

Rio Tinto Exploration Pty Ltd

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A member of the Rio Tinto Group

Report Title:	Partial Relinquishment Report - EL32736 Undoolya Gap
Tenement Number(s):	EL32736
Project:	Undoolya Gap
Tenement Holder:	Rio Tinto Exploration Pty Ltd
Tenement Operator:	Rio Tinto Exploration Pty Ltd
Commodity:	Pb-Zn-Ag
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1 Abstract

EL32736 Undoolya Gap was applied to enable testing of the basal units of the Amadeus Basin for epigenetic base metals mineralization associated with diapiric breccias and the Proterozoic rocks of the Aileron Province in order to test for LCT and Ni-Cu-PGE mineralization associated with pegmatite and mafic to ultramafic intrusions in the area..

Exploration completed on the relinquished subblocks of EL32736 Undoolya Gap blocks was limited to desktop studies including in-house processing of Sentinel2 multispectral data, structural interpretation, and review of historic exploration data. No targets of significance were identified in the relinquished block areas. Proposed regional reconnaissance over the area was cancelled due to the inability to secure heritage clearances.

2 Introduction

2.1 Location

The tenement is located approximately 20-50 km east of Alice Springs in the Hale District of Northern Territory, Australia. The tenement overlaps the Undoolya Station (980) and Bond Springs (650) Perpetual pastoral leases within the ALICE SPRINGS 1:250,000 map sheet

2.2 Access

Access to the project from Alice Springs is via the Ross Highway or Undoolya Road. Access within the tenement is limited to variably maintained 4WD tracks.

2.3 Title History

EL32736 was applied for on 28 May 2021 and was granted on the 11th January 2022. The tenement consisted of 199 contiguous sub blocks for an approximate 591km². 100 subblocks were surrendered on the second anniversary of the licence.

Table 1 - Tenement Details

Tenement No.	Tenement Name	Ownership	Application Date	Grant Date	Blocks Granted
EL32736	Undoolya	Rio Tinto Exploration Pty Ltd	28/05/2021	11/01/2022	199

Table 2 : Relinquished subblocks

Map Sheet Name	Block	Sub Block	Sub Block Count
SF53	3121	J K O P T	5
SF53	3122	F G H L M N	6
SF53	3125	Q R S V W X	6
SF53	3193	Y Z	2
SF53	3194	Q R S T U V W X Y Z	10
SF53	3195	D E J K M N O P Q R S T U V W X Y Z	18
SF53	3196	A B F G L M N O P Q R S T U V W X Y Z	19
SF53	3197	A B C F G H L M N Q R S V W X	15
SF53	3265	D E	2
SF53	3266	A B D E	4
SF53	3267	A B C D E	5
SF53	3268	A B C D E	5
SF53	3269	A B C	3

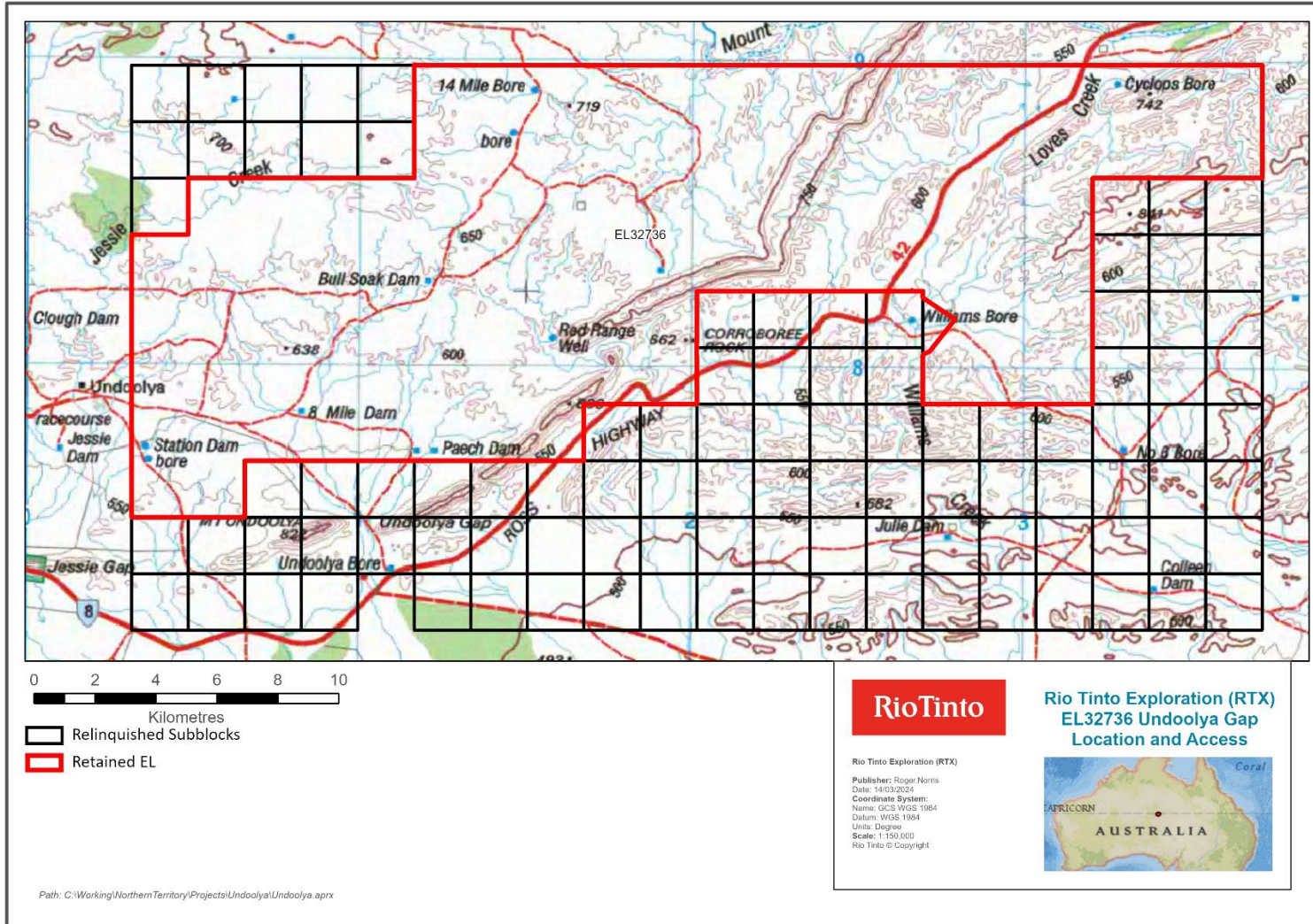


Figure 1 – Location of EL32736, Undoolya Gap Tenement

3 Geology

3.1 Geological setting

Detailed geology and stratigraphy within EL32736 Undoolya is provided for in figure 2 and table 2. The license covers Proterozoic metamorphics of the Aileron Province of the southern Arunta Block in the northwest and Early Paleozoic sediments of the Amadeus Basin in the southeast. The northeast trending unconformity between the provinces dissects through the middle of the tenement.

The Aileron Province is a region of the Northern Territory of Australia that preserves a succession of Palaeoproterozoic metasedimentary and meta-igneous rocks at the southern margin of the North Australian Craton. The province underwent several episodes of magmatism and metamorphism between ca 1.86–1.70Ga, which are related to different geodynamic settings and magmatic events including:

1. The Stafford Event (ca 1.81–1.80 Ga): This event produced strongly bimodal (felsic and mafic) intrusive rocks of the Black Label Suite that are interpreted being formed in an extensional setting.
2. The Yambah Event (ca 1.79–1.76 Ga): This event produced voluminous felsic and bimodal intrusive rocks of the Baikal and Almbulbinya supersuites, that are interpreted as forming in a subduction-related setting. The mafic rocks of the Baikal Supersuite are associated with polymetallic base metal and Fe–Ti–V(–Au–PGE) mineralisation in the eastern Aileron Province².
3. The Strangways Event (ca 1.73–1.69 Ga): This event produced felsic and mafic intrusive rocks of the Strangways Supersuite that are interpreted as being formed in a post-collisional setting

Lithologies of the Aileron Province outcrop in the NW half of the tenement includes various quartz-ofeldspathic gneiss, muscovite -biotite schist, amphibolite, biotite gneiss, rare sillimanite mica-schist and porphyroblastic feldspar gneiss of the Randall Peak Metamorphics and unnamed biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss and quartz feldspathic gneiss all intruded by biotite-quartz-feldspar locally muscovite-bearing granitic gneiss termed Jesse Gap Gneiss. Minor pegmatite bodies are mapped as intruding the Aileron Province.

Neoproterozoic sediments of the Amadeus Basin Bitter Springs Formation outcropping in the area includes the basal Heavitree Quartzite successively overlain by the Gillen Member (Intercalated dolomite, siltstone, shale with minor red sandstone and evaporites); Bitter Springs Formation (dolomite, limestone, siltstone and sandstone); Pioneer Sandstone (pebbly arkose, feldspathic sandstone); Cyclops Member (thinly rhythmically bedded platy sandstone); Julie Formation (dolomite, limestone, sandstone, minor siltstone) and Arumbera Sandstone (red-brown sandstone and siltstone, rare dolomite)

The extreme south of the area consists of steeply plunging and strongly deformed marine carbonate sediments associated with the Cambrian Pertaoorrtta Group and terrestrial siliclastic sediments of the Devonian Pertnjara Group.

Thin Cenozoic cover is common to the recessed units of the Palaeoproterozoic Jesse Creek Gneiss and Neoproterozoic siliclastic units.

Table 3 - Summary stratigraphy through the project area

Map Code (Name)	Description	Age	Group_
Qa	Alluvium	Quaternary	
Qr	Clayey and sandy soil: red earth	Quaternary	
Qc	Colluvium, scree	Quaternary	
Qa,Qs	Select individual units for detailed lithologies	Quaternary	
Tlf	Ferricrete, some laterite gravel	Tertiary	
Ts	Silcrete	Tertiary	
Tss	Sediments below silcrete; sandstone, siltstone, some lignite	Tertiary	
Tw	Chalcedonic limestone, greenish-grey siltstone, sandstone	Tertiary	
Czc	Fanglomerate, dissected alluvium and colluvium	Cainozoic	
Dzm (Mereenie Sandstone)	White cross-bedded sandstone	Devonian	
Db (Brewer Conglomerate)	Conglomerate with sedimentary clasts, sandstone lenses	Late Devonian	Pertnjara Group
De	Pebbly sandstone, sandstone; rare conglomerate lenses	Late Devonian	Pertnjara Group
Dr (Hermannsburg Sandstone)	Sandstone	Late Devonian	Pertnjara Group
On (N'Dahla Member)	Fossiliferous purplish-brown silty glauconitic sandstone; minor conglomerate, limestone	Late Cambrian to Early Ordovician	Larapinta Group
Cs (Shannon Formation)	Siltstone, shale; fossiliferous limestone, dolomite	Late Cambrian	Pertaoorrta Group
Cg (Goyder Formation)	Silty sandstone; minor siltstone, dolomite, limestone	Late Cambrian	Pertaoorrta Group
Ck (Giles Creek Dolomite)	Fossiliferous dolomite and limestone, minor siltstone and shale	Middle Cambrian	Pertaoorrta Group
Cl (Chandler Limestone)	Laminated and locally contorted limestone and dolomite with numerous chert laminae, shale and evaporites in subsurface	Early Cambrian	Pertaoorrta Group
Cr (Todd River Dolomite)	Fossiliferous pink dolomite; minor siltstone, sandstone	Early Cambrian	Pertaoorrta Group
dI (Stuart Dyke Swarm)	Stuart Dyke Swarm; dolerite		
peg	Acid, hydrothermal dyke or vein; pegmatite		
P-Ca (Arumbera Sandstone)	Red-brown sandstone and siltstone, rare dolomite	Late Proterozoic to Early Cambrian	
Puj (Julie Formation)	Dolomite, limestone, sandstone, minor siltstone	Late Proterozoic	
Puy (Cyclops Member)	Platy sandstone, very thinly bedded and laminated, evenly and rhythmically bedded	Late Proterozoic	
Pux (Pioneer Sandstone)	Pebbly arkose, feldspathic sandstone; dolomite in places; minor conglomerate at base in places	Late Proterozoic	
Pue (Bitter Springs Formation)	Dolomite, limestone, siltstone, sandstone; rare basic volcanics	Late Proterozoic	
Pue>1 (Bitter Springs)	Massive stromatolitic dolomite or limestone	Late Proterozoic	

Map Code (Name)	Description	Age	Group_
Formation)			
Pug (Gillen Member)	Intercalated dolomite, siltstone, shale; minor red sandstone, evaporites; rare basic volcanics	Late Proterozoic	
Pug>B (Gillen Member)	Intercalated dolomite, siltstone, shale; minor red sandstone, evaporites; rare basic volcanics > Basic volcanics, some intercalated calc-silicate rock	Late Proterozoic	
Pug>t (Gillen Member)	Intercalated dolomite, siltstone, shale; minor red sandstone, evaporites; rare basic volcanics > Siltstone, shale and slate	Late Proterozoic	
Puh (Heavitree Quartzite)	Silicified sandstone; discontinuous units of siltstone, shale and conglomerate at base; silty conglomerate in the middle; well-sorted sandstone and minor siltstone near the top	Late Proterozoic	
Pj (Jessie Gap gneiss)	Biotite-quartz-feldspar granitic gneiss, locally muscovite-bearing	Middle Proterozoic	
p-C	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss	Early Proterozoic	
p-C>a	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Amphibolite	Early Proterozoic	
p-C>b	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Biotite gneiss Cl>=10	Early Proterozoic	
p-C>f	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Quartzofeldspathic gneiss, Cl<10	Early Proterozoic	
p-C>gg	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Granitic gneiss	Early Proterozoic	
p-C>h	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Hornblende gneiss	Early Proterozoic	
p-C>p	Biotite gneiss, amphibolite, porphyroblastic gneiss, granitic gneiss, quartzofeldspathic gneiss > Porphyroblastic-feldspar gneiss, augen gneiss	Early Proterozoic	
p-Cq (Charles River gneiss)	Garnet-biotite gneiss, amphibolite, local migmatite	Early Proterozoic	
p-Cr (Randall Peak metamorphics)	Quartzofeldspathic gneiss, muscovite -biotite schist, amphibolite, biotite gneiss, rare sillimanite mica-schist, porphyroblastic feldspar gneiss	Early Proterozoic	
p-Cr>a (Randall Peak metamorphics)	Quartzofeldspathic gneiss, muscovite -biotite schist, amphibolite, biotite gneiss, rare sillimanite mica-schist, porphyroblastic feldspar gneiss > Amphibolite	Early Proterozoic	
p-Cr>b (Randall Peak metamorphics)	Quartzofeldspathic gneiss, muscovite -biotite schist, amphibolite, biotite gneiss, rare sillimanite mica-schist, porphyroblastic feldspar	Early Proterozoic	

Map Code (Name)	Description	Age	Group_
	gneiss > Biotite gneiss Cl>=10		

3.2 Exploration History

Exploration licenses overlapping the northern Proterozoic sequences in EL32736 are listed in table 4. Summaries of work completed on selective licences are detailed in the below.

Table 4 – Overlapping Exploration licences to relinquished subblocks of EL32736 Undoolya as extracted from STRIKE.

Title ID	Holder(s)	Date Granted	Date Ceased
AP1604	Magellan Petroleum	1966-08-10	1967-08-09
AP2122	CRA Exploration	1968-11-27	1970-08-26
AP2889	CRA Exploration	1971-05-07	1972-05-06
AP2889	CRA Exploration	1971-05-07	1972-05-06
EL1064	BHP Minerals	1976-02-12	1977-02-11
EL2618	White Industries	1981-01-15	1982-01-14
EL2375	Santos	1979-09-14	1982-04-05
EL2641	White Industries /BHP Minerals	1982-03-27	1987-03-26
EL3559	White Industries /BHP Minerals	1982-12-14	1988-12-13
EL7429	RIO TINTO EXPLORATION PTY LIMITED	1991-08-12	1997-08-11
EL10280	REGIS RESOURCES LIMITED	2002-02-20	2003-07-23
EL25660	WDR BASE METALS PTY LTD	2007-08-30	2009-05-20
EL26012	ARUNTA URANIUM PTY LIMITED	2007-12-18	2010-04-06
EL24282	RAXILE PTY LTD	2004-12-29	2010-09-20
EL26551	BLUEKEBBLE PTY LTD	2008-08-25	2012-11-15
EL27019	NORTHERN MINERALS LIMITED	2009-09-02	2013-08-15
EL28531	NORTHERN MINERALS LIMITED	2011-08-31	2013-08-15
EL29087	NT MINERALS AUST PTY LTD	2012-06-06	2014-01-02
EL29088	NT MINERALS AUST PTY LTD	2012-08-06	2014-01-02

AP2122 CRA Exploration; Targeted the Lower Cambrian carbonates of the Armadeus Basin for high grade Zinc sulphided deposits. Regional and follow-up stream sediment sampling produced a number of weak to moderate zinc anomalies that were interpreted to be associated to metal scavenging of laterites.

EL1064 BHP Minerals; Targeted the Todd River Formation for phosphate mineralization. Best drill intercept was 2m at 4.13% P₂O₅ from 30m in drill hole PD2

EL2641 White Industries /BHP Minerals; Completed helicopter supported gravel sampling collecting 34 samples. No kimberlitic indicators were identified.

EL7429 RIO TINTO EXPLORATION PTY LIMITED; Works completed included regional diamond gravel and stream sediment sampling. Only one sample returned possible kimberlitic indicator minerals (4 x 0.4mm chromites), which upon SEM examination were shown to be of non kimberlitic origin. Stream sediment sampling outlined several low order base metal (Cu Zn Mn) anomalies. 40 rock chip samples failed to highlight any elevated base metal values. Elevated Fe and Mn (Max 23.6 % and 17.6% respectively) correlate with elevated Cu and Zn, suggesting scavenging.

EL10280 REGIS RESOURCES LIMITED; Evaluated the Amadeus Basin geology for Witwatersrand style of mineralization in South Africa. Works included a literature search of government open file data and assessment of regolith, structural geology, geochemistry and geophysics. An orientation program was designed to determine the best method for geochemical sampling, by comparing areas of known mineralization to areas with none. A regional stream sediment and rock chip sampling program was then completed over areas of outcrop.

EL24282 RAXILE PTY LTD; Titles are targeting gold associated with the thrust basal contact of the Amadeus Basin. The exploration model is based on an analogy with the Witwatersrand Basin in South Africa. Particular interest is focused on the unconformity at the top of the Bitter Springs Formation in the Phillipson Thrust Sheet. Drill targets have been selected but delays with AAPA clearances have prevented work.

EL27019 NORTHERN MINERALS LIMITED; Exploration works limited to a review of the previous completed historical exploration work and compilation of all publicly available government data sets. An Aboriginal sacred site desktop study/inspection was also carried out through the Aboriginal Areas Protection Authority (AAPA). On the basis of the results returned it was determined that the project does not meet the company's investment criteria.

EL29088 NT MINERALS AUST PTY LTD; Exploration limited to data review of the Paleo to Mesoproterozoic rocks of the Aileron Province within the Arunta Region of Central Australia. The main commodities targeted within the project include base metals, Ni-Cu, uranium, mafic-hosted vanadiferous magnetite, REE and orogenic gold. No field work was completed.

3.3 Exploration Rationale

EL32736 Undoolya Gap was applied to enable exploration of the basal units of the Amadeus Basin for epigenetic base metals mineralization associated with diapiric breccias and the Proterozoic rocks of the Aileron Province in order to test for LCT and Ni-Cu-PGE mineralization associated with pegmatite and mafic to ultramafic intrusions in the area.

The Amadeus basin hosts numerous diapiric structures which have not previously been assessed for their base metal potential. The basins surface lithologies are likely too old to preserve diapirs. However, prior Santos (2015) field mapping has provided local field evidence of a sabkha-style environment, with hopper crystal structures preserved in sediments. Satellite photo mapping of major structures dissecting the Proterozoic Arunta Block basal Amadeus Basin stratigraphy identified a number of areas where uncharacteristic deformation of the Heavitree Quartzite potentially due to helo-tectonism. Pegmatite and mafic to ultramafic intrusions are mapped and interpreted from high resolution imagery.

4 Land Access

EL32736 Undoolya Gap falls within the Undoolya and Bond Springs Perpetual Pastoral Leases. Access into the relinquished subblocks is via the Ross River Highway and variably by 4WD vehicle along station tracks and thereafter on foot. Station tracks traverse the area from the Undoolya Homestead in the west and The Gardens homestead in the north.

There is no native title claimant underlying EL32736 Undoolya Gap. No AAPA certificates are available for the title. Negotiations with CLC failed to define a pragmatic solution to heritage clearances for multiple location, low environmental impact reconnaissance sampling and mapping surveys.

5 Exploration Results

Exploration over the relinquished blocks was limited to desktop studies including in-house processing of Sentinel2 multispectral data, structural interpretation, and review of historic exploration data. No targets of significance were identified in the relinquished block areas. Proposed regional reconnaissance over the area was cancelled due to the inability to secure heritage clearances.

6 Conclusions and Recommendations

No targets of significance were identified within the relinquished blocks of EL32736 Undoolya. No targets of significance were identified in the relinquished block areas. Proposed regional reconnaissance over the area was cancelled due to the inability to secure heritage clearances.

7 Copyright

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8 Appendices

Not applicable

9 References