALTERED DOLOSILTSTONE: AFTER 33m ONLY 5% TAN CLAY ALTERED DOLOSILTSTONE AND AT 35-36m NO IRON STAINING OR TAN DOLOSILTSTONE.	
	37-38m	RED-TAN DOLOSILTSTONE WITH MnO_2 DENDRITES AND IRON STAINING	
	38-39m	GREEN-BROWN DOLOSILTSTONE WITH MnO_2 DENDRITES AND IRON STAINING	
	39-40m	DARK GREY DOLOSILTSTONE WITH 10% TAN DOLOSILTSTONE WITH MnO_2 DENDRITES AND IRON STAINING	

Notes : COMPOSITE 2m SAMPLES WATER AT 30m

HOLE STOPPED AT 80m DUE TO HIGH WATER BACK PRESSURE

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Percussion Drill Log

Hole No. LP 15
Page No. 2 of 2

Log	Depth	Description	Sample No.
	40-46m	DARK GREY DOLOSILTSTONE	
		AT: 41-42m - 40% RED-TAN DOLOSILTSTONE WITH	
		MnO_2 DENDRITES AND IRON STAINING.	
	46-47m	AS 39-40m	
	47-50m	GREEN-BROWN-RED CLAY ALTERED DOLOSILTSTONE	
		WITH MnO_2 DENDRITES AND IRON STAINING.	
		AT: 49-50m - 35% DARK GREY DOLOSILTSTONE.	
	50-53m	AS 40-46m. AT: 50-51m 25% GREEN-BROWN-RED	
		CLAY ALTERED DOLOSILTSTONE WITH MnO_2 DENDRITES	
		AND IRON STAINING.	
	53-55m	DARK GREY DOLOSILTSTONE WITH IRON STAINING	
	56-61m	AS 40-46m.	
		AT: 56-57m - TRACE GREEN SOLUTION ALTERATION	
		57-58m - MINOR CALCITE	
		58-59m - IRON STAINING	
		59-60m - 5% LIGHT GREY DOLOSILTSTONE	
	61-62m	AS 40-46m WITH ABUNDANT GREEN SOLUTION	
		ALTERATION	
	62-63m	AS 40-46m WITH 15% LIGHT GREY DOLOSILTSTONE	
	63-70m	AS 40-46m WITH 2-5% DISSEMINATED PYRITE.	
	70-72m	AS 63-70m WITH TRACE LIGHT GREEN SOLUTION	
		ALTERATION AND IRON STAINING	
	72-73m	AS 63-70 m WITH IRON STAINING	
	73-74m	AS 40-46m WITH IRON STAINING	
	74-75m	AS 63-70m WITH <1% LAMINATED PYRITE BANDS	
	75-80m	AS 40-46m WITH IRON STAINING TO 78m.	
	EOH		

Notes :

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Percussion Drill Log

Hole No. LP16
Page No. 1 of 1

E.L. 6808 Prospect 'LORELLA' Drilling Type RC PERCUSSION
Co-ordinates 596977 mE 8275582 mN R.L. 1030 m
Inclination -90° Azimuth - Start Date 1-10-92 Finish Date 2-10-92
Driller WADEN DRILLING Logged By DCK Total Depth 80m

Log	Depth	Description	Sample No.
	0-2m	BROWN QUARTZ SAND WITH 20% LATERITIC SANDSTONE.	
	2-3m	RED-WHITE QUARTZ CLAY ALTERED SANDSTONE. WITH 20% LATERITIC SANDSTONE.	
	3-4m	RED-WHITE QUARTZ CLAY (DECOMPOSED SANDSTONE?) WITH 20% LATERITIC SANDSTONE.	
	4-5m	WHITE CLAY WITH 20% BROWN SANDSTONE	
	5-6m	WHITE CLAY WITH 60% WHITE CLAY ALTERED DOLO(?) SILTSTONE WITH MnO_2 DENDRITES	
	6-9m	WHITE-ORANGE CLAY ALTERED DOLOSILTSTONE WITH MnO_2 DENDRITES	
	9·12m	WHITE-PURPLE-RED CLAY/ALTERED DOLOSILTSTONE WITH MnO_2 DENDRITES	
	12-14m	PINK CLAY WITH 20% PINK DOLOSILTSTONE WITH MnO_2 DENDRITES.	
	14-18m	ORANGE CLAY WITH 5% WHITE-ORANGE DOLOSILTSTONE.	
	18-23m	ORANGE DOLOSILTSTONE WITH MnO_2 DENDRITES AND IRON STAINING.	
	23-25m	ORANGE DOLOSILTSTONE WITH 55% LIGHT GREY DOLOSILTSTONE	
	25-27m	LIGHT GREY DOLOSILTSTONE WITH TRACE MnO_2 DENDRITES AND IRON STAINING.	
	27-31m	DARK GREY DOLOSILTSTONE WITH 10% ORANGE DOLOSILTSTONE.	
	31-61m	BLACK CARBONACEOUS DOLOSILTSTONE WITH 1-3% LIGHT GREY SOLUTION ALTERATION. TRACE PYRITE(?)	
	61-80m EOH	DARK GREY DOLOSILTSTONE WITH IRREGULAR TRACE PYRITE(?).	

Notes : COMPOSITE 2m SAMPLES NO WATER

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD17
Page 1 of 2

E.L. 6808 **Prospect** 'LORELLA' **Co-ordinates** 596951 **mE** 8274506 **mN**

Core Size NQ **Precollar Depth** 120.10 **m** **Inclination** -90° **Azimuth** - **Collar R.L.** 1030m

Driller WADEN DRILLING **Logged By** DCK **Start Date** 5-10-92 **Finish Date** 7-10-92 **Total Depth** 150m

From	To	Recovery	Description
			PERCUSSION PRE-COLLAR LOG: 0-120.1m
0m	1m		BROWN QUARTZ SAND
1m	6m		BROWN QUARTZ SAND WITH 20% LATERITIC SANDSTONE
6m	10m		WHITE-RED SANDSTONE WITH 40% RED-BROWN SANDSTONE
10m	13m		GREEN CLAY WITH 60% RED-BROWN-ORANGE DOLOSILTSTONE - CLAY ALTERED AND MnO_2 DENDRITES
			MUCH IRON STAINING
13m	32m		BROWN-ORANGE CLAY WITH BROWN-ORANGE DOLOSILTSTONE - CLAY ALTERED AND MUCH IRON STAINING
			AND MnO_2 DENDRITES.
32m	33m		AS 13-32m WITH 60% DARK GREY DOLOSILTSTONE WITH IRON STAINING.
33	36m		DARK GREY DOLOSILTSTONE WITH OCCASIONAL IRON STAINING
36m	87m		DARK GREY CARBONACEOUS DOLOSILTSTONE WITH OCCASIONAL IRON STAINING AND <1% DISSEMINATED
			PYRITE. AT:- 43-44m - 1% CLEAR CALCITE
			51-52m - 1% DISSEMINATED PYRITE
87m	90m		AS 36-87m WITH 1-2% DISSEMINATED PYRITE
90m	120.10m		AS 36-87m WITH 2% CALCITE FROM 119-120.10m. - END OF PERCUSSION PRE-COLLAR
			NQ CORE LOG: 120.10-150.00m
120.10m	132.00m	100%	BLACK CARBONACEOUS, MODERATELY GRAPHITIC DOLOSILTSTONE WITH 2-5% DISSEMINATED PYRITE AND

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Core Drill Log

Hole No. LD17

Page No. 2 of 2

From	To	Recovery	Description
			OCCASIONAL ZONES OF UP TO 10% DISSEMINATED PYRITE. HAPHAZARDLY FRACTURED THROUGHOUT LENGTH WITH CALCITE
			(CLEAR TO TRANSLUCENT, RARELY WHITE) AND PYRITE INFILLING. MINOR MARCASITE ASSOCIATED WITH PYRITE WHICH
			USUALLY RIMS IT. SLICKEN SIDES ARE COMMON IN FRACTURE OPENINGS. PYRITE OCCURS AS ROSETTS OR FLAT
			SMEARINGS. THESE GROWTHS, IN OPEN FRACTURES, ARE UP TO 1mm HIGH.
			SMALL ZONES OF CLAY ALTERED DOLOSILTSTONE WITH ABUNDANT BLACK CARBONACEOUS CLAY. WISPY CALCITE IS ALOS
			ASSOCIATED. ZONES AT: 122.21-122.28m, 124.72-124.81m (MINOR KHAKI-GREEN SOLUTION ALTERATION), 127.42-127.48m
			(NUMEROUS THIN CALCITE BANDS WITH NUMEROUS OVAL-SHAPED PYRITE MASSES AT THE 129.59m CONTACT) AND 131.83-
			131.92m.
			TRACE SPHALERITE SPECKS (?), STRAW YELLOW WITH WISPY PYRITE
			THIN LIGHT GREY LITHIC BANDS ARE RARE AND RIMED BY FINER LITHIC FRAGMENTS. BCA=80°
			VERY MINOR LIGHT BROWN-GREY SOLUTION ALTERATION ALONG CLEAVAGE PLANES - WISPY - THROUGHOUT LENGTH.
			THE DOLOSILTSTONE IS WEAKLY LAMINATED DOMINANTLY BCA= 80-90° AND THE MAJOR FCA= 0-40°.
132.00m	150.00m	100%	BLACK CARBONACEOUS, MODERATE TO VERY GRAPHITIC DOLOSILTSTONE. THE ROCK IS WEAKLY LAMINATED
	EOH		WITH BCA= 80-90° AND THE MAJOR FCA= 0-30°. THE DOLOSILTSTONE HAS 5-7% DISSEMINATED PYRITE AND
			OCCASIONAL ZONES OF UP TO 15% DISSEMINATED PYRITE.
			HAPHAZARDLY FRACTURED WITH ABUNDANT ROSETTES AND IRREGULAR SHAPED PYRITE MASSES WITH MINOR
			MARCASITE RIMED BY PYRITE. TRACE CALCITE ON FRACTURES.
			THREE CARBONACEOUS CLAY ZONES AT: 132.09-132.11m, 132.25-132.36m AND 138.06-138.15m.
			MINOR WISPY PYRITE BANDS THROUGHOUT LENGTH, NO REGULAR DISTRIBUTION. BCA=80°
			MINOR LIGHT GREY LITHIC BANDS WITH FINER LITHIC FRAGMENTS ON RIMS. ASSOCIATED WITH PYRITE.
			BCA=80°
			CAMERA SHOTS 1): 126.60m -80.5° 151° / 2): 148.00 -80.5° 149° / END.

PAGE...1..OF.1.

MIM EXPLORATION P/L

BASIC GEOTECHNICAL LOG

HOLE No. .L017...
LOGGED BY..DCK.....
DATE..8-10-92.......

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
120.10	120.30	+10			R4	80-90°	1	-	-	SEMI BROKEN	
120.30	123.50	-150			R4	80-90°	13	40°	3	SEMI BROKEN	
123.50	126.60	-140			R4	80-90°	18	30°	3	SEMI BROKEN	
126.60	129.70	-			R4	80-90°	37	0-30°	6	SEMI BROKEN	
129.70	132.80	+40			R4	80-90°	20	0-30°	8	SEMI BROKEN	
132.80	135.90	-110			R4	80-90°	14	30°	8	SEMI BROKEN	
135.90	138.20	-			R4	80-90°	12	30-50°	2	SEMI BROKEN	
138.20	141.30	-60			R4	80-90°	28	30°	4	SEMI BROKEN	
141.30	144.40	+10			R4	80-90°	21	0-30°	8	SEMI BROKEN	
144.40	147.50	-20			R4	80-90°	17	20-30°	4	SEMI BROKEN	
147.50	150.00	+100			R4	80-90°	17	0-30°	4	SEMI BROKEN	
	EOH										

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP18
Page No. 1 of 1

E.L. 6808 Prospect 'LORELLA' Drilling Type RC PERCUSSION
Co-ordinates 597036 mE 8273625 mN R.L. 1025m
Inclination -90° Azimuth - Start Date 9-10-92 Finish Date 9-10-92
Driller WADEN DRILLING Logged By DCK Total Depth 60m

Log	Depth	Description	Sample No.
	0-1m	BROWN QUARTZ SAND	
	1-2m	WHITE-RED QUARTZ CLAY ALTERED SANDSTONE	
	2-9m	WHITE-ORANGE QUARTZ CLAY ALTERED SANDSTONE	
	9-20m	BROWN DOLOSILTSTONE WITH MnO_2 DENDRITES	
	20-21m	ORANGE-WHITE-GREEN QUARTZ CLAY (DECOMPOSED	
		SANDSTONE?)	
	21-23m	BROWN-GREEN QUARTZ CLAY (DECOMPOSED SANDSTONE?)	
	23-37m	GREEN CLAY ALTERED DOLOSILTSTONE WITH MnO_2	
		DENDRITES AND 30% BROWN CLAY.	
	37-45m	AS 23-37m WITH 40% BROWN-ORANGE DOLOSILTSTONE	
		WITH MnO_2 DENDRITES	
	45-60m	ORANGE-RED-BROWN DOLOSILTSTONE WITH MnO_2	
	EOH	DENDRITES	

Notes: 2m COMPOSITE SAMPLES ASSAYED LITTLE WATER FROM 24m

HOLE ABANDONED AT 60m DUE TO CONTINUAL COLLAPSINGS

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD19

Page 1 **of** 3

E.L. 6808 **Prospect** 'LORELLA' **Co-ordinates** 596996 **mE** 8272594 **mN**

Core Size NQ **Precollar Depth** 83.20 **m** **Inclination** -90° **Azimuth** - **Collar R.L.** 1025m

Driller GADEN DRILLING **Logged By** DCK **Start Date** 10-10-92 **Finish Date** 12-10-92 **Total Depth** 120m

From	To	Recovery	Description
			PERCUSSION PRE-COLLAR LOG: 0-83.20m
0m	2m		LATERITE
2m	6m		WHITE-ORANGE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE ?) WITH IRON STAINING PLUS 20% LATERITE
6m	10m		WHITE-ORANGE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE ?) WITH IRON STAINING
10m	13m		ORANGE-RED QUARTZ CLAY (DECOMPOSED SANDSTONE ?) WITH IRON STAINING
13m	16m		ORANGE-RED-WHITE-BROWN INTENSELY CLAY ALTERED SILTSTONE WITH IRON STAINING.
16m	18m		AS 13-16m WITH 30% PURPLE SILTSTONE.
18m	20m		LIGHT GREY-GREEN DOLOSILTSTONE WITH INTENSE CLAY ALTERATION
20m	23m		AS 18-20m WITH 50% MAUVE DOLOSILTSTONE
23m	25m		MAUVE DOLOSILTSTONE WITH MINOR IRON STAINING
25m	31m		WHITE-BROWN-ORANGE DOLOSILTSTONE WITH INTENSE CLAY ALTERATION
31m	37m		WHITE-BROWN-ORANGE CLAY
37m	38m		DARK GREY CLAY
38m	46m		AS 37-38m WITH 15% DARK GREY CARBONACEOUS (?) DOLOSILTSTONE
46m	83.20m		BLACK CARBONACEOUS DOLOSILTSTONE + 35% BLACK CARBONACEOUS CLAY - END OF PERCUSSION PRE-COLLAR
			NQ CORE LOG: 83.20 - 120m
83.20m	94.21m	86%	INTERBEDDED DARK GREY, SLIGHTLY CARBONACEOUS DOLOSILTSTONE WITH <1% DISSEMINATED PYRITE AND

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD19
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From	To	Recovery	Description
			BRECCIA ZONES COMPRISING CLAY ALTERED DOLOSILTSTONE CLASTS IN A YELLOW-BROWN-GREEN MATRIX. THE CLASTS
			RANGE IN SIZE FROM 5mm TO 5cm AND HAVE RAGGED EDGES. ALLARE ALTERING TO CLAY.
			MINOR SOLUTION ALTERATION (LIGHT BROWN-GREY) ALONG FRACTURE AND CLEAVAGE PLANES.
			THE CONTACT BETWEEN THE DOLOSILTSTONE AND BRECCIA ZONES SHOW INTENSE CLAY ALTERATING INVADING THE
			DOLOSILTSTONE. SOLUTION ALTERATION ALSO COMMON HERE.
			BRECCIA ZONES:- 83·80 - 84·36m, 84·60 - 84·88m, 85·39 - 86·30m, 87 - 87·91m, 88·06 - 88·20m, 89·72-
			89·92m, 90 - 90·20m, 90·29 - 90·66m, 90·79 - 90·92m, 91·80 - 91·95m, 93·30 - 93·38m, 93·59 - 93·79m AND
			93·86 - 94·21m.
			ONLY REMENANT BEDDING REMAINS BCA=80-90° - RAREY SEEN.
			CORE IS SUBSTAINTIALLY BROKEN UP (NO FCA POSSIBLE). CORE LOSS: 86·30 - 87m : 0·7m
			89·10 - 89·30m : 0·2m
			92·30 - 93m : 0·7m
			TOTAL : 1·6m
94·21m	114·22m	90%	DARK GREY SLIGHTLY CARBONACEOUS AND CLAY ALTERED DOLOSILTSTONE WITH 1-3% DISSEMINATED PYRITE AND OCCASIONAL
			<1mm THICK WHITE LITHIC BANDS (BCA=85°). REMANENT LAMINATIONS BCA=80-90° - RARE
			BROKEN UP BUT MORE COMPETENT THAN PREVIOUS LENGTH.
			MINOR ANHYDRITE(?)/BARYTE(?) ALONG ON FRACTURE PLANES AS WELL AS SLICKEN SIDES AND AQUA COLOURED CLAY.
			MINOR CLAY BANDS THROUGHOUT LENGTH AND ARE RELATED TO THE FRACTURING: i- FRACTURES ALLOW CLAY ALTERATION
			TO PROCEED. MINOR SOLUTION ALTERATION ASSOCIATED WITH CLAY BANDS.
			CORE LOSS: 95·60 - 96m = 0·4m, 113·30 - 113·80m = 0·5 m
			104·60 - 105m = 0·4m TOTAL : 2·1 m
			107·20 - 108m : 0·8m

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Core Drill Log

Hole No. L019

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From	To	Recovery	Description
114·22m	120·00m	93%	BROWN-GREEN SOLUTION AND CLAY ALTERED DOLOSILTSTONE, SOME SECTIONS ARE DOLOCLAYSTONE. HAPHAZARDLY FRACTURED
	EOH		WITH NO LAMINATIONS. THREE FRACTURE BRECCIAS (INTERCLASTIC)(FCA: 0°) WITH CLASTS OF INTENSELY CLAY AND
			SOLUTION ALTERED DOLOSILTSTONE IN A DARK GREEN CLAY MATRIX. CLASTS ARE EMBAYED WITH RAGGED EDGES
			ZONES: 116·23-116·49m, 118·38-118·46m AND 118·49-118·56m.
			IRON STAINING THROUGHOUT AND MINOR ANHYDRITE(?)/BARYTE(?) ON FRACTURES
			SOLUTION ALTERATION SEQUENCE : GREY → GREEN → BROWN. FRACTURES HAVE BROWN SOLUTION HALOES.
			CORE LOSS: 119·60-120m = 0·4m

Notes :

Camera Shots :

Depth	Inclination	Azimuth	Depth	Inclination	Azimuth
90m	-88·8°	159°			
120m	-89°	153°			

MIM EXPLORATION P/L

PAGE..1..OF.1.

BASIC GEOTECHNICAL LOG

HOLE No. ..LD19..
LOGGED BY..DCK..
DATE..13-10-92

FROM	TO	CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
83.50	84.00	–			R3-R4	–	6	0-40°	4	SEMI BROKEN	
84.00	87.00	.992			R3-R4	80-90°	20	20-50°	6	SEMI BROKEN	CORE LOSS : 0.7m
87.00	89.30	.550			R2-R4	80-90°	17	0-20°	1	BROKEN	CORE LOSS : 0.2m
89.30	90.00	.50			R2-R4	–	6	0-20°	3	BROKEN	
90.00	93.00	.1000			R3-R4	80-90°	26	–	–	BROKEN	CORE LOSS = 0.7m
93.00	96.00	.470			R2-R4	80-90°	36	–	–	BROKEN	CORE LOSS : 0.4m
96.00	99.00	–			R4	80-90°	36	0-30°	8	SEMI BROKEN	
99.00	102.00	.480			R4	–	26	0-40°	8	BROKEN	
102.00	105.00	.940			R3-R4	–	26	0-20°	2	BROKEN	CORE LOSS : 0.4m
105.00	108.00	1150			R4	–	30	–	–	BROKEN	CORE LOSS : 0.8m
108.00	109.30	–			R4	80-90°	15	0-30°	4	BROKEN	
109.30	110.70	–			R4	80-90°	13	0-30°	5	SEMI BROKEN	
110.70	113.80	.620			R4	–	23	0-30°	4	SEMI BROKEN	CORE LOSS : 0.5m
113.80	116.90	.90			R3-R4	–	14	0-20°	3	SEMI BROKEN	
116.90	120.00	.600			R3	–	21	0-20°	5	BROKEN	CORE LOSS : 0.4m
	EOH										

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh
ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD20
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E.L. 6808 **Prospect** 'LORELLA' **Co-ordinates** 614436 **mE** 8282297 **mN**

Core Size NQ **Precollar Depth** 84·30 **m** **Inclination** -90° **Azimuth** - **Collar R.L.** 1010m

Driller LADEN DRILLING **Logged By** DCK **Start Date** 15-10-92 **Finish Date** 18-10-92 **Total Depth** 184·40m

From	To	Recovery	Description
			PERCUSSION PRE-COLLAR LOG :- 0-84·30m
0m	4m		QUARTZ SAND
4m	12m		WHITE-RED-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE ?) WITH 20% WHITE-RED CLAY ALTERED SANDSTONE
12m	24m		WHITE-RED-ORANGE QUARTZ CLAY (DECOMPOSED SANDSTONE ?)
24m	37m		WHITE-RED-ORANGE CLAY WITH 15% WHITE-RED CLAY ALTERED SILTSTONE/CLAYSTONE (?).
37m	48m		WHITE-ORANGE CLAY + 5% WHITE-ORANGE CLAY ALTERED DOLOCLAYSTONE AND 2% DARK GREY DOLOCLAYSTONE.
48m	49m		DARK GREY CLAY WITH 50% ORANGE CLAY
49m	51m		DARK GREY-ORANGE AND WHITE CLAY
51m	55m		DARK GREY, GREEN AND WHITE CLAY
55m	65m		WHITE DOLOCLAYSTONE WITH 40% WHITE CLAY
65m	72m		AS 55-65m WITH 40% DARK GREY CARBONACEOUS(?) DOLOCLAYSTONE.
72m	84·30m		DARK GREY CARBONACEOUS (?) DOLOCLAYSTONE WITH 10% WHITE DOLOCLAYSTONE. END OF PERCUSSION PRE-COLLAR
			NQ CORE LOG :- 84·30-184·40m
84·30m	85·69m	100%	DARK GREEN-GREY DOLOCLAYSTONE WITH MINOR REMANENT BANDS OF DARK GREY CARBONACEOUS DOLOSILTSTONE MUCH SOLUTION ALTERATION AND CLAY ALTERATION THROUGHOUT LENGTH. IRREGULAR SHAPED CLAY BLEBS THROUGHOUT LENGTH. MINOR FRACTURING WITH CLAY ALONG PLANES AS WELL AS CLEAVAGE TRACES. BCA: 85-90° WHERE LAMINATIONS PRESENT.

M.I.M. EXPLORATION PTY. LTD.
Core Drill Log

Hole No. LD20
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From	To	Recovery	Description
85·69m	111·97m	99·6%	DARK MAROON DOLOCLAYSTONE WITH ABUNDANT LIGHT GREEN SOLUTION ALTERATION ALONG FRACTURE AND CLEAVAGE PLANES, ALSO PRESENT BLOCHES AND IRREGULAR-SHAPED PATCHES OF LIGHT GREEN SOLUTION ALTERATION THROUGHOUT LENGTH. BCA= 85-90° WHERE RARE LAMINATIONS PRESENT. DOLARENITE INTERBEDS THROUGHOUT LENGTH. THE MAROON-GREEN-WHITE DOLARENITE IS BRITTLE, INTENSELY CLAY ALTERED AND HAS SMALL IRREGULAR-SHAPED CLAY ALTERED LITHIC(?) FRAGMENTS. SOLUTION ALTERATION ABUNDANT. DOLARENITE BANDS FROM:- 87·56-87·72m, 87·87m, 87·89m, 88·87-88·90m, 89·41-89·43m, 89·72-89·78m, 90·10-90·12m, 90·28-90·30m, 90·32m, 90·48-90·52m, 90·93-90·95m, 91·12-91·15m, 91·37-91·41m, 92-92·02m, 92·11-92·16m, 92·93m, 92·46-92·52m, 94·56-94·58m, 94·59m, 96-96·05m, 96·20-96·54m (MANY THIN BANDS), 96·80-96·83m, 96·85-96·87m, 97-97·18m, 97·22m, 97·30m, 97·35m, 97·38m, 97·45-97·52m, 98-98·03m, 99·83m, 101·02-101·09m, 101·91-101·94m, 102·33-102·45m, 103·51-103·53m, 103·64m, 106·71-106·76m, 106·44-106·52m, 107·39-107·44m, 107·81-107·85m, 108·31-108·33m, 108·62-108·64m, 108·97m, 109·06m, 109·08m, 109·09-109·11m, 109·24-109·35m, 109·37-109·55m, 111·17-111·19m AND 111·40-111·43m.
111·97m	115·36m	100%	INTERBEDDED DOLARENITE (90%) AND DOLOCLAYSTONE. THE DOLARENITE IS INTENSELY CLAY ALTERED, BRITTLE, PITTED, HAS LITHIC(?) FRAGMENTS AND IS WHITE-RED-GREEN IN COLOURATION. THE MAROON DOLOCLAYSTONE IS INTENSELY GREEN SOLUTION ALTERED. GRADATIONAL CONTACTS. BCA= 85-90° WHERE RARE LAMINATIONS ARE PRESENT. FROM 112·91-112·92m, 112·95-112·98m, 113·38-113·44m, 113·66-113·85m AND 113·90-114·01m POSSIBLE PEBBLE BRECCIAS IN DOLARENITE. OVAL, ELLIPTICAL AND IRREGULAR SHAPED DOLOCLAYSTONE PEBBLES 2mm TO 3cm ACROSS (LONG AXIS). NO DISTINCT ORIENTATION TO CLAST ARRANGEMENTS - RANDOM.
115·36m	116·13m	100%	DARK GREY-MAROON DOLOCLAYSTONE WITH LIGHT GREEN SOLUTION ALTERATION. INTENSE CLAY ALTERATION

M.I.M. EXPLORATION PTY. LTD.
Core Drill Log

Hole No. LD20
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From	To	Recovery	Description
			AND WHERE LAMINATION ARE PRESENT BCA= 90°. MINOR IRON STAINING ON FRACTURE, CLEAVAGE AND
			BEDDING(?) PLANES. MUCH CLAY ALONG THESE PLANES ALSO.
116·13m	116·23m	100%	DARK GREEN-GREY-WHITE DOLARENITE BANDS - PITTED, BRITTLE AND CLAY ALTERED. SOLUTION ALTERATION
			THROUGHOUT LENGTH. MANY GREEN CLAY BANDS - VERY THIN.
			BCA= 80-85° THROUGHOUT LENGTH.
116·23m	156·51m	99·3%	DARK GREEN-GREY DOLOCLAYSTONE WITH CLAY AND LIGHT CREAM-GREEN SOLUTION ALTERATION
			ALONG FRACTURE, CLEAVAGE AND BEDDING PLANES. BCA = 85-90° WHERE LAMINATION ARE PRESENT.
			MINOR RED CLAY BANDS <1mm THICK AND WISPY BLACK INCLUSIONS THROUGHOUT LENGTH.
			NUMEROUS ZONES OF MEDIUM GREEN CLAY AND SOLUTION ALTERATION AFTER 139·77m.
			BCA= 80-90° FCA= 0-30°.
			SMALL FRACTURE BRECCIA FROM 150·82- 150·84m ALONG AN OPEN CLEAVAGE PLANE. POSSIBLY AND
			INTERCLASTIC BRECCIA. CLASTS OF DOLOCLAYSTONE IN GREEN-GREY CLAY.
			MINOR ROUNDED PYRITE GRAINS ON FRACTURES AND CLEAVAGE PARTINGS AT; 155m, 155·10m AND 156·04 - 156·09m.
			FROM 145.95 THE DOLOCLAYSTONE REGULARLY HAS SMALL ROUNDED BLACK SPECKS THROUGH IT. CARBONACEOUS
			CLAY SPECKS (?)
156·51m	158·36m	100%	DARK GREY (FRESH) TO WHITE-GREY AND GREEN CLAY ALTERED DOLARENITE. THE DOLARENITE IS SILICEOUS,
			PERVASSIVELY SOLUTION ALTERED AND WELL FRACTURED WITH MINOR CALCITE AND ABUNDANT PYRITE AS
			FRACTURE FILLINGS. IRON STAINING IS COMMON THROUGHOUT LENGTH. PYRITE CONTENT IS ABOUT 5-7%.
			LIGHT GREEN CLAY IS RIGHT THROUGH THE CORE - INVADING ALONG CLEAVAGE/BEDDING PLANES. APPEARS
			THE DOLARENITE IS SLOWLY TURNING TO CLAY. THE PYRITE IS ALTERING TO A IRON-RICH RED CLAY.

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD20

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From	To	Recovery	Description
			A FRACTURE BRECCIA FROM 158.03 - 158.08m CONTAINS CLASTS OF INTENSELY CLAY ALTERED GREEN-GREY
			DOLOCLAYSTONE IN A GREEN-GREY CLAY MATRIX. FCA = 50°
			FROM 156.51 - 156.57m AND 157.08 - 157.15m LITHIC (?) FRAGMENTS WHICH ARE INTENSELY CLAY ALTERED
			CREAM, HARD OVALOIDS. THEY ARE SURROUNDED BY CLAY. THE BANDS ARE FRESH FROM 156.01 - 156.03m AND
			157.09 - 157.13m HERE THE BANDS HAVE DARK GREY MASSES, CLEAR QUARTZ AND LATH-SHAPED PIECES
			JUMBLED RANDOMLY TOGETHER IN A SILICEOUS GROUNDMASS. - GRIT OR PEBBLE BRECCIA (?)
			BCA
			156.51 - 156.77 : 80° FCA = 0-30° THROUGHOUT LENGTH.
			156.77 - 157.06 : -
			157.06 - 157.07 : 75°
			157.07 - 158.26 : -
			158.26 - 158.35 : 75°
			158.35 - 158.36 : -
158.36m	161.28m	100%	BRECCIA ZONE: CLASTS OF MAROON-GREEN CLAY AND SOLUTION ALTERED DOLOCLAYSTONE IN A MATRIX OF MAROON,
			GREEN AND ORANGE CLAY. CLASTS RANGE FROM <1mm TO 18cm ACROSS AND ALL HAVE RAGGED AND EMBAYED EDGES AND
			ARE INTENSELY CLAY ALTERED. THE CLASTS ARE SUB-ANGULAR.
			THE CORE IS VERY PITTED AND WASHED OUT.
			2-3% MASSES OF PYRITE (SMALL CLUMPS 3-5mm ACROSS) THROUGHOUT LENGTH. SEEM TO BE CLASTS.
			THE DOLOCLAYSTONE CLASTS ARE SO SOFT THAT ROUNDER QUARTZ (?) GRAINS HAVE INBEDDED THEMSELVES IN THEM.
161.28m	170.37m	100%	AS 85.69 - 111.97m. POSSIBLE LITHIC (?) BANDS AT 162.32 - 162.45m, 162.50m, 162.67m, 164.05m, 165.29m AND 165.47m.
			THE BAND ARE WHITE, PARTLY BROKEN UP AND INTENSELY CLAY ALTERED. BCA AS BCA FOR CLEAVAGE/BEDDING PLANES.

M.I.M. EXPLORATION PTY. LTD.

Core Drill Log

Hole No. LD20

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From	To	Recovery	Description
			MUCH OF THE LENGTH HAS SMALL BLACK SPECKS ON THE SURFACE - CARBONACEOUS CLAY (?).
			FROM 170.35 - 170.355m A SMALL PITTED DOLARENITE BAND - WHITE TO TRANSLUCENT QUARTZ IN WHITE
			WASHED OUT CLAY.
			BCA
			70° : 161.28 - 166m
			80° : 166m - 170.37m.
170.37m	184.90m (EOH)	73%	WHITE TO CREAM, MEDIUM - COARSE GRAINED LITHIC (IN PART) DOLARENITE INTERBEDDED WITH OCCASIONAL WHITE-
			GREEN DOLOCLAYSTONE. BOTH ARE CLAY AND SOLUTION ALTERED. HYDROSCOPIC AND POROUS CORE. THE DOLOCLAYSTONE
			ZONES ARE VERY SOFT AND WASHED OUT.
			NO LAMINATIONS UNTIL 174.40m AFTER WHICH BEDDING IS ERATIC WITH BCA = 40-70°. THE BEDDING CHANGES
			AS MUCH AS 20° OVER 1-2cm. BAND CONSIST OF WHITE DOLARENITE, SILICEOUS GREY CHERTY MATERIAL AND
			CLEAR - TRANSLUCENT QUARTZ. MINIATURE CLEAR SHARDS OF QUARTZ ARE COMMON ON FRACTURES. MINOR IRON
			STAINING THROUGHOUT ALONG BEDDING/CLEAVAGE/FRACTURE PLANES.
			AFTER 178.10m VERY SILICEOUS AND FOREMENTIONED BANDS ARE VERY PRONOUNCED. THE CORE IS VERY BROKEN UP AND SCATTERED.
			CORE LOSS:- 176.40 - 177.60 = 1.2m 183.00 - 184.00 = 1m
			178.30 - 178.60 = 0.3m 184.10 - 184.40 = 0.3m TOTAL = 3.8m LOST.
			180.20 - 181.00 = 0.8m
			182.10 - 182.30 = 0.2m

Notes : HOLE WAS STOPPED AT 184.40m AS OF NUMEROUS CAVITIES AND MINOR CAVE IN.

Camera Shots :

Depth	Inclination	Azimuth	Depth	Inclination	Azimuth
127m	-87.5°	194°			
169m	-88.0°	196°			

MIM EXPLORATION P/L

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BASIC GEOTECHNICAL LOG

HOLE No. LD20
LOGGED BY. DCK
DATE 17/19-10-92

FROM	TO	mm CORE LOSS	ROCK TYPE	WEATHER	ROCK STRENGTH	C.B.A.	BEDDING BREAKS	C.F.A.	JOINT BREAKS	R.Q.D.	REMARKS
84.30	85.0	-60			R3	85-90°	24	-	-	SEMI BROKEN	
85.0	88.0	-140			R3	85-90°	56	50°	1	SEMI BROKEN	CORE LOSS : 0.1m
88.0	91.0	-10			R3	85-90°	33	-	-	SEMI BROKEN	
91.0	94.0	–			R3	85-90°	28	-	-	SEMI BROKEN	
94.0	97.0	-30			R3	85-90°	30	40-45°	4	SEMI BROKEN	
97.0	100.0	-			R3	85-90°	44	30°	1	SEMI BROKEN	
100.0	103.0	+35			R3	85-90°	20	–	–	SEMI BROKEN	
103.0	106.0	–			R3	85-90°	29	-	-	SEMI BROKEN	
106.0	109.0	-30			R3	85-90°	21	35°	2	SEMI BROKEN	
109.0	112.0	-20			R3	85-90°	24	60°	2	SEMI BROKEN	
112.0	115.0	-80			R4	85-90°	22	0°	1	SEMI BROKEN	
115.0	118.0	-10			R3-R4	85-90°	36	0°	1	SEMI BROKEN	
118.0	121.0	-			R3	85-90°	66	50°	4	SEMI BROKEN	
121.0	124.0	-20			R3	85-90°	26	0-20°	6	SEMI BROKEN	
124.0	127.0	–			R3	85-90°	83	20°	2	SEMI BROKEN	
127.0	130.0	[illegible]			R3	85-90°	73	-	-	SEMI BROKEN	
130.0	133.0	-50			R3	85-90°	48	30°	1	SEMI BROKEN	
133.0	136.0	-			R3	85-90°	63	0°+40°	2	SEMI BROKEN	
136.0	139.0	-			R3	85-90°	37	10-30°	4	SEMI BROKEN	
139.0	142.0	-60			R3	85-90°	41	–	-	SEMI BROKEN	
142.0	145.0	–			R3	85-90°	48	45°	2	SEMI BROKEN	
145.0	148.0	-60			R3	85-90°	52	10°	1	BROKEN	
148.0	151.0	-40			R3	85-90°	44	0°+45°	4	BROKEN	
151.0	154.0	-300			R3	85-90°	32	0°	1	BROKEN	CORE LOSS - 0.3 m
154.0	157.0	-80			R3-R4	85-90°	43	0-35°	5	BROKEN	
157.0	160.0	+60			R2+R4	70°	17	40°	1	SEMI BROKEN	BRECCIA IN PART
160.0	163.0	+50			R2-R3	70°	40	-	—	SEMI BROKEN	BRECCIA IN PART
163.0	166.0	-30			R3	70°	49	-	-	SEMI BROKEN	
166.0	169.0	-100			R3	80°	38	50-60°	4	SEMI BROKEN	
169.0	172.0	+10			R3-R4	70-80°	28	0-40°	8	SEMI BROKEN	
172.0	174.5	-100			R3-R4	80-90°	48	0-10°	2	BROKEN	
174.5	177.6	-1350			R3-R4	40-70°	31	0-45°	4	BROKEN	CORE LOSS = 1.2m
177.6	178.6	-340			R3-R4	40-70°	10	0°	1	BROKEN	CORE LOSS = 0.3m
178.6	181.0	-1450			R4	60°	23	0-10°	3	BROKEN	CORE LOSS - 0.8m
181.0	182.3	-300			R4	70-80°	16	10°	1	BROKEN	CORE LOSS = 0.2m
182.3	184.0	-1050			R4	50°?	11	-	-	RUBBLE	CORE LOSS - 1.0m
184.0	184.4 (EOH)	-300			R4	?	4	-	-	RUBBLE	CORE LOSS - 0.3m

WEATHER : CW comp.weather W part.weather SW sl.weather FrOx fresh weather Fr fresh

ROCK STRENGTH : R1 v.weak R2 weak R3 med.strong R4 strong R5 v.strong

M.I.M. EXPLORATION PTY.LTD.

Percussion Drill Log

Hole No. LP21
Page No. 1 of 1

E.L. 6808 Prospect 'LORELLA' Drilling Type RC PERCUSSION
Co-ordinates 612216 mE 8247321 mN R.L. 1045m
Inclination -90° Azimuth - Start Date 20-10-92 Finish Date 20-10-92
Driller WADEN DRILLING Logged By DCK Total Depth 120m

Log	Depth	Description	Sample No.
	0-1m	SOIL WITH LATERITE	
	1-4m	LATERITE	
	4-5m	AS 1-4m WITH 85% WHITE-CREAM CLAY	
	5-8m	BROWN-WHITE CLAYSTONE	
	8-10m	WHITE DOLOCLAYSTONE	
	10-18m	BROWN-ORANGE-WHITE DOLOCLAYSTONE	
	18-19m	LIGHT CREAM-BROWN DOLOCLAYSTONE WITH MINOR	
		IRON STAINING	
	19-69m	YELLOW-BROWN TO LIGHT GREY DOLOCLAYSTONE WITH	
		MINOR IRON STAINING	
	69-79m	DARK RED-BROWN DOLOCLAYSTONE	
	79-88m	MEDIUM GREEN-BROWN DOLOCLAYSTONE	
	88-120m	GREEN DOLOCLAYSTONE WITH MINOR IRON STAINING	
	(EOH)	AND 10-20% BROWN DOLOCLAYSTONE	

Notes : COMPOSITE 2m SAMPLES

WATER AT 27m

DRILL ASSAY RESULTS

LURELLA, N.T.

amdel

Job: 2DN0954
O/N: QP 102501

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP 102501	9	8	7	1.58%	260
QP 102502	17	10	8	2.70%	1060
QP 102503	14	7	11	1.37%	700
QP 102504	21	13	14	2.74%	660
QP 102505	18	19	15	3.76%	400
QP 102506	15	15	17	3.30%	250
QP 102507	19	15	26	3.04%	390
QP 102508	27	18	35	4.74%	1290
QP 102509	22	15	23	3.40%	820
QP 102510	20	14	19	3.04%	640
QP 102511	21	17	19	3.20%	510
QP 102512	21	13	17	2.70%	510
QP 102513	16	12	11	1.57%	440
QP 102514	12	19	19	2.04%	330
QP 102515	9	14	5	2.40%	100
QP 102516	11	23	10	3.06%	105
QP 102517	10	18	13	2.90%	105
QP 102518	10	17	9	2.74%	86
QP 102519	11	14	10	2.64%	90
QP 102520	14	15	9	2.98%	80
QP 102521	16	19	8	3.46%	96
QP 102522	14	13	4	2.56%	74
QP 102523	9	16	10	2.48%	69
QP 102524	19	36	52	3.40%	135
QP 102525	14	16	32	2.60%	160
QP 102526	16	27	42	3.96%	1170
QP 102527	15	21	26	3.02%	540
QP 102528	15	10	19	1.95%	270
QP 102529	14	10	8	2.08%	560
QP 102530	8	13	21	2.62%	1150
QP 102531	8	11	10	2.18%	460
QP 102532	6	9	9	1.86%	280
QP 102533	6	8	5	1.82%	170
QP 102534	7	10	10	2.20%	170
QP 102535	6	9	4	1.57%	125
QP 102536	8	10	6	2.02%	140
QP 102537	9	16	9	2.54%	195
QP 102538	7	10	9	1.75%	140
QP 102539	8	7	9	1.62%	130
QP 102540	13	16	10	2.80%	160
QP 102541	14	10	12	2.48%	130
QP 102542	9	8	13	1.54%	125
QP 102543	8	11	15	1.47%	570
QP 102544	9	6	13	1.35%	170
QP 102545	13	7	17	1.37%	210
QP 102546	10	10	13	1.83%	320
QP 102547	10	6	9	1.35%	80
QP 102548	7	7	12	1.37%	320
QP 102549	12	12	12	2.64%	290
QP 102550	8	9	11	1.64%	330
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LP8

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP 102551	15	12	4	3.62%	260
QP 102552	27	16	7	5.52%	110
QP 102553	21	10	5	3.48%	60
QP 102554	12	8	3	1.55%	59
QP 102555	10	5	2	8600	24
QP 102556	11	<4	3	1.33%	32
QP 102557	10	6	4	2.10%	165
QP 102558	15	16	12	4.44%	360
QP 102559	12	16	6	2.96%	145
QP 102560	13	17	7	3.20%	200
QP 102561	13	13	7	2.56%	900
QP 102562	15	14	9	2.34%	1170
QP 102563	16	14	14	3.22%	740
QP 102564	13	15	10	2.38%	1370
QP 102565	9	8	11	1.04%	200
QP 102566	9	8	11	1.01%	190
QP 102567	7	6	16	1.11%	100
QP 102568	7	5	11	9100	50
QP 102569	4	16	21	1.42%	47
QP 102570	8	19	22	1.72%	47
QP 102571	9	16	32	1.58%	68
QP 102572	6	21	8	1.01%	34
QP 102573	22	36	64	2.98%	260
QP 102574	33	51	190	5.92%	900
QP 102575	39	45	82	2.60%	1500
QP 102576	17	31	59	2.50%	390
QP 102577	35	28	51	2.92%	550
QP 102578	22	33	56	2.88%	330
QP 102579	11	32	47	2.62%	220
QP 102580	9	37	62	2.98%	330
QP 102581	11	43	71	2.96%	380
QP 102582	9	34	51	2.46%	280
QP 102583	8	35	44	2.42%	320
QP 102584	8	35	40	2.44%	330
QP 102585	12	40	54	2.94%	370
QP 102586	11	38	50	2.58%	330
QP 102587	11	35	51	2.60%	330
QP 102588	13	34	57	2.70%	350
QP 102589	9	29	49	2.16%	310
QP 102590	11	33	53	2.48%	420
QP 102591	20	38	55	3.36%	630
QP 102592	13	30	45	2.64%	440
QP 102593	13	32	33	2.42%	420
QP 102594	12	32	32	2.50%	370
QP 102595	10	30	29	2.08%	310
QP 102596	6	29	20	1.78%	270
QP 102597	13	37	70	3.10%	1130
QP 102598	21	45	91	4.86%	3780
QP 102599	21	39	77	4.28%	3410
QP 102600	22	38	75	3.86%	3520
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LP9

LORELLA, N.T.

amdel

Job: 2DN0987
O/N: QP102601

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102601	2	4	7	9500	43
QP102602	6	<4	8	1.97%	115
QP102603	16	6	33	4.86%	92
QP102604	7	7	4	2.28%	69
QP102605	9	13	12	3.56%	200
QP102606	10	13	7	3.42%	120
QP102607	12	8	7	3.26%	95
QP102608	17	24	15	5.02%	280
QP102609	12	19	12	3.50%	200
QP102610	12	20	12	2.96%	390
QP102611	8	10	6	2.72%	450
QP102612	5	20	9	4.38%	220
QP102613	<2	12	8	4.66%	36
QP102614	3	13	8	3.68%	18
QP102615	2	15	13	1.51%	12
QP102616	3	9	24	1.68%	18
QP102617	4	16	29	1.80%	26
QP102618	4	13	42	1.76%	27
QP102619	9	16	43	2.42%	24
QP102620	12	11	49	2.28%	38
QP102621	10	14	48	1.99%	58
QP102622	7	9	24	1.25%	53
QP102623	8	9	27	1.76%	68
QP102624	8	12	11	5900	30
QP102625	12	50	18	6500	35
QP102626	13	48	18	1.14%	520
QP102627	23	110	54	4.00%	1.29%
QP102628	15	42	57	4.00%	2.08%
QP102629	14	83	110	4.16%	1.23%
QP102630	23	155	160	6.82%	8930
QP102631	17	115	180	6.36%	9150
QP102632	19	290	105	3.32%	2290
QP102633	15	130	105	4.78%	440
QP102634	10	110	120	5.24%	480
QP102635	10	260	230	8.46%	740
QP102636	10	260	240	7.14%	1480
QP102637	9	53	68	1.34%	4740
QP102638	15	180	200	3.96%	1.97%
QP102639	30	300	240	4.82%	1.08%
QP102640	41	570	280	6.80%	5960
QP102641	26	540	260	3.88%	8770
QP102642	10	93	96	1.59%	1.34%
QP102643	18	210	230	4.90%	2.38%
QP102644	42	200	510	1.32%	5310
QP102645	41	160	530	15.7%	3400
QP102646	23	130	290	11.4%	2270
QP102647	22	48	130	4.08%	910
QP102648	10	38	73	2.56%	2690
QP102649	21	55	145	4.50%	970
QP102650	15	46	150	4.00%	780
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	AAS1C

LD10

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102651	37	88	240	6.56%	2590
QP102652	24	11	300	6.70%	1900
QP102653	19	72	220	4.16%	820
QP102654	26	76	300	5.88%	3170
QP102655	34	93	290	5.94%	2690
QP102656	56	110	390	7.16%	2840
QP102657	59	110	410	9.16%	1.05%
QP102658	79	130	390	8.32%	6490
QP102659	18	150	220	7.60%	700
QP102660	40	100	3	6.10%	690
QP102661	19	230	250	11.1%	1950
QP102662	17	175	125	6.32%	520
QP102663	17	140	87	3.20%	680
QP102664	20	145	180	8.00%	890
QP102665	22	75	140	2.94%	200
QP102666	29	83	93	2.22%	115
QP102667	8	63	115	2.10%	5920
QP102668	6	38	66	1.97%	3640
QP102669	7	56	36	1.36%	2670
QP102670	6	75	48	1.87%	3460
QP102671	3	50	44	1.68%	3450
QP102672	6	38	49	1.41%	1980
QP102673	10	34	51	2.18%	1210
QP102674	8	42	55	1.77%	1420
QP102675	6	36	44	3.12%	3910
QP102676	7	35	67	1.49%	1530
QP102677	10	38	68	1.33%	660
QP102678	4	19	12	3100	220
QP102679	5	26	13	3700	115
QP102680	8	23	50	1.01%	440
QP102681	9	36	39	1.61%	1350
QP102682	8	41	40	1.85%	1970
QP102683	56	49	16	1.87%	940
QP102684	10	32	16	2.06%	770
QP102685	20	26	21	1.63%	1110
QP102686	13	24	17	1.79%	690
QP102687	10	24	39	1.58%	840
QP102688	16	22	50	1.69%	1780
QP102689	19	30	59	1.85%	1040
QP102690	17	31	63	1.87%	780
QP102691	16	27	75	1.81%	640
QP102692	17	29	120	1.73%	850
QP102693	14	26	68	1.75%	960
QP102694	38	41	71	2.10%	1350
QP102695	16	24	73	1.53%	1120
QP102696	12	32	98	1.59%	2190
QP102697	10	29	96	1.65%	1940
QP102698	41	24	88	1.70%	650
QP102699	11	27	25	9700	1270
QP102700	6	35	81	1.36%	1370
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	AAS1C

LD10

(cont.)

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102701	12	34	88	1.92%	1810
QP102702	24	36	81	2.92%	2730
QP102703	20	40	120	3.04%	2850
QP102704	23	43	115	1.85%	2110
QP102705	31	42	96	1.94%	1440
QP102706	43	47	96	1.96%	2170
QP102707	35	53	120	2.42%	2380
QP102708	38	53	115	2.22%	3650
QP102709	14	46	105	2.64%	4760
QP102710	16	39	120	2.36%	165
QP102711	21	41	130	2.50%	320
QP102712	9	12	6	1.77%	140
QP102713	20	23	10	2.62%	620
QP102714	14	20	14	2.08%	390
QP102715	18	24	20	3.04%	660
QP102716	21	28	19	4.24%	500
QP102717	22	24	21	4.22%	460
QP102718	19	22	19	3.62%	250
QP102719	18	23	18	3.18%	260
QP102720	12	22	15	3.24%	290
QP102721	13	18	16	3.12%	490
QP102722	11	22	18	4.48%	500
QP102723	6	25	11	6.12%	120
QP102724	4	22	9	3.56%	105
QP102725	6	24	12	4.62%	190
QP102726	7	19	15	4.48%	185
QP102727	6	20	17	4.18%	105
QP102728	6	17	22	3.02%	78
QP102729	8	21	36	2.40%	145
QP102730	9	24	57	1.50%	53
QP102731	8	13	37	1.29%	65
QP102732	9	9	22	1.09%	77
QP102733	7	8	6	5300	270
QP102734	6	15	8	4900	94
QP102735	4	15	6	3000	115
QP102736	5	17	5	6000	780
QP102737	7	19	4	3300	360
QP102738	6	18	6	7000	990
QP102739	7	13	<2	1.03%	100
QP102740	7	18	6	1.38%	1070
QP102741	6	19	<2	1.33%	1210
QP102742	5	150	9	1.13%	1110
QP102743	6	14	10	1.69%	1490
QP102744	4	16	8	1.41%	930
QP102745	4	35	7	1.11%	730
QP102746	8	12	11	1.59%	950
QP102747	6	13	12	1.83%	1010
QP102748	6	23	11	1.88%	1170
QP102749	5	47	13	1.98%	670
QP102750	6	16	12	1.86%	490
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD10

(cont.)

LD11

amdel

Job: 2DN0987
O/N: QP102601

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102751	5	22	10	1.47%	430
QP102752	7	15	11	1.70%	440
QP102753	5	41	12	1.63%	570
QP102754	20	12	10	1.31%	1580
QP102755	10	10	11	1.50%	3260
QP102756	6	13	13	1.43%	1960
QP102757	7	12	12	1.39%	1580
QP102758	7	12	13	1.27%	910
QP102759	6	14	12	1.24%	280
QP102760	5	19	10	1.25%	480
QP102761	5	15	11	1.33%	470
QP102762	15	17	14	1.49%	480
QP102763	11	18	14	1.37%	600
QP102764	12	18	11	1.54%	1120
QP102765	14	17	12	1.69%	690
QP102766	12	18	12	1.17%	640
QP102767	12	86	53	3.64%	1970
QP102768	12	34	100	2.66%	1.01%
QP102769	16	130	670	4.48%	9150
QP102770	11	67	590	5.28%	2.10%
QP102771	20	160	510	3.62%	5960
QP102772	8	83	150	2.02%	2.30%
QP102773	7	120	165	2.48%	1160
QP102774	7	100	190	2.56%	6060
QP102775	9	98	370	3.66%	2280
QP102776	7	39	230	2.86%	740
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME					

LD11

(cont.)

LORELLA

amdel

Job: 2DN1022
O/N: QP102777

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102777	19	46	210	2.54%	1740
QP102778	12	39	125	2.60%	72
QP102779	16	49	165	3.70%	200
QP102780	17	105	350	5.50%	770
QP102781	15	80	440	3.70%	610
QP102782	20	73	400	3.22%	830
QP102783	15	105	460	4.26%	720
QP102784	14	135	800	6.68%	320
QP102785	13	195	630	9.98%	175
QP102786	13	220	770	1.62%	2800
QP102787	13	175	260	1.10%	680
QP102788	14	135	230	6.86%	550
QP102789	4	64	185	2.56%	7350
QP102790	15	98	290	3.94%	3770
QP102791	7	58	170	2.66%	6130
QP102792	9	50	170	4.78%	6430
QP102793	7	39	30	2.20%	7120
QP102794	5	38	73	1.75%	6310
QP102795	13	53	46	2.62%	3130
QP102796	6	53	82	3.50%	2470
QP102797	2	4	14	3600	490
QP102798	39	43	77	3.70%	2860
QP102799	10	35	67	2.06%	2300
QP102800	8	28	110	1.81%	2700
QP102801	18	19	140	1.60%	770
QP102802	15	47	140	1.86%	1970
QP102803	11	27	105	1.84%	1930
QP102804	8	24	87	2.04%	1410
QP102805	16	17	54	1.72%	1470
QP102806	6	12	68	1.86%	440
QP102807	11	24	99	1.99%	1410
QP102808	8	10	58	1.59%	750
QP102809	14	20	57	2.10%	1820
QP102810	13	25	28	1.89%	2240
QP102811	35	31	40	2.20%	1980
QP102812	10	17	67	1.76%	660
QP102813	21	38	61	1.96%	1260
QP102814	14	26	52	2.04%	400
QP102815	10	30	71	1.93%	450
QP102816	25	27	65	1.96%	1640
QP102817	17	55	88	2.22%	3010
QP102818	18	17	58	1.73%	2360
QP102819	23	26	53	1.75%	1690
QP102820	24	79	76	2.40%	1710
QP102821	14	25	45	1.70%	1560
QP102822	20	33	87	2.14%	340
QP102823	12	25	87	2.28%	300
QP102824	36	41	105	2.48%	460
QP102825	18	57	105	2.48%	2690
QP102826	12	21	84	2.12%	350
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD11

(cont.)

amdel

Job: 2DN1063
O/N: QP102827

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn	
QP102827	31	45	105	2.36%	240	**LD11** (cont.)
QP102828	21	32	64	2.00%	2000	
QP102829	25	140	115	2.26%	1210	
QP102830	28	55	44	2.22%	1260	
QP102831	12	40	130	2.08%	1980	
QP102832	13	22	175	2.74%	1270	
QP102833	31	95	140	1.91%	2510	
QP102834	39	68	88	2.22%	1550	
QP102835	23	59	71	1.91%	2100	
QP102836	26	28	125	2.96%	470	
QP102837	29	80	105	2.66%	1300	
QP102838	26	24	195	3.26%	175	
QP102839	15	20	150	2.74%	250	
QP102840	12	19	140	3.00%	230	
QP102841	13	22	145	2.92%	165	
QP102842	13	19	94	3.10%	125	
QP102843	30	34	145	3.22%	130	
QP102844	14	26	150	3.00%	145	
QP102845	36	41	140	3.10%	120	
QP102846	14	18	125	3.04%	96	
QP102887	10	15	28	5.12%	78	**LP12**
QP102888	7	16	27	2.98%	39	
QP102889	7	17	8	2.54%	31	
QP102890	4	12	7	1.67%	30	
QP102891	7	25	12	3.16%	80	
QP102892	8	15	10	2.38%	41	
QP102893	4	26	12	2.18%	330	
QP102894	5	12	20	1.67%	280	
QP102895	12	10	59	3.30%	280	
QP102896	15	19	77	4.18%	430	
QP102897	17	18	82	4.44%	530	
QP102898	24	20	110	2.72%	620	
QP102899	26	20	135	3.88%	2410	
QP102900	22	21	125	3.08%	3510	
QP102901	15	30	70	1.54%	2420	
QP102902	13	30	34	1.26%	1060	
QP102903	11	31	27	1.18%	740	
QP102904	14	32	51	1.07%	640	
QP102905	13	30	68	1.08%	580	
QP102906	11	28	59	1.03%	520	
QP102907	12	30	68	1.08%	510	
QP102908	10	29	68	1.10%	440	
QP102909	14	34	49	1.22%	390	
QP102910	14	28	78	1.14%	410	
QP102911	14	30	42	1.25%	390	
QP102912	13	28	30	1.16%	420	
QP102913	13	29	24	1.27%	390	
QP102914	12	29	19	1.24%	400	
QP102915	13	30	28	1.21%	390	
QP102916	15	28	26	1.26%	350	
UNITS	ppm	ppm	ppm	ppm	ppm	
DET.LIM	2	4	2	4	4	
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1	

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Job: 2DN1063
O/N: QP102827

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn	
QP102917	14	28	33	1.30%	370	**LP12** **(cont.)**
QP102918	12	27	27	1.20%	410	
QP102919	12	27	24	1.31%	450	
QP102920	11	27	40	1.22%	370	
QP102921	13	28	42	1.28%	350	
QP102922	12	31	61	1.20%	300	
QP102923	12	70	135	1.31%	400	
QP102924	13	33	56	1.32%	520	
QP102925	14	34	150	1.28%	480	
QP102926	14	29	45	1.38%	460	
QP102927	15	30	53	1.48%	520	
QP102928	16	31	22	1.68%	540	
QP102929	15	31	41	1.43%	570	
QP102930	15	32	33	1.39%	590	
QP102931	16	35	39	1.51%	640	
QP102932	14	34	47	1.58%	620	
QP102933	14	44	130	1.51%	690	
QP102934	15	44	130	1.51%	700	
QP102935	14	40	230	1.50%	690	
QP102936	17	32	120	1.50%	790	
QP102937	9	185	18	4.00%	1560	**LD13**
QP102938	9	210	18	1.51%	1130	
QP102939	9	210	13	1.39%	370	
QP102940	9	145	12	1.01%	440	
QP102941	11	67	12	9000	770	
QP102942	11	21	13	1.07%	2260	
QP102943	15	27	15	1.12%	3210	
QP102944	14	18	16	1.51%	2800	
QP102945	14	17	19	1.30%	2670	
QP102946	14	27	26	1.21%	2410	
QP102947	14	17	28	1.88%	7310	
QP102948	13	12	24	2.12%	7300	
QP102949	11	7	16	1.34%	2520	
QP102950	12	7	16	1.01%	2290	
QP102951	10	5	18	8040	880	
QP102952	8	4	19	9000	770	
QP102953	8	10	12	8160	230	
QP102954	13	16	17	9840	530	
QP102955	10	13	15	8880	320	
QP102956	7	15	14	8280	350	
QP102957	11	15	14	9720	350	
QP102958	13	21	12	1.03%	290	
QP102959	14	26	14	1.28%	400	
QP102960	9	22	12	1.12%	400	
UNITS	ppm	ppm	ppm	ppm	ppm	
DET.LIM	2	4	2	4	4	
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1	

amdel

Job: 2DN1160
O/N: QP102847

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102847	16	41	140	3.32%	110
QP102848	10	33	135	3.88%	120
QP102849	10	32	130	3.48%	180
QP102850	11	36	155	3.40%	110
QP102851	7	28	125	3.14%	105
QP102852	8	32	150	3.24%	96
QP102853	4	28	145	3.02%	93
QP102854	10	31	115	2.24%	70
QP102855	9	29	150	2.56%	87
QP102856	11	41	160	3.34%	94
QP102857	14	41	210	3.62%	110
QP102858	16	34	220	3.66%	100
QP102859	18	64	210	3.44%	97
QP102860	21	91	170	3.42%	98
QP102861	18	61	150	3.70%	85
QP102862	22	59	160	3.58%	105
QP102863	100	78	110	2.68%	83
QP102864	65	56	79	2.02%	59
QP102865	30	49	170	1.91%	105
QP102866	37	87	175	3.28%	75
QP102867	18	50	76	1.36%	56
QP102868	17	60	55	1.88%	80
QP102869	33	56	130	3.12%	76
QP102870	26	61	440	3.18%	84
QP102871	23	55	370	2.98%	175
QP102872	19	61	300	2.72%	94
QP102873	18	41	145	1.84%	70
QP102874	26	38	36	2.00%	94
QP102875	48	145	23	2.64%	250
QP102876	25	86	33	2.24%	830
QP102877	32	69	31	2.98%	1660
QP102878	33	68	25	2.44%	860
QP102879	95	110	135	2.68%	105
QP102880	34	53	170	2.64%	195
QP102881	30	72	220	3.34%	200
QP102882	18	77	290	3.74%	190
QP102883	17	97	360	3.90%	160
QP102884	17	125	250	5.08%	130
QP102885	16	84	92	2.56%	8860
QP102886	3	75	56	1.82%	2.16%
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME					AAS1C

LD11

(cont.)

amdel

Job: 2DN1087A
O/N: QP102961

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102961	25	21	8	1.02%	300
QP102962	20	30	12	1.29%	1490
QP102963	19	29	13	1.01%	2200
QP102964	21	30	15	1.50%	2440
QP102965	38	26	17	1.62%	2510
QP102966	20	34	23	1.83%	3310
QP102967	27	45	29	1.74%	2440
QP102968	23	58	35	1.98%	3200
QP102969	24	46	47	1.65%	4030
QP102970	62	185	56	2.32%	5590
QP102971	31	320	64	3.04%	9910
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD13 (cont.)

Job: 2DN1162
O/N: QP102972

Final

ANALYTICAL REPORT

LD13 (cont.)

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102972	10	630	65	3.10%	1.23%
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME					AAS1C

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Job: 2DN1152
O/N: QP102073

Final

ANALYTICAL REPORT

LD13
(cont.)

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP102973	16	130	8	4700	750
QP102974	5	26	5	4500	640
QP102975	4	175	35	8400	980
QP102976	48	125	39	6100	640
QP102977	29	33	17	6500	570
QP102978	17	28	14	5700	550
QP102979	18	140	20	8900	1260
QP102980	4	37	250	9500	1280
QP102981	11	145	460	1.14%	1330
QP102982	2	35	24	9800	1380
QP102983	12	52	22	1.48%	1160
QP102984	9	30	11	2.14%	510
QP102985	8	20	28	1.71%	300
QP102986	8	22	19	2.16%	360
QP102987	9	23	12	2.26%	300
QP102988	10	23	15	2.04%	720
QP102989	11	14	10	1.23%	570
QP102990	10	29	22	1.36%	6420
QP102991	8	22	14	1.10%	3590
QP102992	8	33	15	1.34%	2420
QP102993	6	42	70	1.47%	3100
QP102994	4	31	8	7300	680
QP102995	3	26	11	9400	1030
QP102996	5	37	18	1.01%	740
QP102997	4	31	9	9800	870
QP102998	9	41	105	1.29%	1680
QP102999	3	82	13	1.17%	1630
QP103000	5	160	16	1.15%	1460
QP103001	3	61	13	1.29%	1970
QP103002	3	310	29	1.12%	1560
QP103003	4	480	150	1.20%	1870
QP103004	12	90	52	1.40%	3020
QP103005	3	200	22	1.26%	3810
QP103006	5	72	52	1.16%	3390
QP103007	9	40	38	1.22%	1700
QP103008	5	25	19	1.17%	1100
QP103009	2	125	51	1.19%	1360
QP103010	11	28	3390	1.10%	860
QP103011	9	29	59	1.11%	650
QP103012	3	88	26	1.09%	780
QP103013	6	22	15	1.06%	460
QP103014	4	21	15	1.06%	490
QP103015	4	280	41	1.50%	870
QP103016	7	34	31	1.31%	740
QP103017	9	34	17	1.39%	810
QP103018	48	24	16	1.22%	680
QP103019	25	38	19	1.27%	790
QP103020	5	20	8	1.01%	670
QP103021	16	29	39	1.34%	1280
QP103022	89	30	12	1.48%	1410
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

Final

ANALYTICAL REPORT

LD13
(cont.)

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103023	21	21	9	1.39%	1220
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

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Job: 2DN1159
O/N: QP103024

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103024	38	26	23	1.49%	1170
QP103025	42	22	25	1.35%	1160
QP103026	24	27	21	1.33%	750
QP103027	14	38	14	1.96%	1200
QP103028	6	33	10	2.26%	1350
QP103029	23	130	17	2.32%	1160
QP103030	24	46	33	2.24%	960
QP103031	31	65	75	2.26%	780
QP103032	17	53	16	2.34%	940
QP103033	30	56	16	2.40%	910
QP103034	30	56	48	2.18%	850
QP103035	34	74	20	1.72%	800
QP103036	29	72	15	2.04%	910
QP103037	20	43	14	2.24%	1060
QP103038	21	45	17	2.16%	900
QP103039	30	155	52	1.86%	650
QP103040	28	70	18	1.80%	640
QP103041	33	69	31	1.86%	700
QP103042	28	51	23	2.00%	890
QP103043	26	52	30	1.60%	730
QP103044	29	135	240	2.08%	790
QP103045	38	115	130	1.84%	640
QP103046	25	125	22	2.40%	940
QP103047	28	125	220	2.36%	1060
QP103048	41	185	840	2.10%	790
QP103049	28	145	770	2.04%	780
QP103050	29	300	600	1.76%	920
QP103051	35	540	280	2.28%	640
QP103052	6	17	58	2.50%	360
QP103053	7	16	28	3.00%	420
QP103054	7	14	36	2.54%	460
QP103055	4	28	33	1.76%	170
QP103056	3	25	14	8250	22
QP103057	4	18	20	9570	32
QP103058	5	16	22	5610	19
QP103059	2	20	18	4070	14
QP103060	2	33	13	6160	13
QP103061	3	29	19	1.03%	24
QP103062	3	28	19	1.21%	125
QP103063	7	15	24	1.27%	540
QP103064	6	17	23	8360	440
QP103065	9	30	33	1.68%	1210
QP103066	7	36	30	1.62%	1280
QP103067	4	35	200	1.63%	730
QP103068	4	22	105	1.51%	1070
QP103069	5	29	78	1.87%	7440
QP103070	5	24	83	1.35%	4090
QP103071	5	23	41	1.44%	460
QP103072	4	18	26	1.30%	640
QP103073	3	11	24	1.09%	370
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD13
(cont.)

LP14

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn	
QP103074	5	8	26	9900	420	**LP14** (cont.)
QP103075	7	12	35	9570	330	
QP103076	7	5	22	9130	320	
QP103077	6	19	27	1.03%	590	
QP103078	6	20	26	1.00%	480	
QP103079	9	27	27	9240	1110	
QP103080	9	31	33	1.11%	1020	
QP103081	7	25	50	1.40%	600	
QP103082	7	26	69	1.30%	790	
QP103083	10	25	66	1.53%	3950	
QP103084	9	30	69	1.43%	2400	
QP103085	8	49	92	1.79%	8330	
QP103086	10	510	73	1.42%	5440	
QP103087	53	115	105	1.28%	2320	
QP103088	22	60	55	8470	8010	
QP103089	7	50	25	8030	1660	
QP103090	12	41	30	5.40%	640	**LP15**
QP103091	12	30	34	1.50%	1000	
QP103092	13	26	42	1.09%	1180	
QP103093	9	32	66	1.11%	1740	
QP103094	11	27	63	1.51%	1060	
QP103095	14	32	53	1.65%	1480	
QP103096	15	27	44	1.77%	1050	
QP103097	10	25	660	1.71%	640	
QP103098	14	31	230	1.90%	910	
QP103099	14	37	145	1.52%	710	
QP103100	13	38	105	1.60%	780	
QP103101	13	33	77	1.54%	600	
QP103102	15	30	39	1.56%	680	
QP103103	14	35	46	1.61%	770	
QP103104	13	32	43	1.58%	750	
QP103105	12	31	51	1.61%	840	
QP103106	13	31	54	1.63%	1710	
QP103107	14	36	67	1.63%	980	
QP103108	14	34	98	1.65%	1950	
QP103109	19	33	70	1.56%	1220	
QP103110	16	38	63	1.75%	1260	
QP103111	16	34	56	1.50%	1380	
QP103112	15	31	78	1.46%	1280	
QP103113	20	35	77	1.77%	960	
QP103114	20	34	95	1.32%	830	
QP103115	16	32	71	1.65%	710	
QP103116	15	33	120	1.60%	860	
QP103117	15	34	97	1.61%	1080	
QP103118	14	30	64	1.65%	1070	
QP103119	16	31	47	1.58%	940	
QP103120	23	33	40	1.46%	930	
QP103121	19	34	41	1.47%	1160	
QP103122	20	55	49	1.91%	1000	
QP103123	22	35	42	1.40%	920	
UNITS	ppm	ppm	ppm	ppm	ppm	
DET.LIM	2	4	2	4	4	
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1	

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Job: 2DN1177
O/N: QP103132

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103132	4	34	34	1.15%	400
QP103133	2	41	5	5000	110
QP103134	2	41	14	6000	54
QP103135	2	34	13	4000	29
QP103136	7	33	16	3800	27
QP103137	17	28	71	9300	290
QP103138	24	33	135	1.60%	990
QP103139	28	33	155	2.02%	1640
QP103140	22	32	185	2.36%	1780
QP103141	24	33	210	2.30%	1910
QP103142	16	33	135	1.71%	1410
QP103143	12	34	77	1.38%	1230
QP103144	11	34	75	1.26%	1500
QP103145	11	37	57	1.30%	1710
QP103146	12	37	52	1.19%	2210
QP103147	8	37	54	9800	3410
QP103148	8	36	60	9200	2890
QP103149	7	32	54	9900	1670
QP103150	9	33	69	8900	1450
QP103151	10	39	67	1.03%	1110
QP103152	12	40	50	1.16%	720
QP103153	12	36	40	1.21%	780
QP103154	12	47	150	1.18%	530
QP103155	12	32	57	1.32%	570
QP103156	11	32	61	1.21%	600
QP103157	13	35	59	1.60%	470
QP103158	11	35	60	1.43%	500
QP103159	14	36	55	1.49%	470
QP103160	14	33	45	1.44%	470
QP103161	13	32	28	1.49%	500
QP103162	13	32	34	1.48%	550
QP103163	16	37	45	1.53%	510
QP103164	15	36	48	1.55%	500
QP103165	15	36	67	1.49%	490
QP103166	11	34	46	1.24%	610
QP103167	10	37	47	1.29%	740
QP103168	11	38	59	1.23%	740
QP103169	15	36	46	1.54%	790
QP103170	2	4	8	4300	165
QP103171	6	5	6	7200	280
QP103172	8	6	9	9400	320
QP103173	12	13	11	1.69%	410
QP103174	16	13	11	2.56%	550
QP103175	15	21	16	2.10%	1980
QP103176	17	27	29	1.80%	2390
QP103177	18	33	84	1.84%	3840
QP103178	20	41	125	2.14%	3700
QP103179	21	37	100	2.20%	2610
QP103180	18	40	96	1.81%	1600
QP103181	20	38	64	1.97%	1810
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LP16
(cont.)

LD17

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103182	19	35	42	1.79%	1180
QP103183	19	32	37	1.77%	1210
QP103184	19	34	38	1.94%	1420
QP103185	20	32	50	1.76%	1120
QP103186	17	28	130	1.56%	890
QP103187	21	34	63	1.84%	940
QP103188	26	32	57	1.70%	850
QP103189	21	32	72	1.68%	860
QP103190	19	33	48	1.62%	880
QP103191	19	33	37	1.64%	960
QP103192	22	31	67	1.75%	690
QP103193	19	28	74	1.72%	860
QP103194	17	31	130	1.67%	620
QP103195	18	34	135	1.67%	870
QP103196	18	33	78	1.69%	850
QP103197	18	36	87	1.78%	740
QP103198	18	29	51	1.68%	740
QP103199	21	37	88	1.80%	760
QP103200	21	29	72	1.71%	740
QP103201	23	43	115	1.74%	590
QP103202	20	33	66	1.68%	750
QP103203	21	31	62	1.70%	660
QP103204	20	31	65	1.77%	750
QP103205	18	30	150	1.86%	690
QP103206	20	32	61	1.93%	760
QP103207	21	36	125	1.81%	710
QP103208	21	28	65	1.72%	640
QP103209	22	32	58	1.92%	750
QP103210	21	31	89	1.97%	990
QP103211	24	40	145	2.00%	660
QP103212	20	32	105	1.87%	690
QP103213	23	44	860	1.93%	690
QP103214	21	34	200	1.90%	600
QP103215	22	39	185	1.93%	620
QP103216	23	44	230	2.12%	630
QP103217	18	32	86	1.95%	580
QP103218	19	34	94	1.71%	590
QP103219	18	30	76	1.69%	630
QP103220	18	30	52	1.88%	690
QP103221	20	29	74	1.99%	640
QP103222	21	27	78	2.10%	640
QP103223	24	29	82	2.20%	580
QP103224	21	29	51	2.22%	570
QP103225	19	25	41	2.12%	530
QP103226	19	27	60	1.91%	530
QP103227	18	26	49	1.81%	530
QP103228	21	27	30	1.85%	660
QP103229	20	24	91	1.84%	610
QP103230	32	40	99	2.10%	860
QP103231	25	37	70	1.96%	1110
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD17
(cont.)

Job: 2DN1177
O/N: QP103132

Final

ANALYTICAL REPORT

LD17
(cont.)

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103232	43	40	43	2.20%	530
QP103233	31	53	260	2.42%	980
QP103234	31	57	63	2.46%	1150
QP103235	32	54	120	2.18%	1180
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

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Job: 2DN1227
O/N: QP103236

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103236	12	13	10	1.79%	50
QP103237	14	12	10	2.08%	180
QP103238	14	25	9	1.90%	135
QP103239	16	20	12	2.34%	260
QP103240	16	15	13	3.18%	190
QP103241	15	12	12	2.60%	110
QP103242	14	9	11	1.60%	50
QP103243	14	25	12	2.58%	42
QP103244	13	28	10	2.30%	46
QP103245	8	22	12	1.71%	76
QP103246	11	23	22	2.72%	155
QP103247	11	34	31	2.52%	110
QP103248	14	35	35	3.32%	155
QP103249	15	33	45	3.20%	145
QP103250	15	35	54	3.00%	170
QP103251	15	32	64	3.24%	520
QP103252	18	45	64	3.40%	430
QP103253	22	35	78	3.66%	520
QP103254	21	37	80	3.44%	400
QP103255	27	39	91	4.24%	610
QP103256	24	30	85	3.80%	420
QP103257	19	36	90	3.48%	230
QP103258	19	37	66	2.60%	120
QP103259	29	49	100	3.98%	390
QP103260	25	43	100	4.40%	320
QP103261	28	50	105	4.28%	430
QP103262	34	52	110	4.94%	450
QP103263	29	46	73	4.44%	370
QP103264	39	54	110	6.10%	620
QP103265	29	51	96	4.90%	520
QP103266	32	49	26	15.9%	1160
QP103267	15	35	19	7.28%	560
QP103268	15	36	16	6.06%	210
QP103269	14	28	18	5.20%	66
QP103270	21	16	17	4.30%	91
QP103271	27	20	20	6.60%	290
QP103272	15	49	18	9.22%	580
QP103273	8	24	14	4.86%	65
QP103274	4	17	19	4.24%	35
QP103275	5	29	19	1.71%	26
QP103276	5	33	23	3.48%	16
QP103277	14	29	26	4.14%	36
QP103278	15	50	42	3.00%	47
QP103279	16	40	61	3.60%	71
QP103280	20	29	55	3.22%	50
QP103281	15	42	54	3.32%	54
QP103282	27	55	52	2.28%	25
QP103283	31	57	59	2.56%	23
QP103284	33	48	80	2.24%	21
QP103285	29	54	195	2.38%	35
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

LP18

LD19

amdel

Job: 2DN1227
O/N: QP103236

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103286	30	48	185	2.02%	61
QP103287	26	45	155	1.26%	32
QP103288	31	68	105	1.65%	29
QP103289	32	69	170	1.49%	31
QP103290	33	89	240	2.06%	32
QP103291	31	94	210	1.76%	36
QP103292	36	105	135	1.85%	35
QP103293	32	64	460	2.28%	46
QP103294	38	120	200	2.88%	49
QP103295	36	75	200	2.12%	66
QP103296	37	54	300	1.78%	53
QP103297	33	43	98	1.70%	71
QP103298	34	44	125	2.58%	260
QP103299	27	34	135	2.52%	170
QP103300	30	25	105	2.84%	110
QP103301	49	38	120	3.82%	630
QP103302	63	43	115	3.84%	540
QP103303	26	20	96	3.46%	230
QP103304	28	59	82	2.96%	230
QP103305	37	67	89	3.38%	530
QP103306	36	54	62	2.26%	175
QP103307	37	53	69	2.26%	165
QP103308	37	43	51	2.08%	96
QP103309	37	52	42	3.20%	500
QP103310	21	58	25	1.20%	44
QP103311	21	50	25	1.87%	64
QP103312	22	61	28	2.08%	57
QP103313	34	47	29	2.74%	71
QP103314	16	62	61	6.22%	135
QP103315	16	35	61	3.46%	145
QP103316	2	10	8	5300	11
QP103317	4	12	6	1.04%	27
QP103318	15	24	11	2.94%	93
QP103319	15	13	13	2.04%	53
QP103320	26	18	19	2.66%	360
QP103321	17	19	17	2.82%	370
QP103322	11	10	17	2.40%	79
QP103323	14	21	18	4.24%	195
QP103324	15	25	22	4.98%	135
QP103325	16	37	26	4.68%	110
QP103326	16	28	26	4.20%	175
QP103327	15	36	32	4.62%	270
QP103328	9	16	18	3.50%	94
QP103329	17	33	28	5.32%	200
QP103330	20	41	36	6.70%	290
QP103331	16	21	21	5.52%	195
QP103332	13	21	25	3.48%	115
QP103333	7	20	29	3.38%	77
QP103334	10	26	40	3.26%	53
QP103335	6	10	50	3.50%	115
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1

LD19
(cont.)

LD20

amdel

Job: 2DN1227
O/N: QP103236

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103336	6	8	65	6.66%	130
QP103337	7	10	56	3.48%	26
QP103338	9	5	38	1.85%	24
QP103339	9	<4	49	1.78%	51
QP103340	8	6	36	1.78%	31
QP103341	9	6	70	2.36%	42
QP103342	10	9	98	2.68%	42
QP103343	8	9	38	1.21%	25
QP103344	9	11	38	2.12%	46
QP103345	8	4	25	1.71%	38
QP103346	6	6	29	9000	27
QP103347	5	45	29	9300	17
QP103348	16	26	47	1.33%	44
QP103349	18	29	43	1.57%	73
QP103350	24	29	62	2.10%	130
QP103351	12	22	91	20.5%	3640
QP103352	24	15	45	8.24%	2520
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME					

LD20
(cont.)

LORELLA, N.T.

amdel

Job: 2DN1220
O/N: QP103353

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
QP103353	35	5	45	1.98%	185
QP103354	44	<4	38	2.42%	440
QP103355	46	<4	46	2.60%	410
QP103356	105	8	53	3.24%	680
QP103357	44	<4	33	1.90%	230
QP103358	<2	<4	35	2.84%	280
QP103359	<2	<4	12	2.28%	125
QP103360	<2	<4	17	1.84%	80
QP103361	6	<4	18	1.87%	49
QP103362	3	<4	45	2.60%	63
QP103363	4	<4	20	3.68%	260
QP103364	52	<4	51	1.62%	110
QP103365	3	<4	56	2.50%	160
QP103366	<2	<4	54	1.90%	130
QP103367	<2	<4	71	1.78%	130
QP103368	<2	<4	59	2.88%	180
QP103369	3	5	25	1.88%	86
QP103370	7	<4	30	3.34%	150
QP103371	15	<4	29	2.60%	115
QP103372	23	6	17	1.92%	540
QP103373	16	7	85	4.74%	3560
QP103374	21	<4	25	5.22%	1670
QP103375	12	<4	63	4.84%	730
QP103376	41	<4	51	1.73%	57
QP103377	17	14	60	3.64%	1.49%
QP103378	7	<4	32	4560	520
QP103379	12	27	24	9.28%	410
QP103380	16	20	14	12.0%	145
QP103381	7	10	18	2.98%	115
QP103382	5	8	15	1.32%	350
QP103383	2	<4	7	4200	84
QP103384	3	<4	9	1.36%	72
QP103385	6	<4	<2	2.14%	160
QP103386	8	27	5	3.18%	350
QP103387	10	38	13	4.28%	2550
QP103388	9	18	14	2.92%	1270
QP103389	8	17	16	2.38%	1370
QP103390	9	26	7	2.66%	1450
QP103391	10	14	18	3.30%	1350
QP103392	11	13	34	2.90%	640
QP103393	13	29	36	3.38%	690
QP103394	57	28	34	3.46%	1420
QP103395	11	30	30	2.68%	1400
QP103396	13	21	31	3.80%	2810
QP103397	15	33	36	4.62%	2820
QP103398	14	34	24	4.58%	1650
QP103399	17	43	35	6.50%	5880
QP103400	16	34	36	6.26%	4200
QP103401	19	44	34	6.60%	5410
QP103402	12	35	29	5.12%	3080
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	AAS1C

LD20
(cont.)

LP21

APPENDIX 9

1992 PISOLITE ASSAYS

Job: 2DN0986
O/N: 853251

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853251	34	21	15	17.4%	270
853252	36	19	12	21.0%	380
853253	58	26	13	23.9%	980
853254	20	17	9	9.70%	1000
853255	30	22	11	19.4%	550
853256	30	30	11	17.2%	1390
853257	43	25	14	20.9%	1200
853258	60	31	15	22.6%	960
853259	63	32	11	20.5%	910
853260	36	25	11	25.4%	450
853261	37	26	13	30.1%	370
853262	50	26	13	28.3%	270
853263	45	26	12	25.9%	250
853264	30	20	15	27.2%	220
853265	24	21	12	26.5%	210
853266	44	22	13	25.6%	310
853267	43	18	13	29.2%	250
853268	36	18	12	26.1%	320
853269	40	21	12	29.0%	420
853270	38	20	10	24.9%	190
853271	43	20	12	27.8%	620
853272	55	22	15	35.3%	350
853273	54	20	11	28.6%	360
853274	51	21	10	28.4%	360
853275	48	20	11	26.5%	480
853276	33	23	13	27.3%	210
853277	44	23	12	26.5%	330
853278	23	24	9	26.0%	165
853279	22	21	6	25.0%	220
853280	27	22	7	25.5%	200
853281	40	22	5	28.5%	280
853282	42	21	8	26.8%	450
853283	46	25	7	26.0%	730
853284	51	25	5	25.0%	300
853285	60	37	13	17.9%	1000
853286	51	26	10	32.7%	420
853287	43	26	13	23.8%	450
853288	40	25	11	24.7%	400
853289	59	26	11	24.5%	1160
853290	57	36	13	17.9%	3360
853291	65	35	12	20.6%	1100
853292	32	28	12	22.3%	490
853293	57	31	9	25.4%	1090
853294	76	28	10	26.1%	430
853295	70	37	11	25.8%	1180
853296	84	44	13	26.0%	1280
853297	47	32	15	18.9%	500
853298	48	28	15	30.3%	690
853299	59	37	13	21.8%	4960
853300	50	25	13	23.8%	510
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853301	59	32	12	25.9%	970
853302	62	34	15	26.5%	1020
853303	40	33	12	18.6%	195
853304	59	48	10	17.9%	5710
853305	65	33	15	23.9%	570
853306	66	30	14	23.8%	1020
853307	45	27	13	18.6%	1560
853308	64	23	14	25.9%	1190
853309	45	31	18	19.9%	850
853310	50	27	30	24.8%	1000
853311	62	33	22	26.9%	660
853312	37	34	15	19.1%	940
853313	50	31	12	21.8%	690
853314	62	39	13	22.8%	650
853315	47	34	14	20.5%	300
853316	48	33	12	22.6%	510
853317	42	27	15	20.4%	1750
853318	51	48	14	16.0%	2160
853319	50	26	16	20.1%	1040
853320	67	37	15	19.0%	810
853321	48	25	16	21.3%	660

UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Job: 2DN1087B
O/N: QP102961

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853322	20	38	14	24.9%	210
853323	21	40	13	28.8%	220
853324	21	38	14	28.7%	220
853325	24	44	13	26.0%	175
853326	30	47	17	22.9%	230
853327	34	46	17	26.2%	440
853328	19	43	12	27.3%	195
853329	19	44	11	26.8%	175
853330	21	50	14	28.1%	185
853331	24	55	12	27.8%	240
853332	21	53	12	24.5%	175
853333	33	51	11	29.5%	870
853334	34	49	10	26.7%	1610
853335	26	52	7	26.7%	260
853336	23	58	10	33.2%	300
853337	23	53	15	35.7%	240
853338	22	49	13	29.3%	190
853339	30	57	16	28.9%	280
853340	38	68	17	27.9%	1570
853341	22	38	20	33.0%	230
853342	18	36	21	28.5%	185
853343	37	39	18	28.1%	250
853344	23	33	20	29.7%	290
853345	19	33	25	29.6%	240
853346	31	42	23	29.2%	310
853347	23	30	25	29.6%	180
853348	33	30	24	28.3%	330
853349	27	37	24	29.0%	140
853350	5	6	10	3.12%	155
853351	21	30	22	29.8%	230
853352	22	26	23	26.6%	150
853353	25	33	22	26.2%	130
853354	25	28	32	25.7%	240
853355	24	32	32	29.8%	130
853356	40	41	26	29.0%	270
853357	41	38	26	26.3%	610
853358	38	36	25	27.2%	270
853359	42	42	25	30.1%	280
853360	36	34	20	26.5%	200
853361	26	32	18	18.8%	210
853362	27	35	13	23.3%	190
853363	41	39	17	32.5%	320
853364	33	37	19	30.9%	230
853365	41	42	24	30.3%	1160
853366	36	40	22	23.1%	400
853367	40	45	26	28.5%	450
853368	36	47	22	23.7%	440
853369	36	49	25	33.0%	460
853370	43	58	21	30.5%	1700
853371	37	41	22	26.9%	380
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853372	41	41	22	28.3%	270
853373	37	52	19	28.1%	300
853374	40	53	17	30.1%	360
853375	43	41	27	33.5%	240
853376	49	48	29	35.4%	340
853377	51	34	30	31.9%	610
853378	49	38	29	32.2%	410
853379	41	45	31	34.9%	420
853380	40	25	27	31.2%	390
853381	37	32	27	27.8%	360
853382	39	39	30	30.5%	510
853383	41	37	25	31.5%	500
853384	43	39	33	36.1%	2590
853385	51	51	32	34.2%	590
853387	37	40	25	29.5%	280
853388	43	39	26	26.5%	360
853389	33	37	22	21.9%	460
853390	42	38	27	28.8%	310
853391	20	35	7	30.0%	220
853392	18	27	6	26.8%	240
853394	34	41	13	29.8%	450
853395	14	34	13	38.0%	145
853396	11	30	9	24.1%	145
853397	11	25	7	29.5%	360
853398	23	32	13	34.4%	300
853399	18	31	13	32.8%	250
853400	34	40	15	34.6%	260
853401	27	34	14	39.1%	220
853402	23	36	13	34.2%	195
853403	19	32	10	35.8%	185
853404	40	40	20	38.6%	310
853405	26	34	12	33.0%	240
853406	27	37	24	28.0%	4990
853407	13	36	11	29.9%	240
853408	14	34	7	28.0%	240
853409	12	28	8	22.9%	350
853410	14	24	13	23.5%	105
853411	19	30	10	37.3%	155
853412	23	28	22	35.7%	260
853413	20	23	17	27.6%	210
853414	26	34	22	36.1%	230
853415	31	29	17	36.0%	195
853416	22	31	24	35.2%	310
853417	36	47	21	30.4%	5200
853418	11	32	15	33.2%	95
853419	11	51	18	24.7%	115
853420	12	29	14	26.2%	195
853421	11	23	16	32.6%	115
853422	11	23	15	30.6%	100
853423	9	26	14	26.9%	160
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853424	10	24	15	23.8%	175
853425	10	27	15	27.6%	240
853426	15	30	10	31.7%	240
853427	23	27	13	35.4%	220
853428	21	32	11	32.9%	200
853429	28	37	18	34.2%	260
853430	14	24	13	33.4%	120
853431	14	24	12	27.2%	130
853432	19	31	14	24.8%	150
853433	16	33	13	32.5%	180
853434	12	31	10	28.3%	105
853435	15	26	12	24.5%	105
853436	16	23	14	29.4%	115
853437	15	19	14	30.0%	100
853438	15	28	13	34.9%	220
853439	14	24	11	21.8%	185
853440	13	31	14	24.6%	240
853441	15	29	12	24.4%	860
853442	14	22	11	35.4%	420
853443	39	34	18	30.1%	390
853444	25	36	17	32.3%	250
853445	31	40	22	36.1%	330
853446	32	38	24	33.5%	340
853447	23	35	19	34.6%	240
853448	35	42	24	38.4%	220
853449	30	48	23	35.8%	220
853450	12	8	8	2.38%	220
853451	26	47	21	36.1%	185
853452	23	45	21	32.5%	210
853453	19	45	18	27.5%	230
853454	19	42	13	32.0%	330
853455	18	36	18	29.8%	240
853456	13	41	13	28.3%	240
853457	15	33	16	28.9%	230
853458	15	41	13	29.3%	400
853459	12	36	13	29.4%	250
853460	20	36	10	27.1%	260
853461	21	42	13	47.9%	320
853462	21	33	14	22.9%	2460
853463	26	43	21	26.5%	860
853464	39	33	23	32.1%	340
853465	34	32	11	29.6%	360
853466	34	39	12	27.9%	330
853467	43	41	24	29.3%	320
853468	33	44	24	31.6%	260
853469	28	43	26	29.0%	270
853470	39	52	27	28.7%	460
853471	29	36	26	34.2%	230
853472	25	38	19	33.5%	230
853473	25	45	22	32.2%	300
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853474	20	40	18	29.6%	240
853475	20	49	21	27.3%	270
853476	18	42	21	32.8%	195
853477	17	44	20	33.6%	230
853478	20	41	18	29.6%	230
853479	17	28	20	30.0%	180
853480	18	50	20	37.9%	220
853481	23	48	21	31.8%	3080
853482	29	41	23	31.1%	710
853483	25	59	22	28.9%	940
853484	26	47	46	36.2%	640
853485	25	61	23	35.0%	960
853486	39	42	25	35.2%	490
853487	43	41	26	31.8%	430
853488	37	47	23	32.6%	390
853489	40	42	24	32.9%	360
853490	41	35	26	33.1%	510
853491	22	41	21	32.4%	520
853492	19	53	24	35.0%	450
853493	23	47	23	27.6%	420
853494	38	63	24	26.3%	1120
853495	22	54	20	11.4%	1.30%
853496	25	55	41	36.0%	3940
853497	33	100	30	16.9%	9090
853498	24	49	25	26.8%	830
853499	25	55	35	38.8%	500
853500	16	55	22	31.2%	410
853501	12	48	21	32.9%	220
853502	13	57	27	38.4%	390
853503	9	48	21	31.0%	190
853504	15	40	19	31.3%	310
853505	11	47	16	26.2%	3540
853506	11	44	18	30.8%	800
853507	17	92	18	30.7%	5490
853508	19	83	17	25.6%	8480
853509	16	37	17	25.8%	1080
853510	28	47	17	20.3%	4010
853511	20	44	18	23.1%	1120
853542	45	62	21	10.5%	3470
853543	55	43	26	13.8%	1500
853544	61	32	22	25.0%	480
853545	90	42	27	21.1%	1490
853546	80	40	24	25.7%	1280
853547	41	36	25	15.9%	1900
853548	73	38	22	26.3%	630
853549	64	33	21	28.9%	380
853550	9	9	9	1.71%	260
853551	79	60	33	25.6%	3380
853552	79	52	27	26.7%	3470
853553	69	51	27	26.7%	3340
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

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Job: 2DN1087B
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Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853554	75	51	23	23.2%	1240
853555	95	43	22	23.4%	1540
853556	75	42	26	24.3%	1400
853557	68	31	24	25.8%	400
853558	76	30	21	21.5%	1090
853559	43	25	16	8.80%	1170
853560	55	26	17	21.0%	1240
853561	91	37	26	22.7%	1310
853562	74	33	28	22.1%	790
853563	68	34	23	21.9%	780
853564	90	44	21	23.2%	3980
853565	59	37	17	25.9%	580
853566	54	30	25	21.7%	1260
853567	40	25	27	31.9%	390
853568	50	37	22	31.9%	430
853569	49	37	21	27.6%	450
853570	55	26	26	33.1%	340
853571	55	34	25	33.8%	330
853572	53	29	27	34.5%	350
853573	52	25	21	19.9%	510
853574	63	44	25	25.3%	4300
853575	49	35	16	19.3%	2600
853576	44	21	16	24.9%	700
853577	34	30	13	24.4%	770
853578	34	25	14	24.9%	470
853579	38	35	16	30.2%	330
853580	41	33	18	28.6%	920
853581	41	36	19	35.6%	310
853582	40	35	13	31.9%	540

UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

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Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853322	20	38	14	24.9%	210
853323	21	40	13	28.8%	220
853324	21	38	14	28.7%	220
853325	24	44	13	26.0%	175
853326	30	47	17	22.9%	230
853327	34	46	17	26.2%	440
853328	19	43	12	27.3%	195
853329	19	44	11	26.8%	175
853330	21	50	14	28.1%	185
853331	24	55	12	27.8%	240
853332	21	53	12	24.5%	175
853333	33	51	11	29.5%	870
853334	34	49	10	26.7%	1610
853335	26	52	7	26.7%	260
853336	23	58	10	33.2%	300
853337	23	53	15	35.7%	240
853338	22	49	13	29.3%	190
853339	30	57	16	28.9%	280
853340	38	68	17	27.9%	1570
853341	22	38	20	33.0%	230
853342	18	36	21	28.5%	185
853343	37	39	18	28.1%	250
853344	23	33	20	29.7%	290
853345	19	33	25	29.6%	240
853346	31	42	23	29.2%	310
853347	23	30	25	29.6%	180
853348	33	30	24	28.3%	330
853349	27	37	24	29.0%	140
853350	5	6	10	3.12%	155
853351	21	30	22	29.8%	230
853352	22	26	23	26.6%	150
853353	25	33	22	26.2%	130
853354	25	28	32	25.7%	240
853355	24	32	32	29.8%	130
853356	40	41	26	29.0%	270
853357	41	38	26	26.3%	610
853358	38	36	25	27.2%	270
853359	42	42	25	30.1%	280
853360	36	34	20	26.5%	200
853361	26	32	18	18.8%	210
853362	27	35	13	23.3%	190
853363	41	39	17	32.5%	320
853364	33	37	19	30.9%	230
853365	41	42	24	30.3%	1160
853366	36	40	22	23.1%	400
853367	40	45	26	28.5%	450
853368	36	47	22	23.7%	440
853369	36	49	25	33.0%	460
853370	43	58	21	30.5%	1700
853371	37	41	22	26.9%	380
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853372	41	41	22	28.3%	270
853373	37	52	19	28.1%	300
853374	40	53	17	30.1%	360
853375	43	41	27	33.5%	240
853376	49	48	29	35.4%	340
853377	51	34	30	31.9%	610
853378	49	38	29	32.2%	410
853379	41	45	31	34.9%	420
853380	40	25	27	31.2%	390
853381	37	32	27	27.8%	360
853382	39	39	30	30.5%	510
853383	41	37	25	31.5%	500
853384	43	39	33	36.1%	2590
853385	51	51	32	34.2%	590
853387	37	40	25	29.5%	280
853388	43	39	26	26.5%	360
853389	33	37	22	21.9%	460
853390	42	38	27	28.8%	310
853391	20	35	7	30.0%	220
853392	18	27	6	26.8%	240
853394	34	41	13	29.8%	450
853395	14	34	13	38.0%	145
853396	11	30	9	24.1%	145
853397	11	25	7	29.5%	360
853398	23	32	13	34.4%	300
853399	18	31	13	32.8%	250
853400	34	40	15	34.6%	260
853401	27	34	14	39.1%	220
853402	23	36	13	34.2%	195
853403	19	32	10	35.8%	185
853404	40	40	20	38.6%	310
853405	26	34	12	33.0%	240
853406	27	37	24	28.0%	4990
853407	13	36	11	29.9%	240
853408	14	34	7	28.0%	240
853409	12	28	8	22.9%	350
853410	14	24	13	23.5%	105
853411	19	30	10	37.3%	155
853412	23	28	22	35.7%	260
853413	20	23	17	27.6%	210
853414	26	34	22	36.1%	230
853415	31	29	17	36.0%	195
853416	22	31	24	35.2%	310
853417	36	47	21	30.4%	5200
853418	11	32	15	33.2%	95
853419	11	51	18	24.7%	115
853420	12	29	14	26.2%	195
853421	11	23	16	32.6%	115
853422	11	23	15	30.6%	100
853423	9	26	14	26.9%	160
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853474	20	40	18	29.6%	240
853475	20	49	21	27.3%	270
853476	18	42	21	32.8%	195
853477	17	44	20	33.6%	230
853478	20	41	18	29.6%	230
853479	17	28	20	30.0%	180
853480	18	50	20	37.9%	220
853481	23	48	21	31.8%	3080
853482	29	41	23	31.1%	710
853483	25	59	22	28.9%	940
853484	26	47	46	36.2%	640
853485	25	61	23	35.0%	960
853486	39	42	25	35.2%	490
853487	43	41	26	31.8%	430
853488	37	47	23	32.6%	390
853489	40	42	24	32.9%	360
853490	41	35	26	33.1%	510
853491	22	41	21	32.4%	520
853492	19	53	24	35.0%	450
853493	23	47	23	27.6%	420
853494	38	63	24	26.3%	1120
853495	22	54	20	11.4%	1.30%
853496	25	55	41	36.0%	3940
853497	33	100	30	16.9%	9090
853498	24	49	25	26.8%	830
853499	25	55	35	38.8%	500
853500	16	55	22	31.2%	410
853501	12	48	21	32.9%	220
853502	13	57	27	38.4%	390
853503	9	48	21	31.0%	190
853504	15	40	19	31.3%	310
853505	11	47	16	26.2%	3540
853506	11	44	18	30.8%	800
853507	17	92	18	30.7%	5490
853508	19	83	17	25.6%	8480
853509	16	37	17	25.8%	1080
853510	28	47	17	20.3%	4010
853511	20	44	18	23.1%	1120
853542	45	62	21	10.5%	3470
853543	55	43	26	13.8%	1500
853544	61	32	22	25.0%	480
853545	90	42	27	21.1%	1490
853546	80	40	24	25.7%	1280
853547	41	36	25	15.9%	1900
853548	73	38	22	26.3%	630
853549	64	33	21	28.9%	380
853550	9	9	9	1.71%	260
853551	79	60	33	25.6%	3380
853552	79	52	27	26.7%	3470
853553	69	51	27	26.7%	3340
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

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Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853554	75	51	23	23.2%	1240
853555	95	43	22	23.4%	1540
853556	75	42	26	24.3%	1400
853557	68	31	24	25.8%	400
853558	76	30	21	21.5%	1090
853559	43	25	16	8.80%	1170
853560	55	26	17	21.0%	1240
853561	91	37	26	22.7%	1310
853562	74	33	28	22.1%	790
853563	68	34	23	21.9%	780
853564	90	44	21	23.2%	3980
853565	59	37	17	25.9%	580
853566	54	30	25	21.7%	1260
853567	40	25	27	31.9%	390
853568	50	37	22	31.9%	430
853569	49	37	21	27.6%	450
853570	55	26	26	33.1%	340
853571	55	34	25	33.8%	330
853572	53	29	27	34.5%	350
853573	52	25	21	19.9%	510
853574	63	44	25	25.3%	4300
853575	49	35	16	19.3%	2600
853576	44	21	16	24.9%	700
853577	34	30	13	24.4%	770
853578	34	25	14	24.9%	470
853579	38	35	16	30.2%	330
853580	41	33	18	28.6%	920
853581	41	36	19	35.6%	310
853582	40	35	13	31.9%	540
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

SAMPLE	Cu	Pb	Zn	Fe	Mn
853512	22	17	20	3.44%	145
853513	44	58	28	27.4%	320
853514	46	66	36	27.6%	430
853515	23	78	28	34.1%	290
853516	21	75	27	29.9%	440
853517	20	83	26	26.0%	590
853518	36	71	25	22.6%	380
853519	13	79	30	35.1%	160
853520	31	76	20	21.2%	1480
853521	16	77	20	31.0%	160
853522	17	75	30	31.3%	440
853523	12	27	13	3.76%	185
853524	17	25	15	5.16%	390
853525	37	41	31	9.80%	170
853526	42	62	32	25.9%	470
853527	42	54	20	27.0%	420
853528	47	57	22	24.4%	700
853529	38	58	23	35.0%	640
853530	27	60	19	24.2%	200
853531	17	100	19	33.9%	460
853532	23	110	18	23.1%	400
853533	25	68	19	25.6%	410
853534	25	81	31	38.1%	210
853535	18	72	27	36.3%	175
853536	30	81	23	25.8%	250
853537	29	77	27	32.2%	200
853583	34	48	18	25.6%	420
853584	35	49	17	25.4%	580
853585	40	55	18	27.2%	840
853586	58	63	20	25.5%	320
853587	79	56	20	25.4%	1870
853588	81	47	19	23.8%	480
853589	77	46	17	33.9%	2800
853590	54	70	16	9.64%	6630
853591	53	47	23	11.4%	3840
853592	63	49	25	13.6%	6840
853593	99	59	25	17.6%	2440
853594	92	51	27	19.8%	1380
853595	80	54	29	20.5%	1740
853596	58	56	35	27.1%	610
853597	40	51	27	27.5%	330
853598	50	51	25	25.3%	330
853599	50	57	27	24.7%	570
853600	42	54	25	24.0%	540
853601	30	51	23	24.3%	480
853602	30	47	23	23.7%	400
853603	42	43	26	21.4%	430
853604	76	47	26	21.6%	760
853605	60	54	24	14.5%	2700
853606	50	46	24	12.1%	4000
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853607	88	58	37	22.5%	5040
853608	41	49	24	21.9%	480
853609	37	79	25	30.1%	940
853611	61	47	25	20.1%	1450
853612	53	51	24	24.9%	360
853613	77	63	30	24.2%	660
853614	69	49	31	20.1%	1190
853617	62	63	24	21.2%	3010
853618	59	52	25	20.9%	690
853619	56	46	24	23.0%	400
853620	62	63	26	27.8%	700
853621	37	36	20	14.5%	530
853622	58	56	27	23.0%	610
853623	43	38	20	13.9%	330
853624	81	39	24	17.7%	760
853625	23	16	16	5.82%	150
853626	49	49	23	14.3%	730
853627	53	53	25	18.6%	620
853628	50	58	24	19.0%	770
853629	58	66	25	20.3%	1030
853630	68	64	26	21.6%	810
853631	46	51	24	21.7%	400
853632	44	61	26	25.8%	430
853633	46	62	27	26.5%	390
853634	45	58	25	26.2%	440
853635	48	43	25	19.6%	300
853636	22	42	25	22.7%	170
853637	15	36	24	21.3%	160
853638	18	42	26	25.4%	185
853639	30	57	27	30.1%	280
853640	30	43	26	24.4%	310
853641	24	44	23	20.8%	380
853642	37	55	25	23.9%	650
853643	58	46	27	24.8%	490
853644	51	46	23	20.2%	610
853645	38	50	25	22.9%	420
853646	37	50	23	24.3%	450
853647	32	45	23	20.8%	420
853648	31	41	24	16.5%	490
853649	48	50	24	21.2%	300
853650	7	<4	7	1.38%	140
853651	31	43	23	25.2%	260
853652	29	44	24	24.4%	540
853653	34	39	23	20.1%	440
853654	40	46	25	24.6%	360
853655	38	43	24	19.6%	370
853656	40	42	33	26.7%	440
853657	46	43	38	25.8%	420
853658	32	45	25	21.9%	380
853659	35	41	22	21.0%	530
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Job: 2DN1161
O/N: 853512

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853660	30	53	26	27.0%	210
853661	21	42	26	25.2%	200
853662	48	49	23	23.6%	300
853663	36	49	24	21.9%	430
853664	37	50	24	23.7%	320
853665	36	56	25	24.6%	420
853666	39	55	24	26.3%	470
853667	36	49	23	23.5%	380
853668	50	57	25	26.2%	820
853669	44	56	24	23.2%	580
853670	41	55	23	22.3%	700
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

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Job: 2DN1176
O/N: 853671

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853671	40	53	31	26.9%	340
853672	29	33	21	27.1%	340
853673	34	35	28	27.2%	400
853674	25	38	25	28.4%	260
853675	41	32	24	17.9%	900
853676	34	34	30	30.0%	370
853677	29	34	21	27.8%	310
853678	36	33	23	26.2%	400
853679	29	32	20	27.8%	510
853680	35	35	20	29.0%	340
853681	31	57	15	7.04%	7470
853682	94	35	18	22.4%	840
853683	54	25	20	18.3%	590
853684	58	30	22	18.8%	650
853685	73	26	20	19.9%	530
853686	65	21	21	19.6%	840
853687	36	33	21	24.9%	420
853688	46	30	41	22.2%	830
853689	I.S.	I.S.	I.S.	I.S.	I.S.
853690	50	41	20	25.6%	240
853691	27	40	22	22.9%	710
853692	35	44	23	27.8%	300
853693	57	43	23	29.0%	570
853694	32	34	25	27.1%	220
853695	26	33	24	28.5%	200
853696	27	38	28	28.8%	240
853697	39	31	26	22.3%	260
853698	40	36	39	29.2%	300
853699	40	37	25	27.4%	460
853700	31	30	21	23.3%	1410
853701	32	23	21	13.8%	280
853702	37	31	20	29.0%	270
853703	35	30	23	28.2%	360
853704	42	32	28	26.9%	340
853705	34	25	25	31.5%	410
853706	35	24	20	30.1%	590
853707	37	17	17	25.4%	430
853708	51	23	24	27.4%	700
853709	35	27	24	30.7%	510
853710	34	23	22	28.6%	770
853711	30	19	17	30.8%	510
853712	25	43	15	20.5%	2080
853713	40	26	21	26.7%	670
853714	37	22	22	29.1%	370
853715	33	19	21	30.5%	370
853716	43	20	34	29.7%	300
853717	31	21	30	29.9%	340
853718	32	18	23	30.0%	420
853719	28	30	20	28.0%	600
853720	26	28	23	29.1%	730
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

amdel

Job: 2DN1176
O/N: 853671

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853721	30	25	24	28.2%	450
853722	25	35	21	28.4%	540
853723	25	31	21	25.1%	1620
853724	29	28	30	29.5%	410
853725	33	30	27	28.9%	450
853726	40	26	20	23.6%	390
853727	100	33	24	23.3%	710
853728	42	36	29	30.3%	330
853729	33	31	23	28.6%	460
853730	42	35	22	30.3%	400
853731	49	38	24	26.5%	540
853732	29	31	29	14.3%	1810
853733	35	28	24	26.8%	540
853734	38	35	41	26.5%	420
853735	105	34	48	25.0%	720
853736	99	37	29	25.2%	900
853737	74	43	20	17.3%	1750
853738	63	30	21	19.6%	580
853739	94	14	26	9.40%	480
853740	55	37	25	29.2%	530
853741	30	51	24	31.8%	410
853742	30	39	27	28.3%	490
853743	31	40	23	27.6%	410
853744	22	34	34	8.70%	3820
853745	28	45	30	24.3%	330
853746	37	54	39	26.7%	2060
853747	26	45	26	32.6%	340
853748	31	40	23	22.4%	360
853749	25	49	25	31.5%	360
853750	5	12	13	1.31%	165
853751	29	54	25	31.7%	410
853800	63	50	39	21.7%	790
853801	52	55	19	16.6%	4140
853802	58	51	18	21.6%	580
853803	57	44	18	19.1%	430
853804	63	50	21	17.7%	2330
853805	53	24	43	18.9%	520
853806	89	55	22	14.6%	3570
853807	50	36	16	14.3%	940
853808	55	41	17	18.2%	950
853809	36	26	33	7.32%	1210
853810	50	27	36	14.5%	910
853811	49	43	16	6.98%	4840
853812	72	46	18	19.6%	2090
853813	54	39	18	16.8%	380
853814	64	45	37	20.8%	2130
853815	61	41	38	14.4%	3390
853816	55	54	47	22.6%	710
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

amdel

Job: 2DN1218
O/N: 853980

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853980	30	64	31	35.6%	195
853981	31	54	49	31.4%	230
853982	38	52	15	21.6%	210
853983	98	84	37	21.8%	6300
853984	55	71	30	22.0%	4070
853985	86	42	16	14.8%	740
853986	28	34	16	16.4%	240
853988	24	46	15	25.5%	460
853989	27	35	14	23.5%	220
853990	31	35	25	22.3%	210
853991	40	36	28	21.4%	220
853992	38	40	10	14.2%	730
853993	34	40	23	22.9%	320
853994	48	46	19	24.8%	270
853995	97	50	25	21.0%	1060
853996	125	57	28	23.1%	880
853997	51	53	40	29.9%	210
853998	48	56	13	26.1%	270
853999	46	47	8	23.6%	500
854000	32	47	45	24.9%	510
854001	26	48	28	26.4%	490
854002	14	40	26	19.9%	130
854003	33	39	40	22.6%	260
854004	48	32	10	21.0%	480
854005	100	38	9	19.9%	590
854006	60	55	20	22.3%	1250
854007	105	48	20	22.7%	4090
854008	15	37	21	23.0%	630
854009	15	34	14	20.1%	145
854010	20	41	16	25.1%	115
854012	46	44	21	9.22%	4630
854013	73	39	30	20.9%	990
854014	120	43	38	19.7%	1210
854015	49	43	21	12.0%	1090
854016	39	47	16	25.3%	260
854017	54	40	22	25.6%	330
854018	35	44	5	23.2%	220
854019	30	42	5	23.5%	250
854020	28	37	11	22.2%	310
854021	27	47	25	25.7%	180
854022	51	30	36	14.8%	230
854023	36	30	27	16.3%	360
854024	99	36	14	19.0%	460
854025	120	33	22	21.3%	810
854026	105	48	11	19.4%	3340
854027	94	52	33	21.4%	1500
854028	140	57	52	20.7%	1300
854029	57	33	22	16.7%	750
854030	38	44	36	19.7%	490
854031	48	51	16	23.3%	810
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854032	32	42	13	27.9%	260
854033	29	43	20	24.9%	300
854034	30	45	35	23.8%	300
854035	30	47	36	23.9%	420
854036	47	60	27	27.8%	260
854037	30	44	11	24.6%	450
854038	34	43	34	22.6%	530
854039	25	45	42	26.2%	350
854040	23	44	25	26.4%	350
854041	20	47	11	25.2%	220
854042	26	56	44	23.3%	590
854043	23	51	38	24.4%	400
854044	22	39	17	24.2%	590
854045	19	36	15	22.8%	185
854046	28	52	30	24.0%	920
854047	26	56	25	23.6%	610
854048	30	53	17	20.9%	720
854049	23	46	34	25.7%	540
854050	8	11	3	1200	90
854051	26	64	15	26.4%	440
854053	38	39	14	20.0%	220
854054	39	42	20	19.8%	250
854055	31	47	31	20.2%	290
854056	30	45	40	22.3%	130
854057	37	37	19	17.5%	200
854058	37	38	34	20.7%	350
854059	40	37	14	23.5%	450
854060	32	35	13	15.5%	520
854061	47	39	15	21.4%	290
854062	37	24	26	14.7%	260
854063	37	43	16	19.4%	330
854064	47	42	18	24.8%	280
854065	39	41	20	22.1%	430
854066	42	50	15	18.9%	310
854067	38	52	21	18.1%	360
854068	28	99	18	21.7%	195
854069	50	69	20	24.0%	260
854070	30	64	19	24.3%	350
854071	38	60	42	25.6%	290
854072	44	51	15	20.3%	630
854073	39	45	15	22.5%	410
854074	30	57	18	21.4%	520
854075	28	52	19	21.8%	480
854076	25	61	18	17.9%	800
854077	20	52	15	20.1%	450
854078	31	53	26	24.9%	330
854079	24	52	32	25.5%	260
854080	22	48	35	23.2%	210
854081	22	49	33	25.1%	160
854082	32	47	20	24.5%	340
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854083	38	53	20	26.2%	240
854084	41	61	19	25.0%	730
854085	48	56	18	26.7%	240
854086	36	54	20	24.8%	220
854087	23	53	26	14.0%	990
854088	27	49	46	23.3%	340
854089	29	47	18	23.2%	240
854090	30	44	40	24.7%	250
854091	48	55	23	27.3%	820
854092	47	37	18	25.7%	650
854093	36	32	17	25.9%	470
854095	26	33	17	25.6%	410
854096	22	38	14	23.5%	910
854097	19	36	17	28.6%	520
854098	17	36	18	24.4%	850
854099	17	32	28	18.0%	760
854100	32	39	31	24.3%	1010
854101	31	76	18	23.9%	290
854102	15	200	11	21.8%	1350
854103	16	135	15	26.7%	800
854104	14	77	31	27.8%	480
854105	18	70	21	28.8%	330
854106	29	49	33	27.3%	400
854107	26	51	15	26.6%	470
854108	15	61	13	26.7%	400
854109	17	47	14	18.9%	470
854110	14	64	15	28.7%	380
854111	19	56	15	22.9%	1020
854112	19	47	18	28.7%	560
854113	17	50	15	25.2%	290
854114	15	37	17	22.7%	530
854115	21	40	32	23.7%	620
854116	25	38	38	20.9%	510
854117	15	43	38	25.2%	290
854118	15	38	24	19.2%	560
854119	17	35	15	23.9%	750
854120	18	39	13	28.5%	820
854121	20	38	14	21.5%	790
854122	20	42	14	24.2%	700
854123	18	46	15	30.1%	470
854124	23	41	16	24.1%	610
854125	24	35	17	22.8%	500
854126	20	40	15	21.1%	430
854127	18	38	14	19.6%	330
854128	32	33	17	21.3%	510
854129	18	39	16	28.2%	280
854130	18	43	18	22.2%	760
854131	18	42	38	22.4%	730
854132	19	54	36	17.6%	5400
854133	21	62	17	25.4%	1380
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Job: 2DN1218
O/N: 853980

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854134	18	48	17	23.5%	610
854135	15	43	18	26.9%	540
854136	13	49	40	26.5%	520
854137	14	42	14	24.4%	350
854138	16	43	15	26.9%	320
854139	22	40	32	24.0%	500
854140	21	44	23	22.9%	530
854141	17	46	18	24.9%	430
854142	18	50	16	26.4%	800
854143	15	41	14	25.4%	940
854144	17	47	15	22.8%	620
854145	13	49	16	25.1%	720
854146	11	56	22	24.9%	840
854147	15	50	40	22.0%	440
854148	21	40	14	22.6%	490
854149	14	44	13	24.2%	470
854150	6	<4	5	1.20%	165
854151	28	43	16	24.6%	510
854152	21	45	16	26.3%	480
854153	30	53	16	24.5%	470
854154	23	48	16	24.1%	390
854155	21	46	14	22.0%	560
854156	20	43	17	25.0%	460
854157	23	57	17	25.7%	300
854158	21	44	19	23.7%	450
854159	17	47	16	21.6%	360
854160	17	49	17	23.4%	330
854161	22	48	17	25.0%	360
854162	22	43	18	26.7%	270
854163	17	48	18	28.5%	260
854164	14	55	18	34.1%	490
854165	15	58	17	32.8%	430
854166	13	60	17	36.4%	490
854167	13	47	15	23.1%	230
854168	13	31	15	27.7%	200
854169	18	47	15	27.3%	240
854170	16	34	17	25.9%	230
854171	17	48	17	23.6%	350
854172	24	47	19	25.0%	660
854173	22	46	16	23.5%	470
854174	17	53	14	23.0%	420
854175	16	55	16	23.8%	390
854176	15	55	17	22.5%	310
854177	19	49	17	22.1%	670
854178	24	59	28	24.9%	280
854179	29	52	46	20.9%	3780
854180	17	57	16	27.0%	180
854181	22	41	14	24.2%	135
854182	12	60	28	34.4%	460
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

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Job: 2DN1219
O/N: 853689

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853689	32	26	32	19.0%	180
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853752	29	38	18	19.0%	440
853753	26	25	17	19.0%	650
853754	28	43	18	19.9%	580
853755	38	52	17	25.3%	250
853756	16	47	16	27.0%	230
853757	16	31	18	24.8%	340
853758	16	28	15	24.7%	340
853759	28	45	18	19.5%	4660
853760	23	56	17	25.1%	520
853761	24	47	17	25.4%	310
853762	20	44	16	24.1%	300
853764	40	53	20	29.9%	220
853765	32	40	19	28.0%	175
853766	26	36	18	30.2%	250
853768	18	32	21	28.1%	195
853769	17	42	21	32.3%	220
853770	16	42	18	27.5%	310
853771	17	48	20	31.2%	370
853772	21	32	20	26.4%	540
853773	17	41	19	31.2%	330
853774	18	33	20	24.8%	310
853775	16	35	20	25.1%	240
853776	16	41	18	25.8%	230
853777	17	46	19	28.1%	230
853778	16	36	21	24.2%	230
853779	16	46	18	25.2%	260
853780	19	42	21	20.8%	350
853781	17	51	20	28.2%	290
853782	17	44	19	28.4%	320
853783	30	50	21	29.9%	370
853784	15	31	20	28.7%	185
853785	17	32	19	30.1%	200
853786	16	30	20	31.8%	160
853787	15	38	19	30.3%	140
853788	17	47	21	30.5%	220
853789	18	51	20	28.6%	450
853790	17	50	18	25.6%	390
853791	17	54	19	28.0%	250
853792	15	46	17	25.7%	260
853793	14	46	18	30.4%	270
853794	17	63	18	32.2%	330
853795	18	55	18	25.5%	330
853796	16	37	16	26.0%	190
853797	16	41	17	29.8%	290
853798	19	36	27	29.9%	260
853799	22	36	21	28.3%	170
853817	20	38	17	29.3%	340
853818	16	53	19	31.1%	290
853819	27	59	19	26.6%	310
853820	23	69	19	28.5%	250
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853821	17	58	19	27.3%	240
853822	27	49	18	30.0%	175
853823	17	49	18	27.5%	240
853824	17	43	20	27.2%	260
853825	15	55	17	28.7%	230
853826	18	44	19	26.6%	260
853827	16	54	17	25.7%	240
853828	15	50	17	26.4%	240
853829	36	36	16	22.1%	260
853830	22	46	22	31.2%	310
853831	17	60	19	29.4%	270
853832	20	49	18	29.0%	280
853833	23	51	19	27.7%	250
853834	29	42	19	28.2%	300
853835	26	46	20	29.2%	510
853836	31	46	21	29.9%	390
853837	29	48	20	30.0%	290
853838	29	52	19	28.0%	400
853839	23	46	23	25.4%	290
853840	23	46	20	25.1%	260
853841	24	30	19	25.4%	280
853842	18	56	20	27.2%	240
853843	27	48	20	29.7%	220
853844	13	13	16	21.9%	180
853845	14	10	19	26.0%	87
853846	14	15	19	29.1%	69
853847	15	16	21	28.5%	98
853848	15	25	19	29.4%	105
853849	19	37	23	30.0%	220
853850	8	6	7	1.20%	150
853851	32	51	25	32.2%	330
853852	20	32	24	29.8%	195
853853	16	45	21	32.5%	170
853854	19	53	21	32.0%	240
853855	37	40	24	27.1%	350
853856	25	49	24	34.2%	410
853857	29	34	20	26.3%	560
853858	38	38	22	29.0%	600
853859	39	26	22	29.4%	400
853860	88	50	20	25.5%	660
853861	51	24	18	18.2%	440
853863	86	49	28	23.0%	770
853864	59	41	24	25.0%	470
853866	63	45	20	27.0%	360
853868	39	25	22	35.1%	320
853869	46	28	22	35.6%	280
853870	25	32	22	35.2%	210
853871	34	21	19	20.2%	185
853872	51	24	20	27.0%	250
853873	14	45	20	35.5%	170
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853874	16	46	22	32.8%	135
853875	17	34	21	32.9%	165
853876	27	23	23	27.2%	165
853877	29	43	17	27.0%	310
853878	34	15	16	19.9%	390
853879	24	13	16	26.6%	680
853880	24	30	17	27.4%	400
853881	31	45	20	27.8%	300
853882	37	22	19	24.8%	190
853883	13	27	18	30.4%	300
853884	14	37	18	31.8%	180
853885	11	53	17	32.8%	155
853886	15	44	17	29.5%	195
853887	17	36	18	29.4%	220
853888	29	28	18	23.1%	145
853889	27	28	15	19.2%	320
853890	29	9	13	16.0%	380
853891	34	11	17	21.6%	660
853892	17	16	18	31.3%	330
853893	18	37	18	30.7%	165
853894	17	48	20	28.0%	170
853895	16	57	21	32.6%	165
853896	17	55	20	32.4%	155
853897	16	56	17	32.3%	160
853898	19	40	19	33.7%	180
853899	22	42	20	31.5%	190
853900	13	49	19	32.2%	175
853901	20	45	20	30.4%	185
853902	15	12	23	25.5%	140
853903	14	12	14	8.34%	88
853904	15	27	16	19.5%	120
853905	17	42	18	25.7%	200
853906	20	48	24	37.8%	175
853907	24	54	19	31.0%	115
853908	32	47	17	28.1%	200
853909	47	36	18	16.0%	155
853910	36	58	18	32.1%	230
853911	17	31	18	31.9%	185
853912	16	24	16	28.5%	130
853913	13	8	15	20.5%	79
853914	10	7	16	14.4%	94
853915	14	8	13	11.4%	185
853916	31	54	24	34.7%	125
853917	16	60	18	37.1%	195
853918	35	49	22	34.6%	190
853919	27	63	19	33.7%	330
853920	35	48	21	25.5%	310
853921	97	74	17	26.2%	550
853922	87	76	17	21.4%	2120
853923	155	28	23	24.3%	410
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853924	17	9	20	13.9%	120
853925	57	10	27	23.5%	670
853926	68	18	21	15.1%	1460
853927	19	51	20	34.9%	185
853928	30	41	21	30.7%	250
853929	29	21	21	31.5%	145
853930	17	31	21	30.3%	120
853931	18	42	21	31.8%	140
853932	17	47	20	30.7%	115
853933	18	39	19	29.4%	120
853934	16	43	20	33.5%	150
853935	27	45	18	27.6%	210
853936	15	59	16	28.0%	185
853937	16	37	19	23.7%	140
853938	15	42	18	28.2%	115
853939	15	31	17	28.5%	135
853940	14	26	19	36.0%	92
853941	8	9	14	16.8%	105
853942	40	60	19	24.1%	450
853943	30	60	20	28.1%	260
853944	28	41	23	24.6%	300
853945	22	35	19	30.3%	180
853946	23	54	24	31.7%	125
853947	27	63	18	29.3%	170
853948	26	39	19	29.1%	220
853949	37	31	18	19.0%	890
853950	6	8	8	6810	110
853951	30	33	18	21.2%	220
853952	21	27	17	17.3%	320
853953	17	37	22	25.5%	290
853954	17	47	25	24.0%	420
853955	27	50	26	28.1%	250
853956	16	72	24	33.1%	190
853957	16	70	24	34.1%	140
853958	22	62	25	35.6%	120
853959	25	50	22	27.1%	160
853960	19	46	20	24.8%	130
853961	26	44	21	27.2%	115
853962	14	29	19	21.6%	135
853963	12	24	17	16.3%	95
853964	9	14	13	8.20%	65
853965	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.
853966	14	6	14	7.80%	65
853967	49	11	24	21.4%	360
853968	69	29	24	23.8%	1350
853969	71	48	24	23.2%	1340
853970	63	54	24	25.2%	4510
853971	42	28	34	23.5%	930
853972	12	7	13	8.04%	195
853973	67	9	22	25.4%	620
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

amdel

Job: 2DN1228
O/N: 853752

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
853974	21	24	24	24.1%	450
853975	14	6	18	16.4%	150
853976	11	12	20	23.0%	87
853977	18	35	22	26.6%	99
853978	24	47	17	25.4%	190
853979	33	74	23	35.2%	195
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

amdel

Job: 2DN1249
O/N: 854183

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854183	30	50	16	21.0%	410
854184	31	52	18	30.0%	830
854185	31	48	19	29.8%	400
854186	29	56	17	26.8%	760
854187	32	56	17	26.3%	980
854188	26	49	17	27.9%	350
854189	26	48	18	20.6%	730
854190	24	55	19	25.7%	350
854191	23	63	18	27.6%	330
854192	20	56	16	31.4%	300
854194	19	59	13	35.4%	350
854195	17	60	14	34.3%	370
854196	15	65	12	28.8%	1170
854197	15	64	11	23.2%	920
854200	16	31	6	19.3%	2980
854201	16	28	13	24.2%	1170
854202	18	28	12	25.7%	780
854203	17	23	11	14.6%	5290
854204	18	30	10	15.3%	5480
854205	18	29	12	15.2%	4950
854206	18	27	8	16.8%	5410
854207	26	22	13	21.8%	1080
854208	17	22	10	16.7%	4730
854209	17	29	11	18.1%	7700
854210	19	36	13	26.6%	1070
854211	18	40	12	23.1%	3960
854212	16	44	9	23.4%	5310
854213	15	42	9	30.9%	3860
854214	13	58	9	39.0%	530
854216	16	50	11	24.9%	1250
854217	15	59	8	32.6%	1040
854218	14	56	8	29.8%	4350
854219	15	61	9	30.5%	1820
854221	12	64	10	43.5%	370
854222	16	50	8	35.2%	330
854223	20	61	10	27.2%	7250
854224	15	52	13	30.6%	4060
854225	15	41	12	29.2%	4980
854226	16	45	14	31.6%	4640
854227	17	50	7	22.5%	4040
854228	16	39	7	23.4%	4900
854229	37	45	47	27.6%	800
854230	16	36	12	23.9%	310
854231	23	39	16	30.0%	250
854232	16	54	11	29.7%	155
854233	20	57	14	33.3%	230
854234	18	48	21	27.6%	370
854235	19	43	40	28.3%	510
854236	21	49	10	27.8%	360
854237	22	46	11	25.2%	280
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854238	19	51	15	31.5%	290
854239	26	51	19	27.6%	210
854240	53	57	42	27.1%	360
854241	21	53	24	20.6%	350
854242	21	53	13	26.7%	340
854243	21	51	11	26.6%	270
854244	23	50	16	27.4%	310
854245	23	49	24	28.6%	430
854246	25	47	18	32.7%	430
854247	20	52	13	28.2%	370
854248	18	41	12	25.7%	450
854249	31	35	13	23.6%	630
854250	8	9	5	1.01%	160
854251	15	37	17	24.4%	370
854252	20	46	24	27.3%	300
854253	15	46	12	25.7%	180
854254	17	47	14	25.8%	200
854255	21	47	15	25.6%	320
854256	28	36	31	25.0%	310
854257	30	47	19	23.9%	470
854258	33	47	18	23.7%	340
854259	30	43	39	23.3%	400
854261	24	39	16	26.0%	340
854262	22	48	20	23.7%	390
854263	22	47	15	22.0%	550
854264	19	44	16	22.0%	340
854265	21	53	17	23.8%	460
854266	19	54	22	24.0%	430
854267	20	50	17	25.7%	150
854268	19	42	12	23.0%	560
854269	34	62	18	26.9%	350
854270	16	63	34	35.2%	320
854271	15	65	9	34.1%	130
854272	21	54	9	25.4%	400
854273	28	46	10	25.7%	340
854274	27	47	9	29.8%	240
854275	22	50	8	27.6%	360
854276	21	46	12	27.4%	250
854277	24	43	15	19.4%	460
854278	28	42	6	23.7%	360
854279	20	52	8	27.1%	145
854280	24	53	9	30.1%	200
854281	22	56	8	25.1%	360
854282	22	54	10	28.1%	195
854283	25	41	25	23.7%	420
854284	23	39	6	24.7%	200
854285	27	47	15	25.7%	260
854286	42	38	26	32.0%	590
854287	65	50	49	24.0%	980
854288	46	39	15	20.1%	3210
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

Final

ANALYTICAL REPORT

SAMPLE	Cu	Pb	Zn	Fe	Mn
854289	42	45	2	23.7%	300
854290	48	41	6	30.9%	890
854291	49	38	19	27.1%	510
854292	42	41	15	24.3%	360
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIM	2	4	2	4	4
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1
UPPER SCHEME				AAS1C	

APPENDIX 10

CSIRO Pb ISOTOPIC REPORT

Sirotope

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REPORT TO M.I.M. EXPLORATION PTY. LTD.
ON A Pb ISOTOPE STUDY OF
MINERALIZATION FROM EL 6808,
McARTHUR BASIN, NORTHERN TERRITORY

SIROTOPE REPORT SR 232

JUDITH A. DEAN

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9/10/92

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1. AIM OF STUDY

The aim of this study has been to assess the likely metallogenic association of mineralized drill core from exploration licence EL 6808 in the McArthur Basin by comparing their Pb isotopic compositions to the target signature for shale-hosted stratiform Pb-Zn-Ag mineralization in the Middle Proterozoic McArthur Group. It is likely that the mineralization is hosted by the Lynott Formation (D. Kettlewell, writ. comm.) which is slightly younger than the Barney Creek Formation, host to the major HYC deposit at McArthur River. EL 6808 is located _ 150 to 175 km NNW of HYC.

2. SAMPLES AND METHODS

A total of nine diamond drill core samples were submitted in two batches by M.I.M. Exploration via Derrick Kettlewell. Sample descriptions, as provided, are given in Table 1.

The first batch comprised drill core material from LD1 (one sample) and LD3 (five samples). Four of the LD 3 samples contained visible galena which was hand picked for Pb isotope analysis. For the other drill core portions, a representative amount of QP100426 and two sub samples of QP100421 (/1 boxwork gossan, /2 sulfides) were crushed in a Mn-steel mill and analysed.

The second batch comprised three samples, one each from drill cores BB 5, WM 6 and McA 18. Although ?galena was reported in each of these (D. Kettlewell, writt. comm. 5/06/92) it was too fine-grained in BB 5 and WM 6 to handpick, hence a small portion of each of these samples was crushed by hand in an agate mortar. Galena was not identified in McA 18 and sulfides were drilled out using a dental drill.

Galenas were dissolved in concentrated HNO_3 acid and Pb purified by micro-electrodeposition techniques onto Pt electrodes. A small amount of sulfides from QP100429 McA 18 and each of the crushed whole rock samples was weighed into a teflon beaker, along with a known amount of ^{202}Pb spike in order that Pb concentrations could be determined simultaneously with isotope ratios, and digested in a hot 1:1 mixture of 7N HCl and 7N HNO_3 acids. Lead was extracted by anion exchange methods in dilute HBr solutions and purified as for the galenas.

Lead isotope ratios were determined on a VG ISOMASS 54E thermal ionization mass spectrometer run in fully automated mode. The results have been normalized to the accepted values of international standard NBS 981 by applying a correction factor of +0.08% per atomic mass unit. Precision estimates, shown as error bars in the upper left hand corner of the accompanying Figures, are based on over 1300 analyses of international standards and natural samples. Also shown are the 95% confidence ellipses for the standard data. Lead contents are precise to within about ± 10% for low to moderate Pb samples. However, for high Pb samples (about > 1000 ppm), the measurement of the $^{206}Pb/^{202}Pb$ ratio becomes increasingly inaccurate so that the calculated Pb levels are only an approximation.

3. TARGET Pb ISOTOPIC SIGNATURES

The McArthur Basin is a mildly deformed Mid-Proterozoic basin unconformably overlying the Early Proterozoic North Australian Orogenic Province. It hosts the classic stratiform Pb-Zn-Ag McArthur-type deposits, and smaller carbonate-hosted unconformity-related and Mississippi Valley-type (MVT) deposits associated with ancient regolith and karst systems (Plumb et al., 1990). Lead isotope characteristics of mineralization within the McArthur Basin have recently been summarised for M.I.M. Exploration in Dean (1992). The following is taken largely from that report. The Appendix gives a brief explanation of Pb isotope systematics and terminology.

The target for major *shale-hosted Pb-Zn-Ag mineralization in the McArthur Group* is the HYC deposit which occurs near the base of the HYC Pyritic Shale Member. Lead isotope data for the galena/sphalerite mineralization at HYC (Gulson, 1975; Richards, 1975; Gulson, 1985) show a high degree of homogeneity (data shown as 95% confidence ellipse Fig. 1) and are conformable to average crustal Pb evolution models (plot on or near growth curve Fig. 1). Wallrocks of the HYC deposit with greater than about 1000 ppm Pb have the same isotopic composition as the ore (Vaasjoki et al., 1985) whilst low-Pb wallrocks are more radiogenic and define a linear trend on the $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram which projects back through the orebody value, giving a Pb-Pb isochron age of 1620 ± 20 Ma. Tuffs in the Pb-Zn zone have yielded a U-Pb zircon age of 1670 Ma (Page, 1981) which has recently been slightly revised to 1640 Ma (R. Page, oral comm., 1992).

Concordant smaller deposits such as W-fold and HYC North have almost identical isotopic compositions to HYC (Fig. 1; Carr and Gulson, 1984; Gulson, 1985; Gulson et al., 1985) although the large difference in the isotopic composition of the concordant part of Ridge II precludes a common source of Pb for this mineralization (Fig. 1; Gulson et al., 1985).

Discordant and karstic Pb-Zn deposits occur as veins and breccia fillings in the dolomite units of the *McArthur* (Reward, Coxco, Cooley, Ridge), *Nathan* (Eastern Creek) and *Mount Rigg* (Bulman) Groups (Plumb et al., 1990). These are located at or below regional unconformities and have variable and generally more radiogenic Pb isotope ratios (Fig. 2). The ages of the Nathan and Mount Rigg Groups can only be constrained between the base of the Roper Group and the top of the McArthur Group. An age of 1429 ± 31 Ma for the top of the Roper Group has been determined by Rb-Sr dating of illite (Kralik, 1982).

Coxco (Fig. 2; Cook's and Cox's from Richards, 1975; Walker et al., 1983; Vaasjoki and Gulson, 1986), which shows many similarities to MVT deposits and is located about 10 km southeast of HYC, has isotopic characteristics which indicate mixing between two hydrothermal systems with different Pb isotope ratios. One source is the same as HYC with Pb considered to have been derived from deep basinal brines introduced along the Emu Fault, whilst the other has radiogenic $^{206}Pb/^{204}Pb$ ratios up to about 16.4, and derived from brine leaching within the McArthur Group (Walker et al., 1983; Vaasjoki and Gulson, 1986) which is known to contain galena with variable isotopic compositions (Figs 2 and 3; Richards, 1975). Data for other discordant mineralization which resembles MVT deposits such as Cooley I and III, Ridge I, and part of Ridge II are shown in Figure 2.. Their lead isotope data (Gulson et al., 1985) are inconsistent with a simple single-stage model involving westward migration of ore fluids from the Emu Fault as proposed by Williams (1978) and Rye and Williams (1981).

Other mineralization, described as *stratabound disseminated Pb-Zn* deposits (Plumb et al., 1990), such as *Barney's, Bald Hills* (Fig. 3; Richards, 1975), *Bulburra, Mariner and Great Scott* (Fig. 3; Carr and Gulson, 1984) and occurrences in the *Karns Dolomite* similarly have variable and more radiogenic values than the HYC target. They are located at different stratigraphic levels in the McArthur Basin and may be MVT deposits but do not show any obvious relationships to unconformities, karsts, faults or fractures (Plumb et al., 1990).

There are also Pb isotope data for *discordant copper vein deposits* (Fig. 3; Gordon's Coppermine Creek, low-Pb samples which show effects of radiogenic addition; Johnston's prospect) occurring as fault or fracture fillings in dominantly carbonate sequences of the McArthur Basin (Plumb et al., 1990).

In summary, the characteristic Pb isotopic compositions for stratiform/stratabound base metal mineralization are homogeneous and have ratios which conform to average crustal models. In the McArthur Group, the target is the HYC mineralization. It has a Pb isotope model age, based on the Stacey and Kramers model, of 1606 Ma, compared to a revised mineralization age from tuff beds in the Pb-Zn horizons of 1640 Ma. Vein-style and discordant mineralization in the McArthur Group has variable and generally more radiogenic isotopic compositions in comparison to HYC (Figs 2 and 3).

4. RESULTS OF SAMPLES FROM THIS STUDY

Lead concentrations, determined by isotope dilution, and isotope ratios are given in Table 2. Data are plotted in Figures 4 and 5 on conventional XY ratio plots ($^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ = uranogenic Pb diagram; $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ = thorogenic Pb diagram). Shown for reference are the average crustal Pb evolution curves, or growth curves, of Cumming and Richards (1975), and target 95% confidence ellipses for the HYC deposit.

Galenas from DDH LD3 (QP100422-25) (points 3 to 6; Fig. 4) form a heterogeneous group and have significantly more radiogenic isotope ratios (i.e. higher $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ ratios) than the HYC target signature. The remaining LD3 sample QP100426 (point 7) has ≈ 1100 ppm Pb and a much less radiogenic isotopic composition than the galenas. It has a $^{206}Pb/^{204}Pb$ ratio which is ≈1.9% higher than the HYC target (compared to 2σ analytical precision of ± 0.1% for this ratio).

The two subsamples from LD1 QP100421 (/1 boxwork gossan, /2 sulfides; points 1 and 2 respectively), have Pb contents of 440 and 840 ppm and slightly lower ratios to QP100426 from LD3, being ≈1.2% more radiogenic than the HYC target signature. Since these samples have relatively low-Pb contents the ratios may have been affected by *in situ* radiogenic addition since the Proterozoic (i.e. the initial ratios may have changed over the period since formation; see Appendix for a brief discussion of Pb isotope systematics).

The three samples from drill holes McA 18, WM 6 and BB 5 (points 8, 9 and 10 respectively) ≈ 5-10 kms distant from M.I.M.'s LD series holes have relatively low-Pb contents despite the apparent presence of galena grains as described in the notes provided (Table 1). The ratios are radiogenic compared to the HYC target with a correlation between .Pb content and radiogeneity. The low- Pb data define a linear trend on the $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram (Fig. 4) but define different Th/U relationships on the $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram.

5. DISCUSSION

Three types of signatures have been defined in the McArthur Basin.:

1. Mineralization of Barney Creek Formation age, and associated with the Emu Fault, would have a high probability of having the same isotopic composition as the HYC orebody.

2. It has been discovered that mixing of this major hydrothermal system(s) with smaller more local fluids having more radiogenic Pb, can also occur (e.g. Coxco, Walker et al., 1983). Evidence of such mixing is apparent in the Lawn Hill region and the South Nicholson Basin (SIROTOPE unpubl. data). It is possible, though less likely, that such radiogenic mineralization may have formed in response to a much later diagenetic or epigenetic event. Mineralization with these mixed, more radiogenic signatures is considered to have a lower probability of representing a significant resource.

3. The extreme heterogeneity of the bulk of the Cooley-Ridge data indicates a separate hydrothermal event with a much higher U/Pb ratio source than the HYC, and/or a larger age difference between source rocks and the time of ore deposition.

The stratigraphic position of the sulfides analysed is an important consideration in interpreting Pb isotope results in the McArthur Basin. Signature (1) above is defined for the Barney Creek Formation. Synsedimentary sulfides from higher in the stratigraphy may have different Pb isotope signatures if there is a significant time difference (e.g Nathan Group) or they may have the same signatures if the sedimentary pile was deposited over a relatively short time frame (e.g. < 20Ma). Since there is no known stratiform mineralization hosted by the Lynott Formation in this part of the McArthur Basin, some 150 km distant from HYC, it is not possible to say with certainty that the target Pb isotopic composition for major mineralization will be identical to that of HYC. It is worth noting that the isotopic composition of part of the high-Pb Coxco mineralization which is hosted by the Reward Dolomite and the Lynott Formation, has $^{206}Pb/^{204}Pb$ ratios up to 16.4 (Walker et al., 1983).

In Figure 5, the results of this study are compared with data from four samples containing fine grained pyrite from DDH McA 5 (SIROTOPE Database) with Pb contents ranging from 360 to 1050 ppm. The highest Pb sample of these has the least radiogenic Pb isotope ratios. The broad grouping of sulfide results at $^{206}Pb/^{204}Pb$ ratios of ≈ 16.35 (QP100421, possibly 426, high-Pb data from DDH McA 5) suggests that these data probably represent close to an initial ratio. These data are similar to an unpublished SIROTOPE analysis of galena from McA 5. They yield a Pb isotope model age of ≈1500 Ma based on the Stacey and Kramers (1975) model. These data are consistent with signature (2) above and may represent a Mid Proterozoic mineralizing event of a reasonably large regional extent and of either a similar or younger age than HYC . It is not possible however to determine from the Pb isotope data if stratiform mineralization is indicated.

These data are similar to the most radiogenic values for galenas from vein mineralization analysed by Richards (1975) in the McArthur River area (Fig. 6.).

Richards (1975) interpreted these vein leads as probably representing mixture of Pb from the HYC Pyritic Shale Member, having the HYC isotopic composition, with country rock Pb having more radiogenic values.

In contrast, the isotopic heterogeneity and radiogeneity compared to the HYC target for the galena mineralization from LD3 are consistent with an epigenetic event. There is thus a very low probability that they represent a major stratiform deposit or remobilization from such a deposit.

Samples from other drill holes in the area have low-Pb contents and high $^{206}Pb/^{204}Pb$ ratios, probably reflecting a large radiogenic component. Thus the metallogenic association of these samples is difficult to assess particularly when galena could not be positively identified. They plot on a linear array on a $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram (Fig. 5) with other low-Pb data from drill holes McA, WM and BB (SIROTOPE unpubl. data) which yields a Pb-Pb isochron age of 1300 +160/-190 Ma with an MSWD of 0.6. Although the fit of the data to the line is good (exemplified by the low MSWD) the spread of ratios is relatively small which results in the large error limits.

6.. CONCLUSIONS

The least radiogenic leads from LD 1, possibly LD 3 and McA 5 are considered to represent close to initial Pb isotope ratios. These are considerably different from the HYC target signature and are at the upper limit of galena vein mineralization from the McArthur area analysed by Richards (1975). However, mineralization in the EL 6808 area, some 150 kms NNW of HYC, is hosted by stratigraphically higher sedimentary sequences than HYC and is similar to part of the Coxco mineralization. For this mineralization to be synsedimentary, then this sequence would have to be about 100Ma years younger than the Barney Creek Formation. This is considered unlikely, but could only be verified by precise zircon dating.

In contrast galena mineralization from LD 3 have Pb isotope data which are consistent with vein-style mineralization although the possibility that mixing of Pb from two sources, one of which was a Middle Proterozoic stratiform source, cannot be discounted.

The rest of the data show some radiogenic component due to *in situ* radioactive decay of U and Pb. It is difficult in these samples to assess their likely metallogenic association. However, the data from drill holes in the region such as McA, WM and BB holes, yield an isochron age which is consistent with the age of younger unconformity related events in the region.

7. REFERENCES

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APPENDIX 1 - BRIEF DISCUSSION OF Pb ISOTOPE SYSTEMATICS AND TERMINOLOGY

Lead isotope data are conventionally represented as the ratio of one isotope of Pb to another, most often in terms of $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$. Whilst ^{206}Pb, ^{207}Pb and ^{208}Pb derive from the constant radiogenic decay of ^{238}U, ^{235}U and ^{232}Th respectively, ^{204}Pb has no parent isotope and so its abundance does not change through geological time. Thus the three ratios above are continually increasing with time according to well defined decay criteria. Lead isotope ratios are presented graphically on conventional XY ratio plots; $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram details the Th-U/Pb system, and the $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram the U/Pb system.

Variation of Pb isotope data results principally from geological factors. However, some variation can be ascribed to **analytical errors**. The 95% confidence ellipse of the error associated with any Pb isotopic analysis is shown in the top left hand corner of each diagram. The major axis of this ellipse indicates the strong correlation inherent in the errors which arise from **fractionation** and to a lesser extent **^{204}Pb** error. Fractionation occurs at the very high temperatures induced during mass spectrometer analysis and results from preferential emission o..f the light isotopes (e.g. ^{204}Pb) relative to the heavier isotopes (e.g. ^{208}Pb, ^{207}Pb). ^{204}Pb error results from the lower precision in estimating peak heights of this low abundance isotope.

The geological variables are:

1) The **age** of the sample, i.e. the time at which the Pb was incorporated into the rock/mineral.

2) The relative amounts of Pb, U and Th (expressed generally as $^{238}U/^{204}Pb$ (μ) and $^{232}Th/^{204}Pb$) in the source rocks from which the Pb was leached prior to incorporation in the rock/mineral.

3) The U/Pb and Th/U ratios in the rock/mineral between the time the Pb was incorporated and the present.

A **growth curve** is a model of this variation and indicates the expected isotopic composition of Pb-rich ores at any particular stage in the Earth's history. There is no unique growth curve for the Earth, and different curves can be generated assuming source rocks with different U/Pb and Th/U ratios. **Model ages** can be determined when data from high-Pb samples plot on or near a growth curve on a $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ diagram. The accuracy of model ages vary considerably and relies on the appropriateness of the chosen model. The commonly used Cumming and

Richards curve is based on the assumption that the U/Pb and Th/Pb ratios in the Earth's crust have been varying continuously and is correlated with the known ages of a set of massive sulfide deposits which probably gained their Pb from hydrothermal solutions which leached large volumes of rocks through the crust. Massive sulfides and other ores which leached their Pb from mantle rocks or lower crustal rocks will not fall on this growth curve.

The Pb isotope **fingerprinting technique** is based on the fact that in any geological domain, ores forming during a particular mineralizing event from the same or similar source rocks will have the same isotopic composition. In some cases we can broadly predict the likely isotopic composition based on geological criteria such as age/rock type etc., but in general the technique relies on a library of data on known ore deposits in a region.

This isotopic "fingerprint" represents the Pb isotopic composition at the time of formation of the ore/rock - otherwise known as the **initial ratios**. If the ore/rock has relatively low U/Pb, and Th/Pb ratios, such as in galena, then these initial ratios will not change with time because insignificant ^{206}Pb, ^{207}Pb and ^{208}Pb will have been added *in situ* since the time of formation by the radioactive decay of ^{238}U, ^{235}U and and ^{232}Th respectively. However with "low-Pb" samples (generally less the about 50- 100 ppm for Palaeozoic samples and less than about 500-1000 ppm for Proterozoic samples) measurable ^{206}Pb, ^{207}Pb and ^{208}Pb will have been added by *in situ* radioactive decay and so the ^{206}Pb/^{204}Pb, ^{207}Pb/^{204}Pb and ^{208}Pb/^{204}Pb ..ratios will increase; i.e. will be **more radiogenic**. This effect will be magnified in high-U samples and higher Pb contents than the figures quoted above are needed to guarantee that significant additional radiogenic Pb has not changed the initial ratios.

Where *in situ* radioactive decay has occurred the ratios will plot on a line on any of th.....e diagrams commonly presented. This line will always incorporate the initial ratios. On the ^{208}Pb/204 vs ^{206}Pb/^{204}Pb diagram the slope of the line is dependant on the Th/U ratio of the sample, whereas on the ^{207}Pb/^{204}Pb vs ^{206}Pb/^{204}Pb diagram the slope is dependant only on the time interval over which radioactive decay has taken place. In this latter case, where it can be shown that the isotope ratios of all the points on such a line have developed under a closed system with respect to Pb and U then the line is termed an Pb-Pb **isochron**. An isochron is thus defined by the slope, **m**, of a linear regression through the data. An estimate of how well such a regression fit the data is gained from Mean Square Root of the Deviates or **MSWD**. This function compares the deviation of each point from the regression relative to the estimeat of analytical precision. An MSWD of 1 or less indicates that the data deviate minimally from the regression whereas higher values indicate increasing deviation.

Source rock studies involve determining, if possible, the initial Pb isotope ratios of those rocks considered to be possible source of metals for mineralization. Such studies are particularly important in areas where mineralization may result from a syngenetic event, such as a VMS deposit, or from later granite intrusion. The syngenetic signature may be well established, but it is also important to know what is the likely Pb isotopic composition of epigenetic mineralization forming in response to the intrusion. This may be done by measuring mineralization known to be associated with the intrusion, such as skarns, or by determining the Pb isotopic composition of a relatively high-Pb silicate component such as K-feldspar. Although K-feldspars may contain a significant proportion of radiogenic Pb (i.e. Pb derived from *in situ* radiogenic decay since crystallization) techniques are available that enable, in many instances, the discrimination of the initial component from the radiogenic component.

TABLE 1

DIAMOND CORE SAMPLES ENCLOSED

HOLE	SAMPLE NO.	INTERVAL (m)	GEOLOGY
LD1	QP100421	276.10 - 277.20*	Black dolosiltstone with massive pyrite bands (25%) + disseminated pyrite (10-25%). Minor alteration and tuffaceous horizons. Assayed 750ppm Pb.
LD3	QP100422	216.30	Black dolosiltstone with <0.1mm galena grains on fracture surface. Disseminated pyrite from 10-20%.
LD3	QP100423	252.10	Black dolosiltstone with a number of 1mm galena grains along fractures.
LD3	QP100424	265.10	Black dolosiltstone with a number of 1mm galena grains along the outside fracture.
LD3	QP100425	284.24	Black dolosiltstone with a <0.1mm galena grains on fracture surface. Disseminated pyrite from 5-10%.
LD3	QP100426	449 - 450*	Dolarenite with massive pyrite (30-40%). a minor tuffaceous component and graded bands and beds. Much solution and clay alteration with silification being present with some pieces. Assayed 730ppm Pb.
BB5	QP100427	310.65	pyritic. carbonaceous shale & <0.1mm galena grains
WM6	QP100428	490.48	pyritic. carbonaceous shale & <0.1mm galena grains
McA18	QP100429	194.75-195.45	arenaceous dolosiltstone & <0.1mm galena grains

TABLE 2. LEAD ISOTOPE DATA FOR SAMPLES FROM EL 6808, McARTHUR BASIN, NORTHERN TERRITORY

Sample	$\frac{^{208}\text{Pb}}{^{206}\text{Pb}}$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	$\frac{^{206}\text{Pb}}{^{204}\text{Pb}}$	$\frac{^{207}\text{Pb}}{^{204}\text{Pb}}$	$\frac{^{208}\text{Pb}}{^{204}\text{Pb}}$	Pb(ppm)
DDH LD1 276.10 - 277.20m						
1 QP100421/1	2.2034	0.9477	16.338	15.484	35.999	440
2 QP100421/2	2.2015	0.9464	16.366	15.488	36.028	841
DDH LD3 216.30, 252.10, 265.10, 284.24m						
3 QP100422gn	2.1149	0.9070	17.165	15.569	36.301	
4 QP100423gn	2.1291	0.9109	17.064	15.544	36.331	
5 QP100424gn	2.1478	0.9050	17.176	15.544	36.890	
6 QP100425gn	2.0970	0.8978	17.380	15.604	36.445	
7 QP100426	2.1850	0.9412	16.455	15.487	35.953	1110
DDH BB5 310.65m						
8 QP100427	2.1583	0.9257	16.765	15.519	36.184	154
DDH WM6 490.48m						
9 QP100428	1.9222	0.8152	19.271	15.711	37.043	34
DDH MCA18 194.75M - 195.45m						
10 QP100429	2.1020	0.8780	17.775	15.607	37.363	104

gn denotes galena
/1 gossan; /2 sulfides
Pb contents determined by isotope dilution
SAMPLE NUMBER PREFIXES REFER TO PLOTTED POINTS FIG. 4

CONCORDANT MINZ McARTHUR GROUP

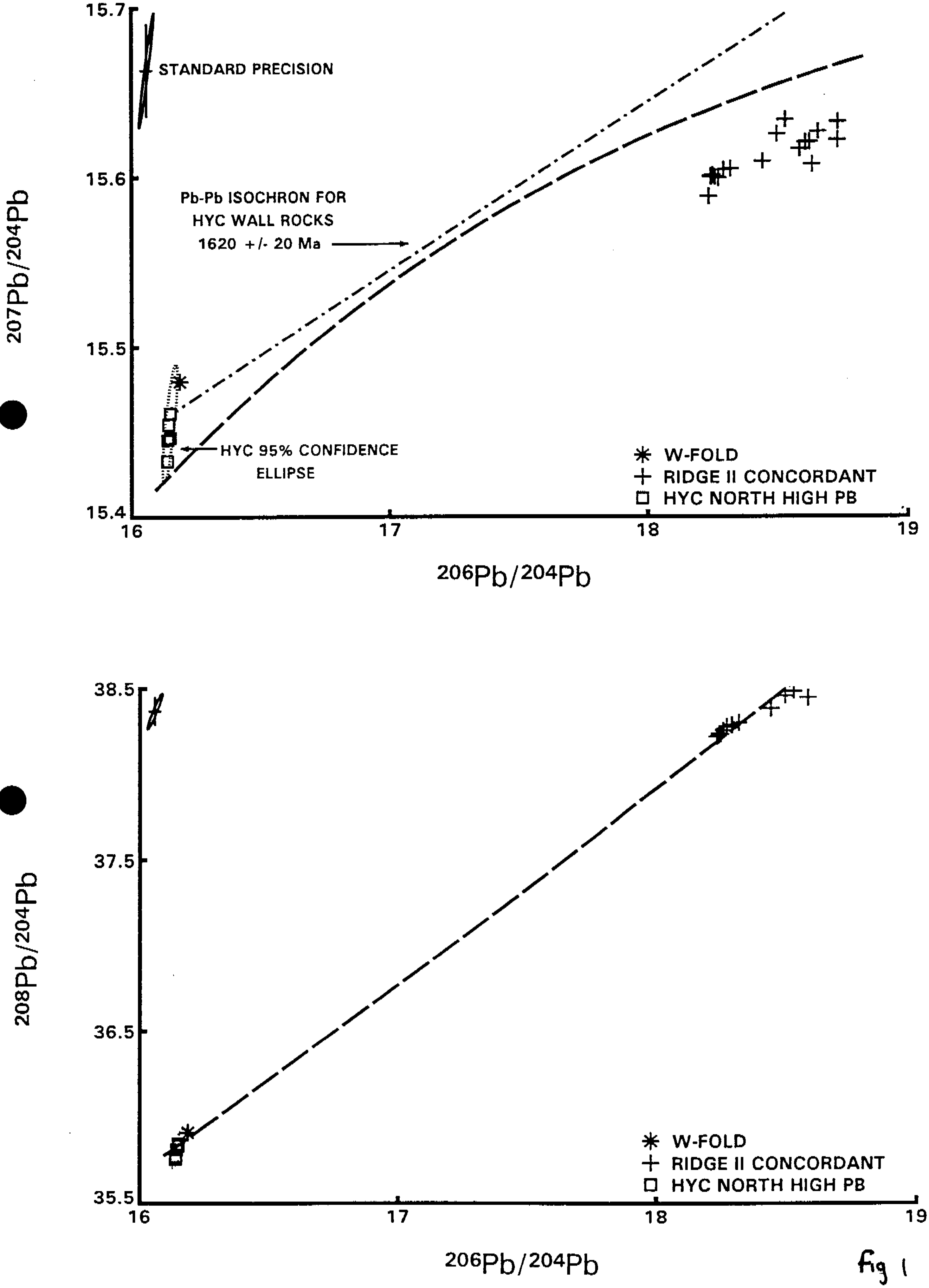


Fig 1

DISCORDANT MINZ McARTHUR BASIN

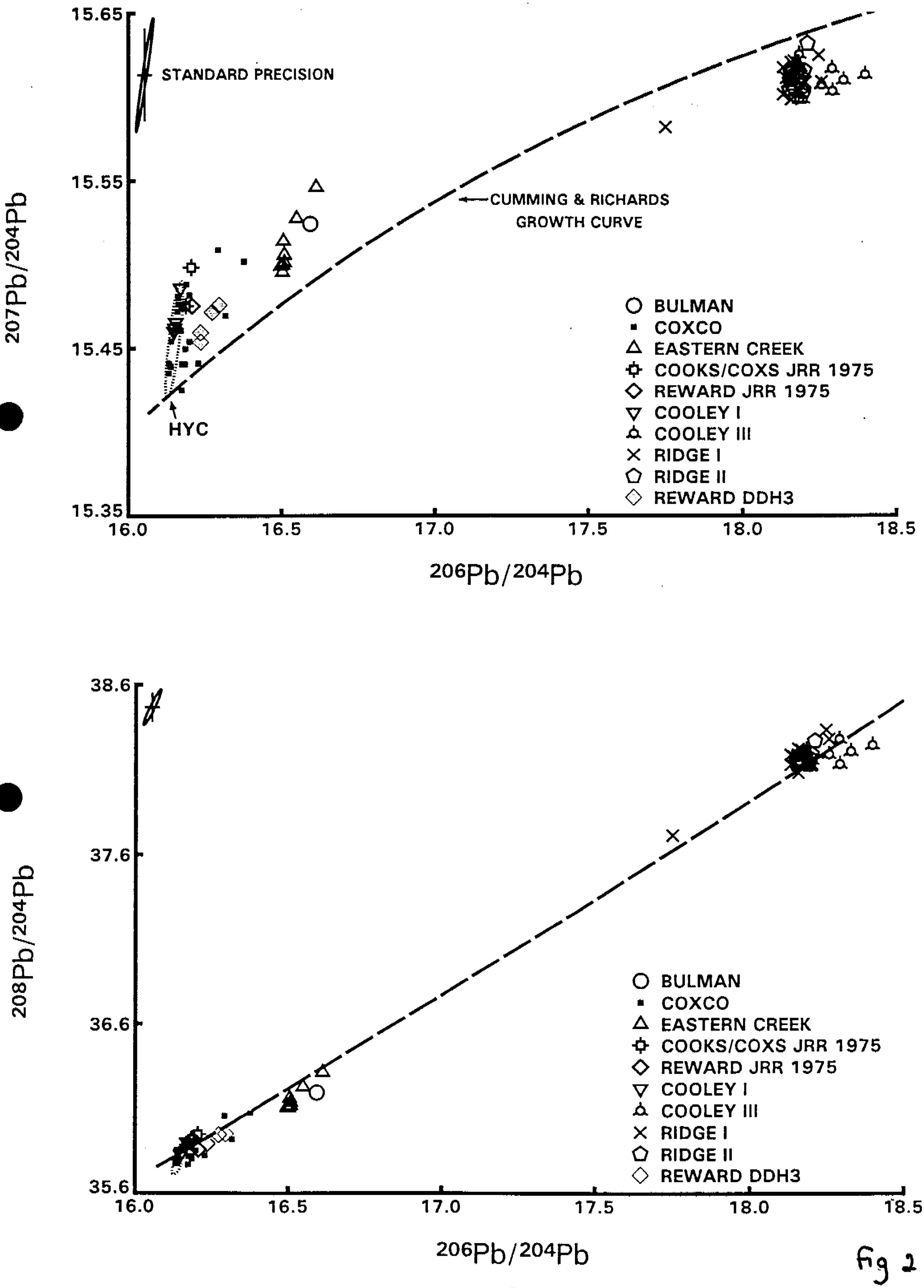


Fig 2

OTHER MINZ McARTHUR BASIN

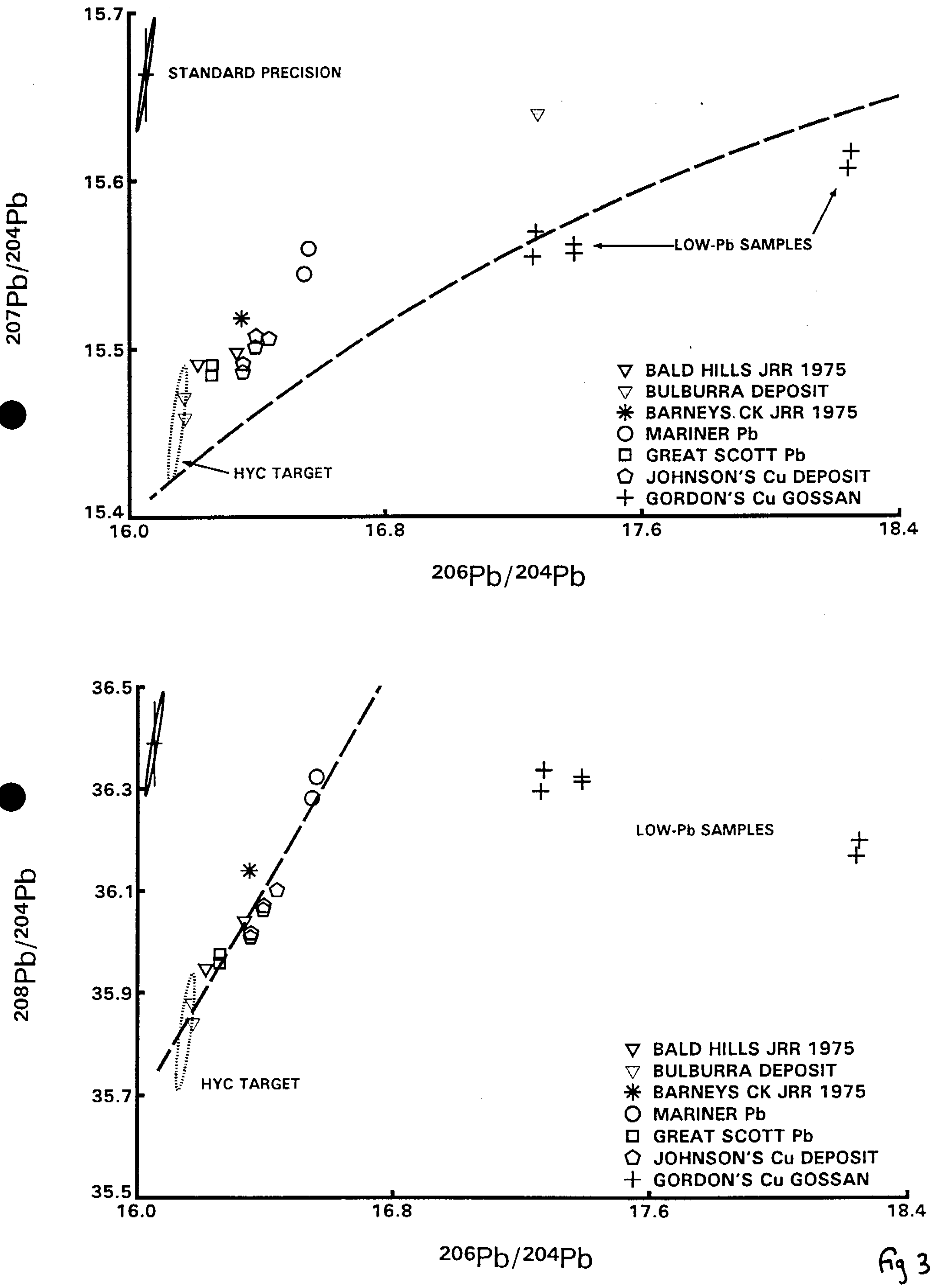


Fig 3

DATA THIS STUDY

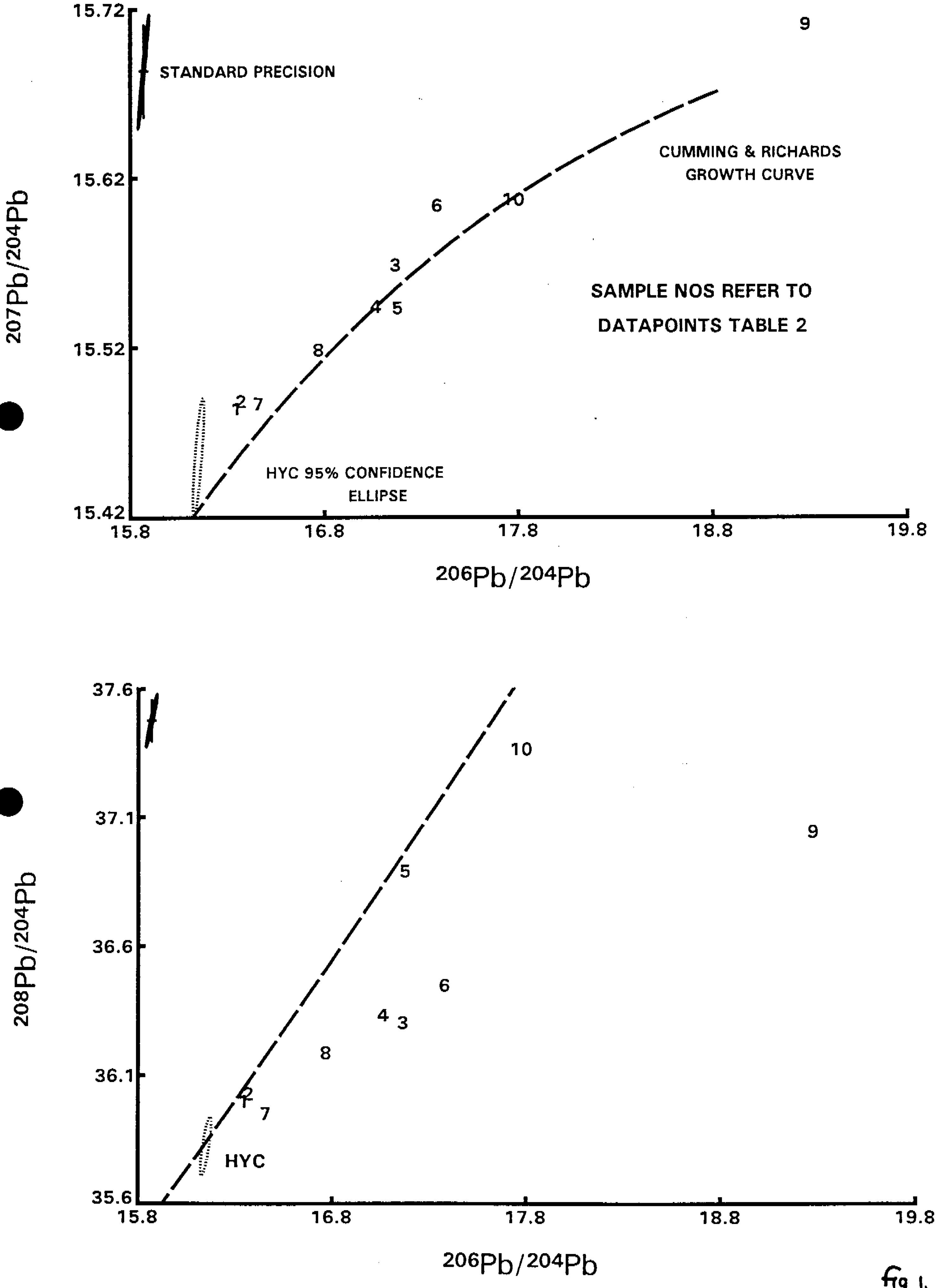


Fig 4

COMPARISON WITH DDH McA 5 DATA

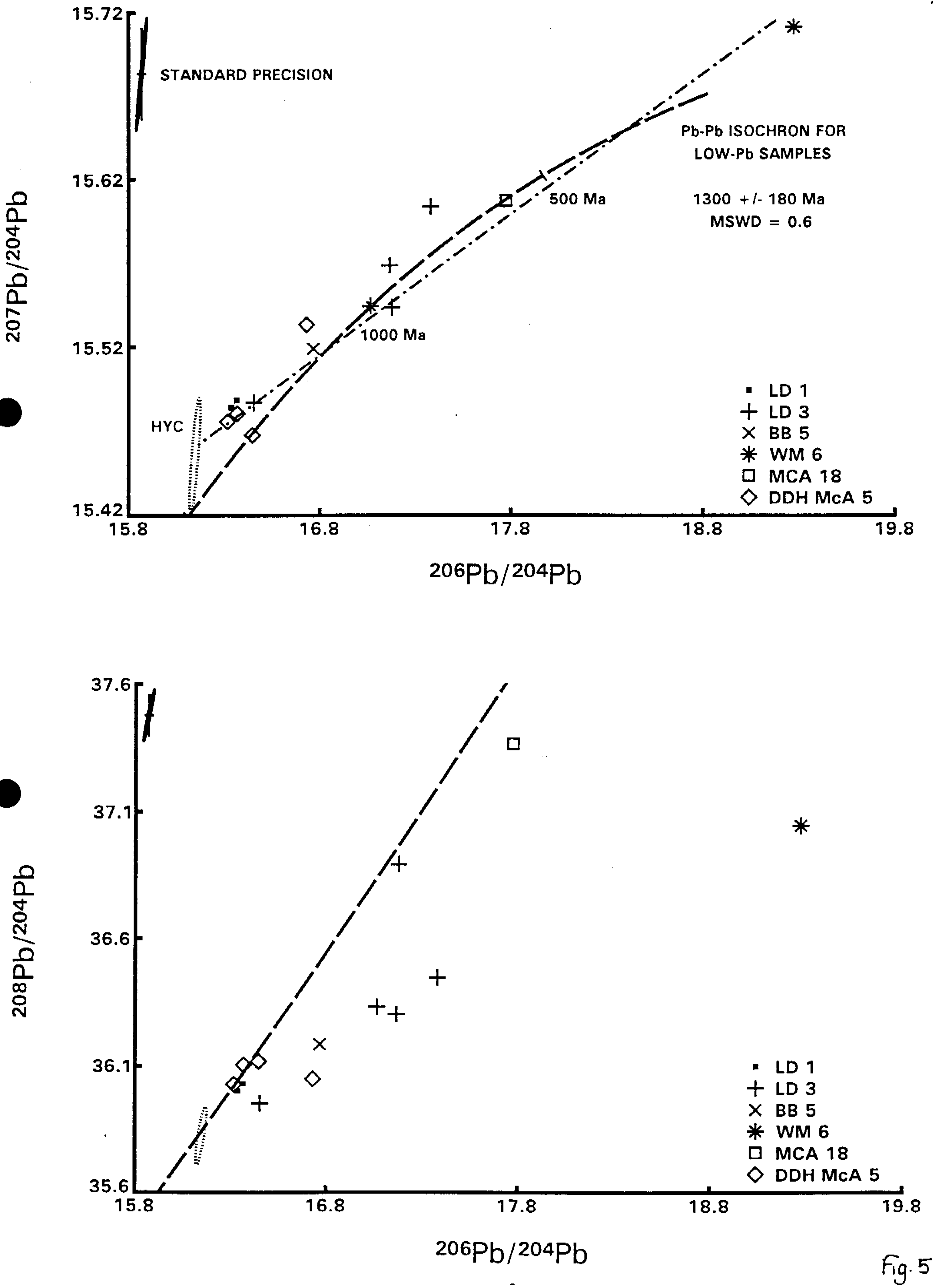


Fig. 5

NTH AUSTRALIA PROT. MINZ.

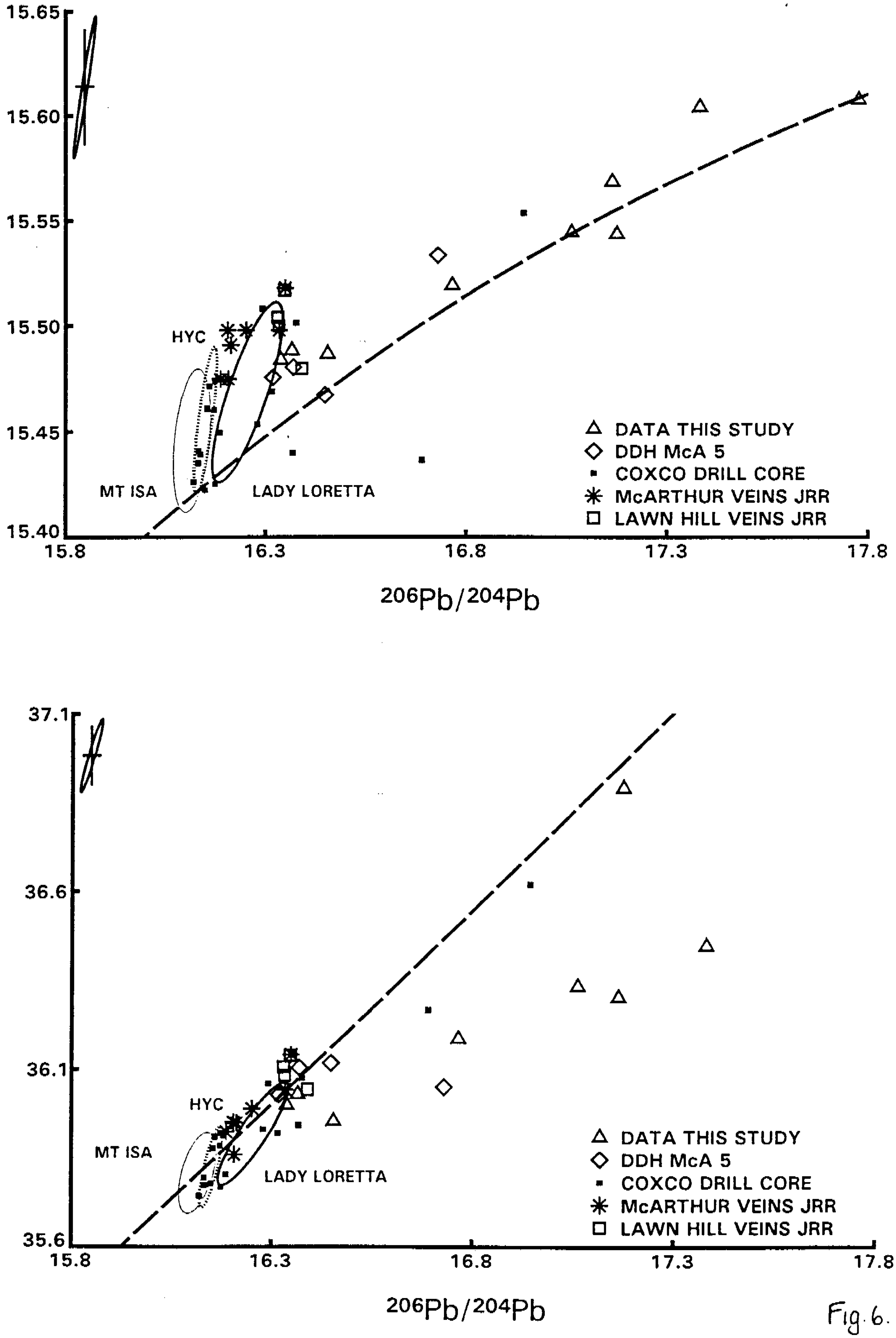


Fig. 6.

APPENDIX 11

LD7 - PETROLOGICAL REPORT

ROCKCO PTY. LTD.

MINERALOGY & PETROLOGY SERVICES

195 Mt Ommaney Drive, Jindalee. Qld. 4074 Home:(07) 376 2303 Lab: (07) 833 8424 Fax: (07) 369 2820

REPORT NO : 1291-822
DECEMBER 1991

The Petrology of Five (5) NQ Core Specimens from DDH (Lorella Project/Cost Centre 203BT)

CLIENT : PETER SIMPSON

ATTENTION : DERRICK KETTLEWELL

M.I.M. Exploration Pty Ltd
P.O. Box 21
BERRIMAH N.T. 0828

NJW Croxford

N.J.W. CROXFORD MSc. Ph.D.
(PRINCIPAL)

INTRODUCTION

Derrick Kettlewell submitted five (5) NQ drill core specimens for petrological examination and in part, the accompanying instructions read:

> *"Please find enclosed five rock specimens for thin and polished section work. Samples have been taken from diamond drill hole LD7. All five require thin sections while specimens numbered four and five require polished sections to determine if only pyrite is present. The samples are:*
>
> 1. *312.77 - 312.84m: A dark grey dolosiltstone with minute siliceous rounded to oval fragments forming a band around the core. Possibly chert nodules (?).*
>
> 2. *324.44 - 324.50m: A chert nodular zone within a tuffaceous (?) dolarenite which is intensely clay altered.*
>
> 3. *325.72 - 325.77m: Irregular shaped cherty masses in a dark grey dolosiltstone. Possibly remnant vitric tuffaceous material (?) or simply chert concretions which have suffered soft sediment deformation (?).*
>
> 4. *345.94 - 346.00m: A siliceous, silica rich rock with abundant pyrite. Possibly chalcedonic quartz replacing the dolarenite (?). This rock type occurs periodically down the hole, but always associated with grit/breccia zones.*
>
> 5. *459.70 - 459.75m: Massive pyrite bands interbedded with a dark grey carbonaceous dolosiltstone. Is the pyrite similar to what we have already seen?*
>
> *Bill you could please carry out a detailed examination of the five samples provided giving as much detail as possible and special note to any volcanic evidence found. Also your thoughts on the possible origin for the pyrite would also be useful. The chert nodules are most probably similar to*

those already examined in diamond holes LD1-3, but you never know. This hole is about 5km south of the forementioned holes. I feel that what we have been finding in the south is significantly different to warrant the submission of these rocks for petrographical work."

SUMMARY

SPECIMEN 1 AT 312.77 TO 312.84M (Plates 1, 2, 3)

Thinly bedded, weakly pyritic, carbonaceous and potassic (K-feldspar) dololutite sediment encloses a median band ("sandstone") (24mm thick) composed of chertified gypsum monocrystals (?clastic), dololutite clasts, detrital quartz grains and oncolites. This band lies on a scoured surface and at the top, shows crossbedding.

It is proposed the "sandstone" represents a turbidite formed by the storm flood scouring of adjacent sabhka type sediments.

Possibly the K-feldspar is igneous in origin.

SPECIMEN 2 AT 324.44 TO 324.50M (Plates 4, 5)

A fine grained dolomite sediment (dololutite) encloses spherical, subspherical and angular, zoned chert (± dolomite) bodies with carbonaceous cores.

The bodies are silica concretions which nucleated about the carbonaceous shreds and zonally replaced the enclosing dololutite.

The growth of the nodules was an early diagenetic event, with later compaction causing dislocation of the chert bodies - hence the angular bodies seen in hand specimen.

SPECIMEN 3 AT 325.72 TO 325.77M (Plates 6, 7)

Dololutite sediment encloses roughly layered but discontinuous, subparallel chert (± dolomite) bodies mostly of rounded form and occasionally of dumb-bell shape.

These bodies are interpreted as having been flattened blobs of gelatinous silica "precipitated" onto the sea floor. Subsequent dewatering of the sediments with compaction led to squeezing, necking and "snapping" of the globules over a long time period, during which the gelatinous silica gradually became crystalline ie., solidified.

The origin of the silica is uncertain. It may indicate highly alkaline sedimentary conditions (high SiO_2 solubilities); the absence of SiO_2 consuming radiolaria; and/or adjacent geothermal/volcanic activity.

SPECIMEN 4 AT 345.94 TO 346.00M (Plate 8)

A totally silicified rock composed of chert, chalcedony and well crystalline quartz. No relict textures were found, except for (1) angular chert bodies and angularly bounded holes, representing medium to coarse grained carbonate and (2) chert layers which, in places, persist across the section.

I suspect this is a silicified, brecciated fine grained dolomite sediment, with the chert representing the original sediment (dolomicrite/dololutite); and the breccia cavities being represented by chalcedony and chertified dolomite crystals.

The concentric textures referred to in my facsimile belong to zoned chalcedony masses and not stromatolites.

The intense silicification observed is indicative of highly siliceous, diagenetic waters having percolated permeable rocks eg., breccias.

SPECIMEN 5 AT 459.70 TO 459.75M

A laminated, highly carbonaceous and "pyritic", potash feldspar-rich siltstone. Subordinate, detrital quartz, muscovite, chlorite (after biotite) and zircon are present.

The term "pyritic" is used because original pyrite has been pseudomorphed by marcasite. This suggests the onset of acidic, diagenetic conditions as in coal measure sediments.

This sediment is more carbonaceous than most I have observed from the region, and it could indicate either the burial of abundant algae settling from the surface, or a bottom zone of extreme algal activity. Could this rock have generated hydrocarbons and would they be significant in terms of base metal fixation?

I think the recent information gathered on the Century and Bloodwood Bore mineralization, strongly implicates hydrocarbons and mineralization. Perhaps one should regard the Specimen 5 sediment as a potential hydrocarbon source for metal fixation at a site to which the hydrocarbons could migrate eg., zones of structural dislocation.

I am not sure the pyrite has any significance except that some soluble iron found its way into a sulphur-rich environment. It is difficult to believe that hydrothermal iron would be unaccompanied by some Pb and Zn, which should have been sulphidized as well.

Clearly more research needs to be done on stratiform pyrite occurrences from different geological settings and modern day chemistry should produce meaningful results compared to similar efforts eg., Se/S ratios, attempted 40 years ago.

PETROGRAPHIC DESCRIPTIONS

AND

PHOTOGRAPHY

CODE:

TL	:	Transmitted light
TPPL	:	Transmitted plane polarized light
RL	:	Reflected light
RPPL	:	Reflected plane polarized light
XN	:	Crossed nicols
GP	:	Gypsum plate
OIL	:	Oil immersion

SPECIMEN 1 (PTS) FROM DDH LD7 AT 312.77 TO 312.84M

HANDSPECIMEN

A core piece (NQ size) consisting mostly of light to medium grey, moderately bedded, fine grained dolomite sediment (dololutite). This encloses a median layer to 24mm thickness (faulted out in places) which is dark grey in colour, siliceous, granular and suggestive of a sandstone. Some crossbedding may exist at the stratigraphic top of this "sandstone" layer.

PETROGRAPHY

1. The Dolomite Sediment

Predominantly a variably feldspathic (K), dololutite consisting of interlocking angular to subhedral dolomite grains averaging 5-10 µm in size.

In handspecimen, the dololutite shows moderately thick bedding, but under the microscope, the apparently homogeneous dololutite shows thin layering related to varying K-feldspar content as revealed by the yellow potassium cobaltinitrite stain. These beds reach 0.1mm thickness and contain up to 20% (estimated) fine K-feldspar grains.

In places, the dololutite merges into slightly coarser grained, siltier equivalents. Other aspects of the dololutite include:-

1.1 Quartz (detrital). If present, a minor component.

1.2 Chlorite. As isolated flakes, mostly oriented length parallel to the bedding and perhaps representing detrital biotite flakes.

1.3 Carbonaceous Matter. As isolated laminae to 40 µm thickness.

1.4 Rutile. As minute grains, mostly < 5 µm and composing ~ 1% volume of the sediment.

1.5 **Pyrite**. Up to an estimated 3% in some beds and ranging from sub microscopic grains (< 1 μm) to small crystal euhedra reaching 30 μm (as observed). Features of the pyrite include:-

- Some pyrite grains consist of pyrite rings enclosing an unidentified non-sulphide core.
- An outer pyrite ring is separated from a pyrite core by an intermediate non sulphide zone. This is very similar to the atoll textures seen at Mount Isa.
- As above, but with the core and intermediate zone being occupied by carbonaceous matter.
- The dimpled surface of numerous pyrite grains indicate submicroscopic framboids. These often contain carbonaceous matter.
- Indeterminate submicroscopic, shapeless grains, which may be aggregated. This material is not seen at low magnifications and is < 1 μm in size.

1.6 **Marcasite**. As minute bladed to wedge shaped, twinned crystals that appear younger than the associated pyrite.

1.7 **Other Sulphides**. Not observed.

2. The "Sandstone" Layer

This layer, in fact, consists of a main layer up to 18mm thick, overlain by several thinner layers to 2mm thickness, which are cross bedded with the accompanying fine grained dolomite sediment.

2.1 The main layer

As shown in Plate 1, this consists basically of shapeless chert bodies (~ 60% volume) resting in a sediment composed of lithoclastic dololutite fragments, oncolites, and accompanying carbonaceous, variably potassic dololutite.

This sediment differs sharply from the enclosing dololutite (quiet sedimentation) and reflects turbulent current action and rapid sedimentation.

2.1.1 The chert bodies

The chert bodies show the following features.

- A size range of < 0.1mm to 0.3 x 2.1mm and averaging about 0.1 x 0.3mm in size.
- Generally, the chert bodies are length oriented parallel to the bedding (Plate 1).
- The chert grainsize and texture differs from clast to clast. This may be seen in adjoining clasts, which indicates they were discrete entities at the time of formation (?deposition).
- Some chert bodies are more carbonaceous than others.
- The content of microcrystalline dolomite differs from clast to clast.
- Fine grained pyrite content is variable. Several chert bodies contain ~ 5% fine grained pyrite. The adjacent chert bodies contain no pyrite.
- Wisps of carbonaceous matter pass around the chert areas and the lithoclastic dololutite fragments.
- The possibility exists that the chert bodies are evaporite crystals. This is suggested by some chert areas showing biconvex shape (as in gypsum monocrystals, Plate 2) and the presence of straight edges corresponding to crystal faces (Plate 3).

2.1.2 The dolomite sediment enclosing the chert bodies

Definitely lithoclastic, with angular to rounded dololutite clasts to 0.3 x 0.65mm and accompanied by angular, detrital quartz grains (to 5% in places) reaching 0.05 x 0.15mm.

Quartz grains are mostly absent in the dololutite sediments and they were not found inside the chert bodies.

In places, some dololutite clasts are rounded, ovoidal and spherical. Zoning may also occur and these features indicate oncolites suggestive of current action and "ripping up" of algal mats on the sea floor.

Oncolites and quartz grains are most common in the upper (?)crossbedded layers, which include the subordinate thin chert-rich layers.

2.2 The Subordinate Chert Layers

The top chert layer (Plate 1) is 2.4mm thick and composed of chert "clasts" up to 0.3 x 3mm size and oriented length parallel to the bedding. This layer consists of ~ 90% chert, the remainder being interstitial dolomite. Are we looking at a disjointed chert layer, or a collection of chert clasts?

In summary, variable textures and compositions in different chert areas indicates the layer is an aggregate of "unrelated" chert clasts. This is indicated particularly by the presence of several clasts, which contain detrital quartz and K-feldspar grains. The bodies are regarded as detrital in origin.

ROCK NAME AND COMMENTS

Dololutite sediment enclosing an intermediate layer consisting of lithoclastic dololutite; oncolites; detrital quartz grains and predominating chert bodies representing silicified evaporite crystals.

Initially, I thought the chert bodies were primary and clastic in origin. Had the chert come in as gelatinous material, then rather than being angularly shaped, one would expect the chert to occur as rounded blobs, as seen in some McArthur cherts. Also, being soft, the solid dololutite clasts should have imposed their shapes on soft, gelatinous silica.

I suggest the chert clasts represent silicified gypsum monocrystals (and aggregates thereof) as indicated by:

- Biconvex shapes as seen in gypsum monocrystals. Careful inspection shows some linear margins, rather than completely curved outlines (Plate 2).
- Some chert bodies show good "crystal" shapes in keeping with monoclinic symmetry (Plate 3).
- Other chert bodies have outlines suggesting they were composite evaporite (gypsum) crystals.
- Linearly bounded bodies occur where dolomite predominates over chert. These may have been partially silicified gypsum bodies, in which the remaining gypsum was dolomitized. This resolves the problem of dolomitized gypsums having been silicified without effecting the oncolites and dololutite clasts. However, it seems clear that the silicification was post sedimentary, because a chert + dolomite matrix encloses the oncolites.

Origin of evaporite crystals

I think the gypsum crystals were clastic. This would explain the textural and compositional (eg., pyrite) variations observed in different clasts. The detrital origin fits with the lithoclastic character of the band ie., a period of turbulent current action, which contrasts to the slowly accumulated, enclosing dololutite sediment.

The detrital origin would also explain the cross bedded relationships at the top of the band.

If this interpretation is correct, the "sandstone" bed was probably derived from a shallow water evaporitic terrain (?sabhka) - possibly during a period of heavy rainfall and flooding. Other mechanisms are possible.

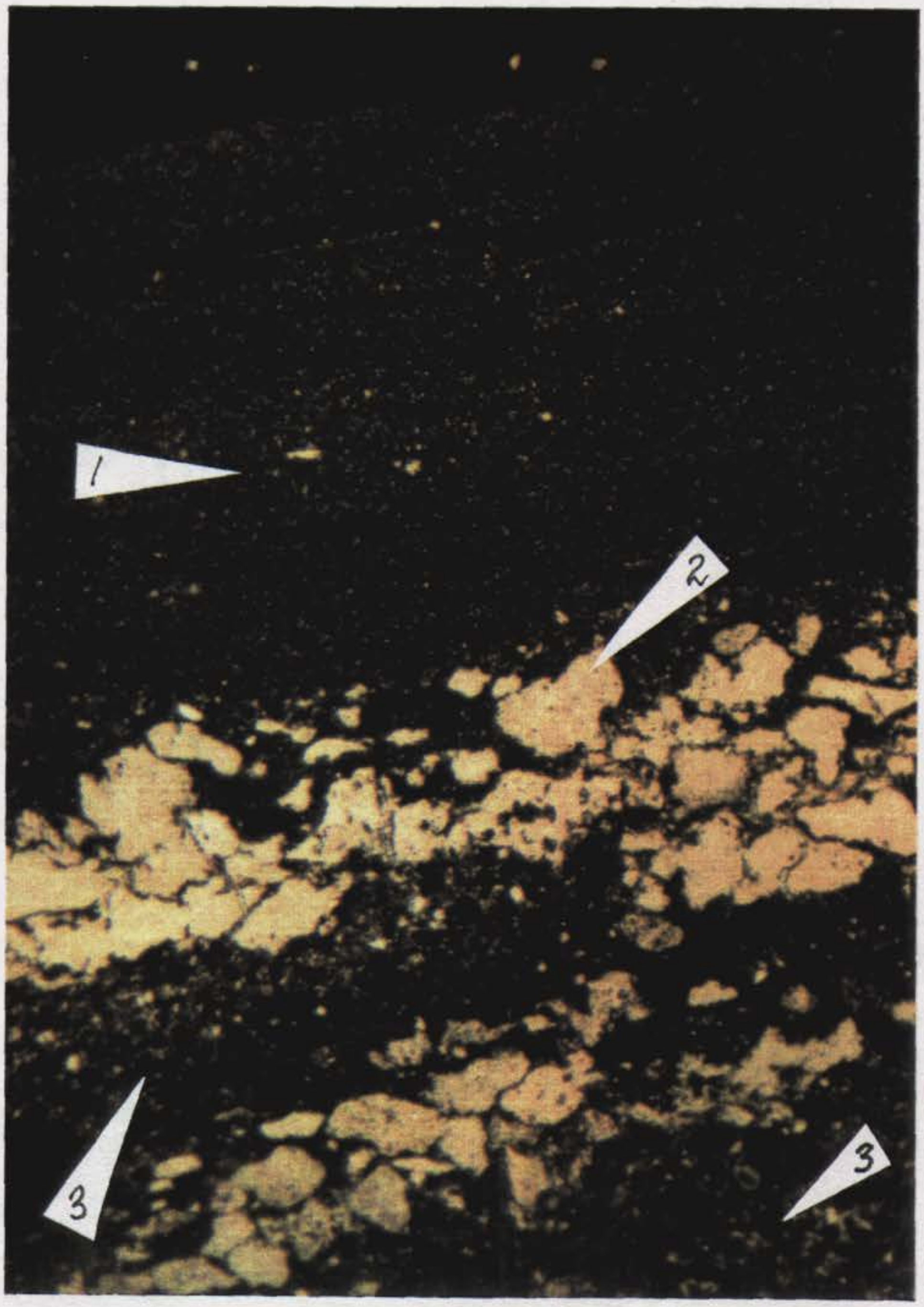


PLATE 1

SPECIMEN 1 FROM DDH LD7 AT 312.77 TO 312.84M (X12.5/TPPL)

CAPTION TO PLATE 1

The top of the chert-rich band is shown with numbered arrows indicating:-

1. The dololutite sediment mostly composed of dolomite, but with up to 20% K-feldspar (estimated) as indicated by staining. Quartz, chlorite (after biotite?) rutile, pyrite and carbonaceous matter are the other components.

2. The chert bodies believed to be detrital gypsum crystals and fragments.

3. Clastic layer composed of oncolites and dololutite fragments.

The chert band is believed to be crossbedded at the top. It could rest on a scoured dololutite surface.

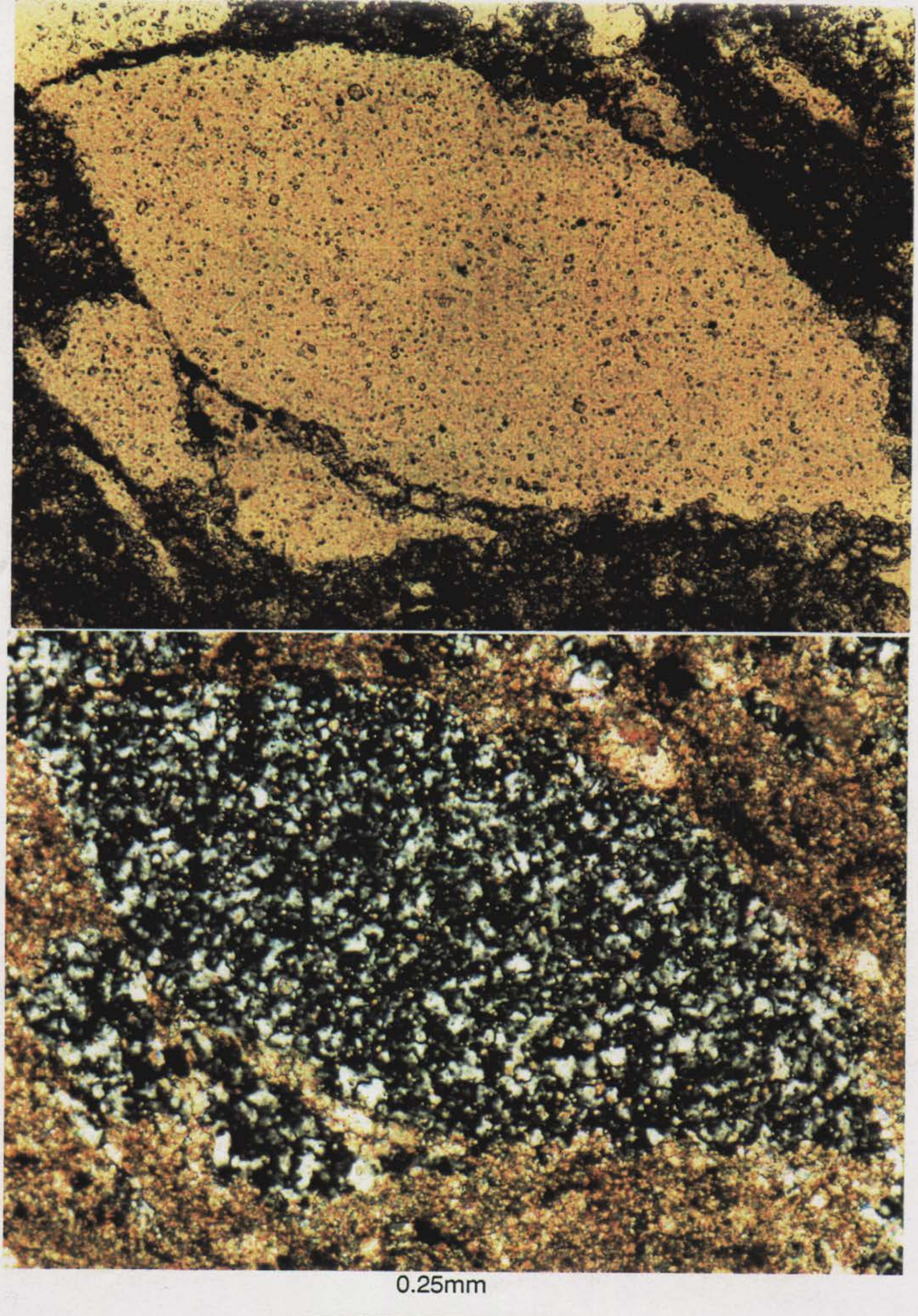


PLATE 2

SPECIMEN 1 FROM DDH LD7 AT 312.77 TO 312.84M (X125)

CAPTION TO PLATE 2

The two photographs show the same subject at X125, but under different optical conditions, viz.,

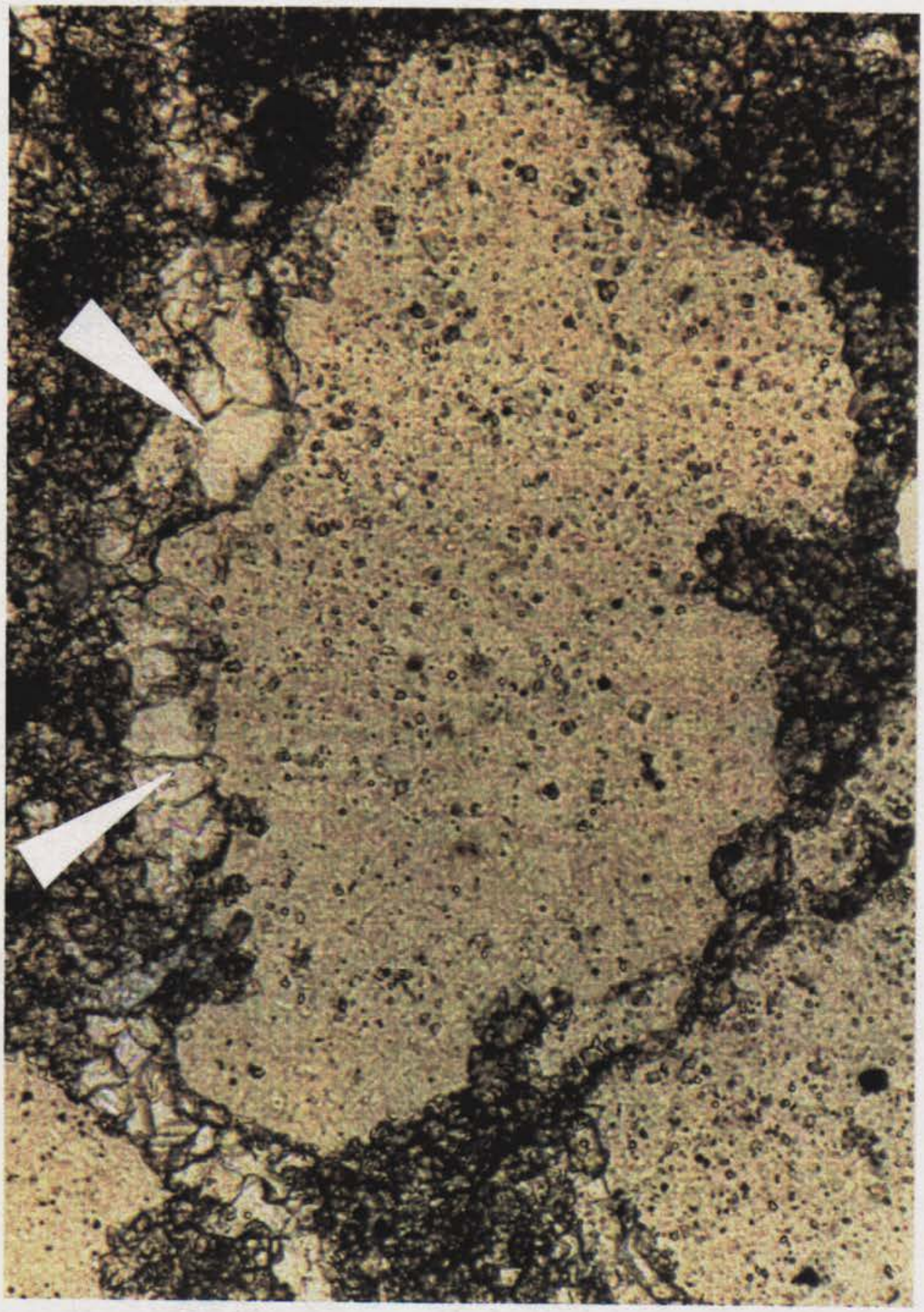
TOP PHOTOGRAPH (X125/TPPL)

A suspected biconvex shaped chert body is shown. This shape is typical of gypsum monocrystals, which develop during early diagenesis of evaporite sediments. Careful examination indicates a linear crystal face as arrowed. This body is typical of gypsum monocrystals as seen growing in soft, sabhka sediments.

BOTTOM PHOTOGRAPH (X125/TL/XN)

As above, but with crossed nicols to show the fine grained mosaical texture of the chert. Minute dolomite crystals dust the chert body.

Note the enclosing carbonaceous (brown colour) fine grained dolomite sediment.



0.25mm

PLATE 3

SPECIMEN 1 FROM DDH LD7 AT 312.77 TO 312.84M (X125/TPPL)

CAPTION TO PLATE 3

A chert body is shown with well developed straight edges believed to represent facets on a single crystal.

In places, the "faces" are interrupted by encroachments of finely crystalline dolomite.

The whole chert body has the symmetry of a monoclinic gypsum crystal, with quite well developed (010), (110) and (111) faces.

With crossed nicols, the chert texture is very similar to Plate 2.

A vein of relatively coarsely crystalline dolomite (arrowed) passes down the left side of the "crystal".

SPECIMEN 2 (PTS) FROM DDH LD7 AT 324.44 TO 324.50M

HANDSPECIMEN

A hard fine grained grey to grey white (?Kaolinite) rock which encloses spherical, hemispherical and angular dark grey, chert-like bodies up to 5mm across.

PETROGRAPHY

1. The Host Sediment

A microcrystalline dolomite aggregate with anhedral to euhedral interlocking dolomite crystals ranging in size from $< 5\ \mu m$ to $25\ \mu m$ (as observed) and averaging about $10\ \mu m$ (Plate 4).

Very minor (2-3%) detrital quartz and K-feldspar occur throughout and the dolomite is speckled with microcrystalline pyrite.

No evidence of lithoclastic dolomite sedimentation was recognized, so that this was either a chemical sediment and/or an ultrafine, detrital carbonate (not necessarily dolomite) mud.

No clay minerals were found in the dololutite sediment, as was anticipated by the white, kaolinitic appearance of the handspecimen. A few thin quartz veins to $30\ \mu m$ thickness cut the dololutite.

2. The Nodules

The following aspects were noted:-

2.1 Some nodules contain chertified wisps of brown organic matter (Plate 5). These are centrally placed in three nodules and appear to have acted as nuclei. Other nodules show no cores, but this may be a function of the intersection plane.

2.2 The nodules are concentrically zoned (Plate 5) and this is seen by inspecting the section with the naked eye.

2.3 The zoning is related to the carbonaceous core (nucleus).

2.4 The nodules are dusted with microcrystalline dolomite and the content is variable from zone to zone. In places, dolomite predominates and the interstitial chert is difficult to recognize.

2.5 Detrital quartz grains lie inside the chert nodules indicating that the nodules formed by carbonate replacement. This would explain the dolomite content.

2.6 Wisps of organic matter in the enclosing dololutite are similar in size and orientation to the carbonaceous wisps inside the chert nodules.

2.7 Quartz filled fractures transect both the nodules and enclosing dololutite.

2.8 Nodules have been dislocated and cemented by dolomite.

ROCK NAME AND COMMENT

A dololutite containing zoned chert nodules.

The nodules are replacement concretions, where silica in solution has replaced the dololutite with carbonaceous matter, having acted as growth nuclei.

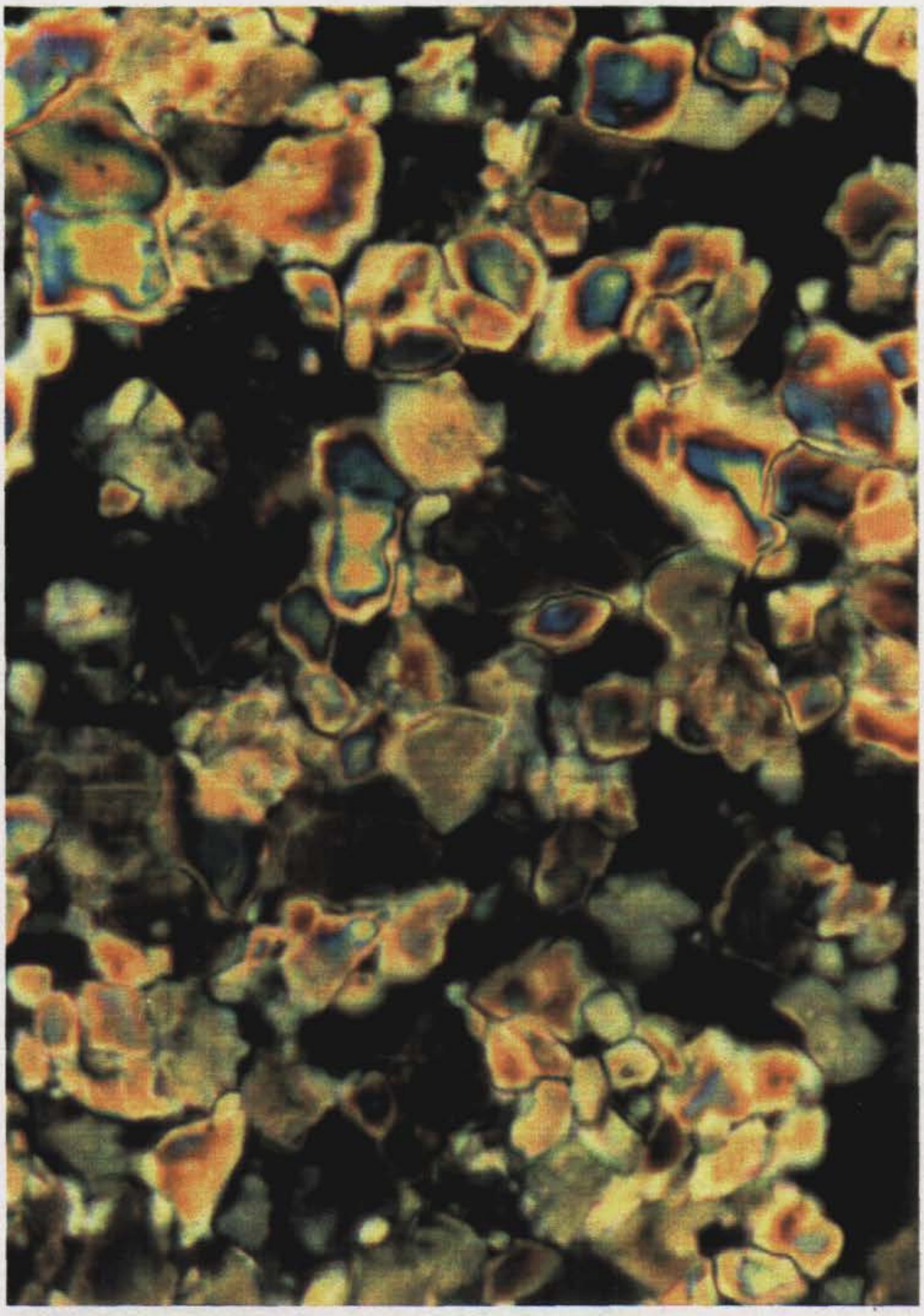
Accretionary chert nodules are common in limestones and chalks, and often these are black because of included organic matter.

Blatt, Middleton and Murray (P.576)* described chert nodules in carbonate bank deposits as seen "......in shelf and basinal areas rather than in the more pure carbonate shelf edge and flank talus slopes".

*In "Origin of Sedimentary Rocks", 2nd Edition. 782p.

Here, radiolaria are the proposed silica source, but this could not be the case for the Lorella sediments. Perhaps this silica was either related to volcanic activity or the silica content of Precambrian seas was greater than now, because radiolaria were not evolved. Alternately, the silica may be a reflection of Precambrian evaporitic conditions where highly alkaline diagenetic waters could dissolve considerable silica.

In Specimen 1, considerable early diagenetic silica must have been available to replace the gypsum crystals - a process which preceded later dolomitization. This would explain why the dolomite veining in Specimen 2 is younger than the quartz veining.



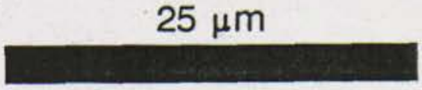


PLATE 4

SPECIMEN 2 FROM DDH LD7 AT 324.44 TO 324.50M
(X1250/TL/XN/OIL)

CAPTION TO PLATE 4

The microcrystalline dolomite matrix of the dololutite sediment is shown. The only other mineral found was pyrite (< 1%) and no clastic material was detected.

Possibly this was a chemical (?)carbonate sediment, but dolomitization may have occurred after sedimentation.

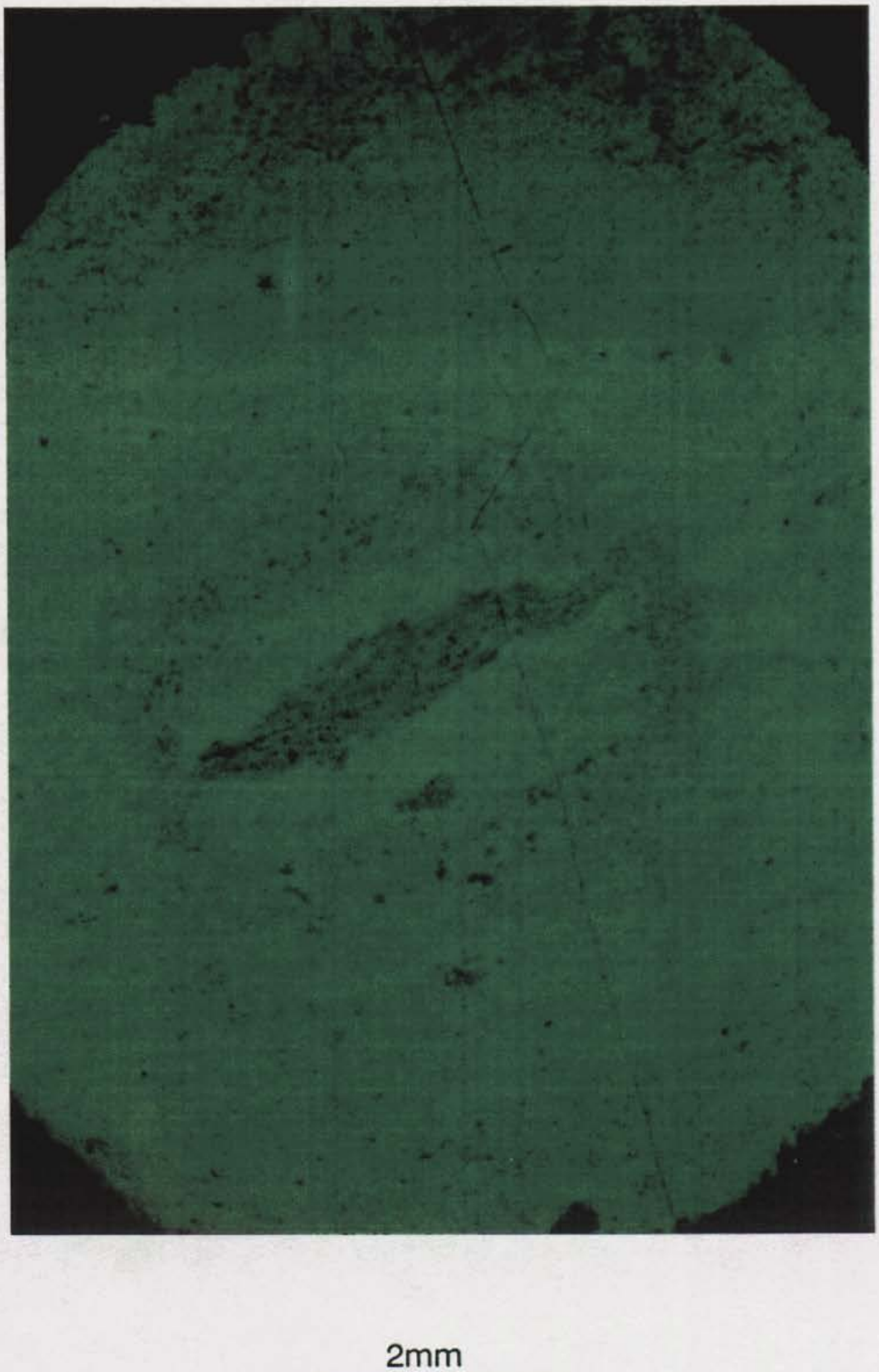


PLATE 5

SPECIMEN 2 FROM DDH LD7 AT 324.44 TO 324.5M
(X12.5/TPPL/GREEN FILTER)

CAPTION TO PLATE 5

Part of a subspherical, chert-rich body is shown with its nucleus of carbonaceous chert material. Similar nuclei were found in two other chert spheroids. They could be missed by the plane of section.

Several concentric zones may surround the carbonaceous core, suggesting these cherty bodies grew in the sediment.

SPECIMEN 3 FROM DDH LD7 AT 325.72 TO 325.77M

HANDSPECIMEN

The core piece (NQ) is 43mm in length and several millimetres thickness of carbonaceous (very dark grey) and weakly pyritic dolomite sediment at each end encloses a central zone (~ 40mm thick) of grey white dololutite, enclosing blebby (?) chert bodies to 1 x 7mm size.

The (?) chert bodies are generally aligned parallel to the bedding.

PETROGRAPHY

1. The Carbonaceous, Pyrite Sediment

A lithoclastic, dololutite siltstone containing minor detrital quartz and feldspar. Carbonaceous matter is dispersed throughout and also occurs as wisps and threads. Fine crystalline pyrite (2-3%) is present too.

2. The Grey White Carbonate Bed with the Dark Grey Inclusions

Mainly a submicroscopic dolomite sediment (< 15 µm) with minor (< 10%) detrital quartz, K-feldspar and (?)chlorite. This sediment is similar to the dololutites of the preceding rocks especially Specimen 1.

The included grey bodies show the following features:

1. Rounded, lobate, and dumb-bell shapes.
2. Lengthwise orientation parallel to the bedding.
3. Carbonaceous matter is found as rims to the bodies; and as filling in thin cracks.
4. Poorly developed simple zoning is seen, consisting of a central coarser chert surrounded by an outer zone of fine chert.
5. The fine chert is developed in the "necked" zone of one body (See Plate 6).

6. Dolomite (± carbonaceous matter) filled fractures cut the dololutite and chert bodies.

7. Aligned, elongate nodules indicate the segmentation (soft sediment boudinage) of gelatinous silica sheets. Overall, the nodules are restricted to distinct layers (Plate 7).

ROCK NAME AND COMMENT

A very fine grained dolomite sediment (dololutite) with included chert nodules of layered disposition.

The origin of the chert nodules is puzzling and there is no evidence to show they are concretionary bodies as seen in Specimen 2. The textures indicate they were soft originally and subject to deformation by sediment compaction. I favour the idea they were discontinuous, gelatinous silica sheets, that precipitated on the basin floor concurrent with carbonate (?chemical) deposition. The early age of the nodules is indicated by:

1. Necked out zones being filled with dololutite sediment ie., the dololutite was still capable of flowage (Plate 7).

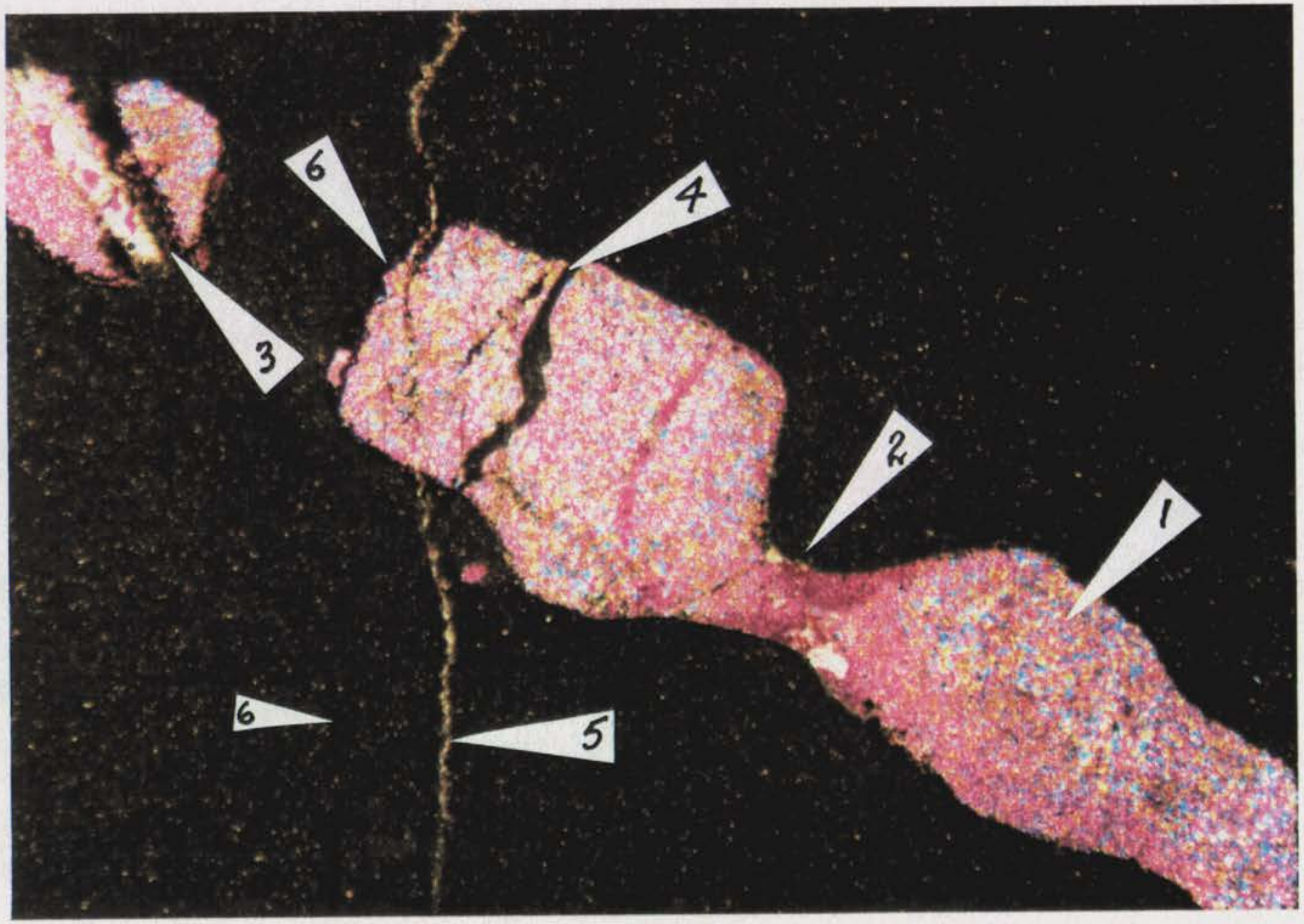
2. Carbonaceous outer zones to the nodules suggest the nodules were present, while mobile organic matter existed in the sediment.

3. Crosscutting, undulatory "fractures" bisect the nodules which are filled with dololutite. Were these dewatering channels?

If the nodules do represent a gelatinous silica sediment, then complete solidification ie., crystallization may have taken several thousands of years. This might explain the zonal textures, for example, with the fine cherty silica being younger than the coarser chert.

To unravel all these aspects calls for a detailed petrological study, but I doubt if it is warranted in respect to our activities. Nevertheless, the suggestion of a chemical silica sediment is intriguing. For example, is the silica the result of igneous activity? Similar material occurs in the H.Y.C. Pb/Zn deposit.

Undoubtably Specimens 1, 2 and 3 show that abundant silica was present, possibly from the time of sedimentation to late diagenesis.



2mm

PLATE 6

SPECIMEN 3 FROM DDH LD7 AT 325.72 TO 325.77M (X12.5/TL/XN/GP)

CAPTION TO PLATE 6

The fine grained dololutite is shown enclosing subrounded, blebby chert bodies. The numbered arrows indicate:-

1. A chert (±fine dolomite) body.
2. A "necking out" zone suggesting the body was soft ie., gelatinous and capable of being squeezed.
3. A possible break. Elsewhere suspected breaks are better defined.
4. A possible dewatering channel filled with dololutite.
5. Dolomite filled fractures.
6. Carbonaceous matter.

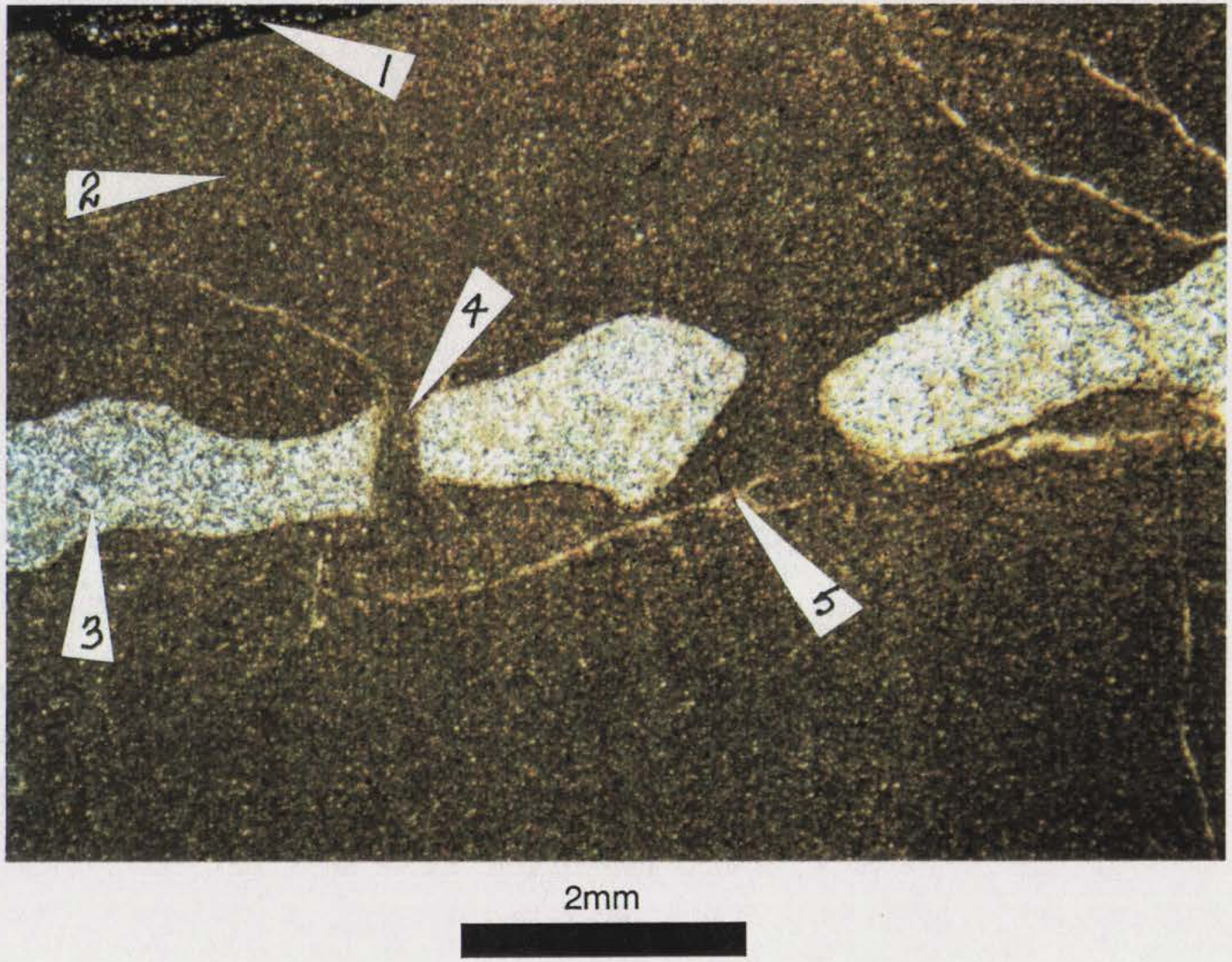


PLATE 7

SPECIMEN 3 FROM DDH LD7 AT 325.72 TO 325.77M (X12.5/TL/XN)

CAPTION TO PLATE 7

Part of a "layered" series of chert (±dolomite) nodules is shown with the numbered arrows indicating:-

1. The carbonaceous and weakly pyritic lithoclastic dololutite, which encloses the nodule bearing dololutite bed.
2. The dololutite.
3. Chert (±dolomite) nodule.
4. A suspected break which is filled with dololutite sediment.
5. Thin dolomite veins, formed after solidification of the nodules.

SPECIMEN 4 FROM DDH LD7 AT 345.94 TO 346.0M

HANDSPECIMEN

A hard, fine grained grey white (opaline) to dark grey siliceous rock which, in part, is highly porous as if leaching of sulphide(s) and/or carbonates had taken place.

PETROGRAPHY

Apart from very minor (< 1%) fine grained dolomite and pyrite, this rock consists wholly of chert, and chalcedony with some well crystalline quartz. I suspect strongly that it represents a thoroughly silicified dolomite-rich fine grained sediment. Points of interest are:-

1. Euhedral, often rhombic shaped holes at least to 0.1mm size correspond to comparatively large carbonate crystals upon which chalcedony developed.

2. Rhombed shaped crystal zones (see 1 above) rest on zones of crystalline quartz (~ 20-50 µm size) dusted with fine dolomite. The optical continuity of dolomite grains with angular domains indicates silicification of dolomite crystals.

3. Ultrafine, chert material has a layered disposition as viewed at low magnification (X12.5).

4. Brown, membranous carbonaceous matter pervades the finest chert and has an overall layered, although undulatory distribution.

ROCK NAME AND COMMENT

A algal dolomite, in which early brecciation (?collapse) enhanced the development of comparatively coarse crystalline with vughs. Later silicification occurred with fine chert representing algal dolomite (?micritic) with infilling of the vughs by chalcedony.

Concentric structures were interpreted originally as stromatolites, but this is probably incorrect and the zoning corresponds to growth rings in the chalcocedony.

The porous texture of the core piece may have arisen from solution of dolomite.

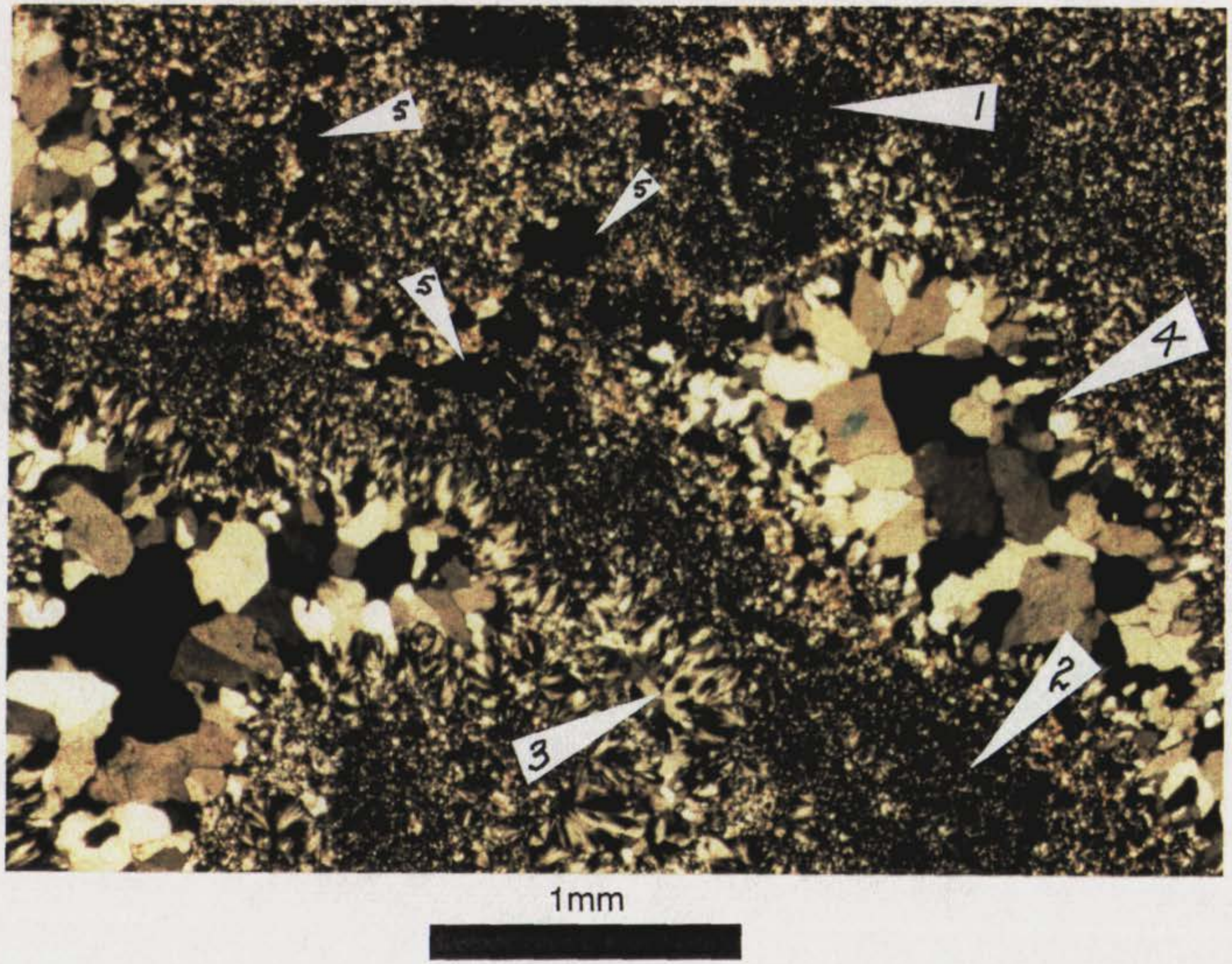


PLATE 8

SPECIMEN 4 FROM DDH LD7 AT 345.94 TO 346.0M (X30/TL/XN)

CAPTION TO PLATE 8

The general texture of the suspected brecciated, and silicified algal dolomicrite is shown with numbered arrows indicating:-

1. Chert. Note the fragmentary appearance.

2. A chert band (?bed) crosses the section.

3. Chalcedony. Often, this material is developed on silicified dolomite rhombs that may have lined breccia cavities.

4. Late stage, well crystalline vugh filling quartz.

5. Holes (black) representing leached and/or plucked out carbonate crystals.

The sulphide is mostly marcasite, and it represents altered pyrite. Some marcasite is also primary as indicated by tabular to lathy, twinned crystals.

The origin of marcasite is uncertain, but in coal measures, it often pseudomorphs pyrite and reducing, acidic conditions are regarded as the cause. This may be the case here, as the sediment is highly carbonaceous compared to most black shales ie., as at McArthur.

The highly carbonaceous nature of the sediment indicates loss of appreciable hydrocarbons during diagenetic degradation of organic material. If migratory, this hydrocarbon component may have caused base metal fixation in other places - especially in structural zones or traps which have their counterparts in modern oil geology.

SPECIMEN 5 FROM DDH LD7 AT 459.70 TO 459.75M

HANDSPECIMEN

A black, highly carbonaceous shale/siltstone. On the sawn face in oblique light, pyrite and thin bedding are discernible.

PETROGRAPHY

A laminated, highly carbonaceous sediment containing on average about 10% pyrite and 50% K-feldspar, although both minerals are more abundant in particular layers. Subordinate minerals include dolomite, quartz, muscovite and biotite.

The detrital quartz and K-feldspar averages about 25 µm with some grains reaching 0.12mm and these sizes indicate a siltstone.

The origin of the K-feldspar is uncertain. It could be potash metasomatised volcanic glass and/or plagioclase. It could be primary, although the highly variable extinction patterns suggest otherwise. Some K-feldspar grains are chert-like in appearance and this texture is seen in potash metasomatized tuffs eg., McArthur.

NATURE OF THE IRON SULPHIDES

Although the microscope at X500 reveals abundant microcrystals (cubic symmetry) of apparent pyrite, crossed nicols show these microcrystals are composed of finer grained marcasite crystal composites. Marcasite also reports in the more characteristic tabular to bladed shape and good twinning is present.

The material is too fine to photograph.

Other Sulphides

Not observed.

ROCK IDENTITY AND COMMENT

Essentially a very carbonaceous, potash feldspar-rich siltstone with subordinate fine dolomite and detrital quartz, muscovite and chlorite (from biotite).

APPENDIX 12

STOCKDALE PROSPECTING LTD. REPORT ON WORK COMPLETED AND RESULTS ACHIEVED ON EL6808 "LORELLA" FARM-IN, 1992

STOCKDALE PROSPECTING LIMITED

EXPLORATION LICENCE 6808

MIM LORELLA JOINT VENTURE
NORTHERN TERRITORY

M.H. PODOLSKY

OCTOBER, 1992

Project Name:

Title: MIM Lorella Joint Venture
EL 6808

Author: M.H. Podolsky Edited/Approved: J. Joyce

Date: October, 1992 Place: Darwin

1:250,000 Sheet Name & No: Mt Young, SD 53-15

Keywords: MIM Lorella Joint Venture, Aerial Magnetic Surveys, Geophysical Surveys, Stream Sediment Sampling, Soil Sampling, Indicator Minerals

Abstract:

Ref: EL6808.REP

Copy to: Darwin, IC, MIM.

Circulate: RVD, JJ

SUMMARY

Exploration Licence:	6808
Dated Granted:	
Area:	750 sq km, 283 blocks
Occupant:	MIMEX
Operator:	Stockdale Prospecting Limited
Commodities sought:	Diamonds
Exploration:	Exploration for diamonds involved follow-up to three airborne magnetic anomalies, and included ground magnetic surveys, accompanying heavy mineral stream sediment and soil sampling, and geochemical sampling. Sampling results are currently outstanding and will determine any future work.

CONTENTS

MAPS

FIGURES

TABLES

STOCKDALE PROSPECTING LIMITED
EXPLORATION LICENCE 6808
MIM Lorella Joint Venture
Northern Territory

1. INTRODUCTION

Most of the Mt Young D 53-15 1:250,000 sheet area, located near the south-western end of the Gulf of Carpentaria in the Northern Territory, has been covered by airborne magnetic surveys. Fieldwork was conducted by Stockdale Prospecting Ltd (SPL) over three aeromagnetic anomalies located within EL 6808 (Tawallah Range 6066 1:100,000, Map 1), under a joint venture agreement with Mt Isa Mines Ltd (MIM). Fieldwork involving follow-up ground magnetics and check sampling of the anomalies was completed during the period 3rd to 16th October 1992.

2. SUMMARY OF AIRBORNE MAGNETIC SURVEYS

Two airborne magnetic surveys have been carried out over the Mt Young D 53-15 1:250,000 sheet area. The first survey covered the Bing Bong 6168 1:100,000 sheet, and was commissioned by Broken Hill Pty Ltd (BHP). The survey was flown over the period 1983-1985 at 80m altitude, 300m line spacing, and used both east-west and north-south flight directions.

The second survey covered almost all of the Mt Young D 53-15 1:250,000 sheet area, but excluded the Bing Bong 6168 1:100,000 mapsheet area. This survey was commissioned by the Northern Territory Geological Survey (NTGS) and was flown during 1989-1990 at 100m altitude using a 500m line spacing, and east-west flight direction.

Three anomalies were selected for ground magnetic follow-up and termed BT11, BT12 and BT13 (Figs 1 to 3, Map 1). Anomaly BT13 lies at the north-western end of a 35km long magnetic lineament along which two discrete dipole anomalies occur to the south-east, in opposition tenements. BT11 is a small, local magnetic high; BT12 is a small dipole; and BT13 is a north-westerly trending dipole.

3. JOINT VENTURE AGREEMENT

A farm-in and joint venture agreement between SPL and MIM covering EL's 6808, 7525 and ELA 7736 was successfully concluded on 16 July, 1992. SPL has exclusive rights to, and is restricted to exploration for diamonds. The joint venture partnership has been named Lorella.

4. REGIONAL GEOLOGY

EL 6808 is located within the Batten Trough, which is one of several tectonic elements comprising the McArthur Basin. The McArthur Basin is a large, complex, depositional basin which extends from Arnhem Land in the north-west to south-east beyond the Queensland border, covering an area of about 200,000 km^2. The McArthur Basin lies near the eastern edge of the North Australian Craton and is the principal element of the North Australian Platform Cover, with bedrock being represented by c.1700 to 1300Ma sediments (Plumb, et al, 1981).

Plumb et al (9181) described several tectonic elements recognised within the McArthur Basin. The palaeogeography of the basin was dominated by the northerly trending Batten Trough-Walker Trough fault zone, which is a palaeotectonic feature controlled by syndepositional faults. Up to 12km of shallow water sediments accumulated in the Troughs. EL 6808 occurs over the north-eastern corner of the Batten Trough, proximal to the eastern end of the cross-cutting Urapunga Tectonic Ridge (as defined by Plumb (1988)).

A very thin succession of sediments accumulated on the Urapunga Tectonic Ridge, which separates the Arnhem Shelf from the Bauhinia Shelf to the south where between 1.5 - 4.0km of sediment have accumulated (Plumb et al, 1981). The Urapunga Tectonic Ridge may also have divided the Batten Trough - Walker Trough into two separate elements (Plumb et al, 1981). Deformation of the Batten Trough-Walker Trough and Urapunga Tectonic ridge into the presently observed tectonic features then occurred. Large vertical uplifts have reversed the Batten Trough-Walker Trough into a horst-like feature with basement rocks being locally exposed in the Walker Trough. Deformation of the stable shelves is very mild in comparison (Plumb et al, 1981).

Plumb (1988) mapped Batten Subgroup sediments (c 1690 Ma McArthur Group) to the north and south of EL 6808, and questionable Cambrian Bukalara Sandstone/Cox Formation sediments are mapped over the licence area. Batten Subgroup sediments are comprised of dolomitic siltstone, cherty dolostone, pyritic shale, quartz sandstones, and evaporites; Cambrian sediments are comprised of sandstone and shale formations (Plumb, 1988).

According to Plumb and Paine (1964), Lower Cretaceous rocks unconformably overlie older rocks in the Mt Young D 53-15 sheet area, and form bedrock for most of the Coastal Plain physiographic division, over which EL 6808 occurs. Both terrestrial and marine conglomerate, sandstone and massive claystones occur. A Cainozoic pisolitic ferricrete upto about 10m thick is present beneath the sand of the Coastal Plain (Plumb and Paine, 1964).

5. FIELDWORK

5.1 Ground Magnetics

Three anomalies were followed up with ground magnetics (Table 1).

TABLE 1: EL 6808 GROUND MAGNETIC SURVEYS SUMMARY

ANOMALY	1:100,000 AMG COORDINATE, GRID CENTRE	SIZE (m)	LINE SPACING (m)	SAMPLE INTERVAL (m)
BT11	5.97.207E, 53 82.68.038N	600x600	100	10
BT12	5.97.284E, 53 82.70.007N	700x700	100	10
BT13	6.06.155E, 53 82.77.390N	1000x900	100	25

Ground magnetic plots are shown in Figures 4 to 6. BT11 produced a noisy response which is ascribed to shallow surface activity due to pisolitic ferricrete (Map 2). BT12 also produced a noisy response also considered to be due to shallow, magnetically active pisolitic ferricrete (Map 3). BT13 confirmed a dipole anomaly suggesting a relatively deep magnetic source. In the northern half of the BT13 grid, pisolitic ferricrete has been dissected and exposed along a network of small drainages (Map 4).

5.2 Sampling

All three anomalies were check sampled over and around magnetic highs by surface soil and/or stream sediment sampling (Table 2). A total of six stream sediment and ten soil samples was collected.

TABLE 2: SPL SAMPLING SUMMARY, EL 6808

SAMPLE NO	ANOMALY	SAMPLE TYPE	COLLECTED MATERIAL (mm)	AMG 1:100,000 COORDINATE
BD 9132	BT 13	Stream	-2.0	065 775
BD 9133	BT 13	Stream	-2.0	060 777
BD 9134	BT 13	Stream	-2.0	061 776
BD 9135	BT 13	Stream	-2.0	062 778
BD 9136	BT 12	Stream	-2.0	973 703
BD 9137	BT 12	Stream	-2.0	971 702
BD 9138	BT 12	Soil	Raw	972 701
BD 9139	BT 12	Soil	Raw	973 701
BD 9140	BT 12	Soil	Raw	974 701
BD 9141	BT 12	Soil	Raw	975 700
BD 9142	BT 12	Soil	Raw	976 701
BD 9143	BT 11	Soil	Raw	974 681
BD 9144	BT 11	Soil	Raw	973 680
BD 9145	BT 11	Soil	Raw	972 681
BD 9146	BT 11	Soil	Raw	972 679
BD 9147	BT 11	Soil	Raw	971 681

All stream sediment samples were 100 ltr excavated samples hand screened on site. Accompanying geochemical samples were also collected at each sample location.

6. SAMPLE TREATMENT AND EXAMINATION

The stream sediment and soil samples were sent to SPL's Darwin Treatment Plant and underwent primary concentration. Further concentration and mineral examination is being carried out in SPL's Melbourne laboratory.

7. SAMPLING RESULTS

As the heavy mineral samples are currently undergoing treatment and examination, results are therefore outstanding. Analysis of geochemical samples is dependent upon the outcome of heavy mineral sampling results.

8. PERSONNEL

Two people comprising 1 geologist and 1 field assistant carried out the fieldwork, with the use of 4WD vehicles.

9. EXPENDITURE

Project expenditure to date by SPL is totalled at $????, and a breakdown of allocated costs is shown in Table 3.

TABLE 3: PROJECT EXPENDITURE

EL NO.	6808
OPERATIONAL STAFF COSTS	6818
GENERAL OPERATIONAL	1046
TRANSPORT AND TRAVEL	1850
TENEMENTS COSTS	0
SAMPLE ANALYSIS	0
CENTRAL TREATMENT PLANT	2272
LAB TREATMENT	240
LAB EXAMINATION	464
DRILLING	0
GENERAL CONTRACTORS	0
GEOPHYSICAL CONTRACTS	0
REMOTE SENSING	0
GEOPHYSICS	586
DRAFTING	400
COMPUTER SERVICES	150
MINERALOGY	0
REGIONAL ADMINISTRATION	980
HEAD OFFICE ADMINISTRATION	1052
CAPITAL EXPENSES	271
TOTAL	16129

10. CONCLUSIONS

10.1 The noisy ground magnetic responses of anomalies BT11 and BT12 are the result of shallow, magnetically active pisolitic ferricrete. BT13 appears to have a relatively deep-seated magnetic source, and is of the greatest interest.

10.2 No conclusions can yet be made from heavy mineral sampling.

11. RECOMMENDATIONS

Depth modelling of anomaly BT13 should be carried out to determine if drilling may be feasible.

12. PROPOSED WORK AND EXPENDITURE FOR 1993

The results of heavy mineral and soil sampling, and depth modelling of BT13 will determine any further work within the licence area. A forward work programme will be completed once results are available.

13. REFERENCES

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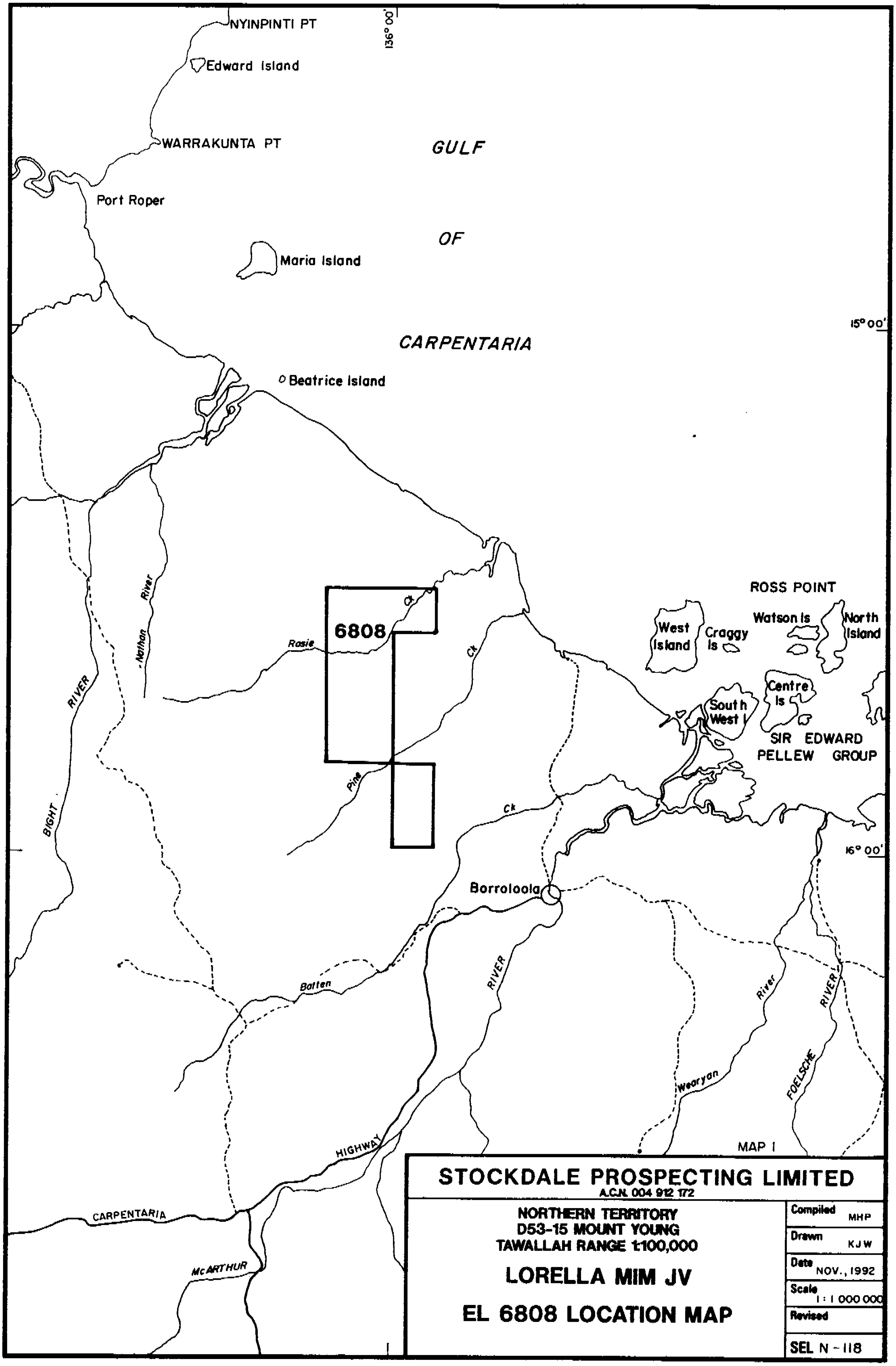
SENIOR GEOLOGIST
DARWIN, N.T.



STOCKDALE PROSPECTING LIMITED

A.C.N. 004 912 172

NORTHERN TERRITORY
D53-15 MOUNT YOUNG
TAWALLAH RANGE 1:100,000

LORELLA MIM JV

EL 6808 LOCATION MAP

Compiled	MHP
Drawn	KJW
Date	NOV., 1992
Scale	1 : 1 000 000
Revised	
SEL N - 118	

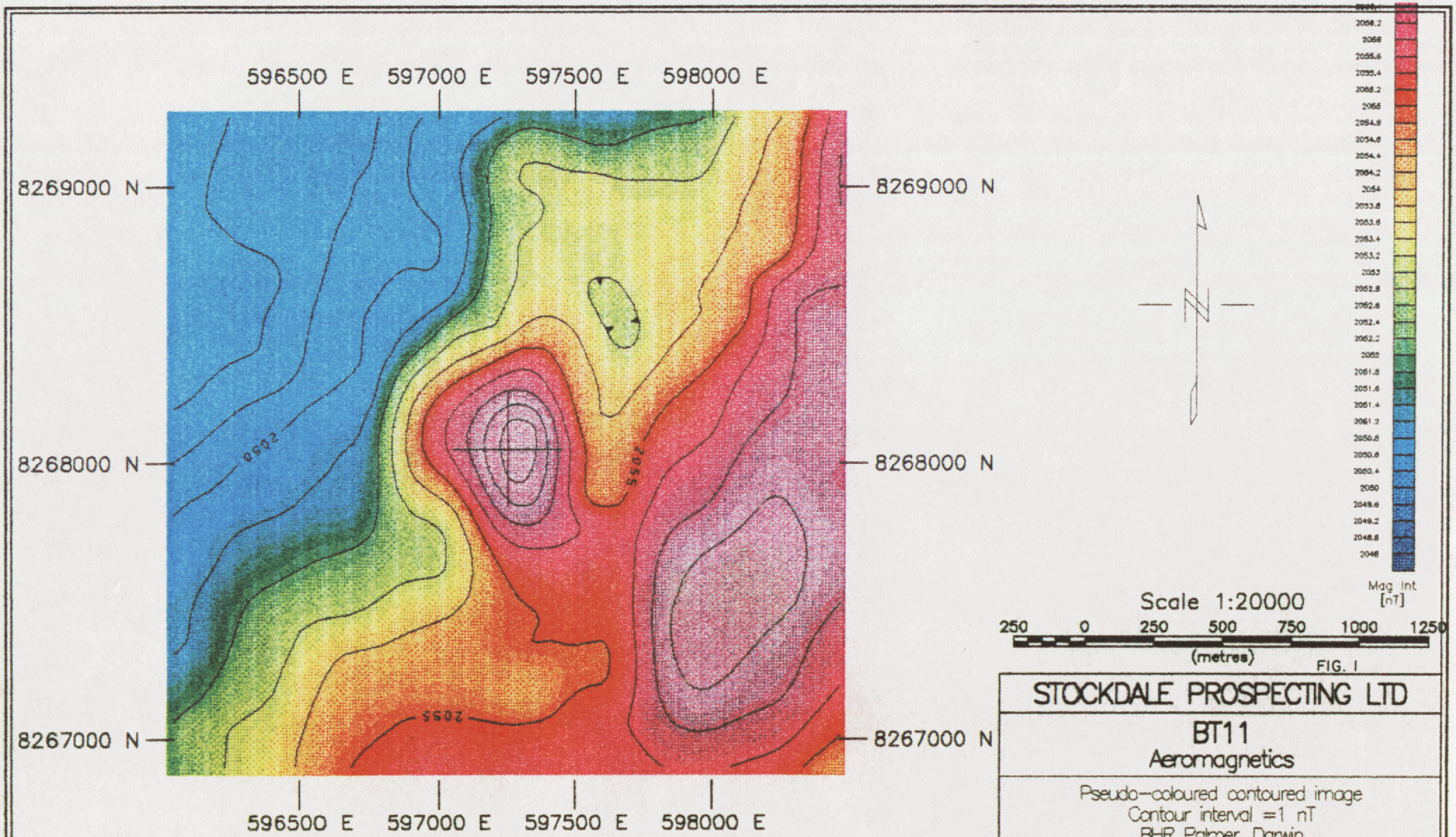


FIG. 1

STOCKDALE PROSPECTING LTD

BT11
Aeromagnetics

Pseudo-coloured contoured image
Contour interval =1 nT
BHR Palmer, Darwin

D53-15 SEL:

2VE

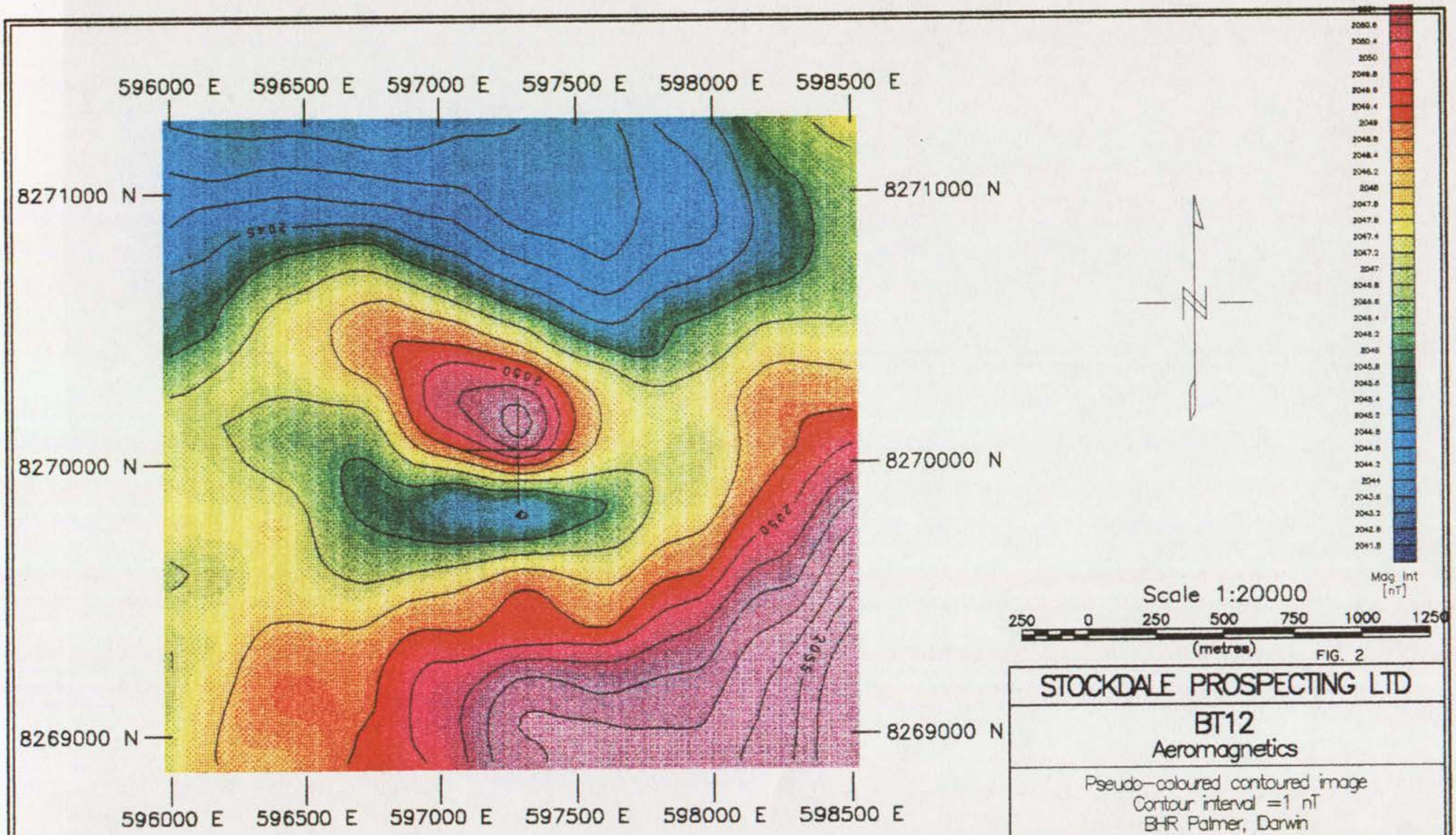


FIG. 2

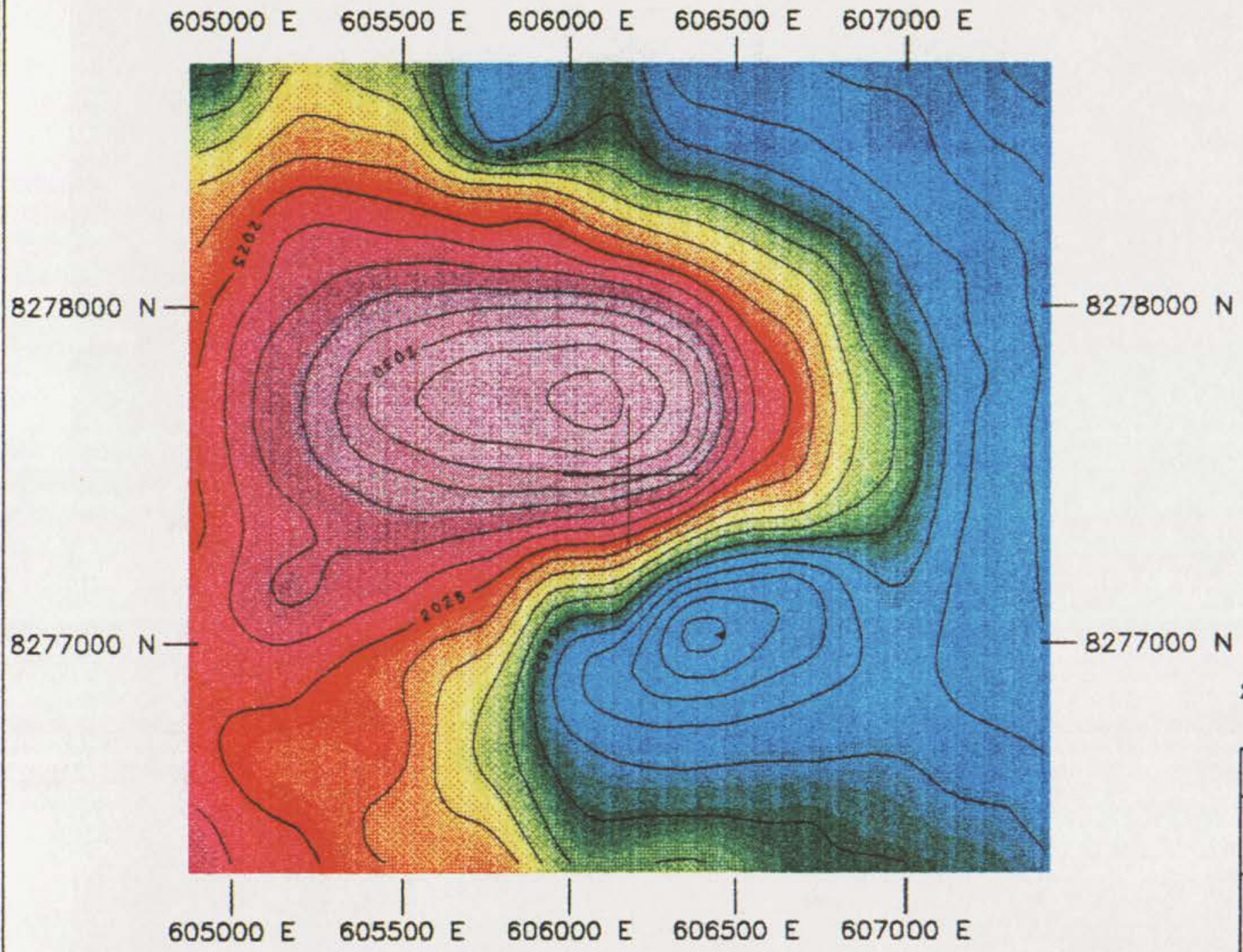
STOCKDALE PROSPECTING LTD

BT12
Aeromagnetics

Pseudo-coloured contoured image
Contour interval =1 nT
BHR Palmer, Darwin

D53-15 SEL:

B



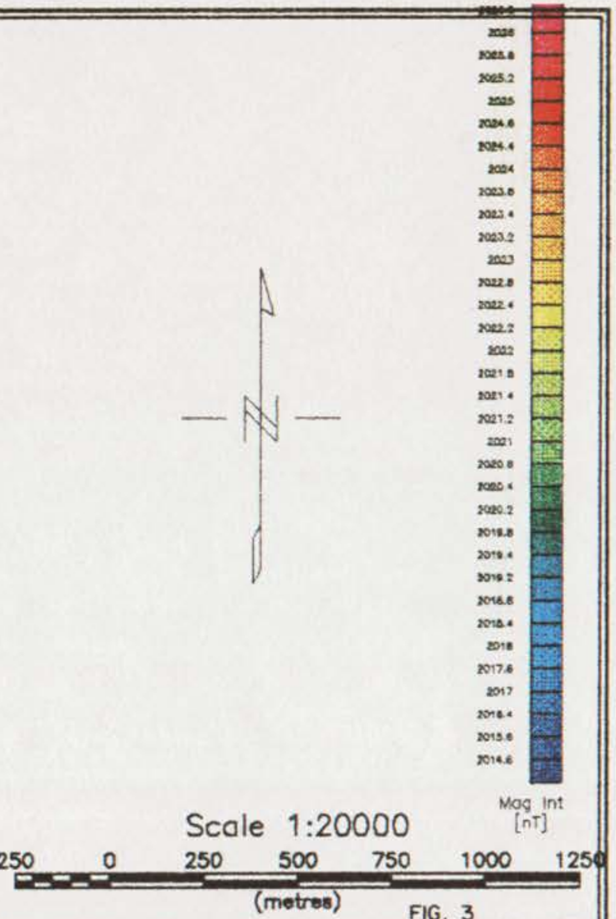


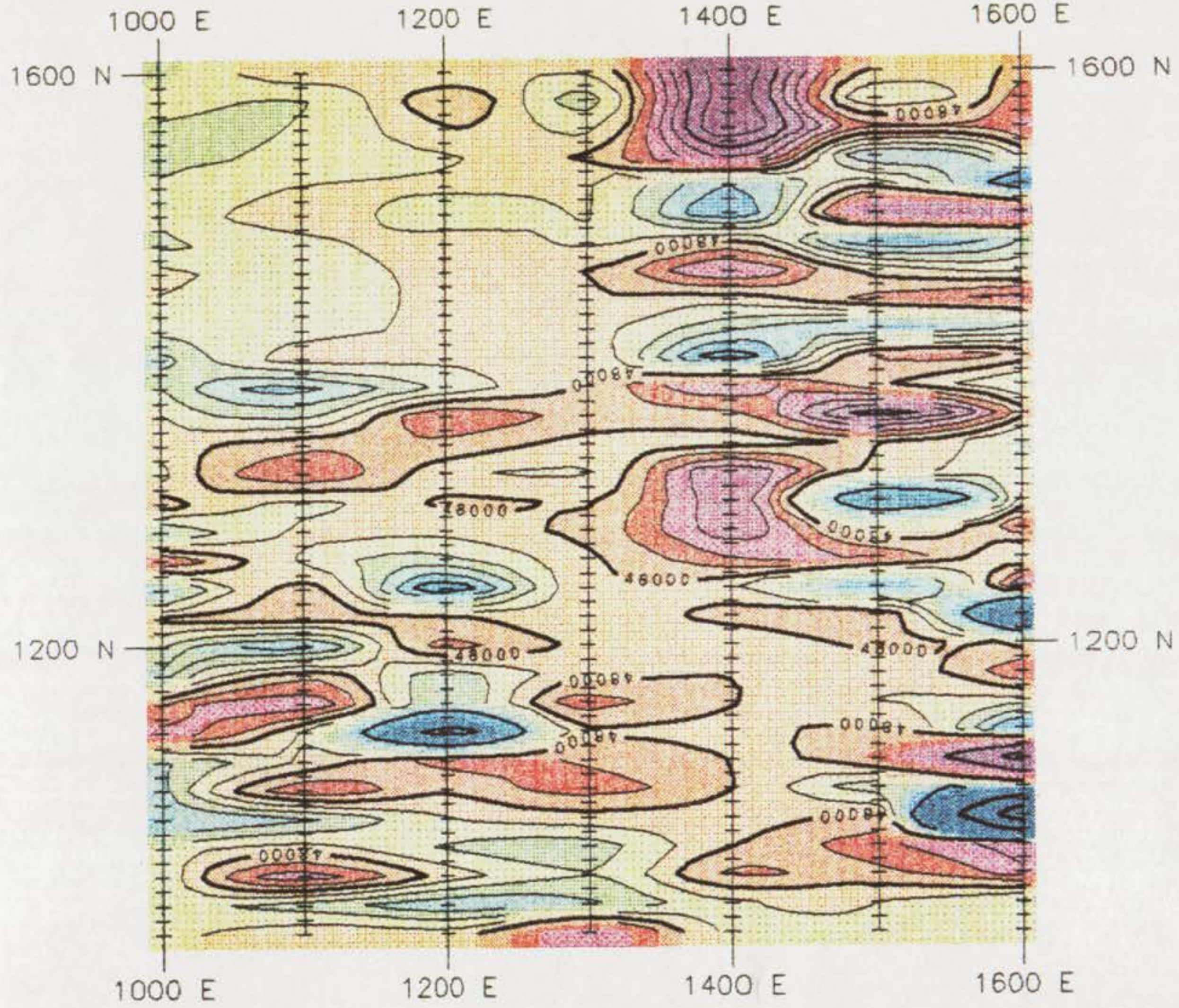
FIG. 3

STOCKDALE PROSPECTING LTD

BT13
Aeromagnetics

Pseudo-coloured contoured image
Contour interval =1 nT
BHR Palmer, Darwin

D53-15 SEL:



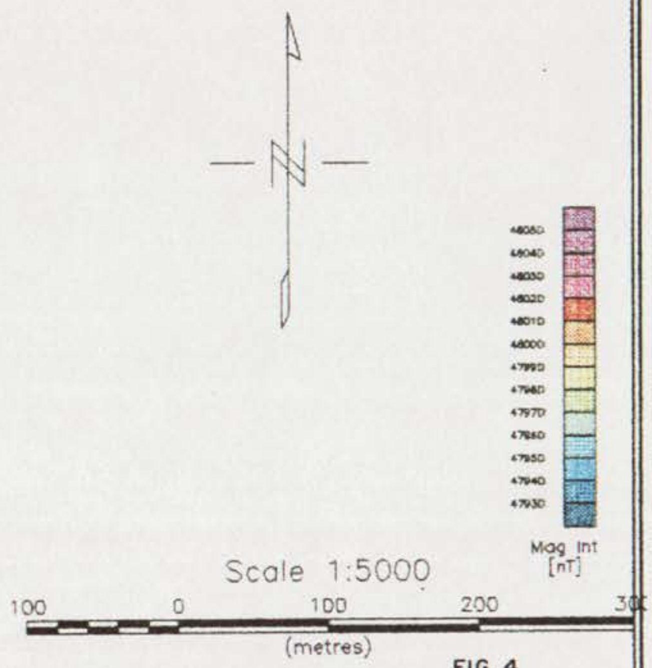


FIG. 4

STOCKDALE PROSPECTING LTD

BT11
EL6808, LORELLA JV

GROUND MAGNETICS
10 nt
131992, MHP

D53–15 SEL:

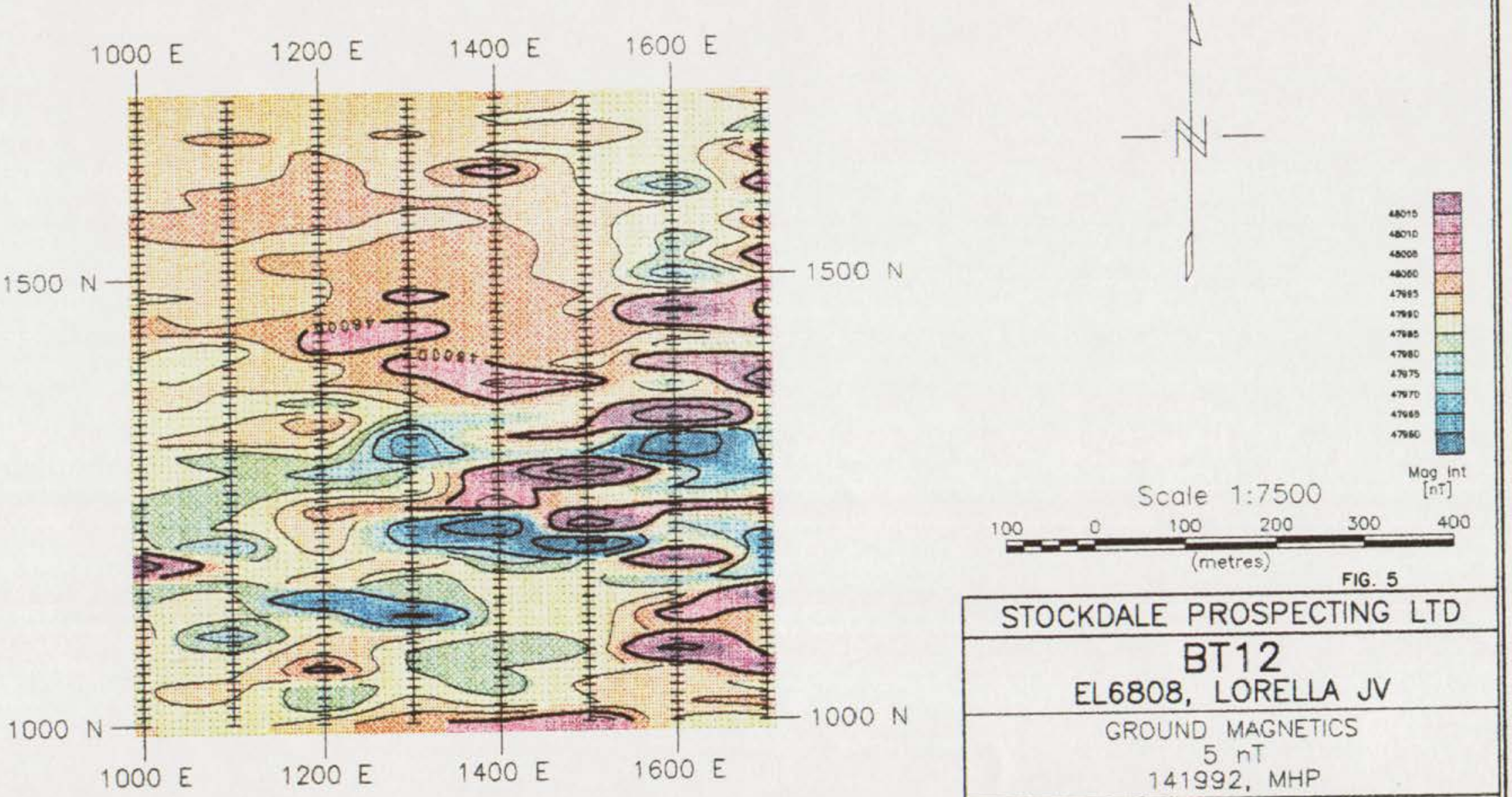


FIG. 5

STOCKDALE PROSPECTING LTD

BT12
EL6808, LORELLA JV

GROUND MAGNETICS
5 nT
141992, MHP

D53–15 SEL:

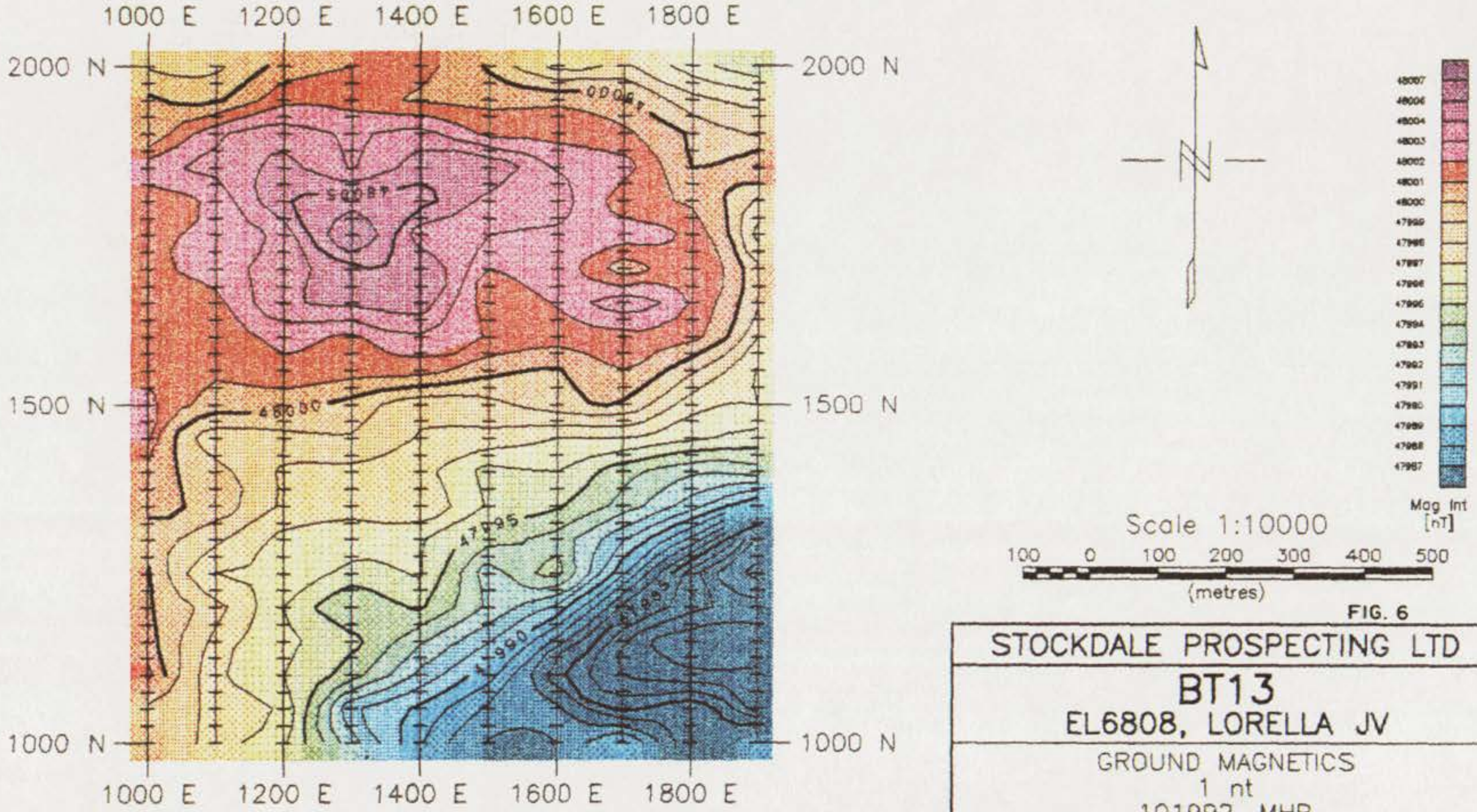


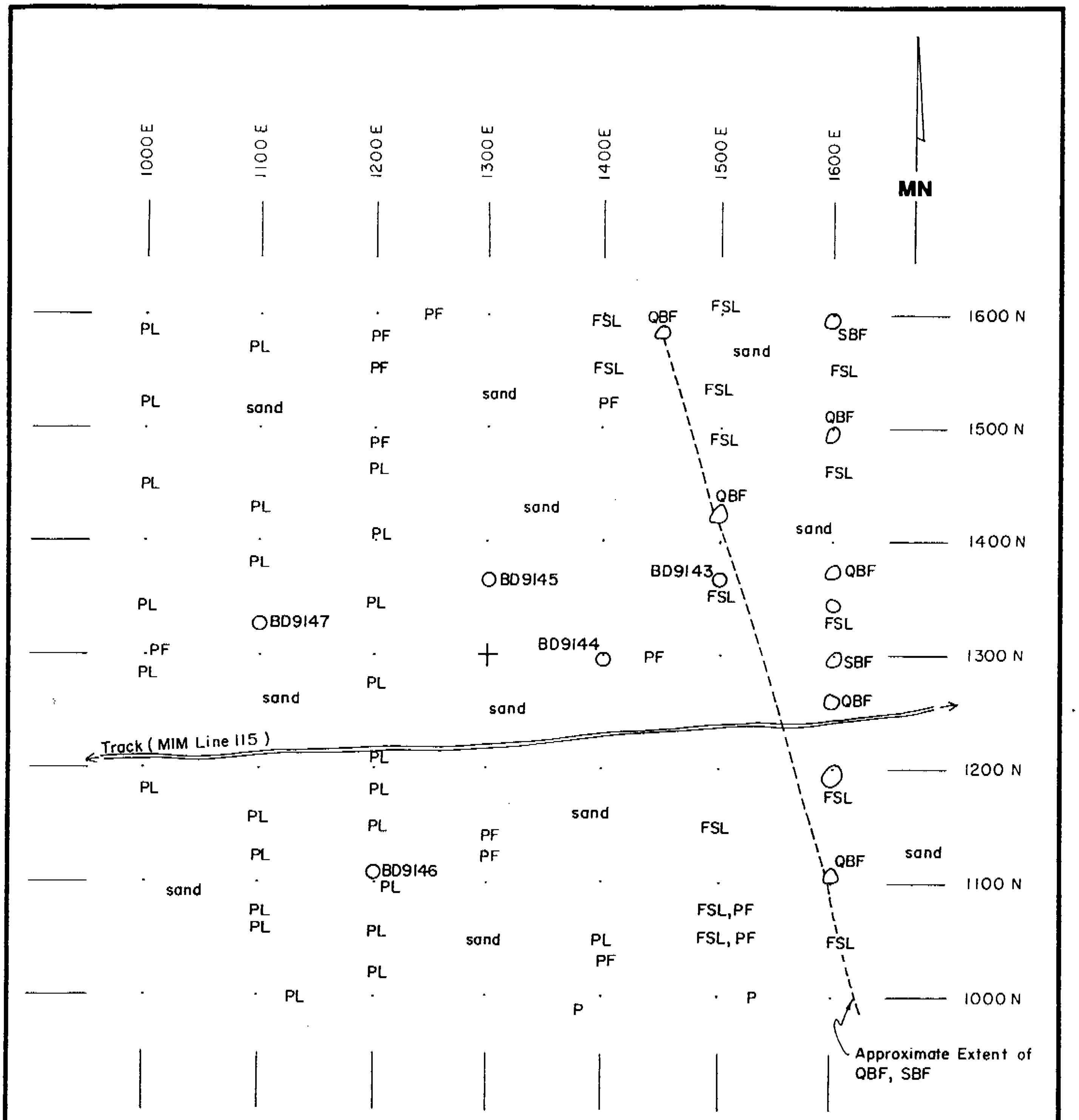
FIG. 6

STOCKDALE PROSPECTING LTD

BT13
EL6808, LORELLA JV

GROUND MAGNETICS
1 nt
101992, MHP

D53–15 SEL:



GR 1300E / 1300N
AMG 5.97. 207E, 53 82.68.038 N
pdop 3.8

LEGEND

sand : Cream-buff fine sand-silty quartz
FSL : Ferruginous sandstone pebble lag
SBF : Sandstone boulder float
QBF : Quartzitic sandstone boulder float
PF : Pisolitic ferricrete boulder
PL : Pisolitic ferricrete lag

Sampling (MHP) Oct., 1992
Soil
BD9143 - 9147 (5)

MAP 2

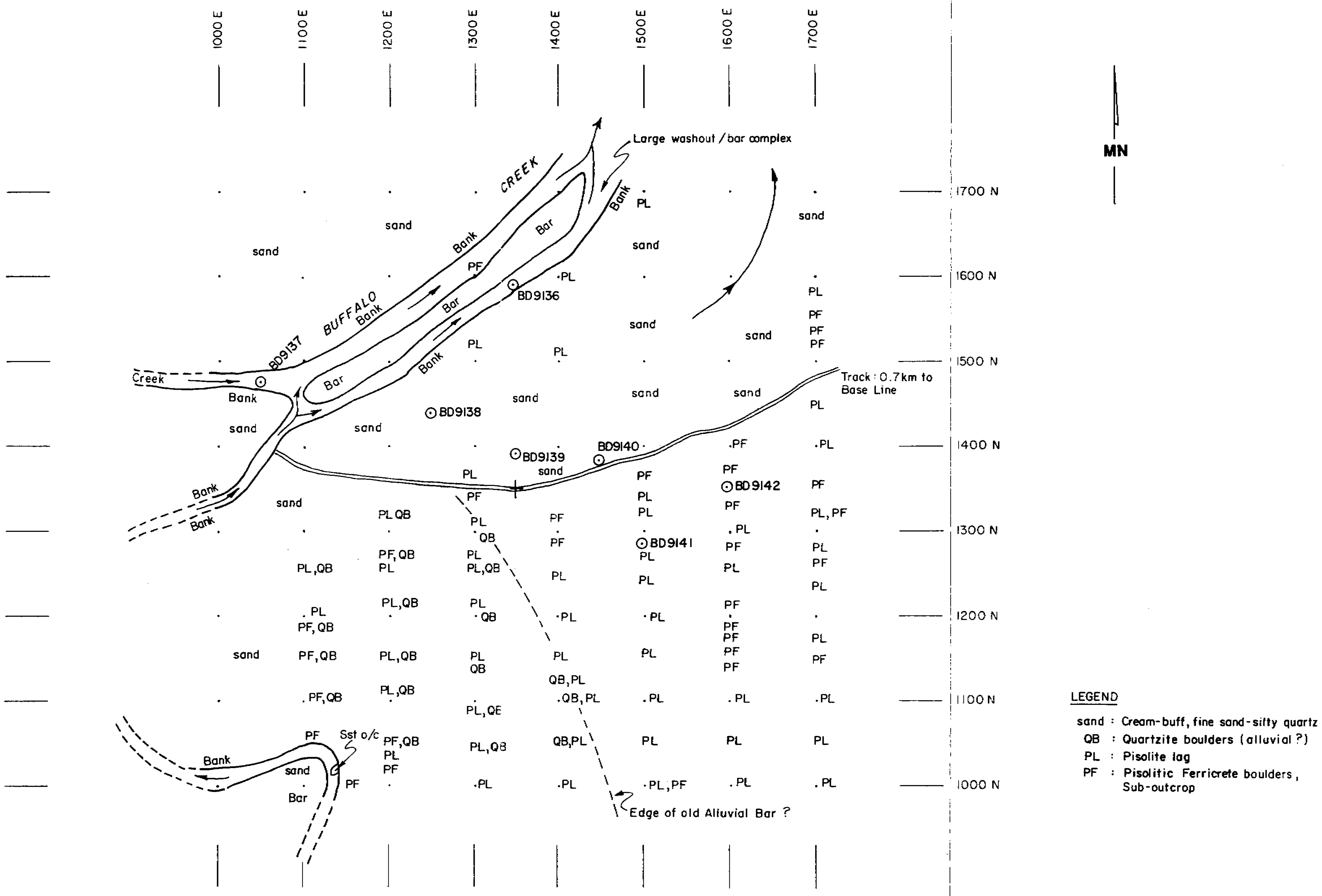
STOCKDALE PROSPECTING LIMITED

A.C.N. 004 912 172

NORTHERN TERRITORY
D53-15 MOUNT YOUNG
TAWALLAH RANGE 1:100,000

LORELLA MIM JV
BT11 MAGNETIC ANOMALY
EL 6808
BT11 SKETCH MAP

Compiled MHP
Drawn KJW
Date OCT., 1992
Scale 1 : 5000
Revised
SEL N - 104



LEGEND

sand : Cream-buff, fine sand-silty quartz
QB : Quartzite boulders (alluvial ?)
PL : Pisolite lag
PF : Pisolitic Ferricrete boulders, Sub-outcrop

GR 1350E / 1350N :
AMG 5-97-284E, 53 82-70-007N
pdop 3.1

Sampling (MHP) Oct., 1992

Stream
BD9136 – 9137 (2)

Soil
BD9138 – 9142 (5)

0 50 100 200 m

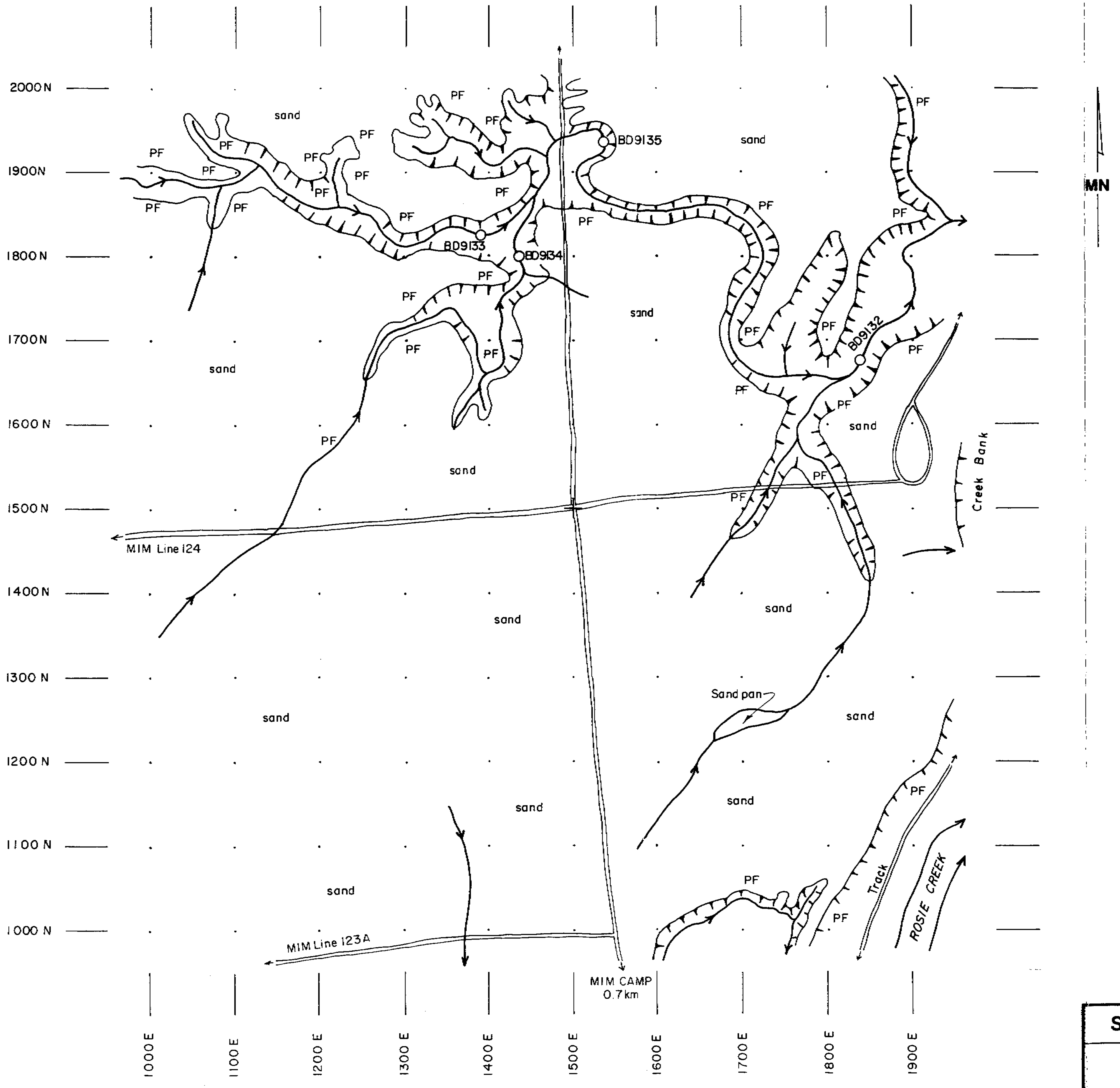
MAP 3

STOCKDALE PROSPECTING LIMITED
A.C.N. 004 912 172

NORTHERN TERRITORY
D53-15 MOUNT YOUNG
TAWALLAH RANGE 1:100,000

LORELLA MIM JV
BT12 MAGNETIC ANOMALY
EL6808
BT12 SKETCH MAP

Compiled MHP
Drawn KJW
Date OCT., 1992
Scale 1 : 5000
Revised
SEL N-102



1500 E / 1500 N :

AMG 6. 06. 155E 53 82. 77. 390

pdop 3. 1

Sampling (MHP) Oct., 1992

Stream

BD9132 - 9135 (4)

LEGEND

sand	: Cream-buff fine sand-silty quartz
PF	: Pisolitic ferricrete
⛰	: Breakaway

0 50 100 200 m

MAP 4

STOCKDALE PROSPECTING LIMITED

A.C.N. 004 912 172

NORTHERN TERRITORY
D53-15 MOUNT YOUNG
TAWALLAH RANGE 1:100,000

LORELLA MIM JV
BT13 MAGNETIC ANOMALY
EL 6808

BT13 SKETCH MAP

Compiled	MHP
Drawn	KJW
Date	OCT., 1992
Scale	1 : 5000
Revised	
SEL N - 103	