RIO TINTO

# Rio Tinto Exploration Pty. Limited

ABN 76 000 057 125 / ACN 000 057 125

A member of the Rio Tinto Group

## First Annual Report for the Period 5 July 2002 to 4 July 2003, EL10103 Warramana, EL10317 Yalco, and EL10329 Yalco 1, McArthur Base Metals Program, Bauhinia Downs SE-5303 & Mt Young SD-5315 Northern Territory

**Exploration Report No. 26172**

| | |
|---|---|
| Tenement Holder: | Rio Tinto Exploration Pty Limited |
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# 1 SUMMARY

Exploration Licences 10103 Warramana, 10317 Yalco and 10329 Yalco 1 are located within the McArthur Basin of northern Australia, approximately 25 km northwest of Borroloola, on the Bauhinia Downs and Mt Young 1:250,000 map sheets, Northern Territory. The tenements were acquired as a result of Rio Tinto's takeover of North Mining Ltd during 2000. All three tenements and were granted on 5th June 2002 for a period of 6 years.

The Warramana ("*Fandango prospect*") and Yalco ("*Yalco prospect*") tenements are considered prospective for base metal mineralisation (Pb-Zn-Ag) given their proximity and similar stratigraphy and geologically setting to the McArthur River (HYC) base metal mine, operated by MIM Holdings Ltd (now part of Xstrata Plc).

Rio Tinto Exploration Pty Limited (RTE) conducted site heritage clearance surveys, geophysical surveying over a part of Warramana EL 10103, geological mapping at each prospect, RC drilling (12 holes at each prospect), a petrologic report on core from Fandango prospect, and rehabilitation of tracks and drill pads.

Intervals of anomalous base metal geochemistry were identified on Warramana EL10103 (Fandango), with the best intersection of 69m @ 1087 ppm Zn in drill hole RC02FAN006. No significant results were reported from Yalco prospect.

A review in 2002 by RTE of its base metal projects in the McArthur Basin resulted in the decision to divest EL's 10103, 10317 and 10329. Negotiations were being held with interested parties at the time of reporting.

# 2 CONCLUSIONS AND RECOMMENDATIONS

The drilling program at **Fandango** tested many of the obvious anomalies resulting from the HoistEM survey flown during the reporting period. Drilling indicates that these intense conductors are probably caused by thick weathering and clay profiles.

A large untested area measuring at least eight km x four km is viewed as possessing high potential for hosting pyritic black shale facies of the BCDS. The area, located immediately west of RC02FAN005 – FAN007, is interpreted to represent the deep-water basinal facies of the postulated sub-basin. This area is regarded as a high

priority for further exploration. IP surveying may prove the most useful technique in assisting diamond drill targeting of sulphide bodies.

The drilling program at **Yalco** indicated that thicker weathering and clay profiles were probably responsible for the observed EM responses. No black shale units were intersected. IP may prove an effective technique in testing for sulphide bodies at depth and in other parts of the exploration licence area.

The divestment of the project should be finalised in the next reporting period.

## 3 INTRODUCTION

Exploration Licences 10103 Warramana, 10317 Yalco and 10329 Yalco 1 are located within the McArthur Basin of northern Australia, approximately 25 km northwest of Borroloola, on the Bauhinia Downs and Mt Young 1:250,000 map sheets, Northern Territory (Plan WAp45702). The Carpentaria Hwy runs immediately southwest of the tenements. Access to the Yalco prospect area is via the Roper Bar Road 20 km west of Borroloola, then by following established dirt tracks from Cow Lagoon Community. Access to the Fandango prospect area is gained by following the Carpentaria Hwy 30 km north of Borroloola (toward Big Bong) and turning west along the track leading to Bone Lagoon Community. Established dirt tracks lead from the community to the prospect area.

The three tenements were part of a group of tenements (including tenement applications) acquired as a result of Rio Tinto's takeover of North Mining Ltd during 2000. All three tenements were granted on 5$^{th}$ June 2002 for a period of 6 years.

## 4 LICENCE DETAILS

Table 1: Tenement Information

| Name | Tenement No. | Grant Date | Sub-Blocks | Area ($km^2$) |
|---|---|---|---|---|
| Warramana | EL10103 | 5 June 2002 | 194 | 641 |
| Yalco | EL 10317 | 5 June 2002 | 113 | 167 |
| Yalco 1 | EL10316 | 5 June 2002 | 80 | 127 |

## 5 GEOLOGY AND MINERALISATION

The Warramana and Yalco tenements are located within the Middle Proterozoic McArthur Basin of northern Australia. A sequence of ~4.5 km thick McArthur Group sediments (comprising the Batten and Umbolooga Subgroups) are preserved in the Batten Trough, a 70 km wide north-trending syn-sedimentary graben or half-graben, defined to the east by the Emu Fault Zone. Younger Roper Group sediments obscure the western margin.

Much of the tenement and prospect areas are covered by Cainozoic sand, silt and lesser black soil, which conceal much of the underlying McArthur Group sediments. By its nature, the Barney Creek Formation is a relatively recessive unit and does not crop out well across the area, and as such dolomitic and cherty units of the Lynott Formation, Reward Dolomite and Teena Dolomite dominate outcrops. Rare outcrops of Barney Creek Fm siltstone occur in the eastern part of EL 10103.

The Batten Trough hosts several major base metal accumulations, the most significant of these being the McArthur River (HYC) Zn-Pb-Ag deposit. Significant thicknesses of black pyritic Barney Creek Formation shale are known from drilling on EL 10103 prior to RTE's exploration in 2002. These also contained elevated base metal geochemistry. Drilling at Yalco had also previously identified elevated base metal geochemistry in areas of prospective stratigraphy i.e. Barney Creek Depositional Sequence (BCDS).

Yalco and Fandango are located on the low relief Gulf of Carpentaria coastal plain, where drainages are mature and depositional. Despite the coverage of stream sediment sampling throughout much of the Batten Trough, stream sediment sampling is an ineffective exploration method in this coastal environment, as catchment areas are large and streams do not sample underlying bedrock lithologies.

## 6 PREVIOUS EXPLORATION

EL's 10103, 10317 and 10329 cover areas of several historic tenements.

AO (Australia) conducted regional gravity surveys over EL 1728 in 1979 (CR1980-0191). Nine NE-SW traverses spaced 1.5 – 2 km apart with station spacings of 200m covered the northern parts of the **Fandango** prospect.

Shell (Bornman, 1981) conducted RAB drilling (2129m) at **Fandango** in the early 1980's to test the extent of subcropping Barney Creek Formation and to aid in the placement of diamond holes. These RAB holes averaged 9.6m depth and were not (geologically) logged. Of the 221 RAB holes drilled, only 39 were recorded as finishing in "bedrock?" or "hard". Shell concluded that RAB drilling as an exploration tool was of limited use, due to the thickness of the cover and weathered zone.

AO and Shell drilled six diamond holes in the northern parts of the **Fandango** area in the 1980's. Holes BB1 (AO (Australia), 1980), BB3 and BB4 (Bornman, 1981) targeted gravity features, with all three holes intersecting Emmerugga Dolomite. BB2 (AO (Australia), 1980) and BB5 (Bornman, 1982) were drilled as stratigraphic holes. BB6 (Dashlooty, 1983) was drilled below a RAB anomaly of 420ppm Zn, 80 ppm Pb. Drill holes BB2, BB5 and BB6 are interpreted to have intersected rocks of the Barney Creek Formation.

BHP drilled three diamond holes in the southern parts of **Fandango** in the early 1980's. DDHMcA4 tested an aeromagnetic low in an area of extensive Cainozoic cover. It intersected Mallapunyah Formation (stratigraphically below the target unit).

DDHMcA5 (BHP Minerals, 1983) tested a local gravity high near outcrop of Barney Creek Formation. It intersected anomalous Barney Creek Formation. Detailed sampling of thin pyrite beds within the anomalous zone returned up to 4.05% Zn and 1500 ppm Pb.

In 1983 and 1984, BHP (BHP Minerals, 1984; Carville, 1985) completed numerous EM37 soundings on the old Shell grid lines and around drill hole DDMcA5. Soundings around DDMcA5 identified a conductive zone trending NW-SE in concurrence with the mapped strike of the Barney Creek Formation. DDHMcA16 (Carville, 1985), drilled to test this EM37 conductor, intersected siltstones and pyritic black shales of the Caranbirini Member (maximum 285 ppm Zn and 125 ppm Pb).

Between 1988 and 1998, a consortium of companies under the McArthur Joint Venture (McArthur JV) held the majority of the Batten Trough including the **Yalco** and **Fandango** areas. This consortium comprised Quilpie Pty Ltd, Noranda Pty Ltd, Perilya Mines NL, Topend Resources NL and T P Lindner. MIM Exploration entered the McArthur JV in 1992. The McArthur JV concentrated their exploration activities on defined target areas, most of which were within 20 km of the HYC deposit. They

also conducted work as an apparent second priority on more regional targets including **Yalco**.

In the mid 1990's, BHP collected soil samples in the vicinity of outcropping Barney Creek Formation southeast of **Fandango** (Paterson, 1995). No significant results were returned, probably hampered by the veneer of Quaternary cover.

In 1992, the McArthur JV flew a series of QUESTEM surveys over extensive areas of the Batten Trough. This data produced only two significant strongly conductive zones across all channels, one underlying the HYC deposit the other at **Yalco**.

In 1994, MIM Exploration Pty Ltd drilled three diamond holes totalling 708.7m at **Yalco**. Hole YNPD02 was drilled to test a very weak soil geochemistry anomaly at the contact of the BCDS and the underlying Emmerugga Depositional Sequence (EDS). The pre-collar of this hole intersected 6m @ 0.11% Pb, 240 ppm Zn from 18m in BCDS. The collar locations of diamond holes YNPD05 and YNPD06 are uncertain. These holes appear to have drilled through parts of the stratigraphy above the target BCDS.

BHP held title over the south eastern corner of **Fandango** again in the mid 1990's. They conducted TEM soundings around DDMcA5 including "re-sounding" old sites.

Airborne EM surveys included the **Yalco North** 75Hz QUESTEM survey and the Lorella 75Hz QUESTEM survey (Kettlewell, 1992), both of which were flown for MIM Exploration. MIM identified one QUESTEM anomaly ("Anomaly 18") in the south western area of the **Fandango** prospect. They followed up this anomaly with PROTEM soundings on a 500 x 600m grid (Partington, 1992). In 1991 a single RC hole was drilled to test the conductor. The hole intersected weathered dolostone of the Lynott Formation with a laterite cap. The deep weathering was thought to be the cause of the EM anomaly.

In 1995 BHP (Paterson, 1996) drilled a diamond hole 2.5 km WNW of DDMcA5 targeting a PROTEM sounding. Hole BCD001 finished in pyritic black shales of the Barney Creek Formation after running out of drill rods.

No further work was carried out in the Fandango or Yalco areas until RTE's 2002 program.

# 7 SITE CLEARANCE SURVEYS

Heritage site clearance surveys were conducted over both prospect areas. Restricted work areas were identified at each prospect, however exploration activities were not conducted near these sites.

# 8 EXPLORATION COMPLETED DURING REPORTING PERIOD

All sample material collected from the exploration programs detailed in the following sections was submitted to Amdel Laboratories in Adelaide, South Australia. Details regarding the detection limits, the full elemental suite for which analyses were performed, and other analytical information are included in appendices 3 and 7.

## 8.1 Yalco Prospect

Yalco prospect is located on EL's 10317 and 10329 approximately 40 km north of HYC.

The Yalco target was identified as a stratiform Zn-Pb target from RTE's Batten Trough Review in November 2000. The area was ranked as high priority because it contained a large-scale, strongly conductive zone across all channels of a 1992 MIM QUESTEM survey. It was interpreted to represent the extent of basinal facies black shales within the Caranbirini Member in a zone interpreted as a series of syn-depositional extensional basins adjacent to the Emu Fault.

Re-examination and detailed interpretation of existing EM data highlighted an additional conductor to the west of the interpreted Caranbirini Member position. This second position was equated with Barney Creek Formation. A drill hole (drilled by MIM Exploration in 1994) collared 800m NW of the Questem anomaly returned 6m @ 0.11% Pb.

During August and September 2002, RTE undertook an RC drilling program comprising 12 holes for a total of 1209 metres (Plan WAp45707 shows the location of holes RC02YAL001 – YAL012). Hole depths varied between 75 to 123 metres, however none intersected black shale facies. No significant assay results were returned, although several mildly elevated intervals in Zn were recorded. Only two intervals contained Pb and/or As results to compliment the Zn geochemistry. Table 2 outlines a summary of the results from Yalco. The EM responses are attributed to

thicker sequences of regolith, weathered material and clay developed over mudstones and dolomitic siltstones, which dominate the bedrock units.

Collar information, geological drill logs and assay results and for drill holes RC02YAL001 – YAL012 are contained in Appendices 1 to 3.

Table 2: Significant Geochemical Results, 2002 Yalco Drilling Program

| HOLE | INTERVAL (metres) | WIDTH (metres) | Zn (ppm) |
|---|---|---|---|
| RC02YAL001 | 3 – 15 | 12 | 188 |
| RC02YAL002 | 21 – 27 | 6 | 190 |
| RC02YAL003 | 15 – 21 | 6 | 105 |
| RC02YAL004 | 3 – 27<br>66 - 90 | 24<br>24 | 230<br>130 |
| RC02YAL005 | 96 – 111 | 15 | 173 |
| RC02YAL006 | 81 – 90 | 9 | 115 |
| RC02YAL007 | 30 – 39<br>93 – 99 | 9<br>6 | 127<br>183 |
| *RC02YAL008 | 3 - 27 | 24 | 311 |
| **RC02YAL009 | 9 - 21 | 12 | 145 |
| RC02YAL010 | 6 - 12 | 6 | 190 |
| RC02YAL011 | 39 – 45<br>51 - 60 | 6<br>9 | 123<br>122 |
| RC02YAL012 | No significant results | | |

*Interval averages 160 ppm Pb and 145 ppm As

**Interval averages 249 ppm As

## 8.2 Fandango Prospect

The **Fandango** prospect is located on Warramana EL 10103, approximately 35 km NW of Borroloola and 65 km north of HYC.

The Fandango target was identified as a stratiform Zn-Pb target from RTE's Batten Trough Review in November 2000. The area was ranked as a high priority because of its proximity to the intersection of the Emu Fault and Cover Sequence 2 transfer structure; anomalous base metal geochemistry hosted by pyritic black shale facies of the Barney Creek Formation (known from drilling); and indications that an adjacent untested 11 km x 5 km area contained shallowly buried Barney Creek Formation concealed by Quaternary cover.

The review of previous exploration also indicated that EM was an effective tool in mapping the extent of conductive horizons such as Barney Creek Formation black shale.

### 8.2.1 Geophysical Surveys

During July 2002, an airborne HoistEM survey was flown over an area of approximately 10 x 15 km in the southern part of EL 10103. A number of broad and discrete, moderate to intense conductors were identified by the survey, across various channels. The results of this survey were used in locating drill holes to target black shale facies of the Barney Creek Formation. The area flown is indicated on Plan WAp45707. Results of this survey are included in Appendix 4.

### 8.2.2 Drilling

During September 2002, RTE undertook an RC drilling program comprising 12 holes for a total of 1574 metres (Plan WAp45707 shows the location of holes RC02FAN001 – FAN012). Hole depths varied between 117 to 195 metres. As at Yalco, most holes encountered significant amounts of groundwater and this combined with the clay-rich weathering profiles, in many cases, prevented hole depths progressing beyond 120 metres.

Holes RC02FAN001 – 004 and RC02FAN009 – 010 tested the central, most intensely developed HoistEM anomaly. Hole FAN001 returned a broad interval of elevated Zn, persisting into the bedrock. Most of the other holes host elevated zinc in the weathering profile.

Holes RC02FAN011 – 012, drilled into the most conductive portion of the NNW-SSE elongate HoistEM anomaly in the south-west of the prospect area, returned some elevated intervals. The lower part of FAN012, which included 6m at 975ppm Zn and 205 ppm Pb in “black to brown weathered rock”, indicates that elevated base metal geochemistry may be associated with rocks of the BCDS. However, the interval 106 – 110m in FAN011 (dolomitic black shale) does not contain anomalous base metal geochemistry. Much of the upper 80m in FAN012 was dominated by clay, although the >100 ppm Zn intervals extend below the depth of clay development.

The cluster of holes in the southeast of the prospect (FAN005 – 008) returned the most promising results. Hole FAN008, which intersected 122 metres of black,

dolomitic and variably pyritic siltstone, returned only sporadic, short intervals of >100 ppm Zn. This tested the up-dip potential from holes BCD001 and McA5. Hole FAN007, drilled virtually on the tenement boundary between FAN008 and FAN005/006, returned a broad interval of results in the range 100 – 200 ppm Zn.

Holes FAN005 and 006, drilled on the same fence 400m apart, contain the most significant results from the program. FAN005 is dominated by brown-cream to purple and green laminated fine-grained siltstones, which are dolomitic and shaley in places. FAN006, which returned 69m at 1087 ppm Zn, is dominated by variably coloured dolomitic siltstones and laminated (sometimes black) cherty mudstones. The anomalous geochemistry in FAN006 persists to the base of the hole (117m). This is the most significant intersection at Fandango, including all previous drilling.

Table 3 summarises the most significant results from the drilling at Fandango.

Table 3: Significant Geochemical Results, 2002 Fandango Drilling Program

| **HOLE** | **INTERVAL (metres)** | **WIDTH (metres)** | **Zn (ppm)** |
|---|---|---|---|
| RC02FAN001 | 18 – 102 | 84 | 224 |
| | 120 - 129 | 9 | 110 |
| RC02FAN002 | 18 – 27 | 9 | 162 |
| | 33 - 48 | 15 | 163 |
| #RC02FAN003 | 30 - 45 | 15 | 186 |
| RC02FAN004 | 21 – 39 | 18 | 160 |
| | 54 – 63 | 9 | 117 |
| ##RC02FAN005 | 15 – 96 | 81 | 278 |
| including | 57 – 75 | 18 | 578 |
| | 102 – 123 | 21 | 662 |
| RC02FAN006 | 24 – 33 | 9 | 157 |
| | 48 – 117 | 69 | 1087 |
| RC02FAN007 | 21 – 72 | 51 | 184 |
| RC02FAN008 | 36 - 69 | 33 | 299 |
| RC02FAN009 | No significant results | | |
| RC02FAN010 | 21 – 27 | 6 | 165 |
| ###RC02FAN011 | 33 – 36 | 3 | 250 |
| | 42 - 51 | 9 | 138 |
| ####RC02FAN012 | 51 – 117 | 66 | 297 |
| including | 75 - 81 | 6 | 975 |

[#]Interval averages 204 ppm As [##]Includes 48 – 69m at 324 ppm Pb

[###]Includes 24 – 51m at 185 ppm Pb [####]Includes 60 – 84m at 210 ppm Pb

The elevated zinc geochemistry in drill holes from Fandango during 2002, including FAN006, is not associated with sulphides (as logged and as evidenced by the very low S assay results). It was interpreted that the results may be explained by siderite development, which could have been considered significant in terms of the possible formation of an alteration halo around a Pb-Zn mineralised body. A petrologic report (Appendix 8) examining drill chips from hole FAN006 did not indicate the presence of zinc-anomalous carbonate minerals (siderite or ankerite). In addition, there is little in the way of supporting geochemistry (e.g. Pb, Ag).

Drill holes FAN005 and FAN006 are interpreted to have intersected BCDS units. A large, untested area to the west of these holes is still regarded potential for black, pyritic shale facies of the Barney Creek Formation.

Collar information, geological drill logs, and assay results for drill holes RC02FAN001 – FAN012 are contained in appendices 5 to 7.

## 9 ENVIRONMENT

RTE completed a Mine Management Plan (MMP) for both Yalco (combined tenements) and Warramana. No significant environmental issues were recognised.

All tracks and drill pads constructed by RTE were rehabilitated at the conclusion of the program.

## 10 EXPENDITURE STATEMENT

The annual exploration expenditures for Warramana EL 10103, Yalco 10317 and Yalco 1 EL 10329 are listed in Tables 4, 5 and 6.

Table 4: Expenditure Statement for the Reporting Period, Warramana EL10103

| | |
|---|---|
| Computing Services | 8,402.34 |
| Cont Exploration- Ext | 4,143.00 |
| Drilling | 86,129.78 |
| Field & Transport | 36,675.44 |
| Gen Office Supp & Comm | 2,826.41 |
| Indirect Costs | 41,864.89 |
| Laboratory Analysis | 6,198.26 |
| Payroll & Benefits | 93,173.51 |
| Recoveries & Income | -777.63 |
| Rent & Property | 12,538.54 |
| Sundry Prof & Other | 3,304.99 |
| Tenement Payments | 12,768.27 |
| Travel & Accomodation | 13,705.52 |
| **Grand Total** | **$320,953.32** |

Table 5: Expenditure Statement for the Reporting Period, Yalco EL 10317

| | |
|---|---|
| Computing Services | 5,756.45 |
| Cont Exploration- Ext | 1,976.25 |
| Drilling | 49,049.45 |
| Field & Transport | 25,934.93 |
| Gen Office Supp & Comm | 2,811.05 |
| Indirect Costs | 26,952.73 |
| Laboratory Analysis | 2,453.27 |
| Payroll & Benefits | 65,432.06 |
| Recoveries & Income | -1,531.00 |
| Rent & Property | 9,546.37 |
| Sundry Prof & Other | 1,165.28 |
| Tenement Payments | 6,278.61 |
| Travel & Accomodation | 10,799.69 |
| **Grand Total** | **$206,625.14** |

Table 6: Expenditure Statement for the Reporting Period, Yalco 1 EL 10329.

| | |
|---|---|
| Computing Services | 2,171.04 |
| Cont Exploration- Ext | 106.60 |
| Drilling | 43,696.43 |
| Field & Transport | 14,278.97 |
| Gen Office Supp & Comm | 622.42 |
| Indirect Costs | 15,750.59 |
| Laboratory Analysis | 2,453.29 |
| Payroll & Benefits | 26,748.29 |
| Recoveries & Income | -31.99 |
| Rent & Property | 3,190.43 |
| Sundry Prof & Other | 980.96 |
| Tenement Payments | 6,584.97 |
| Travel & Accomodation | 4,203.51 |
| **Grand Total** | **$120,755.51** |

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## LOCALITY

| | | |
|---|---|---|
| Bauhinia Downs | SE-5303 | 1:250 000 |
| Mount Young | SD-5315 | 1:250 000 |
| Bing Bong | 6166 | 1:100 000 |
| Tawallah Range | 6066 | 1:100 000 |
| Batten | 6065 | 1:100 000 |
| Borroloola | 6165 | 1:100 000 |

## DESCRIPTOR

First Annual Report by Rio Tinto Exploration (RTE) for exploration within Warramana EL 10103, Yalco EL 10317 and Yalco 1 EL 10329 in the McArthur Basin, NT. No significant results were returned at Yalco. Further work at Warramana is considered a priority, with a 4 km x 8 km area west of drill hole RC02FAN006 (69 metres at 1087 ppm Zn) remaining untested. The divestment of the project was being negotiated as this report was written.

## KEYWORDS

EL 10103 Warramana, EL 10317 Yalco, EL 10329 Yalco 1, Fandango prospect, Yalco prospect, Middle Proterozoic, McArthur Basin, Batten Trough, Zinc, Lead, Base Metals, Emu Fault Zone, Barney Creek Formation, Lynott Formation, Dolomite, McArthur River (HYC) Zn-Pb-Ag deposit, RC drilling, Divestment.

# APPENDIX 1

## Yalco Drill Hole Collar Information

## Yalco Drill Collar Info.pdf

# APPENDIX 2

## Yalco 2002 Geological Logs

## Yalco Drill Lith Logs.pdf

# APPENDIX 3

## Yalco 2002 Drill Hole Assay Data

## Yalco Drill Assay Data.pdf

# APPENDIX 4

# Warramana HoistEM Survey Data

# Multiple

# APPENDIX 5

## Warramana (*Fandango*) Drill Hole Collar Information

## Fandango Drill Collar Info.pdf

# APPENDIX 6

## Warramana (*Fandango*) Geological Logs

## Fandango Drill Lith Logs.pdf

# APPENDIX 7

## Warramana (*Fandango*) Assay Data

## Fandango Drill Assay Data.pdf

# APPENDIX 8

## Petrology Report on High Zn Intersections from Chip Samples Submitted by Rio Tinto

## Petrology Report.pdf