

**M. RUANE**

**TECHNICAL REPORT**

**EL 9518 "JERVOIS"**

***Northern Territory***

**Annual Report for the year ending  
2nd October 2001**

**AUTHOR** N.J.CRANLEY

**DATE** November 2001

**KEY WORDS**

JERVOIS  
BONYA SCHIST  
PROTEROZOIC  
COPPER  
BASE METALS  
MIMDAS IP  
EM SURVEY METHOD  
DRILLING  
ASSAYS

## **TABLE of CONTENTS**

	SUMMARY
1.	INTRODUCTION
2.	LOCATION and ACCESS
3	TENURE
4.	GEOLOGICAL SETTING
5.	PREVIOUS EXPLORATION
5.1	1961-1965 New Consolidated Goldfields
5.2	1969-1973 Petrocarb
5.3	1973-1974 Petrocarb N
5.4	1980-1983 Plenty River Mining
5.5	1983-1984 Plenty River Mining -Anaconda N
5.6	1991-1996 Plenty River Mining -Normandy Poseidon N
5.7	1997 -1999 Britannia Exploration
5.8	MIM Exploration from August 1999
5.9	MIMEX Exploration from 2000
	IP Survey
	EM Surveying
	Drilling
	Costean Sampling
	Metallurgical Test Work
6 .	DISCUSSION AND RECOMMENDATIONS
	REFERENCES

**M. RUANE****EL 9518 "JERVOIS"  
NORTHERN TERRITORY  
Annual Report for the  
Year Ending 2nd October 2002****SUMMARY****AIM**

To explore and evaluate the potential for economic base and precious metal mineralisation.

**OBJECT of REPORT**

To document exploration activities and results achieved on Exploration Licence 9518 "Jervois" and to report these to the Department of Mines and Energy, Northern Territory. Information from adjacent leases and claims is also included.

**LOCATION**

EL 9518 is located 280 kilometres north east of Alice Springs on the Huckitta 1: 250 000 map sheet (SF53 - 11), and surrounds the mineral leases which cover the gossanous outcrop of the Jervois Mine and its extensions (Drawing 50794).

**TENURE**

EL 9518 "Jervois" was granted to C. Savage on 1st October 1996 for a period of six years. Under compulsory partial surrender provisions, 50% of the tenement was relinquished on the 30<sup>th</sup> September 1998. The tenement was subsequently transferred to M. Ruane on the 19<sup>th</sup> July 1999, who applied for a deferment of relinquishment until 2nd October 2000, which was approved by the Department of Mines and Energy, Northern Territory. M. Ruane then entered into an option to acquire agreement with Britannia Gold NL. A deferment of relinquishment has been extended to 2nd October 2001.

On 5<sup>th</sup> August 1999, M.I.M. Exploration Pty Ltd entered into a Joint Venture agreement with Britannia Gold NL, agreeing to act as manager and operator of the Jervois Project, which incorporates EL 9518 "Jervois."

**PRECIS**

During this reporting year, the joint venture between Solbec Pharmaceuticals Ltd (Solbec) and MIM was terminated in late May 2002 and the data returned to Solbec which transferred the tenement to M.Ruane. A thorough review of all the data was then carried out by a geological team resulting in a global mineralised resource being calculated and economic modeling carried out.

**RECOMMENDATIONS**

Further infill drilling is recommended to better define the shallow sulphide resource.

**M. RUANE****EL 9518 "JERVOIS"  
NORTHERN TERRITORY****Annual Report for the  
Year Ending 2nd October 2000****1. INTRODUCTION**

Exploration Licence 9518 "Jervois" (EL 9518), is located in the Proterozoic terrain of the Arunta inlier. The tenement surrounds the mineral leases which cover the gossanous outcrop of the Jervois Mine and its extensions along strike (MCS 13-18,MLS 10,16,17,23,51-57,61,62,90) and the water holdings over Lake Petrocarb(HLDS 19-21). EL 9518 has a total area of approximately 58 km<sup>2</sup>.

MIM Exploration Pty Ltd (MIMEX) farmed into the tenement in August 1999 and was both manager and operator of the Joint Venture project. Exploration conducted by MIMEX focussed on finding structurally controlled high grade Isa copper and Broken Hill base metals mineralisation, as well as Fe-oxide associated copper-gold mineralisation.

The purpose of this report is to detail exploration conducted both by MIMEX and M.Ruane on EL 9518 during the year ended 2nd October 2002. Because of the complicated arrangement of Mining Leases and Mineral Claims over the main lode horizons, no attempt has been made to separate data which is actually outside the area of EL 9518.

This report therefore includes all the exploration data acquired by MIMEX and M.Ruane over the project

**2. LOCATION and ACCESS**

EL 9518 is located 280 kilometres north east of Alice Springs on the Huckitta 1:250 000 map sheet (SF53 - 11), and surrounds the mineral leases which cover the gossanous outcrop of the Jervois Mine and its extensions (See Figure 1).

Access is via the Stuart and Plenty River Highways to the Lucy Creek Station Road, with the tenement located approximately 20km north of this turn off. Historical exploration and mine tracks, as well as limited station tracks provide local access throughout the tenement which is located over a portion of the Jervois Pastoral Lease.

**3. TENURE**

EL 9518 "Jervois" was granted to C. Savage on 1st October 1996 for a period of six years. Under compulsory partial surrender provisions, 50% of the tenement was relinquished on the 30th September 1998. The tenement was subsequently transferred to M. Ruane on the 19th July 1999, who applied for a deferment of relinquishment until 2nd October 2000, which was approved by the Department of Mines and Energy, Northern Territory. M. Ruane then entered into an Option to Acquire agreement with Britannia Gold NL.

On 5th August 1999, M.I.M. Exploration Pty Ltd entered into a Joint Venture agreement with Britannia Gold NL, agreeing to act as manager and operator of the Jervois Project, which incorporates EL 9518 "Jervois."

A second deferment until 2nd October 2001 has been granted.

MIM withdrew from the joint venture in late May 2002. The tenement was subsequently transferred to M.Ruane.

#### **4. GEOLOGICAL SETTING**

EL 9518 lies on the Huckitta 1: 250 000 map sheet (SF 53-11), for which geological notes are available. The tenement is located mainly within the Palaeo-Proterozoic Bonya Schist on the north eastern boundary of the Arunta Orogenic Domain. The Arunta Orogenic Domain in the north western part of the tenement is overlain unconformably by Neo-Proterozoic sediments of the Georgina Basin.

The prospective lithologies within the tenement are considered to be contained within the Bonya Schist, Division 2 of Arunta Orogenic Domain (Freeman, 1986). This unit is made up of quartzo-feldspathic muscovite and sericite schists, ranging from pelitic to psammo-pelitic in composition, and has local occurrences of cordierite, sillimanite, garnet and andalusite. The mine sequence, in addition to these lithologies, also contains chlorite schist, garnet ± magnetite, quartzite, magnetite quartzite, calc-silicates, and impure marbles.

The topography of the tenement is dominated by the Jervis Range, composed of Georgina Basin sediments to the west, and the "J Range," comprised of Bonya Schist, and includes the mine sequence. Peters et al (1985) recognised three deformation periods in the Jervis area, with refolded folding of the mine sequence resulting in the "J" shape of the Bonya Schist outcrop in the tenement area. Mineralisation in the area occurs mostly as stratiform/bound copper and/or lead-silver-zinc associated with variable garnet and calc-silicate alteration, although tungsten occurs as disseminated scheelite in calc-silicate rocks.

#### **5. PREVIOUS EXPLORATION (Extracted from Alcock, 1999)**

Following the discovery of the Jervis mineralisation in the 1920s, some small-scale mining of the oxides took place and concentrates were transported to Mt Isa for treatment.

##### **5.1 1961-1965 New Consolidated Goldfields**

From 1961 -1965, New Consolidated Goldfields (Australasia) Pty Ltd undertook the first modern exploration program. This involved regional and detailed prospect mapping, geochemistry, magnetic and Turam surveys. Diamond drill holes totalling 1,901 metres were drilled in this period (DDH Series). The program was terminated because it had failed to find ore reserves of the required tonnage and grade. Ore reserves for Reward, Green Parrot and Bellbird were estimated to total 2.4 million tonnes at 2% copper to a depth of 95 metres (Catley, 1965, Wilson and Ward, 1962).

##### **5.2 1969 -1973 Petrocarb**

Apart from some small scale mining of the oxidised zone by Mr K Johansson, no further exploration was undertaken until Petrocarb Mineral Exploration (SA) Pty Ltd acquired certain key leases in 1969-70. During 1971 and 1972 intensive diamond drilling and lesser percussion drilling took place to test the known mineralised horizons. About 110 holes were drilled including some 55 diamond core holes (JR, JA and JG Series) and 22 percussion holes (MP Series) on the Reward, Marshall and Green Parrot prospects.

A smaller number of diamond and percussion holes were drilled at Green Parrot Scheelite (PE2- 7, PE 1-4), Crystallisation Plant Scheelite (WP 1-4), Pioneer A (PAI), Pioneer B scheelite (PBI-4), Cox's West (PEI), Mineral Lease 613H (Rockface PFI-5) and at Jericho. Costeaming of scheelite prospects also took place in 1972.

In late 1970, McPhar Geophysics carried out a detailed dipole-dipole IP survey of the Reward -Green Parrot mineralised zone and the Bellbird zone together with orientation VHEM and vertical flux gate magnetometer surveys.

Copper ore reserves for Reward, Marshall and Bellbird defined by the Petrocarb drilling were calculated at 2,295,600 tonnes at 2.5% copper and about 50 g/t silver (Ypma, 1983) to a maximum depth of 130 metres. In addition, a further 300,000 tonnes at 9% lead, 3% zinc, 1.5 % copper and 170g/t silver were estimated for Green Parrot (Holmes, 1972).

### **5.3 1973 -1974 Petrocarb Joint Venture**

A joint venture agreement between Petrocarb Exploration NL, Wilstone Pty Ltd and Union Corporation (Australia) Pty Ltd was negotiated in late 1973 whereby Union would undertake exploration in the Jervois area. The program which was implemented in 1974, involved colour air photography, geological mapping at 1: 10,000 and 1: 1,000 scale, soil and rock chip geochemistry on selected targets, a review of previous geophysical work and test surveys using a variety of methods by Scintrex, and the drilling of seven diamond core holes totalling 1,723 metres.

A reserve of 2,085,000 tonnes at 3% copper, 55 g/t silver over an average intercept width of 4.7 metres was estimated for Marshall and Reward. This was short of the objective and Goldner recommended drilling to 600 metres vertically (Goldner et al, 1974).

Union Corporation, about this time, was contemplating with drawing from Australia and the Joint Venture terminated without this recommendation being implemented.

### **5.4 1980 -1983 Plenty River Mining**

The Jervois area remained inactive between 1975 and 1980 when Plenty River Mining Company NT Limited negotiated a tribute agreement with Petrocarb whereby Plenty River would be assigned the leases in return for payment of a royalty on production.

In 1980 the PR Series of about 50 percussion holes (PR 1 -57) were drilled in the Marshall -Green Parrot area for ore definition and open pit planning and grade control.

Other drilling in 1981-83 included 17 percussion holes (R 1 -17) and four diamond core holes (RWD 1 -4) at Reward in 1983; 14 percussion holes about 500 metres north of Reward near scheelite costean yielding narrow low grade copper intersections; 24 percussion holes at HM (Sykes) Lode intersecting narrow low grade copper intercepts; and 11 percussion holes at Killeen Prospect, at the southern end of the "J" east of Bellbird. Costeaning was undertaken at Cox's, Killeen and HM Lode.

A treatment plant designed to treat Green Parrot lead-zinc-copper-silver ore at a rate of 125,000 tonnes per annum was completed in early 1982 together with township and services at a cost of \$A15 million. Open pit mining at Green Parrot using company equipment commenced in 1982, and the plant was successfully commissioned in April 1982. It was then placed on care and maintenance in June 1982 after having produced about 500 tonnes of concentrate.

The company became public by the issue of shares through a prospectus dated 28th March 1983. In this prospectus, Terence Willsted and Associates produced ore reserve estimates based on previous drilling plus 50 shallow percussion holes (PR Series) drilled in July, August 1980 for greater ore definition (Willsted, 1983). These estimates to 100 metres vertical depth were as follows:

#### *Green Parrot ,*

Probable primary resources reserves:

210,000 tonnes at 1.47% Cu, 8.58% Pb, 2.56% Zn, 166 g/t Ag



Possible primary ore:

50,000 tonnes at 1.55% Cu, 8.07% Pb, 2.2% Zn, 135 g/t Ag

Oxidised mineralisation:

70,000 tonnes at 1.57% Cu, 8.14% Pb, 3.17% Zn, 179 g/t Ag

#### *Marshall Reward*

Probable primary reserves:

320,000 tonnes at 2.77% Cu, 0.43% Pb, 0.39% Zn, 65 g/t Ag

Possible primary ore:

205,000 tonnes at 2.71 % Cu, 0.49% Pb, 0.33% Zn, 70 g/t Ag

Oxidised mineralisation:

180,000 tonnes

The plant was again commissioned in August 1983 and operated on Green Parrot oxidised ore for five months, treating 25,000 tonnes. Due to a sharp decline in metal prices the plant was placed on care and maintenance in December 1983 and has not operated since. About 2,000 tonnes of concentrate were sold at a grade of 50.4% Pb, 5.4% Zn, 0.6% Cu, 680 g/t Ag and 0.1 % Bi. About 40,000 tonnes of ore were mined from the Green Parrot pit (300 metres long by 25 metres deep).

#### **1983 -1984 Plenty River Mining -Anaconda Joint Venture**

With the objective of discovering a large stratiform base metals orebody of the Broken Hill type, Anaconda Australia Inc. negotiated a joint venture with Plenty River Mining in September 1983. The Anaconda program primarily centred on the flying of an Input electromagnetic survey in October 1983 with follow up reconnaissance geology and geochemistry of 26 moderate to low order EM anomalies. At the same time the Jervois Range 1: 100,000 sheet magnetic data flown by the NT Department of Mines and Energy in 1981 was interpreted. The ground follow up of EM anomalies did not reveal any lode horizon rocks and the geochemical results were discouraging (Marjoribanks, 1983 and Dunnet et al1984). Anaconda withdrew from the joint venture in May 1984, about the time the parent was contemplating the ultimate shut down of activities in Australia.

#### ***Other Exploration and Research Activities***

Since 1982 Plenty River Mining Company has explored Exploration Licences 3301,3202, 3203,3204, and 3165 in the Jervois area as well as its leases. The results of this work appear in reports by Ypma (1983,84,85,86,87).

The principal activities during this period have been:

- Geological mapping at 1: 5,000 scale of former EL 3301 and parts of former EL's 3202 and 3204 (including the "J" structure in 1982 -1983 by students under the supervision of Dr P.J. Ypma of Adelaide University. Emphasis in this work was on structural geology, and the results are documented in a report by Peters et al, 1985. Honours Thesis by University of Adelaide students on interpretation of ground magnetic and gravity data in the Jervois mine area, and on results of fluid studies.
- A 250m line spacing, airborne magnetic and gamma ray spectrometer survey by Austirex for Plenty River Mining Company in April -May 1983 of EL 3301, the western part of EL 3202 and the northern part of EL 3204. Interpretation was conducted by T. Whiting of the University of Adelaide as part of a PhD thesis (Whiting, 1984).
- Ore reserve estimation of the Reward -Marshall -Green Parrot zones by students at the School of Mines of Delft University of Technology in Holland under supervision of P. Ypma in 1986. This computer -

based study led to the production of graphs permitting estimation of ore reserves at varying grade cut-offs (Lensvelt, 1986).

- An ore-microscopy study of the Jervois Mine, 1987, by a student at the School of Mines of Delft University of Technology, Holland, and a study on Small Scale Mining, with special attention paid to Jervois Mine (Coenan, 1987).

A major review by Yates, Ypma and Dickson summarised the work done to that time (Yates et al, 1989).

### **Regional Drilling**

Some diamond drilling was completed in the period 1984 -1987 including four holes (X84 -1, 2, 3, 5) to test airborne magnetic anomalies in the Bellbird and Green Parrot South areas. No significant mineralisation was intersected and the targeting of further magnetic anomalies was abandoned.

In 1986, accent was on testing geochemical anomalies due to high zinc in biotite. Four core holes were drilled at Pioneer, north of the Marshall -Reward resource (X86 1 -4) yielding narrow copper intercepts, one at Anaconda, south east of the "J" line of lode (X86-5) .and four holes at Killeen, east of Bellbird (X86-6 to 9). One of the Killeen holes showed intersections of 16% Zn over 0.9 metres and 15.1 % Zn over 1.15 metres in calc-silicate rocks.

Four core holes were drilled in 1987, three at Van Gils Prospect on the Outer J line of mineralisation (X87-1 to 3) and one (X87-4) at Killeen. Results at Van Gils were not encouraging, while at Killeen, zinc values in the range of 2% to 3.65% were intersected over 4.35 metres with one 0.15 metre interval at 12.5% Zn in calc-silicates. A further three diamond drill holes were later completed at Killeen in 1987 (X87-5 to 7) all of which yielded zinc/lead intersections.

### **5.6 1991-1996 Plenty River Mining -Normandy Poseidon Joint Venture**

Plenty River Mining reached an agreement with Normandy Poseidon in October 1991, whereby Poseidon Exploration Limited would extend their exploration of the ELs 6993, and 6994 to include the ERLs 67-70.

Exploration activities included a combined airborne magnetometer and EM survey. About 1,894 line kilometres were flown in 1991 for the assessment of Normandy Poseidon's EL 6994 with about 418 line kilometres passing over Plenty River Mining's ERLs 67-70.

A new grid based on AMG was established and a fixed loop EM Survey (Sirotem MK III) was undertaken over the "J" structure. Three diamond holes (JD1, IA, 2, 3) were drilled east of the Marshall zone to test an EM anomaly coincident with the Sykes zone of mineralisation and its northern extension. One diamond drill hole (ill4) was also drilled at the Bellbird zone on the South East limb of the "J" structure.

### **5.7 1997 -1999 Britannia Exploration**

In 1997 Britannia Gold NL carried out a survey and RC drilling program following acquisition of the tenements from Tyson Resources who held an option to purchase from Plenty River Mining.

The RC drilling program was carried out to fill in some gaps in earlier drilling by previous workers, and establishing resource figures for the copper oxide zone extending from surface to approximately 40 metres. A total of 1,618 metres (26 holes) were drilled to depths between 42 and 102 metres (Alcock, 1999).

### **5.8 MIM Exploration from August 1999**

In early 1999, Britannia Gold NL offered the exploration lease and mine leases as part of a Joint Venture package to MIM Exploration Pty Ltd. MIM Exploration entered the Joint Venture agreement as manager and operator in August 1999.

During the period from 3rd October 1998 to 5th August 1999, Britannia Gold NL operated on EL 9518 "Jervois." No ground exploration was completed, however data was compiled and a Joint Venture offer designed. M.I.M Exploration took over as manager and operator on 5th August 1999, and completed an Airborne geophysical survey, petrological studies, and physical properties studies in the period from 5th August 1999 to 2<sup>nd</sup> October 1999. Since that time MIM Exploration has carried out extensive geophysical surveying and percussion and diamond drilling. This work is covered in the previous annual report and in the following sections.

## **5.9 MIM Exploration from 2000**

During the year ending 2nd October 2001, MIM carried out the following program:

### *IP Survey*

In November and December of 2000 an IP and resistivity survey was undertaken on EL 9518 'Jervois'. The survey was designed to map, in greater detail, the lode horizon at the Marshall and Reward prospects ie. in-filling data previously acquired in 1999 (reported previously) and also to extend existing coverage both north and south of the Bellbird prospect.

### *Acquisition and Processing*

A total of 34.4line kms of acquisition was carried out on 13 lines. This brings the total coverage for the tenement, including the April 1999 coverage, to 70.4 line km on 31 lines. MIM Exploration's generic electrical and electromagnetic acquisition system 'MIMDAS' was used to acquire the data coupled with a Zonge GGT10 7.5 kV A transmitter.

### *Drilling*

Thirty-four drill holes were completed during the current reporting term. Almost all the drilling was focussed on testing the Marshall-Reward and Bellbird zones at depth. Several holes also tested MIMDAS IP anomalies to the north of Reward, to the north and south of Bellbird, and in the Rockface area to the east of Bellbird.

A summary of the drillholes completed is given in the following table.

Hole	North	East	Dip	Azimuth	RC (m)	Diamond (m)	Total (m)
J1	7494307	629502	-60.0	270	126.0		126.0
J2	7493611	629712	-60.0	292	150.0		150.0
J3	7490414	627078	-60.0	92	77.6	216.4	294.0
J4	7490452	627273	-60.0	90	90.0		90.0
J5	7490452	627273	-70.0	120	119.7	132.3	252.0
J6	7491005	627019	-70.0	96	119.5	47.6	167.1
J7	7491016	627017	-70.0	80	113.5	81.5	195.0
J8	7490308	628237	-60.0	180	48.0		48.0
J9	7490318	628222	-70.0	180	77.9	180.1	258.0
J10	7493868	630231	-70.0	270	96.0	129	225.6
J11	7494206	630345	-70.0	270	59.8	389.8	449.6
J12	7491180	629240	-60.0	120	138.0		138.0
J13	7494600	630300	-64.0	270	57.7	176.1	233.6
J14	7494937	630529	-64.0	275	64.0		64.0
J15	7494937	630529	-75.0	275	101.3	594.2	695.5
J16	7495405	630235	-70.0	96	149.0	262	411.0
J17	7495418	630125	-75.0	90	89.2	344.4	433.6
J18	7497000	630466	-70.0	90	89.6	165.4	255.0
J19	7497522	630563	-70.0	90	114.4		114.0
J20	7497400	630520	-70.0	90	60.0		60.0
J21	7497400	630520	-75.0	90	89.4	162.6	252.0
J22	7494600	629970	-75.0	90	65.3	532.2	597.5
J23	7494600	630130	-90.0	0.0	72.0		72.0
J24	7495200	630303	-65.0	272	138.0		138.0
J25	7495200	630000	-75.0	90	101.4	534.6	636.0
J26	7495000	630400	-74.7	272	65.1	156.9	222.0
J27	7495000	630399	-60.0	268	89.6	301.1	390.7
J28	7494800	629950	-70.0	90	71.3	459.7	531.0
J29	7494389	630459	-65.0	265	101.4	564.6	666.0
J30	7490427	627301	-60.0	270	48.0		48.0
J31	7490427	627301	-65.0	270	90.0		90.0
J32	7490427	627301	-75.0	270	95.3	180.7	276.0
J33	7490726	627294	-65.0	270	77.5	201.5	279.0
J34	7494802	630952	-60.0	270	101.4	324.6	426.0
J35	7494400	629975	-75.0	94	89.6	450.4	540.0
J36	7494108	630316	-60.0	270	108.0		108.0
<b>34 Holes</b>							<b>9932.2</b>

The drilling was carried out in several programs. The initial program consisted of the drilling of J1 to J22 in the second half of 2000. Drilling ceased in December due to heavy rains, with J22 only completed to a depth of 204m; well short of its targeted depth. Holes J1, J2, J12 and J19 were designed to test below surface

copper mineralisation. Holes J3, J5, J9, J10, J11, J13, J15, J16, J17, J18, J21 and J22 were drilled to intercept various modelled MIMDAS IP targets. Holes J4, J6, J7, J8, J14, J20 all failed to reach the planned target depths and in most cases were redrilled using the next number in sequence. Drilling recommenced in January 2001 with the completion of J22 to 597.5m, the extension of J15 from 507 to 695.5m, and the extension of J11 from 153 to 449.6m. J15 was extended as it initially had stopped short of the main Reward Lode and J11 was extended to test the main Marshall Lode in addition to the originally targeted Sykes Lode (chargeability anomaly). Significant mineralisation was intersected in J15 which is summarised in the table below.

Drilling recommenced again in late April 2001, and barring a short break continued until the end of August. Holes J23 to J36 were completed in this program as well as the extension of J16 from 150m to 411m. This extension was designed to test a possible second mineralised horizon to the east of the main Reward trend. J23 was drilled as a water bore and achieved good water flows. Percussion hole J24 was drilled to test an IP anomaly associated with a narrow lode horizon along strike to the north of the Reward Lode. J25 was designed to intersect the Reward Lode at depth to the north of J15.

J26 was aimed at testing immediately to the south of the zone intersected in J15 and was drilled from the east. However the hole failed to lift as planned and deviated excessively towards the north and was therefore abandoned at 222m. It intersected reasonable-grade chalcopyrite mineralisation which is shown in the summary table. These values were from quartz-veined Magnetite Quartzites. The hole drilled parallel to the main schistosity and veining with which the copper is associated. The true width is therefore probably only 1 or 2 m. The entire hole intersected biotite schist, magnetite-biotite schist and magnetite-garnet-biotite schist. Another hole, J27, was drilled at a shallower angle from surface. This also deviated to the north but was successful in intersecting the lode horizon about 50 to 60 m to the south and above the area intersected in J15. The interpreted equivalent to the main lode was intersected between about 264 to 273.5 m.

Drillhole J28 was aimed at testing beneath the central part of the main Reward lode. It was drilled from the west and planned to intersect the lode at about 300 m below surface and roughly halfway between MIMEX holes J13 and J15. Holes J30 and J31 were failed precollars for the hole successfully completed as J32. Holes J32 and J33 were drilled to test the Bellbird lode horizon in the southern and central part of the prospect area and were targeted to intersect the EM anomaly modelled from the Normandy EM data.

J34 was drilled to test a MIMDAS IP / resistivity anomaly to the east of the Reward Prospect. It intersected no significant sulphides sufficient to explain the anomaly. It was positioned to test the inferred east-dipping resistivity low which is on the flank of what appears to be a shallow dipping IP anomaly. It may therefore have not tested the optimal position. Further interpretation of the IP data in this area is required before deciding whether to do further work in this area.

Hole J35 tested the Marshall lode on line 7494400N. It tested up-dip of the planned position of hole J29 which failed to lift as planned and swung significantly to the north to the extent that it intersected the Marshall lode just north of 7494500N. Hole 35 intersected a disappointingly narrowed poorly mineralised Marshall Zone. The hole extended across to the Sykes lode which also contained poor copper mineralisation. The hole was terminated at 540m due to drill bit failure caused by water loss through cracked drill rods. It is possible that it has not penetrated the entire Sykes lode. Attempts to case the hole with 50mm PVC were unsuccessful due to the sharp lift achieved in the hole between 300 and 400m. The PVC was inserted to the bottom of the hole however the drill rods could not be retrieved without dragging the pvc out with it. The casing had to be cut as the rods were removed. Just over 100m of casing remains at the bottom of the hole. Hole J36 was a percussion hole aimed at testing the Sykes lode where it appears to thicken significantly at surface south of hole J11. It intersected a wide lode zone of magnetite-garnet metasomatites and magnetite quartzite lithologies however the copper mineralisation is patchy and low grade.

A summary of the better intersections achieved is shown below. The number in brackets below some figures denotes Intersections calculated from repeat assaying.

Hole	From m	To m	Width m	Cu%	Au g/t	Ag g/t
J3	190	206	16	0.74	0.04	4
J4	52	58	6	0.46	<0.01	2
J9	173	179	6	1.39	0.03	9
J11	278	281.96	3.96	1.55	0.05	7
J11	285.34	290.6	5.26	0.87	0.01	7
J11	381	384	3	1.36	0.29	14
J13	128.5	171	42.5	1.77	0.24	120
				(1.94)	(0.39)	(120)
J15	512	540	28	2.47	0.59	25
				(2.5)	(0.75)	(23)
J16	219.8	222	2.2	1.03	0.05	2
J16	393.5	395.5	2	0.63	0.01	4
J22	341	355	12	1.54	0.54	16
				(1.58)	(0.68)	(17)
J25	563.8	574.04	10.24	1.32	0.3	12
J26	179.8	186	6.2	3.29	0.09	37
J27	246.5	249	2.5	1	0.01	6
J27	264	274	10	1.4	0.07	10
:				(1.06)	(0.07)	(7)
J28	465	469.8	4.8	1.06	0.14	5
i	".,..."			(1.10)	(0.10)	(5)
J29	436	440.8	4.8	0.97	0.06	6
J29	597.8	600.3	2.5	2.18	0.05	24
				(2.13)	(0.10)	(22)
J32	192	247	55	0.33	0.03	<1
J33	196	225.9	29.9	1.05	0.08	5
J33	216.8	225.9	9.1	3.21	0.24	17
				(2.94)	(0.24)	(14)
J35	411	412.9	1.9	0.57	0.1	3

### *Costean Sampling*

Numerous costeans have been dug by previous explorers across the line of lode around the "J" structure. No assaying of the samples of these included gold. It was decided to resample these old costeans in order to obtain gold results to assess whether there is potential for higher grade gold mineralisation within the lode sequences.

The costeans were sampled by marking 2 m intervals on the wall (usually the northern wall as most costeans were orientated roughly east-west) and taking a continuous rock chip between the marks. Samples

were marked with an aluminium tag at the start of the interval. Coordinates for the samples were determined by taking a DGPS reading at either end of the costean and then interpolating between these points based on the distance of each sample from the ends.

A total of 541 samples were collected from 33 costeans and submitted to ALS in Alice Springs. Gold analyses were done by the Aqua-regia + flame AAS method (AA42 / PM203) and base metals by aqua regia-digest and ICP-OES (IC203). The assay results show numerous zones of highly anomalous copper, particularly in the Bellbird, Sykes, and Reward North areas. One of these zones, at the Sykes Lode, showed a wide zone of 0.5 to 1 % copper and was tested by percussion hole J36.

No high-grade gold assays were obtained from the costeans. The highest assay was a result of 0.38 g/t Au from a costean to the south of the Bellbird workings.

### *Metallurgical Test Work*

Metallurgical test work was conducted on samples from drillhole J25 and J27 in order to gain a preliminary indication of the likely recoveries obtainable from a conventional treatment plant. The samples were collected by taking half of the core from J25 over the mineralised interval (leaving one quarter remaining in the tray as one quarter had already been used for assaying) and by quartering the remaining half-core from J27 over the mineralised interval. The composite sample from J25 covered the interval from 570 m to 574.04 m while J27 was sampled between 263 to 274m

From a metallurgical point of view, it is free milling and concentrates up well. For both samples, at a grind size of 80 % passing 106 microns, the rougher cons graded around the 20 % copper mark at 75 -80 % copper recovery, and would clean up pretty well. The remaining copper minerals would probably need a regrind to around 80 % passing 65 microns to get up to saleable copper grades. All up it should behave in a similar manner to Mount Isa ores, and achieve a +28 % copper concentrate at better than 90 % recovery.

## **6.0 DISCUSSION AND RECOMMENDATIONS**

Following the termination of the joint venture between MIM and Solbec, a complete review of all the data was made with a view to upgrading the resource and suggesting recommendations for further work.

The MIMEX Annual Report of 2 October 2002, concluded that drilling carried out at Marshall-Reward has shown potential for reasonable thicknesses of high-grade copper mineralisation at depth, however that it may be depth limited and not continuous over the length of the Marshall-Reward zone. In other words, the higher grade mineralisation may well be confined, as is normally the case, to “shoots” of, as yet, indeterminate dimensions – depending on economics, and structural geometry. The report further noted that drilling at Bellbird has intersected high-grade copper mineralisation over 7m true width in the central part of the prospect and lower-grade and wider mineralisation in the south. It also states that EM data suggests that high-grade sulphides do not continue more than about 100m to 150m north of drillhole J33. In fact, there is insufficient detailed drilling to determine the structural geometry and northerly extent of the mineralisation and a **plunging shoot** (or shoots) cannot be discounted, indeed it is very **common structure** for most metalliferous deposits.

There is no consideration of associated metal value credits.

From the above MIMEX comments, a more detailed evaluation of the shallower sections of the above three deposits, say to 250m vertical depth, plus the relatively neglected Green Parrot and Green Parrot – east lodes would seem to be a reasonable starting point for attempting to develop a more modest 5-7 million tonnes of “**Measured Reserve**” category which might be potentially achievable by in-fill drilling – especially at the shallower depths – within higher grade shoots and in poorly-tested contiguous zones along strike, where justified.

In spite of the above earlier observations, the MIMEX Quarterly Report for December 2001, ie **three months later** – after completing 2 more diamond drill holes at Bellbird deposit, alternatively suggests that drilling carried out during the year down-graded the potential at depth of the Marshall – Reward and Bellbird prospects for a large tonnage (20Mt+) orebody (probably a reasonable goal for Mount Isa Mines). The report further states that the drilling appears to show discontinuous, narrow(?), high grade(!) zones of mineralisation. Additionally, they consider that if the DHEM anomalies represent high-grade Cu mineralisation, there may be potential for an additional 2 to 3 million tonnes below the previous drilling (approximately 200m RL). They also believe that drilling at Bellbird suggests there is little potential for significant high-grade sulphide mineralisation **at depth**. However, this observation does not address the question of possible ore grade, plunging shoots which could be fitted into the present longitudinal sections due to the lack of adequate drilling information. In fact, the perception of “discontinuous” zones rather supports this possibility.

Note that, presumably because of Mount Isa’s exclusively sulphide ore treatment, there is no consideration of the volume, mineral composition and grades of the near-surface supergene deposits, and to date, there does not appear to be any previous definitive survey of workings, depths and mineralisations of such. This could conceivably add a modest additional economic resource to a mine operation.

The question of possible “ore shoots” patterns can be initially addressed by reference to longitudinal sections of the Marshall-Reward and Bellbird lodes. In general, longitudinal sections can provide a very good basis for ascertaining probable higher grade zones ie “shoots” which may be expected to occur along the strike of an ore body of this type – due to various geological controls. Numerous economic factors can be established to outline different shoots, however the general structure and plunge is usually the same but with variable dimensions and shapes modification according to the parameters chosen.

With the advantage of additional, albeit widely – spaced, MIMEX drilling and applying conventional contouring techniques to 250 metres vertical depth, both of these sections show possible “shoot” structures based on a 1.5% Cu content cut off to envisage likely patterns and tonnages at SG 2.95, and 01 March 2002, A\$ metal prices.

Whithin the **Marshall-Reward lodes** system it can be seen that there are three distinctly definable shoots, dipping steeply east or west and plunging steeply north, containing, from available drill intersections, some 4,884,000 tonnes @ 2.08% Cu, ie A\$63.34 / tonnes as follows:

Northern Shoot	2,185,000 tonnes @ 1.88% Cu	av. width	8m
Middle Shoot	1,260,000 tonnes @ 2.03% Cu	av. width	14.9m
Southern Shoot	<u>1,439,000 tonnes @ 2.44% Cu</u>	av. width	<u>7.9m</u>
Total	4,884,000 tonnes @ 2.08% Cu	av. width	9m

Other lesser credits for associated Ag-Pb-Zn cannot be determined due to lack of report data but could possibly add a further \$8 to \$10 / tonne to the “in-ground” value.

Both the Northern and Southern shoots show a broad southerly extension down to about 180m depth which could be interpreted as downward influence of higher level supergene alteration but this is very speculative conclusion without the benefit of supporting data.



The relatively small number of “grade” drill holes intercepts at the **Bellbird Lode** (9 holes over 500m strike length) suggest that there may be an approximately 160 metres deep shoot plunging flatly at about 20 degrees north and containing, to a reasonably definable northern limit, about 1,257,000 tonnes @ 2.17% Cu over an average width of 5.4 metres (ie A\$65.64/tonne). Other metal credits are hard to define as the Ag content, for example, is erratic – varying from 5 to 40g/t. The centre of the shoot more or less coincides with the extent of the DHEM conductive layer which probably had a northward constraint due to lack of available drill holes prior to the drilling and subsequent surveying of the two last drill holes – J37 and J38, which were drilled to test the original DHEM model. Detailed modelling of the latest DHEM survey is still awaited. Nevertheless, it is interesting to note that MIMEX consider the depth extent of the lode to be probably less than 300m which lends support to the flatly – plunging shoot concept.

There is virtually no testing to 250 metres depth, within the confines of this possible shoot north of hole J33 although MIMEX delineated a target some 300m north – and fitting within the current shoot interpretation – which was unsuccessfully drilled by abandoned holes J6 and J7. Very shallow Britannia drill holes BR97-148 and BR-149 intersected 4m @ 1.67%Cu, 160m above the MIMEX target.

Within the Green Parrot lodes system, south of the Marshall prospect, the **Green Parrot – East lode** may have the potential to be a smaller, high grade accessory to the Marshall-Reward and Bellbird prospect. As previously noted, the main Green Parrot lode was subjected to a short-lived and unsuccessful mining operation by Plenty River Mining Co and MIMEX apparently consider the Green Parrot to be too restricted in size, and hence tonnage. But there does not appear to be much recognition by either company of the Green Parrot – east lode which certainly deserves preliminary interest as containing several drill hole intersections with credible, albeit variable, Cu-Ag-Pb-Zn assays.

An analysis of mining and processing costs was made to determine the viability of setting up an on site processing plant to treat the ore. It was found that the normal costs of mining and processing small-medium size base metal resources, combined with the high costs of transporting concentrates from an area such as Jervis militate against positive economic result from 2% copper resources. It is clear that only the high in-ground value polymetallic mineralisation would be viable as a mining-processing proposition.

Two economic appraisals were undertaken:

Case1 (500,000tpy) assumed that Green Parrot could contribute 500,000t within a reasonable pit profile (7.5:1 strip ratio), and that a similar deposit would be located nearby (Green Parrot East?, Marshall upper zone?). In the economic model it was assumed that these resources would contribute ore by open pit for the first two years, following which ore from Marshall Shoot and Reward Deep Shoot would be mined underground. Assumptions as regards concentrate grades, recoveries, process costs and transport costs were based on advice given by a metallurgist specialist in flotation. An underground mining cost of \$25 per tonne is undoubted low consideration no allowance was made for capital development. The conceptual resource base is sufficient for only 7 years operations. Capital costs at \$19 million are also likely to be on the low side. The spreadsheet bottom line shows a negative NPV.

Case 2 examined the smaller scale, lower capital cost exploitation of Green Parrot and additional similar resources to be present (Green Parrot East?, Marshall upper zone?). Even at a capital cost less than \$10 million results are negative.

## REFERENCES

Alcock, P.J., 1999: Jervois Base Metals Project Information Memorandum. Britannia Gold NL Report (Unpublished).

Brien, J., 2002: Report on the Jervois Polymetallic Deposit. Unpublished.

Catley, D.E., 1965: Summary of Investigations Jervois Range copper-lead prospects NT , and report on 1965 activities. New Consolidated Gold Fields (Australasia) Pty Ltd Report 9/1695 (Unpublished).

Coenan, J.H., 1987: A Microscopic study on the ores of Jervois Mine, NT, Australia. M.Sc. Thesis contribution Delft University of Technology, The Netherlands (Unpublished).

Dunnet, D., Buerger, A.D., and Kerr, T., 1984: Plenty River Mining Company - Anaconda Nickel Inc. Jervois Joint Venture EL's 3202, 3023, and 3204. Report on exploration work done for 12-month period to March 1984. Anaconda Australia Inc.Report (Unpublished).

Freeman, M.J., 1986: Explanatory notes to Huckitta SF 53-11 1: 250,000 Geological Map series. Northern Territory Geological Survey.

Goldner, P.T., Turner, A.F., and Wright, J.F., 1974: Wilstone Pty Ltd –Petrocarb Exploration NL Joint Venture -Attutra Pro\_ject. Report on investigation of Exploration Licences 584, 740 and associated mineral claims Jervois Range area, Northern Territory.

Union Corporation (Australia) Pty Ltd Bulletin 82 (Unpublished). Gunter, J., 1999: EL 9518 "Jervois" Northern Territory. Annual Report for the year ending 2nd October 1999. M.I.M. Exploration Pty Ltd. Report 2764. (Unpublished).

Lensvelt M., 1986: ore reserve estimation of the Jervois ore body. M.Sc. Thesis Delft University of Technology, The Netherlands (Unpublished).

Marjoribanks, R. W., 1984: Exploration on the Plenty River joint venture area. Annual report for 1983. Anaconda Australia Inc (Unpublished).

McGeough, M. A., 2000: EL 9518 "Jervois" Northern Territory. Annual Report for the year ending 2nd October 2000. M.I.M. Exploration Pty Ltd. Report 2779. (Unpublished).

Peters, M., Kehrens, P., and van Gils, H., 1985: Geology and mineralisation of the Jervois Range area, NT, Australia. M.Sc. Thesis State University of Utrecht, the Netherlands (Unpublished).

Whiting, T .H., 1984: Report on aeromagnetic interpretation Jervois Ranges, Northern Territory. University of Adelaide (report for Plenty River Mining NL, unpublished).

Willsted, Terrence and Associates, 1983: Mining Engineer's and Geologist's Report in Prospectus for Plenty River Mining Company Limited (with contributions by Silver, A. and Kater, G.).

Wilson, G.I., and Ward, D.F., 1962: Report on investigations Jervois Range copper-lead prospects, Northern Territory, to November 1962. New Consolidated Gold Fields (Australasia) Pty Ltd Report 15/1962.

Ypma, P.J., 1984: Exploration report on EL 3301 for the twelve month period ending 31 March, 1984. Plenty River Mining Company NL (Unpublished).

Ypma, P.J., 1985: Exploration report on EL 3301, EL 3202, EL 3203, and EL 3204 for the period 1 April 1984 to 1 June 1985. Plenty River Mining Company NL (Unpublished).

Ypma, P.J., 1986a: Drill completion report 1986, EL 3301 and EL 3202. Plenty River Mining Company NL (Unpublished).

Ypma, P.J., 1986b: Exploration report on EL 3301, EL 3202, EL 3203 and EL 3204 , Huckitta Sheet SF 53-11 for the period 1 June 1985 to 1 May 1986. Plenty River Mining Company NL (Unpublished).

Ypma, P.J., 1987a: Final Report on Exploration Lease 3301. Plenty River Mining , Company NL (Unpublished).

Ypma, P .J., 1987b: Final Report Exploration Leases 3202, 3203, 3204. Plenty River Mining Company NL (Unpublished).

Ypma, P.J., 1987c: Drill completion report 1987, EL 3301, EL 3202, ERL 69, ERL 70. i i Plenty River Mining Company NL (Unpublished).

**M. Ruane****EL9518 .JERVOIS****STATEMENT OF EXPENDITURE FOR 12 MONTHS ENDED OCTOBER 2, 2002**

LABOUR MEX	0	
SUPPLIES & SERVICE –OFFICE FIXED	3170	
INFRASTRUCTURE	0	
PERSONNEL COSTS -FIXED	0	
PERSONNEL COSTS –VARIABLE	402	
MISC GOVERNMENT CHARGES	323	
SUPPLIES & SERVICE -OFFICE VARIABLE	85	
SUPPLIES & SERVICE -FIELD	0	
TRAVEL & ACCOMMODATION	4121	
DRILLING	0	
CONTRACT & CONSULTANT SERVICES	18,676	
INTERNAL GEOPHYSICS .	0	
GEOPHYSICS	0	
GEOCHEMICAL	0	
RESEARCH	0	
LABOUR -EXTERNAL	0	
JOINT VENTURE CONTRIBUTIONS	52,992	
LAND TENURE & ENVIRONMENT	345	
<b>TOTAL DIRECT COST</b>		80,114
ADD: TECHNICAL SUPPORT & ADMINISTRATION		2,111
<b>TOTAL CURRENT TERM</b>		82,225
PREVIOUSLY REPORTED		\$2,127,162
<b>TOTAL PROJECT EXPENDITURE TO DATE</b>		<b>\$2,209,387</b>