Second Partial Relinquishment Report
for the period 12 September 2005 to 11 September 2015

Tenement No.—EL4171 Cato River – Cato Project

Report Title: EL4171_2015_P_01_Report
Tenement Number(s): EL 4171
Project: Cato Project
Tenement Holder: Rio Tinto Exploration Pty Ltd
Tenement Operator: Rio Tinto Exploration Pty Ltd
Commodity: Bauxite
Author: G. Hartshorn
Date of report: 28 October 2015
Mapsheet: Gove Special SD5304
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Department of Mines and Energy, NT
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GEMCO

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EL4171_2015_P_06_aircoredownholegeochem.txt
EL4171_2015_P_07_RCDrillCollars.txt
EL4171_2015_P_08_RCDrillholeLithologs.txt
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4 files for DEM
1 Abstract

This is the second relinquishment report for EL 4171 (Cato River), East Arnhem Land. This report covers the relinquishment of 82 sub blocks on the 11 September 2015 from a total of 96 sub blocks. The retained licence area covers 14 sub blocks or approximately 8% of the original granted area.

EL 4171 (Cato River) was applied for by BHP Minerals Pty. Ltd. (BHP) on 3rd December 1982 and was granted on 12th September 2005. EL4171 was renewed until 11 September 2017 for the retained 14 sub blocks.

Rio Tinto Exploration Pty Limited (RTX) signed an agreement with BHP on 27th March 2000 whereby RTX took over management of the tenement and the application was transferred to RTX upon grant. This agreement was amended in 2007 to allow for BHPB to conduct simultaneous activities for manganese within the licence package. Following the demerger of South32 from BHPB, the joint venture has been transferred to GEMCO.

The original tenement application (ELA 4171) covered an area of 846 km² (264 sub blocks) of which 598.2 km² (208 sub blocks) was granted. A first relinquishment of 369.3 km² (112 sub blocks) was completed on the 14 September 2010. This second relinquishment will leave the licence with an area of 46.96km² (14 sub blocks) or approximately 8% of the granted area.

The licence is located about 40km west of Nhulunbuy, east Arnhem Land and consequently is processed under the Aboriginal Land Rights Act 1975 (ALRA).

Combined reporting of EL 4171 and EL 4170 was granted and the project called ‘Cato Project’ with reporting number GR077/09. The Cato Project forms part of the larger contiguous tenement package in east Arnhem Land which is prospective for bauxite and manganese.

EL 4171 covers a small part of the Cato plateau which is a known occurrence of bauxite in east Arnhem Land similar in style to the nearby Gove deposit. BHPB (now GEMCO), through an agreement with RTX, retains the right to explore for manganese (Mn) within EL 4171 and have been conducting simultaneous activities with the consent of RTX.

Exploration activities conducted within the relinquished portion of EL 4171 have included:

- Reconnaissance inspections of outcrops and tracks within the area including rock sampling by RTX (4 in 2007, 20 in 2010 and 7 in 2012)
- Aircore drilling of bauxite targets (25 holes in 2007) (RTX)
- Airborne geophysical survey (EM and magnetics in 2009) (BHP)
- Reverse circulation drilling for manganese (18 holes in 2009) (BHP)
- Hand auger sampling for bauxite (8 auger holes in 2012) (RTX)
The results of the exploration have not shown any bauxite development within the relinquished area of EL4171.

The manganese exploration conducted by BHP as part of the joint venture has not shown any significant accumulations of manganese within the area. The maximum result in the drilling was 17.6% Mn over a single 0.5m interval.

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3 Introduction

3.1 Location

The licence (EL 4171) is in East Arnhem Land approximately 40km west of Nhulunbuy. The main community located close to the licence is Dhalinbuy. Access is easily gained via the Central Arnhem HWY. An entry permit is required from the NLC to access the land.

Figure 1: Tenement Location Plan
Figure 2: Tenement Location showing the relinquished and retained blocks.
3.2 Title History

EL 4171 (Cato River) was applied for by BHP Minerals Pty. Ltd. (BHP) on 3rd December 1982 and was granted on 12th September 2005 to Rio Tinto Exploration Pty Limited (RTX) as stipulated in the joint venture agreement between RTX and BHP (now transferred to GEMCO). EL4171 was renewed until 11 September 2017 for the retained 14 sub blocks. Combined annual reporting of EL4171 and EL4170 was granted with number GR077/09.

The original tenement application (ELA 4171) covered an area of 846 km² (264 sub blocks) of which 598.2 km² (208 sub blocks) was granted. A first relinquishment of 369.3 km² (112 sub blocks) was completed on the 14 September 2010. This second relinquishment will leave the licence with an area of 46.96km² (14 sub blocks) or approximately 8% of the granted area.

Table 1: Tenement Details

<table>
<thead>
<tr>
<th>Holder</th>
<th>Appn Date</th>
<th>Grant Date</th>
<th>Renewal until</th>
<th>Area applied (km²/ sub blocks)</th>
<th>Area granted (km²/ sub blocks)</th>
<th>Area renewed (km²/ sub blocks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTX</td>
<td>3/12/1982</td>
<td>12/09/2005</td>
<td>11/09/2017</td>
<td>846.0 264</td>
<td>598.2 208</td>
<td>49.96 14</td>
</tr>
</tbody>
</table>

3.3 Physiography

EL 4171 lies within the Arafura Fall physiographic sub division between the western shore of Melville Bay, and the eastern shore of Arnhem Bay (Rawlings et al., 1997). Most of the original granted tenement is low lying (<50m elevation) and includes the Cato River, and tributaries of the Cato and Giddy Rivers. The western edge of the Cato Plateau extends four kilometres across the centre of EL 4171 and this area is being retained. The plateau has steep breakaways and a flat top at an elevation of approximately 100m and can be clearly seen on the space shuttle radar data (see figure 4 below).
3.4 Access

The tenement falls wholly within Arnhem Land and is subject to the provisions of the Aboriginal Land Rights Act which is administered by the Northern Land Council. An Exploration deed has been negotiated over this licence.

4 Geology

Geology of the Cato area comprises of a sequence of sedimentary sandstones and claystones belonging to the Walker River Formation (Middle Cretaceous) and the younger Yirrkala Formation (Upper Cretaceous) which unconformably overly Proterozoic basement. (Refer to SD5304 – Gove Special GSNT Geology Map).

During the Tertiary period, the Yirrkala Formation has undergone extensive lateritisation in the east Arnhem area. This has resulted in the formation of bauxite in areas where the protore was sufficiently clay rich, the landform allowed adequate drainage and the land surface has been preserved. The Cato Plateau which lies mostly to the east of EL4171 has known bauxite occurrences. While several
occurrences of bauxite have been recorded in the east Arnhem area, large, economic deposits outside the Gove mine site have not been delineated.

The Cretaceous sediments are prospective for manganese and this has been the focus of the GEMCO (BHPB) work. The transition between the Walker River formation and the Yirrkala Fm is considered the time equivalent to the Groote Eylandt mineralisation.

Figure 3 EL 4171 showing the 1:250,000 geology. (SD5303-04 Arnhem Bay-Gove special sheet)

5 Geophysics

The project area is covered by a regional scale aeromagnetic survey flown for the NTGS in 1990-92 (Rawlings et al., 1997). The radiometric data can be used to help distinguish the laterite-covered areas from those of both basement and Quaternary sand cover. This method does not distinguish between bauxitic and non-bauxitic laterite.

In 2009, as part of the joint venture, BHPB flew an airborne EM and magnetic survey over part of EL 4171.

Digital terrain data has been acquired and processed to assess areas that may be prospective for bauxite and or areas that are not eroded. The Cato Plateau is clearly defined as a gently south-westerly dipping flat surface of approximately 100 km² in area.
6 Previous Exploration

Previous exploration over this area is described in Report 13 of the Northern Territory Geological Survey (Ferenczi, 2001). New Guinea Resources drilled 19 auger holes in the northern end of the Cato Plateau and concluded that most of the bauxite had been eroded off. In 1966 BHP drilled 89 auger holes for a total of 778m into the Cato Plateau to test the area for bauxite. Of these, only six holes are located within EL 4171 and this area is being retained. The BHP data (Chestnut et al., 1966) shows that there is patchy bauxite within the plateau however the silica values are generally high and the recoverable (ABEA) alumina is low. No further work has been conducted in the area since the late 1960’s until the area was again granted in 2005.

In the mid 1960’s, BHP (then BHP Ltd) explored parts of the eastern Arnhem Land area for sedimentary-diagenetic Mn following the discovery of the Groote Eylandt deposit. A variety of exploration campaigns were completed by BHPB in the 1960’s, including helicopter reconnaissance work, regional mapping, pitting and regional drilling at some prospects (e.g. Caledon Bay, Peter John River, Lake Evella). The Peter John River prospect extends over an area of about 10 sq km part of which sits within EL4171. In 1965, a total of 33 exploration pits were dug. Subsequently 11 holes were drilled to various depths to test the Mn potential. However no significant Mn mineralisation was found at this prospect and was not pursued further.

7 Exploration completed during the reporting period

This report covers the exploration completed within the relinquished area of EL 4171 (82 sub blocks) since grant, 12 September 2005. The exploration conducted within the retained 14 sub blocks is not discussed in this report.

The work completed has been focused on testing the area for both bauxite which was completed by RTX and for manganese which was conducted under a joint venture, by BHPB.

In summary the work completed has included:

- Reconnaissance inspections of outcrops and tracks within the area including rock sampling by RTX (4 samples in 2007, 20 samples in 2010, 7 samples in 2012)
- Aircore drilling of bauxite targets (30 holes in 2007) (RTX)
- Airborne geophysical survey (EM and magnetics in 2009) (BHP)
- Reverse circulation drilling for manganese (18 holes in 2009) (BHP)
- Hand auger sampling for bauxite (10 auger holes in 2012) (RTX)
Table 2 Summary of drilling completed

<table>
<thead>
<tr>
<th>Hole Type</th>
<th>Hole Number Range</th>
<th>No of Holes</th>
<th>Total Metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand auger</td>
<td>-</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td>AC</td>
<td>AC15CR0019 - 28</td>
<td>25</td>
<td>255</td>
</tr>
<tr>
<td>RC</td>
<td>EARC0034 - 0110</td>
<td>18</td>
<td>802</td>
</tr>
<tr>
<td>Grand Total</td>
<td>-</td>
<td>53</td>
<td>1066.6</td>
</tr>
</tbody>
</table>

Figure 5: Summary plan of the exploration conducted
7.1 Bauxite Exploration conducted within EL4171

During the period, bauxite exploration focused on exploring areas that have potential for preserved laterite both on the edge of the known Cato Plateau and at lower elevations adjacent to Arnhem Bay. The targets were selected based on the topographic pattern (smooth elevated surface with little drainage), the potential for a suitable protore (Cretaceous formations), and the radiometric signature (elevated response in the thorium channel). Figure 6 below shows the two main target areas which were the focus of the bauxite exploration programme within the relinquished license area.

Figure 6: Location of bauxite target areas tested on the NT Government airborne radiometric (Thorium channel) data. (legend is the same as for figure 5)
7.1.1 Rock sampling

A total of 31 rocks were collected whilst undertaking reconnaissance work, see figures 8, 10 and 11 for the location of rock samples. No samples had assays indicative of bauxite, that being low (<15%SiO2, with high >30% Al2O3). The weathered surface adjacent Arnhem Bay showed rock samples with a high silica and iron content typical of a lateritised surface on siliceous poorly sorted sandstone.

Figure 7 Typical ferruginous laterite (Location 646632 8635934 GDA94_Zone 53)

Figure 8 Location of rock samples (2010) collected in northeast corner of EL 4171
7.1.2 Auger sampling

A hand auger was used to attempt to penetrate through the soil and determine if there is any evidence of bauxitic material in the weathering profile on the target adjacent Arnhem Bay (figure 10). This technique is used as a first pass method in areas where bauxite is yet to be recorded. It has the benefit of being very low impact however it does have limitations if a hard laterite surface is present.

A total of 8 auger holes were completed as part of the 2012 reconnaissance of the Arnhem Bay target. The maximum depth that the auger penetrated was 2.6m with most sites only extending to 1m before either hitting iron laterite or evidence of clay. Ten samples were collected for assay see figure 10 for locations. The samples were either collected at the base of the auger hole or at the end of each metre. Three of the 8 auger holes penetrated deep enough to have clay rich material (saprolitic clay) recorded. This indicates that there is very low likelihood of any bauxite being formed as the depth to the saprolite zone is less than 3 meters.

![Auger site and samples](image)

Figure 9: Photo of an auger site and the samples. (Note the white chips in sample 10249075 is saprolitic clay)

The samples (rock and auger) were assayed at ALS Brisbane by fused bead XRF (ALS code ME-XRF13).

The results of the auger samples show that the material is high in silica and iron with low to moderate alumina. These results (max. Al₂O₃ 22.9%) match what was expected from the visual logging. No bauxite was identified.
Figure 10  Location of rock and hand auger samples (2012) collected on bauxite target adjacent to Arnhem Bay
7.1.3 Aircore drilling

Aircore drilling was completed in 2007 on the target on the southern border of EL4171. The drilling was testing the low (30-50m elevation) smooth landform that sits on Cretaceous sediments. The drilling was conducted by Wallis drilling using a Toyota mounted aircore drill. A total of 25 holes for 255m of drilling were completed at a spacing of about 500m along traverses across and along the prospective landform. The drilling was mostly to a depth of 6m which was sufficient to penetrate into the saprolite zone of the weathering profile. Three holes were extended to a depth of about 30m to test for manganese. The drill holes were all sampled at 1m intervals and assayed by XRF for a multi element suite. The data was made available to the joint venture partners (BHPB) to assess for manganese. Figure 11 shows the location of the aircore drill holes.

The maximum alumina assay recorded was 31.7% Al₂O₃ and the lowest silica being 25% SiO₂ indicating that no bauxite was intersected in the drilling. The maximum manganese result was 0.19% MnO.
Figure 11 Location of aircore drill holes and rock samples (2007) completed on EL 4171
7.2 Manganese Exploration conducted within EL4171

Under the joint venture between RTX and BHPB (Now transferred to GEMCO), simultaneous activities were conducted for manganese exploration within EL 4171 by BHPB. The main period of work within the relinquished area was in 2009 with an airborne EM/magnetic survey and 18 RC drill holes being completed.

The information below is summarized from the annual report submitted to Rio Tinto Exploration by BHPB under the terms of the Joint Venture.

7.2.1 Airborne survey

The airborne (TEMPEST electromagnetic and magnetic) survey was flown over both EL4171 and the adjoining license EL 24524 by Fugro Airborne surveys (see acquisition and processing report in appendix 3).

Figure 12 Location of the airborne survey.
7.2.2 Reverse Circulation Drilling

In 2009, BHPB conducted drilling within EL 4171 as part of their East Arnhem Joint Venture with RTX. A total of 18 reverse circulation (RC) drill holes (totalling 802m) were drilled at 1 to 2 km spacing to test the geological and EM targets in EL4171 (see figure 13 for the location of the drill holes). All were vertical holes with lengths ranging from 28 to 74m. Wherever it was possible the drilling was continued to intersect the entire thickness of Cretaceous rocks through to the basement rocks. Drill chips were collected at 0.5 m intervals for logging purposes. Samples for assaying were mostly taken as composite over lithological units. Only the intervals with visible Mn mineralisation were sampled at 0.5 m. A total of 196 samples were collected which represent drilling intervals between 0.5 and 11.5 m. The samples were assayed for Mn, Fe, SiO2, Al2O3, P, CaO, Sr, Ba, TiO2, Mg by XRF.

Drilling results indicated the presence of thin and discontinuous intervals of low-grade sandy Mn mineralisation in only three holes in EL4171. The best interval contained 17.6% Mn over 0.5 m at a depth of 7.0 m in EARC72. Further it was found that the conductive layers corresponded with greyish to black-coloured clays within the Cretaceous rocks.

### Table 3: Best Mn values from the RC Drilling programme

<table>
<thead>
<tr>
<th>Hole Id</th>
<th>Depth From</th>
<th>Depth To</th>
<th>Interval (m)</th>
<th>Mn%</th>
<th>Fe%</th>
<th>SiO2%</th>
<th>P%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARC34</td>
<td>2.5</td>
<td>3.5</td>
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<td>0.08</td>
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<td>57.10</td>
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<tr>
<td>EARC106</td>
<td>15.5</td>
<td>18.0</td>
<td>2.5</td>
<td>6.57</td>
<td>6.03</td>
<td>51.27</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Figure 13 Location of the RC drill holes
8 Conclusions and Recommendations

The exploration within the relinquished area did not locate any bauxite or manganese.

9 References


Hartshorn G. 2011, Annual Report For Period Ending 13 October, 2011, EL 4171 Cato River and EL 4170 Cato Plateau, Gove SD5304, Northern Territory. RTX Report Number 29177


Hartshorn G. 2013, Annual Report For Period Ending 13 October, 2013, EL 4171 Cato River and EL 4170 Cato Plateau, Gove SD5304, Northern Territory. RTX Report Number 29587


**LOCALITY**

Gove Special SD 5304 1:250 000