

# **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 Ending 22 September 2003, EL's 1638 Port Keats 1, EL1639 Port Keats 2, EL1640 Keats, EL1641 Port Keats, EL192 3Keats 2, EL3403 Barwolla, EL3404 Fitzmaurice, EL3406 Keyling, EL6516 Tom Turners Creek, EL6517 Cui-eci Creek, EL6551 Greenwood, EL22218 Fitzmaurice 4, Yambarra Project, Northern Territory.

## **Exploration Report No. 26197**

Tenement Holder:	Rio Tinto Exploration Pty Limited
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**RTE** Perth Information Centre

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1	Gravel and Stream Sample Description and Locations	gravel_Locations.txt stream_Locations.txt
2	Diamond Indicator Results	Indicator_Results.txt
3	Kimberlitic Indicator Chemistry	Grain_chemistry.txt
4	Stream sediment Geochemical Results	SS_Geochem.txt
5	Rock Chip Sample Locations and Descriptions	Rock_Locations.txt
6	Rock Chip Sample Results	Rock_Geochemistry.txt
7	Yambarra Project Mine Management Plan	25615 Yambarra EMP.pdf

## LIST OF PLANS

Plan No.	<u>Title</u>	<u>Scale</u>
WAp45817	Tenement Location Plan	1:500 000
WAp45815	Sample Location Map	Non Standard

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#### 1 SUMMARY

EL's 1638 Port Keats 1, EL1639 Port Keats 2, EL1640 Keats, EL1641 Port Keats, EL192 3Keats 2, EL3403 Barwolla, EL3404 Fitzmaurice, EL3406 Keyling, EL6516 Tom Turners Creek, EL6517 Cui-eci Creek, EL6551 Greenwood and EL22218 Fitzmaurice 4 were applied for by Ashton Mining Limited and Ashton Operations Australia Limited ("Ashton") in the late 1970's and early 1980's. The tenements are centered approximately 200 km south west of Darwin on the Daly River / Port Keats Aboriginal Land Trust and consequently are processed under the Aboriginal Land Rights Act 1975 (ALRA).

The project area covers parts of the Palaeoproterozoic Pine Creek Orogen, the Mesoproterozoic Victoria – Birrinduddu Basin and the Palaeozoic Bonaparte Basin.

Exploration completed during the current reporting period was directed at locating a diamondiferous kimberlite / lamproite and has comprised:

- Review of previous exploration. •
- Completion of consultation meetings and site clearance surveys. •
- Interpretation of existing magnetic and TM data. •
- Establishment of an exploration camp. •
- Collection of 220 helicopter supported gravel and stream sediment samples. •
- Collection of 55 rock chip samples from the Murrentja intrusion. •

Available results are encouraging given the wide spread nature of the initial sampling and follow up sampling programs and possibly airborne geophysical programs are recommended for the second year of tenure.

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#### 2 CONCLUSIONS AND RECOMMENDATIONS

Reconnaissance gravel sampling over the well drained portions of the tenement package has been completed. Available results are significantly encouraging to warrant follow up sampling during the next dry season. Selection of target areas will not be undertaken until all results are available.

The high numbers of chromite retuned from samples on the Western edge of the Proterozoic sequences are considered to be derived from sediments within the Finniss River Group, though a local intrusive source could have contributed grains. Samples returning diamonds will be followed up.

#### 3 INTRODUCTION

The tenements were applied for by Ashton Mining Limited and Ashton Operations Australia Limited ("Ashton") in the late 1970's and early 1980's. The tenements form a contiguous block centered approximately 200 km south west of Darwin on the Daly River / Port Keats Aboriginal Land Trust and consequently are processed under the Aboriginal Land Rights Act 1975 (ALRA).

The tenements were granted to Ashton on 23<sup>rd</sup> September 2003. Ashton was acquired by Rio Tinto in late 2000. Tenement details are included in Table 1 below. The tenements are located on Plan WAp45817.

All exploration was completed in accordance with a DBIRD lodged and approved Mine Management Plan (Smith et al 2003).

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Tenement No.	Tenement Name	Ownership	Application Date	Grant Date	No. Blocks Applied	No Blocks Granted	No Blocks Current
EL3403	Barwolla	Ashton Mining Limited	28/09/1981	23/09/2002	23	23	23
EL6517	Cui-eci Creek	Ashton Mining Limited	22/02/1989	23/09/2002	194	194	194
EL3404	Fitzmaurice	Ashton Mining Limited	28/09/1981	23/09/2002	118	118	118
EL6551	Greenwood	Ashton Mining Limited	23/03/89	23/09/2002	365	365	365
EL1640	Keats	AO (Australia) Pty Limited	02/06/1977	23/09/2002	389	389	389
EL1923	Keats 2	AO (Australia) Pty Limited	08/09/1978	23/09/2002	414	414	414
EL3406	Keyling	Ashton Mining Limited	28/09/1981	23/09/2002	214	214	214
EL1641	Port Keats	AO (Australia) Pty Limited	02/06/1977	23/09/2002	394	394	394
EL1638	Port Keats 1	AO (Australia) Pty Limited	02/06/1977	23/09/2002	358	358	358
EL1639	Port Keats 2	AO (Australia) Pty Limited	02/06/1977	23/09/2002	390	390	390
EL6516	Tom Turners Creek	Ashton Mining Limited	22/02/1989	23/09/2002	97	97	97
EL22218	Fitzmaurice 4	Ashton Mining Limited	28/9/1981	23/09/2002	51	51	51

## Table 1: Tenement Details

## 4 PREVIOUS EXPLORATION

Minimal previous exploration has been conducted within the project area. A brief chronology of previous company exploration is as follows.

Table 2: Previous Exploration Summary

Year	Company	Tenement	Exploration Completed
1967	Geotechnics Pty. Ltd.		Coal exploration – 5 drill holes. No significant results.
1971	Utah Development Company	CL 173	Coal exploration – 18 holes on three traverses (CR1973-0082)
1975	Central Pacific Minerals	EL601	Track etch surveys for uranium – no significant results (CR1975-0088)

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## 5 <u>GEOMORPHOLOGY</u>

The geomorphology of the project area may be divided into five divisions: Lateritised mesa surfaces, Uplands, Escarpments and dissected hills, Elluvial lowlands and Flood plains (Edgoose, C.J., et al, 1989).

The Lateritised mesa surface has developed on a thin sheet of Cretaceous sedimentary rocks. This sheet was once very extensive but is now reduced to isolated plateau and outlying remnant mesas. A thicker soil profile (than on other units) developed on this surface supports a tall, dense eucalypt forest.

The Mesa escarpments, Uplands and dissected hills form the ground between the mesa surfaces and lowlands. The escarpments form the flanks of mesa and usually consist of a small scarp topping a steep, talus-strewn slope. The dissected hills are formed on Early - Middle Proterozoic igneous, sedimentary and metamorphic rocks. The soils developed are dominantly skeletal and support sparse open woodland and hardy grasses.

The elluvial lowlands form over sedimentary, grantitic and metamorphic rocks which are largely concealed by elluvium. The lowlands are characterized by open woodland and perennial grasses.

The floodplains are extensively developed in the western half of the project area. The plains remain wet well into the dry season and are vegetated by swamp grasses and stands of Melaleuca. Extensive mud and salt tidal flat are also present adjacent to the Fitzmaurice River and the Joseph Bonaparte Gulf.

## 6 <u>GEOLOGY</u>

The geological description below is dominantly taken from Edgoose et al 1989.

The project area covers parts of three geological regions within the Northern Territory. These are; the Palaeoproterozoic Pine Creek Orogen, the Mesoproterozoic Victoria – Birrinduddu Basin and the Palaeozoic Bonaparte Basin.

The oldest rocks in the project area are the Early Proterozoic Hermit Creek Metamorphics. This unit consists of pelitic schist and gneiss, phyllite, quartz-mica schist, sillimanite-andalusite-muscovite schist, and alusite-cordierite hornfels and quartzite. The Finniss River Group also of Early Proterozoic age is inferred to overlie the Hermit Creek Metamorphics although the exact nature of their relationship is unclear. Within the project area, the Finniss River Group is dominanted by the extremely thick, monotonous quartz arenites of the Chilling Sandstone and

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Burrell Creek Formation. The Henschke Breccia, a massive breccia conglomerate is interpreted to be approximately synchronous with these units.

The Hermit Creek Metamorphics and Finniss River Group were intruded successively by the Early Proterozoic Muarra-Kamangee Granodiorite (weakly foliated, xenolithic, medium to coarse grained biotite tonalite, granodiorite and minor anamellite) and Peppimenarti Granite (fine aplitic to coarse grained pegmatitic phases of adamellite and granite).

The Middle Proterozoic Fitzmaurice Group unconformably overlyies the Early Proterozoic basement. This Group consists of a thick sequence (in excess of 6000 m) of unmetamorphosed quartz rich sediments. The formations comprising the group are the basal Moyle River Formation (dominantly quartzarenite with lesser conglomerate, stromatolitic dolomite, dolomite and siltstone), the Goobaieri Formation (siltstone an quartzarenite) and the Lalngang Formation (quartzarenite). These units are intruded by Midldle Proterozoic intrusives of both basic (Murrenja Dolerite) and acid (Ti-Tree Granophyre) composition. The Murrenja Dolerite consists of altered gabbro and dolerite and the Ti-Tree Granophyre of significantly and variably altered adamellite.

Permian sediments of the Bonaparte Basin are present in the east of the project area. These sediments consist of quartzarenite, subarkose and mudstone with minor conglomerate and coal.

Creataceous rocks form an extensive unit within the project area. Friable, clayey, commonly ferruginous and mottled arenite is the dominant rock type.

Cainozoic sediments and Quaternary alluvium cover much of the bedrock.

The dominant structural features of the area are the extensive, regional transcurrent faults that are the northerly continuations of the major faults which define the Middle Proterozoic Fitzmaurice Mobile Zone and the Early Proterozoic Halls Creek Mobile Zone.

## 7 <u>GEOPHYSICS</u>

The project area is covered by two regional scale aeromagnetic surveys. The western half was flown east west at 500 m line spacing (100 m elevation) in 1994 by AGSO (Medusa Banks, Port Keats, Survey). The eastern half was flown north south in 1984 by the NTGS (Litchfield South Survey) also at 500 m line spacing (100 m elevation).

Data has been acquired and reviewed.

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#### 8 EXPLORATION COMPLETED DURING REPORTING PERIOD

Exploration completed during the reporting year included:

- Review of previous exploration. •
- Completion of consultation meetings and site clearance surveys. •
- Interpretation of existing magnetic and TM data.
- Establishment of an exploration camp. •
- Collection of 220 helicopter supported gravel and stream sediment samples. •
- Collection of 55 rock chip samples from the Murrentja intrusion.

#### 8.1 Stream Sampling

A total of 220 gravel and stream sediment samples were collected over the well drained eastern portion of the project area. Sample spacing was a notional 1 per 15 km<sup>2</sup>. The program was designed to provide an approximately even sample density across the parts of the project area amenable to gravel sampling. Loam samples were planned to be collected at approximately 2.5 km centres over the Cretaceous plateau. These samples were not collected as the dense eucalypt forest present on these plateau precluded the helicopter landing.

The gravel samples consisted of approximately 30 kg of -1mm gravel collected from trap sites. Sample site quality was assessed by the geologist collecting the sample and ranged from very good (bedrock bar or pothole) to very poor (no satisfactory trap). At each sample site a -80#stream sediment sample was also collected. Sample site descriptions and locations are included as Appendix 1. Samples are located on Plan WAp45815.

Gravel samples were processed to 0.125 mm at Rio Tinto's Belmont laboratory and observed for kimberlitic indicators to 0.2 mm and diamonds to 0.125 mm. Available results are included as Appendix 2. Kimberlitic Indicator grains (i.e. chromite, picroilmenite, pyrope garnet etc) were probed using an SEM. Available probe data is included as Appendix 3.

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Data within Appendix 3 identifies grains as follows:

C= chromite G = garnet I = ilmenite M = magnetite O = olivine P = pyroxene R = rutile S = spinel T = tourmaline X = unknown

Interpretation of the results will be completed when all data are available.

80 mesh stream sediment samples were processed by Amdel using methods IC3M (Ag, As, Ba, Bi, Cd, Co, Cu, Mo, Nb, Pb, Sb, Sr, Th, U, W, Zn, Zr, Cs, Ce, Ga, In, La, Rb, Se, Te, Tl, Y), IC3E (Al, Ca, Cr, Fe, K, Mg, Mn, Na, Ni, P, S, Ti, V) and FA3 (Au, Pt, Pd).

Samples were crushed and pulverised to -75 micron. Digestion is HF/multi acid for methods IC3E and IC3M. Method FA3 is a fire assay extraction with graphite furnace ICPMS measurement Analytical methods, upper and lower detection limits are listed in Table 3.

## 8.2 Rock Chip Sampling

A total of 55 rock chip samples (2-3 kg) were collected from the Murentja Intrusion. Sample locations and descriptions are included as Appendix 4.

Samples were processed at Amdel Laboratories using method IC3E (Al, Ca, Cr, Fe, K, Mg, Mn, Na, Ni, P, S, Ti, V,), IC3M (Ag, As, Ba, Bi, Cd, Ce, Co, Cs, Cu, Ga, In, La, Mo, Nb, Pb, Rb, Sb, Se, Sr, Te, Th, Tl, U, W, Y, Zn, Zr) and FA3M (Au, Pt, Pd). Analytical data is included as Appendix 5. Analytical methods are described in section 8.1. No elevated nickel results were observed.

Sample locations are shown on Plan WAp45815.

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## Table 3: Analytical Details

Element	Digest	Method	Units	Lower_	_det_limit	Upper_ ₊	_det_limi	Overrange_Meth
Au	Fire Assav/ICPMS	FA3M	nnh		1	L	400	FA1
Au Dn1	Fire Assay/ICPMS	FA3M	ppb		1		400	FA1
Pt	Fire Assav/ICPMS	FA3M	nnh		0.2		10000	FA3M
Pt1	Fire Assav/ICPMS	FA3M	ppb		0.2		10000	FA3M
Pd	Fire Assav/ICPMS	FA3M	nnh		0.2		10000	FA3M
Pd1	Fire Assav/ICPMS	FA3M	ppb		0.2		10000	FA3M
Al	ICPOES-Multi Acid	IC3F	ppm		10		100000	
Ca	ICPOES-Multi Acid	IC3E	mag		10			
Cr	ICPOES-Multi Acid	IC3E	mag		2			
Fe	ICPOES-Multi Acid	IC3E	ppm		100			
K	ICPOES-Multi Acid	IC3E	ppm		10		100000	IC3E
Mg	ICPOES-Multi Acid	IC3E	ppm		10		100000	
Mn	ICPOES-Multi Acid	IC3E	ppm		5			
Na	ICPOES-Multi Acid	IC3E	ppm		10		100000	
Ni	ICPOES-Multi Acid	IC3E	ppm		2		10000	MET1R
Р	ICPOES-Multi Acid	IC3E	ppm		5		20000	
S	ICPOES-Multi Acid	IC3E	ppm		50			
Ti	ICPOES-Multi Acid	IC3E	ppm		10		10000	
V	ICPOES-Multi Acid	IC3E	ppm		2		10000	OA4
Ag	ICPMS-Multi Acid	IC3M	ppm		0.1		20	IC3E
As	ICPMS-Multi Acid	IC3M	ppm		0.5		500	IC3E
Ва	ICPMS-Multi Acid	IC3M	ppm		0.1		500	XRF1
Bi	ICPMS-Multi Acid	IC3M	ppm		0.1		500	IC3E
Cd	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	IC3E
Со	ICPMS-Multi Acid	IC3M	ppm		0.2		2000	IC3E
Cu	ICPMS-Multi Acid	IC3M	ppm		0.5		500	IC3E
Мо	ICPMS-Multi Acid	IC3M	ppm		0.1		2000	IC3E
Nb	ICPMS-Multi Acid	IC3M	ppm		0.5		1000	XRF1
Pb	ICPMS-Multi Acid	IC3M	ppm		0.5		500	IC3E
Sb	ICPMS-Multi Acid	IC3M	ppm		0.5		2000	IC3E
Sr	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	IC3E
Th	ICPMS-Multi Acid	IC3M	ppm		0.02		1000	XRF1
U	ICPMS-Multi Acid	IC3M	ppm		0.02		1000	XRF1
W	ICPMS-Multi Acid	IC3M	ppm		0.1		100	XRF1
Zn	ICPMS-Multi Acid	IC3M	ppm		0.5		500	IC3E
Zr	ICPMS-Multi Acid	IC3M	ppm		0.5		1000	XRF1
Cs	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	OA4
Ce	ICPMS-Multi Acid	IC3M	ppm		0.5		1000	XRF1
Ga	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	XRF1
In	ICPMS-Multi Acid	IC3M	ppm		0.05		1000	XRF1
La	ICPMS-Multi Acid	IC3M	ppm		0.5		1000	XRF1
Rb	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	XRF1
Se	ICPMS-Multi Acid	IC3M	ppm		0.5		1000	XRF1
Те	ICPMS-Multi Acid	IC3M	ppm		0.2		1000	XRF1
TI	ICPMS-Multi Acid	IC3M	ppm		0.1		1000	XRF1
Y	ICPMS-Multi Acid	IC3M	ppm		0.05		1000	XRF1

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## 8.3 Magnetic and TM Data Interpretation

Available airborne magnetic and Thematic Mapper data sets were interpreted to identify features possibly related to kimberlite / lamproite intrusion. Ten features were identified and are located on Plan WAp45815. The features were considered well enough drained to not require loam sampling. No on-ground reconnaissance of these features was undertaken.

## 9 ENVIRONMENT

All exploration was completed in accordance with a DBIRD lodged and approved Mine Management Plan. (Smith et al 2003) (Appendix 7).

Access to RTE's exploration camp was via existing tracks and roads. The camp was sited in an area of existing disturbance and did not additionally impact on the environment. All of the field-based exploration completed by RTE was helicopter-assisted and non-surface disturbing. No additional rehabilitation is required.

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## 10 EXPLORATION EXPENDITURE

The exploration expenditure attributed to the project by RTE for the first year of exploration is detailed on Table 3 (next page).

## 11 PROPOSED EXPLORATION

Results will be assessed when completely available. At this stage follow up activities are envisaged as follows:

- In fill gravel samples to follow up results of interest.
- Additional gravel samples where trap sites exist.
- Loam samples over specific targets.
- Grid loam sampling over cretaceous plateau.
- Airborne geophysical surveying (HEM and magnetic).

A notional budget for the project area is listed as follows:

Table 5: Proposed Expenditure

Description	Amount \$
Gravel and loam sampling	50000
Sample processing	50000
Geophysical surveys	50000
Other	20000
Total	170000

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## Table 4: Exploration Expenditure

Element Summary Group Desc	EL1638	EL1639	EL1640	EL1641	EL1923	EL22218	EL3403	EL3404	EL3406	EL6516	EL6517	EL6551	Grand Total
Computing Services	1930	4346		4346		1170		836	5		2340	2006	16975
Cont Exploration- Ext	5586	14524		15929		3910		2793	5		7821	6703	57266
Drilling	1327	3449		3449	1	929		663			1857	1592	13267
Field & Transport	24418	62336		62336		16783		11988			33566	28771	240197
Gen Office Supp & Comm	945	2276		2276	i	613		438	1		1226	1051	8825
Indirect Costs	12508	27720	1642	29461	1714	6442	1258	5 7274	1468	3 1791	14929	15248	121455
Laboratory Analysis	9252	16932		1920		294	(	) 210	276	6 1104	588	13452	44028
Payroll & Benefits	14580	33512		33512		9022		6445	5		18045	15467	130583
Rent & Property	1323	2974		2974		801		572			1602	1373	11619
Sundry Prof & Other	177	420		420	1	113		81			226	194	1631
Tenement Payments	17461	27783	10957	27803	11427	4350	7957	7 11394	9347	7 8697	18366	18834	174377
Travel & Accommodation	2995	7716		7716		2077		1484	ļ		4155	3561	29703
Grand Total	92503	203989	12599	192144	13142	46504	9213	3 44177	11092	2 11592	104720	108251	849926

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1989	Northern Territory Geological Survey
Smith, S.L &.	Mine Management Plan Yambarra, EL3403 Barwolla, EL6517
Curtis R A, 2003	Cui-eci Creek, EL3404 Fitzmaurice, EL 6551 Greenwood, EL1640
	Keats, EL1923 Keats 2, EL3406 Keyling, EL1641 Port Keats, EL1638
	Port Keats 1, EL1639 Port Keats 2, EL6516 Tom Turners Creek,
	SD5211 Port Keats, SD5212 Fergusson River, SD5207 Cape Scott,
	Northern Territory. RTE Report Number25615.
Williams, P.R.	Report on 1971 Drilling Programme on Coal Licence 173, Bonaparte
	Gulf Basin, NT. CR 1973-0082.

## LOCALITY

Port Keats	SD 5211	1:250 000
Fergusson River	SD 5212	1:250 000
Cape Scott	SD 5207	1:250 000

First Annual Report for the Period Ending 22 September 2003, EL's 1638 Port Keats 1, EL1639 Port Keats 2, EL1640 Keats, EL1641 Port Keats, EL192 3Keats 2, EL3403 Barwolla, EL3404 Fitzmaurice, EL3406 Keyling, EL6516 Tom Turners Creek, EL6517 Cui-eci Creek, EL6551 Greenwood, EL22218 Fitzmaurice 4, Yambarra Project, Northern Territory. Report No. 26197 Page 14

DPO	No. Sample	Sample Range	Laboratory
200741	20	6014601 – 6014607	Belmont Diamond Laboratory
		6014701 – 6014707	
		6014801 - 6014806	
200742	71	6014608 - 6014635	Belmont Diamond Laboratory
		6014708 – 6014728	
		6014807 - 6014829	
200744	65	6014616 - 6014616	Belmont Diamond Laboratory
		6014636 - 6014654	
		6014729 – 6014746	
		6014751 – 6014762	
		6014830 – 6014844	
200882	64	6014655 - 6014674	Belmont Diamond Laboratory
		6014747 – 6014750	
		6014763 – 6014800	
		6014849 – 6014850	
		6014830 – 6014844	
200883	54	6014913 – 6014920	Amdel
		6014928 – 6014930	
		6014955 – 6014967	
		6015638 - 6015650	
		6015720 – 6015736	
		6015788 – 6015797	
200743	130	6015701 – 6015719	Amdel
		6015751 – 6015787	
		6015575 – 6015637	
		6014901 – 6014912	
200220	55	5533650 - 5533659	Amdel
		6014365 - 6014410	

## LIST OF DPO'S

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## DESCRIPTOR

First Annual Report for the Period Ending 22 October 2003, EL's 1638 Port Keats 1, EL1639 Port Keats 2, EL1640 Keats, EL1641 Port Keats, EL192 3Keats 2, EL3403 Barwolla, EL3404 Fitzmaurice, EL3406 Keyling, EL6516 Tom Turners Creek, EL6517 Cui-eci Creek, EL6551 Greenwood, EL22218 Fitzmaurice 4. Yambarra Project, Northern Territory. located within the Daly River / Port Keats Aboriginal Land Trust, Northern Territory, Australia. Diamond exploration activities consisted of first pass gravel and stream sediment sampling. Results are not completely available.

## **KEYWORDS**

Port Keats, Fergusson River, Cape Scott gravel sample, -80 # stream sediment sample, rock chip sample, Chromite, Cretaceous, Diamond, Garnet, Indicator mineral, Kimberlite, Loam sample, Proterozoic,

Gravel and Stream Sample Locations

Gravel\_locations.txt

Stream\_locations.txt

**Diamond Indicator Results** 

Indicator Results.txt

# **Stream sediment Geochemical Results**

grain\_chemistry.txt

# **Stream sediment Geochemical Results**

Ss\_geochem.txt

Rock Chip Sample Locations

Rock\_locations.txt

Rock Chip Sample Results

Rock\_geochemistry.txt

Yambarra Project Mine Management Plan

25615 Yambarra EMP.pdf