

MIM EXPLORATION PTY. LTD.

TECHNICAL REPORT

No. 2837

TITLE: FINAL REPORT
EXPLORATION LICENCE No. 7891 "MULE CREEK"
NORTHERN TERRITORY

1: 250 000 SHEET: Mt Young (SD53-15)

1: 100 000 SHEET: Bing Bong (6166)

**INVESTIGATIONS
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DATE: June, 1997

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TECHNICAL REPORT No.

SUMMARY

Date : June 1997

EXPLORATION LICENCE No. 7891 'MULE CREEK'
NORTHERN TERRITORY
FINAL REPORT

AIM OF PROJECT

To explore for HYC style base metal mineralisation on Exploration Licence No. 7891 'Mule Creek'.

OBJECT OF REPORT

To report exploration activities for the term of EL 7891 'Mule Creek'

LOCATION

'Mule Creek' was situated on the Bing Bong (6166) 1:100 000 scale topographic map, approximately 100 km north-west from Borroloola or 960 km (by road) south-east of Darwin, Northern Territory. The Licence was bounded by latitudes 15°35' and 15°50' south and longitudes 136°15' and 136°24' east.

TENURE

'Mule Creek' was granted for a period of six years from November 16th, 1992 over 111 one minute graticular blocks, an approximate area of 357 km². The EL was reduced to 56 blocks in November 1994, to 28 blocks in November 1995 and finally to 14 blocks in November 1996.

PREVIOUS EXPLORATION

There have been 6 prior mineral tenements and one petroleum tenement held over all or part of the area covered by EL 7891. Metal exploration was concentrated on base metals, uranium and manganese. Recently released information from EL 6764 showed that several holes along the Gulf Fault intersected anomalous copper mineralisation up to 0.27% Cu.

PRECIS

MIM Exploration Pty Ltd re-assessed aeromagnetic data over the Licence area. Several magnetic domains were identified which appeared to have potential to contain favourable geological environments for base metal mineralisation.

A QUESTEM survey delineated two major conductivity domains. Salt flats in the northern half of the tenement produced strong EM anomalies in contrast to the generally low amplitude EM responses in the southern half of the tenement.

A five hole percussion drilling program totalling 606 m was used to test the stratigraphy and geochemistry of the Gulf Fault. The location of these holes was based on structural and geophysical criteria. One hole on the Gulf Fault intersected 48 m which assayed 1140 ppm Cu with values ranging from 760 ppm to 1710 ppm.

A SIROTEM line across the Gulf Fault at drill hole Mule Ck. 5 gave a weak anomaly which was thought to represent the joint responses of the weak mineralisation and the Gulf Fault.

CONCLUSIONS

Exploration over the 'Mule Creek' Licence failed to locate the target style of mineralisation

RECOMMENDATIONS

Relinquish Exploration Licence No. 7891, 'Mule Creek'

1. INTRODUCTION

Exploration Licence No. 7891 "Mule Creek" was taken up to search for HYC style base metal mineralisation. The Licence was located approximately 960 km by road south-east of Darwin, in the McArthur Basin.

MIM Exploration Pty Ltd re-assessed the NTGS aeromagnetic data over the tenement. Several magnetic domains were thought to have potential to for base metal mineralisation.

A QUESTEM survey delineated two major conductivity domains. Salt flats in the northern half of the tenement produced strong EM anomalies in contrast to the generally low amplitude EM responses in the southern half of the tenement.

A five hole percussion drilling program totalling 606 m was used to test the stratigraphy and geochemistry of the Gulf Fault. Minor copper mineralisation was intersected in one hole.

2. LOCATION AND ACCESS

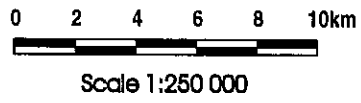
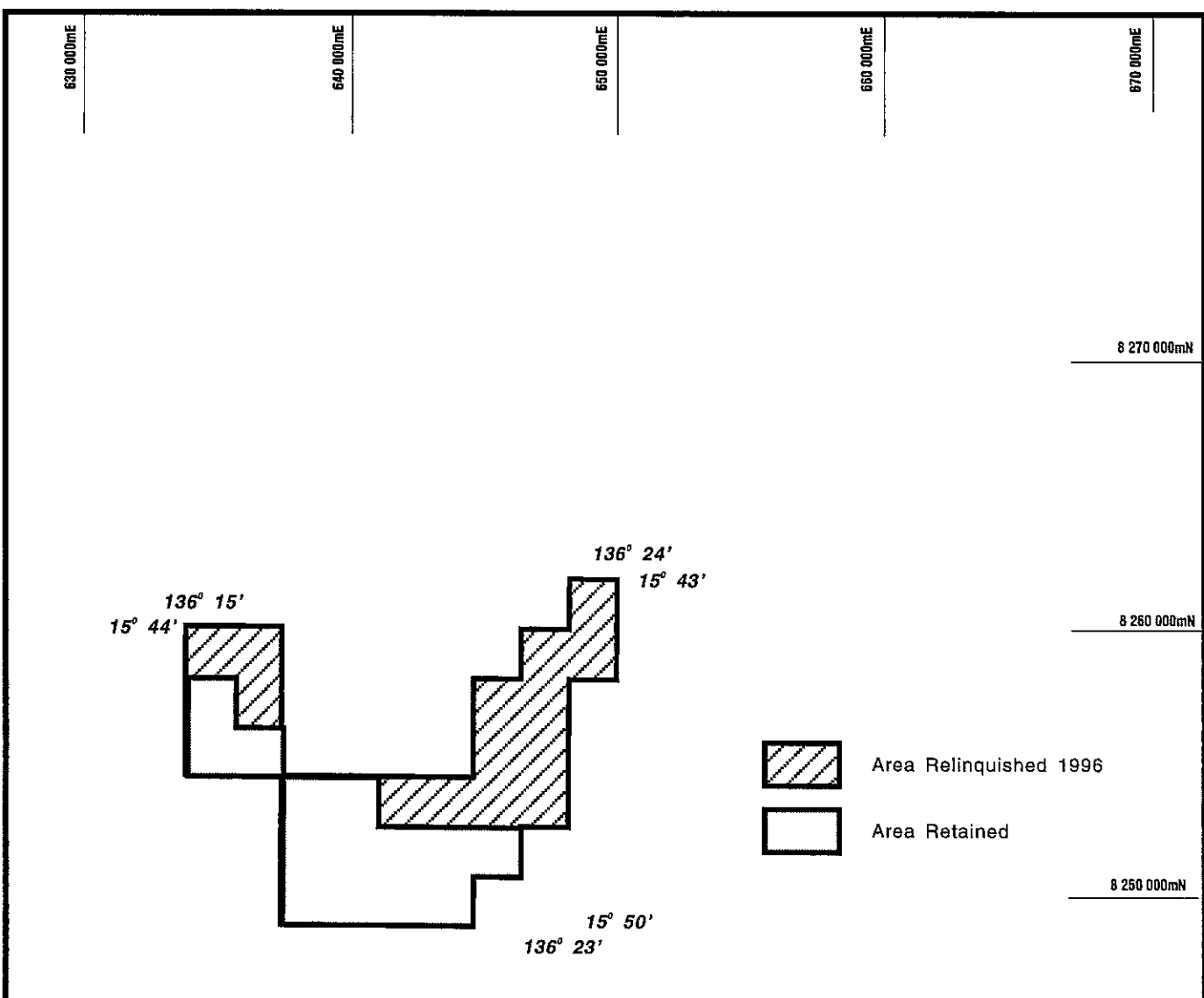
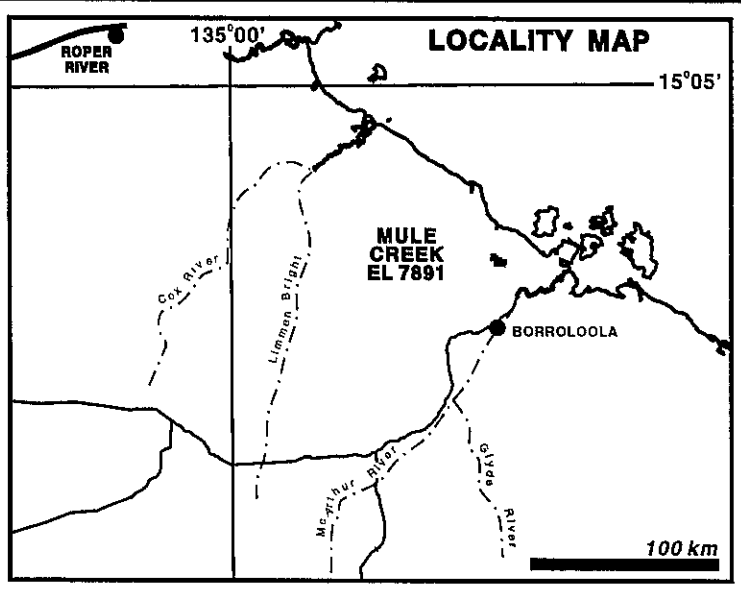
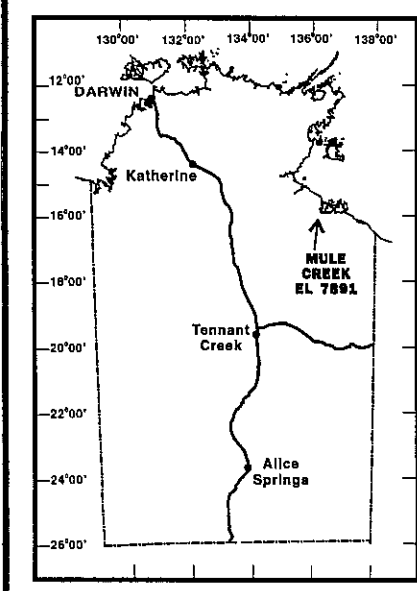
'Mule Creek' was located on the Bing Bong (6166) 1:100 000 scale map, approximately 100 km north-west from Borroloola or 960 km (by road) south-east of Darwin, Northern Territory. The Licence was bounded by latitudes 15°35' and 15°50' south and longitudes 136°15' and 136°35' east (Figure 1).

Access to EL 7891 was by the Stuart Highway from Darwin to Daly Waters, the Carpentaria Highway to Borroloola, and along the Bing Bong road for approximately 85 km to the turn-off into the Licence area.

Numerous sand tracks within the Licence allowed four wheel drive vehicle access. Cross country traverses were difficult due to the low and thick nature of the scrub. The terrain was mostly flat lying and sandy with occasional black soil and paperbark swamps.

3. TENURE

Exploration Licence No. 7891 was applied for on 20th July 1992 and granted to Mount Isa Mines Limited for a term of six years on 16th November 1992. The licence initially covered an area of 111 one minute graticular blocks. It was reduced to 56 blocks in November 1994, further reduced to 28 blocks on November 15, 1995 and finally to 14 blocks on November 15, 1996. Details of the blocks which comprised the Licence are shown on Figure 1.



M.I.M. EXPLORATION PTY. LTD. NORTHERN TERRITORY		
PROJECT MULE CREEK EL 7891		
TITLE LOCATION DIAGRAM		
Mining District: Northern	Author: S.B.	Scale: 1:250 000
1:250 000: SE 63-15	Drawn: E.J.K.	Date: 9/85 Rev: 10/86
1:100 000: 6166	Drawing No.: 50213	Figure No.: 1

4. PREVIOUS EXPLORATION

Tenements which have previously covered all or part of Exploration Licence 7891, Mule Creek are tabulated below.

TABLE 1

TENEMENT NUMBER	GRANTED	COMPANY	CR NUMBER
AP1973	01.07.68	Australis Mining Co Pty Ltd	69/039
AP2169	01.02.69	US Steel Int (NY) Inc	70/075
AP2170	01.02.69	US Steel Int (NY) Inc	70/075
EL1425	23.12.76	Aust and New Zealand Expl Co	78/011
EL4678	20.10.84	BHP Minerals Ltd	86/009 87/028
EL4756	18.06.85	BHP Minerals Ltd	86/206
OP198	22.01.81	Amoco Production Co	PR82/003 PR82/025A-E PR83/036A-G PR83/058A-H PR84/007 PR85/015A-F

The western half of the current tenement was held under AP1973 by Australis Mining Co Pty Ltd in 1968 (Table 1). The Licence was operated by Placer Prospecting Pty Ltd. Eleven auger holes were drilled and samples panned to define areas of heavy mineral accumulations. Results were disappointing and the AP was relinquished in 1969.

APs 2169 and 2170 were held by US Steel Int. (NY) Inc in 1969. Target mineralisation was base metals, uranium and manganese. Limited helicopter supported reconnaissance geological mapping and rock and stream sediment sampling were conducted in the present tenement. The APs were relinquished in 1971 due to poor results.

EL 1425 was explored for manganese by Australia and New Zealand Exploration. A number of shallow auger holes were drilled in the present tenement area and although ferruginous manganiferous siltstone and laminated silty argillite with abundant manganese were intersected, an economic deposit was considered unlikely. The Licence was surrendered in 1977.

BHP Minerals Co held two tenement areas, ELs 4678 and 4746, which covered the south-west portion of EL 7891 "Mule Creek". An HYC equivalent base metal deposit was targeted. Extensive airborne geophysics (aeromagnetics and radiometrics) were flown to define ground targets. EM-37 soundings and limited gravity surveys over these targets were completed. Limited reconnaissance work was conducted in

the present tenement area with disappointing results. Both Licences were surrendered by late 1986.

OP 198, held by Amoco Productions Co. in 1981, was taken out to explore for hydrocarbons. Much of the work consisted of geophysics, geochemistry and drilling of favourable hydrocarbon hosts through the southern McArthur Basin. Little work was done over the area of EL 7891 due to the extensive alluvial cover. The Licence was relinquished in 1985 after no significant results were achieved.

Since EL7891 was granted BHP relinquished their 'Pine Creek' EL 6734. They also targeted the Gulf Fault and explored it with 49 RC holes and a stratigraphic diamond hole. All these holes intersected anomalous copper mineralisation with up to 2560 ppm in the RC drilling and 2660 ppm from the diamond drill hole.

5. REGIONAL GEOLOGY

EL 7891 'Mule Creek' was located within Carpentarian rocks of Lower Middle Proterozoic age which were extensively covered by sand, ferruginous cemented detritus and alluvium. The sequence of interest was the McArthur Group which forms part of a thick platform-cover sequence deposited within the McArthur Basin. It unconformably overlies the Tawallah Group and is overlain by the Nathan and Roper Groups. Many base metal deposits within the North Australian Craton are hosted by the McArthur Group or its equivalents. This, coupled with major lineaments which traverse the Licence, made EL 7891 prospective.

6. EXPLORATION BY M.I.M. EXPLORATION PTY. LTD.

6.1 1993 Review of NTGS Aeromagnetics

A review of the NTGS multi-client aeromagnetic data over the tenement was undertaken during 1993 (Kettlewell, 1993). The interpretation was carried out to identify major structures in the area, with the aim of focusing further ground and possibly airborne geophysical surveys.

A major north-west structure, called the Gulf Fault, was identified in the southern half of the tenement. Its trend was approximately parallel to other major structures within the McArthur Basin (e.g. The Calvert Fault). The fault was mainly defined by the truncation of an interpreted shallow volcanic unit. A second fault trending approximately north-north-east was noted and again it was defined by the truncation of near surface volcanic units.

6.2 1994 QUESTEM Survey

In June 1994 an airborne QUESTEM survey was undertaken over the tenement area (Busuttill, 1995). The survey incorporated a considerable area of salt flats and tidal creeks which formed a very conductive overburden. In the southern half of the tenement, away from the salt flats, lower amplitude EM responses dominated. This response indicated a predominantly resistive country rock. A number of low

amplitude anomalies occurred in this region, possibly indicating the existence of near surface pyritic shale.

6.3 Drilling

Analysis of the QUESTEM results together with structural analysis suggested that the Gulf Fault offered the best chance for target style mineralisation. Five reverse circulation drill holes were drilled along the fault trend on QUESTEM anomalies (Crabb, 1996). Summaries of the drill holes are tabulated below:

Hole	Start	Finish	EOH m	250 mm Blade	200 mm PVC	200 mm Blade	150 mm PVC	140 mm Hammer
MuleCk1	29/6/96	29/6/96	86	-	-	-	0 - 18	18 - 86
MuleCk2	28/6/96	28/6/96	120	-	-	-	0 - 12	12 - 120
MuleCk3A	30/6/96	30/6/96	36	0-6	0-6	6-18	0 - 18	18 - 36
MuleCk3k	30/6/96	31/6/96	100	-	-	0-33	0 - 33	33 - 100
MuleCk4	29/6/96	30/6/96	126	0-4	0-4	4-16	0 - 16	16 - 126
MuleCk5	31/6/96	31/6/96	138	-	-	0-43	0 - 43	43 - 138
MuleCk5A	31/6/96	31/6/96	36	0-1	0-1	1-13	0 - 13	13 - 36

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The drill holes are individually described below.

Mule Ck 1 was designed to investigate the western side of the tenement, south of the Gulf Fault. Block movement and hence stratigraphy along and either side of the Gulf Fault was unknown; the target lithology was black carbonaceous siltstones. The hole intersected 78 m of transported cover (clay and arenites), and then drilled into 8 m of magnetic lag, chert and iron stone representing the top of a palaeo-weathered profile – essentially a 'hard pan'. The palaeo-weathered horizon was sampled from 78 m to 85 m.

Mule Ck 2 was designed to investigate the western side of the tenement, north of the Gulf Fault. The target lithology was black carbonaceous siltstones. The hole intersected 52 m of transported cover (clay and arenites), and then drilled into 68 m of magnetic lag, chert, siliceous/ferruginous siltstone and ironstone representing the top of a palaeo-weathered profile with a 'hard pan' capping. The hole was terminated at 120 m still in weathered rock. The palaeo-weathered horizon (60 m to 120 m) was sampled in 2 m composites.

Mule Ck 3A/3 was designed to investigate the eastern side of the tenement, north of the Gulf Fault. The target lithology was black carbonaceous siltstones. This hole intersected 30 m of transported cover (clay and arenites), and then drilled into 20 m (30 - 50 m) of weathered, oxidised, green and maroon siltstone. The hole then intersected 50 m of moderately fresh maroon and green siltstones (50 -100 m, EOH) No samples were taken.

Mule Ck 4 was designed to investigate an EM anomaly in the centre of the tenement, south of the Gulf Fault. The hole intersected 32 m of transported cover (clay and arenites), and then drilled into 20 m (32 - 52 m) of weathered, oxidised, green and maroon siltstone. The hole then intersected 55 m of moderately fresh maroon and green siltstones (52 -107 m) then 19 m of white arenites and maroon siltstones (107 - 126 m, EOH). Cuttings were sampled from 104 m to 126 m.

Mule Ck 5 was designed to investigate an EM in the centre of the tenement, south of the Gulf Fault. This hole intersected 44 m of transported cover (clay and arenites), and then drilled into 36 m (44 - 80 m) of chert, chalcedonic jasper and siltstone, siliceous/ferruginous siltstone, non-magnetic lag and iron stone; the lithologies were interpreted as representing the top of a palaeo-weathered profile with a 'hard pan' capping. Silica boxworks and cavities were common in the interval. The hole then intersected 58 m (80 - 138 m, EOH) of moderately fresh dark grey to black dolomite/dolosiltstone. The dolomite was weakly pyritic (to 0.5%) and this pyrite was interpreted to be the source of the conductive horizon in the EM anomaly. The hole was sampled from 90 m to 148 m.

Selected parts of drill holes Mule Ck 1, 2, 4, and 5 were sampled over 2 m sample intervals and submitted to Amdel Laboratories in Winnellie, Darwin for analysis for Cu, Pb, Zn, Fe, Mn and Tl. Results of these analyses are summarised below. Drill logs and full assay results are given in Technical Report 2595 (Crabb, 1996).

	Cu	Pb	Zn	Mn	Fe%
<u>Mule Creek 1 From 74 m to 85 m (last sample 84 m - 85 m)</u>					
Mean	135	40	48	370	8.53
Maximum	230	51	95	500	15.2
Minimum	40	23	19	185	0.58
<u>Mule Ck 2 From 60 m to 120 m</u>					
Mean	130	46	115	1020	3.81
Maximum	185	66	190	1390	7.47
Minimum	69	28	63	660	2.83
<u>Mule Ck 4 From 104 m to 106 m</u>					
Mean	27	19	13	145	1.54
Maximum	87	44	42	220	3.57
Minimum	5	9	4	82	0.72
<u>Mule Ck 5B From 90 m to 138 m</u>					
Mean	1140	105	73	2500	5.93
Maximum	1710	200	110	4030	8.54
Minimum	760	55	55	1590	4.37

The above summaries show that drill hole Mule Ck 5B was the only hole to contain any significant mineralisation and this hole had a maximum of 1710 ppm Cu from 110 m to 112 m. Similar mineralisation has been encountered by BHP in their drilling along the Gulf Fault in their EL 6734, 'Pine Creek'.

6.4. Geophysics

The SIROTEM line across the Gulf Fault and drill hole Mule Ck 5 gave a weak 3 Siemens anomaly (Crabb, 1996). It was felt that the anomaly was explained by the weak sulphide mineralisation intersected.

7. CONCLUSIONS

Exploration over the 'Mule Creek' Licence failed to locate the target style of mineralisation

8. RECOMMENDATIONS

Relinquish Exploration Licence No. 7891, 'Mule Creek'

9. REFERENCES

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