



Rio Tinto Exploration Pty. Limited

ABN 76 000 057 125 / ACN 000 057 125

A member of the Rio Tinto Group

**Final Report (Combined Arrla Bay Project)
For EL 22744 Arrla Bay 1, EL 22708 Arrla Bay 2
EL 24657 Arrla Bay 2a, EL 23972 Arrla Bay 5,
EL 27156 Arrla Bay 5a, EL 27157 Arrla Bay 5b,
EL24108 Arrla Bay 6
SD5301 Alligator River, SD5302 Milingimbi
SC5313 Coburg Peninsula
Northern Territory**

Exploration Report No. 28985

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Distribution:	Department of Regional Development, Primary Industry, Fisheries and Mines, NT RTX Perth Information Centre

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LIST OF PLANS

Plan No.	Title	Scale
pAI07_002	Aircore drilling, Wacker and Stream Sample locations	1:100 000
pAI07_003	Tenement location	1:500 000
pAI07_004	Airborne radiometrics - thorium	1:350 000
pAI07_005	Simplified Geology	1:350 000
pAI07_006	DTM and aircore drillhole location	1:350 000
pAI09_005	Location of EM flight lines	1:400 000
pU11_004	Sample Locations	1:150 000

LIST OF APPENDICES

Title	File Name
Drilling Data	ArrlaBay_2006_A_02_drillcollars.txt
	ArrlaBay_2006_A_03_lithology.txt
	ArrlaBay_2006_A_04_downholegeochem_XRF.txt
Rock/Wacker Data	ArrlaBay_2006_A_05_rockgeochem.txt
Stream Data	ArrlaBay_2006_A_06_Streamedgegeochem_ICP.txt
Soil Data 2010	ArrlaBay_2010_A_11_Soilgeochem_ICP.txt
Stream Data 2010	ArrlaBay_2010_A_11_SSgeochem_ICP.txt
Drainage Gravel data 2010	ArrlaBay_2010_A_11_DG_Location.txt
Rockchip data 2010	ArrlaBay_2010_A_11_RKgeochem_ICP.txt

1. SUMMARY

The Arrla Bay Project consisted of four granted Exploration Licences (EL) 22744, 22708, 24657 and 22707 that were applied for in 2000 by Rio Tinto Exploration Pty Limited (RTX). A further four applications EL 23972 Arrla Bay 5, EL 27156 Arrla Bay 5a, EL 27157 Arrla Bay 5b and EL24108 Arrla Bay 6 were granted in June 2009 leaving 2 applications within the grant process forming the remainder of the project. EL22707 has undergone a partial surrender with 43 sub-blocks being relinquished.

The tenements are located approximately 60km northeast of Oenpelli in north-west Arnhem Land and consequently are processed under the Aboriginal Land Rights Act 1975 (ALRA).

The tenements were originally considered prospective for lateritic bauxite, however the drilling reported in previous annual reports has greatly downgraded the potential. A multi-client airborne EM survey was flown in 2008 with the data released in 2011. The survey did not highlight any potential for bauxite or unconformity-style uranium within the surrendered tenements. The surface geochemical sampling over several of the tenements carried out in 2010 failed to identify any potential uranium targets.

2. CONCLUSIONS AND RECOMMENDATIONS

Previous auger drilling for bauxite failed to identify any significant bauxitic plateaus within the tenement package. The GA multi-client airborne EM survey data fails to highlight any undercover plateau extensions within the tenements, it also fails to identify the presence of any conductive unit such as the Cahill Formation which could host a significant uranium deposit.

Geochemical sampling over the highest tenor radiometric anomalies have failed to identify any uranium anomalism within the tenements with the highest grade sample containing only 7ppm U.

It is recommended that tenements EL 22744, 27156, 24108, 23972, 22708, 27157 and 24656 be surrendered in full as there is little likelihood of finding a Rio Tinto sized bauxite or uranium deposits within these tenements.

3. INTRODUCTION

The Arrla Bay Project consists of four granted Exploration Licences (EL) 22744, 22708, 24657 and 22707 that were applied for in 2000 by Rio Tinto Exploration Pty Limited (RTX). A further four applications EL 23972 Arrla Bay 5, EL 27156 Arrla Bay 5a, EL 27157 Arrla Bay 5b and EL24108 Arrla Bay 6 were granted in June 2009 leaving 2 applications within the grant process forming the remainder of the project. EL22707 has undergone a partial surrender with 43 sub-blocks being relinquished.

The tenements are located approximately 60km northeast of Oenpelli in north-west Arnhem Land and consequently are processed under the Aboriginal Land Rights Act 1975 (ALRA).

EL 24657 was split out of EL 22708 following the consent process from the Northern Land Council.

Following tenement grant in 2005 (table 1), Work Programme meetings were held. Due to the inaccessibility of the proposed work area, a helicopter supported clearance survey was required. The approved work programme of aircore drilling was completed in the 2006 field season and described in report (RTX 27967).

RTX participated in the Geoscience Australia (GA) multi-client regional EM survey by funding 889 line kilometres of infill.

A further work programme meeting took place in mid 2010 before helicopter supported reconnaissance surface sampling commenced in September 2010.

Table 1: Tenement Details

Tenement No.	Tenement Name	Ownership	Application Date	Grant Date	Blocks Applied	Blocks Granted	Surrendered
EL22707	Arrla Bay 3	Rio Tinto Exploration Pty Limited	10/7/2000	06/06/2005	103	87	Partial
EL22708	Arrla Bay 2	Rio Tinto Exploration Pty Limited	10/7/2000	06/04/2005	27	18	Yes
EL24657	Arrla Bay 2a	Rio Tinto Exploration Pty Limited	10/7/2000	31/3/2005	3	3	Yes
EL22744	Arrla Bay 1	Rio Tinto Exploration Pty Limited	14/8/2000	31/3/2005	118	118	Yes
EL23972	Arrla Bay 5	Rio Tinto Exploration Pty Limited	14/08/2003	24/06/2009	28	28	Yes
EL 27156	Arrla Bay 5a	Rio Tinto Exploration Pty Limited	14/01/2009	16/06/2009	34	34	Yes
EL 27157	Arrla Bay 5b	Rio Tinto Exploration Pty Limited	14/01/2009	16/06/2009	2	2	Yes
EL 24108	Arrla Bay 6	Rio Tinto Exploration Pty Limited	11/12/2003	16/06/2009	152	113	Yes

4. GEOMORPHOLOGY

The tenements are situated in low undulating terrain called “*sandy plains*” (Needham, 1984) that has a range of elevations from sea level to approximately 150m. The two main topographic feature of interest are low smooth elevated plateaus between Jungle Creek and King River, referred to as the north plateau and the south plateau. These plateaus have mostly smooth sloping margins and an elevation of about 50m above sea level.

5. GEOLOGY

The tenement area is mostly covered by lateritic weathered Cainozoic sediments of the Arafura Basin. Cretaceous units have also been mapped and are named as the ‘Bathurst Island Formation’, although historically they are known as the ‘Mullaman beds’ (Rix, 1965). These sediments consist of variable amounts of sub-labile sandstone, poorly sorted quartz sandstone

and siltstone and lesser mudstones. The units are fossiliferous in parts indicating a shallow marine origin. The units are roughly equivalent to the protore sediments upon which the Gove bauxite deposit has formed.

In the all tenement there are varying amounts of sub-cropping basement consisting mostly of Archaean to Paleo-Proterozoic granites and dolerites of the Nimbuwah Complex (see plan pAI07_005). Within EL22744 there are outcrops of the Kombolgie Formation which provides the seal to the mineralisation at Ranger and Jabiluka unconformity style uranium deposits found 100km to the southwest.

The tenements are within the East Alligator River uranium province.

6. GEOPHYSICS

Airborne magnetic and radiometric data are available across the project area. The aeromagnetic data are from the Milingimbi 1992 and West Arnhem 2000 surveys that were flown at 500m and 400m line spacing and mean survey elevation of 100 and 60m, respectively. Cameco Pty Ltd (Cameco) has also flown airborne surveys over parts of the tenement. The regional airborne survey indicates the plateau of primary interest (north) has an elevated thorium anomaly indicative of laterite development. Radiometric response is less developed across the south plateau, indicating a lower degree of lateritisation, more siliceous protolith, or both.

In 2007 GA proposed and commissioned a wide spaced regional airborne EM survey, known as the Pine Creek (Kombolgie) Project area. RTX participated in this survey by funding two infill areas (see plan pAI09_005). The survey was flown between August and November 2008 by Geotech Airborne Pty Ltd on behalf of GA.

7. PREVIOUS EXPLORATION

Bauxite exploration in the region was conducted in the late 1950's to early 1970's, work focussed on the coastal areas of Arnhem Land including the Coburg Peninsula and Croker Island where small resources were found. In 1964, United Uranium NL conducted both ground and helicopter supported exploration for bauxite and manganese in the Cretaceous laterites along the coastline between Coburg and Milingimbi. No significant occurrences were discovered, however minor tubular laterite indicative of bauxite development was recorded near Maningridi in the Arrla Bay region.

The Arrla Bay Project area has been explored primarily for uranium. Tenements EL 734 and EL 5890 were explored by Cameco using airborne geophysics and ground sampling techniques such as RAB drilling and stream sediment sampling. The tenements were relinquished in 1999 as no significant mineralisation was identified.

8. EXPLORATION COMPLETED DURING REPORTING PERIODS

Exploration completed during the life of the tenure included:

- Helicopter reconnaissance stream sediment and wacker sampling
- Botanical survey
- Access track construction

- Aircore drilling (53 holes for 368 m)
- Participation in the Geoscience Australia Pine Creek (Kombolgie) multi-client EM survey by funding infill lines for a total of 889 line Kilometres
- Helicopter reconnaissance stream sediment, soil and drainage gravel sampling

8.1 Helicopter Supported Wacker Drilling and Stream Sediment Sampling

A total of 7 wacker/surface samples were collected during a helicopter supported exploration programme in July 2006 (see plan pAI07_002). This work was designed to sample areas of the tenement that could not be accessed by vehicles. The number of sites accessible was limited due to a lack of suitable helicopter landing sites. A wacker drill is a small hand held petrol driven jack hammer that is used to drive a geoprobe soil sampling tube into the ground to recover core. The wacker programme proved to be unsuccessful due to the presence of a hard lateritic duricrust that was impenetrable with the wacker drill bit. Thus at two of the sites visited, a surface rock grab sample was collected instead. Assay results from the collected samples were negative for bauxite. A total of five stream sediment (-80#) samples were collected (see plan pAI07_002). At the same sites a gravel sample of approximately 30 kg sieved to -1 mm was collected. The stream samples were analysed by ICP at Ultratrace Laboratories in Perth and gravel samples for diamond and diamond indicator minerals at the RTE Laboratory.

8.2 Botanical Survey

A helicopter supported botanical survey was undertaken by GHD consulting to assess the potential botanical risks involved with construction of an access track through the tenement. Approximately 27 km of the proposed track was surveyed by foot. No previous botanical work had been undertaken throughout this region, thus the botanist also utilised the time to collect samples for the Darwin herbarium. No significant risk areas were identified along the proposed track route.

8.3 Access Track Construction

A 69.5 km access track was pushed through the tenement to enable access for a small aircore drill rig. The track was pushed through with a bulldozer contracted from the local community council.

8.4 Aircore Sampling for Bauxite

A total of 53 Aircore holes were drilled at ~1km spacings along the ~65 km access track at Arrla Bay (see pAI07_002). The holes were to a minimum of 2 m depth and maximum of 16 m with an average of the 53 holes ~7 m. The drilling was conducted by Wallis Drilling Pty Ltd using HQ aircore pipe. Samples were collected directly from the rotary splitter at 1m intervals, with a total of 368 samples collected. RTE standards were included every 50 samples and field duplicates collected every 20 samples. The aircore samples were sent to Ultratrace Analytical Laboratories in Perth for analysis by XRF using their bauxite suite (see table 2 for details). The duplicate samples show adequate repeatability.

The average Al₂O₃ content for the entire data set (without duplicates) is 14.7% (north, south plateau average 17.2, 8.4 % alumina respectively). The only significant result is in hole AC06AB034 (see plan pAI07_002) where an intercept of 2 m (from 3-5 m depth) @ 43.3% Al₂O₃, 19.9 % SiO₂, 12.75 % Fe₂O₃ and 20.2 % LOI occurs. Adjacent holes to AC06AB034 drilled at 1 km distance in a westerly, easterly and southerly direction returned (max) assays of

3 m @ 30.9 %, 23.5 % & 30.5 % Al₂O₃ respectively (see plan pAI07_002). Holes that return assays of >30 % Al₂O₃ are restricted to the north-eastern section of the north plateau. In general the assays are very high in SiO₂ (223 of the 368 samples >60 %, minimum value 19.5 %), reflecting the siliceous nature of the protore sediments.

This data suggests there is very limited development of thin bauxite which is probably due to the high silica content of the protore sediments.

Table 2: Analytical Details.

Lab	Element	Digest	Method	Units	Det_limit
Ultra Trace	P ₂ O ₅ , V ₂ O ₅	XRF Fused bead	XRF bauxite suite	%	0.001
Ultra Trace	Al ₂ O ₃ , CaO, Fe ₂ O ₃ , K ₂ O, MgO, MnO, Na ₂ O, SiO ₂ , SO ₃ , TiO ₂ , ZrO ₂	XRF Fused bead	XRF bauxite suite	%	0.01
Ultra Trace	LOI	Thermo-gravimetric	bauxite suite	%	0.01

8.5 Participation in GA EM survey

In 2007 GA proposed and commissioned a wide spaced regional airborne EM survey, known as the Pine Creek (Kombolgie) Project area. RTX participated in this survey by funding two infill areas (see plan pAI09_005). The survey was flown between August and November 2008 by Geotech Airborne Pty Ltd on behalf of GA.

The final data from this EM survey was received from GA during early 2011. The infill survey lines were flown to try and identify down dip extensions of existing plateaus under the recent cover. The EM data does not support this at all. The data was also used to try and determine the presence of Kombolgie Sandstone, whether outcropping or buried. The rationale was to highlight potential settings analogous to Ranger and Jabiluka. The data in the northern part of the combined area does not show any existing Kombolgie, whether outcropping or buried under recent cover.

8.6 Helicopter reconnaissance stream sediment, soil and drainage gravel sampling

During September 2010 stream sediment, soil and drainage gravel samples were taken around the King and Goomadeer River areas targeting potential uranium deposits. Sampling was targeting radiometric anomalies of unknown origin as no ground work was able to undertaken without traditional owner consent.

A total of 144 soil samples, 6 gravel samples, 5 stream sediment samples and 3 rock samples were taken across the tenement package. A total of 21 soil traverses were walked and sampled for a total length of 48km (see plan pU11_004). These soil traverses were across the higher tenor radiometric anomalies that were identified within the tenement package. The stream sediment and drainage gravel samples were taken downstream of these radiometric features trying to identify any upstream anomalism.

All samples were sent to ALS Chemex in Perth for analysis. The samples underwent a multi acid digest including HF-HNO₃-HClO₄ and HCl leach. The samples were analysed by a combination of ICP-AES and ICP MS for 48 elements using ALS lab method MS -ME-MS61 (see Table 3).

Table 3: Analytical Details.

Lab	Element	Digest	Method	Units	Det_limit
ALS Chemex	Ag, AS, Ba, Be, Bi, Cd, Ce, Co, Cr, Cs, Cu, Ga, Ge, Hf, In, L, Li, Mn, Mo, Nb, Ni, P, Pb, Rb, Re, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Tl, U, V, W, Y, Zn, Zr	HF-HNO ₃ -HClO ₄ and HCl leach	MS -ME-MS61	ppm	0.001
ALS Chemex	Al, Ca, Fe, K, Na, S, Ti	HF-HNO ₃ -HClO ₄ and HCl leach	MS -ME-MS61	%	0.001

The analytical results from the sampling programme do not highlight any potential within the tenement package for uranium mineralisation. The highest grade soil sample returned 5.9ppm U against a background of 1.5ppm U, which is not anomalous. The highest grade samples were taken over sub-cropping granites and iron-rich laterites which overlie on the granites. A rock chip returned a U result of 7ppm U, however the other two samples returned less than 3ppm U.

The sampling, traverse mapping and analytical results all indicate that there is no potential to find a uranium deposit within the tenement package. The radiometric anomalies are due to sub-cropping basement Nimbuwah granites that have a slightly higher radiometric signal to the surrounding cover. Nearly all elevated samples were taken from near sub-cropping granites. As this is the basement to the West Arnhem Province there is little likelihood of finding significant uranium mineralisation which is usually hosted within the overlying Cahill or Koolpin Formation.

9. ENVIRONMENT

All tracks and auger drill pads have been rehabilitated at the cessation of the exploration drilling programme.

10. EXPLORATION EXPENDITURE

The exploration expenditures have been reported separately from the technical report.

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LOCALITY

Alligator River	SD5301	1:250 000
Milingimbi	SD5302	1:250 000
Coburg Peninsula	SC5313	1:250 000
Junction Bay	SC5314	1:250 000

DESCRIPTOR

Final Report (Combined Arrla Bay Project) for EL 22744 Arrla Bay 1, EL22708 Arrla Bay 2 EL24657 Arrla Bay 2a, EL 23972 Arrla Bay 5, EL 27156 Arrla Bay 5a, EL 27157 Arrla Bay 5b and EL24108 Arrla Bay 6, SD5301 Alligator River, SD5302 Milingimbi SC5313 Coburg Peninsula, Northern Territory.

KEYWORDS

Alligator River, Coburg Peninsula, Milingimbi, bauxite, Cretaceous laterite, EM survey, uranium, surface sampling.

