

Report Summary

Regional Geology

The Ti Tree project (also referred to as Barrow creek project) area lies within the S.E. portion of the Mt. Peake and the SW portion of the Barrow Creek 1:250 000 geological map sheets.

The project area is located in the Northern tectonic zone of the Paleoproterozoic Arunta inlier. The relationship between the Arunta and Tanami provinces is poorly understood. Numerous workers (e.g. Blake et al, 1975; Shaw & Stewart, 1975; Shaw 1975, 1990) have suggested the meta-sedimentary basement sequences of the Arunta province and the Granites-Tanami province may be lateral equivalents. Both provinces share similar stratigraphy, magmatic and deformation histories.

Important Orogenic and Magmatic events within the Arunta Province:

Event	Radiometric Age	Description	Reference
Barramundi	1890 –1850Ma.	Intrusion by mafic rocks, regional deformation & metamorphism (<amphibolite facies).	Page & Williams, 1988
	1820-1800 Ma.	Intrusion of Granite Plutons	
Hatches Creek Group	?	Deposition of platform quartzite-shale-carbonate sediments (Reynolds Range group/Hatches creek) unconformably overlying the Metamorphic basement.	Blake et al, 1987
	?	Tight upright folding of Hatches Creek group.	
Strangeways Orogeny	1780-1730 Ma.	Strange ways Granulite event	Shaw et al, 1984
Aileron	1760-1650 Ma	Aileron retrogressive metamorphic event.	Windrim & McCulloch, 1986
Granite intrusion	1760 – 1570 Ma.	Multiple granite intrusion events at 1780-1770, 1713, 1635 & 1570 Ma.	
Alice Springs Orogeny	350-300Ma	Open folding and faulting of the Georgina basin	Haines, Hand & Sadniford

The geology of the Ti Tree project area is comprised of stratigraphic divisions two and three (lander Rock beds and Bullion Schist unit) of the Arunter inlier. These rocks have variable metamorphic grades ranging from lower greenschist to lower amphibolite facies. The lithologies identified within these stratigraphic units include orthogneiss, calc-silicates, schists, arenites, phylites amphibolites and felsic volcanic rocks.

Exploration Summary

Exploration in this area includes Uranium (CRA), gold/ base metal/diamond (WMC) and gold exploration (Aberfoyle Resources) conducted during the 1980 – 1997. This work consisted of regolith mapping, aeromagnetic, radiometrics, gravity ground mag, lag sampling, auger drilling (ineffective), vacuum drilling and shallow RC drilling (< 65m).

During WMC's exploration of the Ti Tree project area a number of mafic - ultramafic intrusions have been identified within the Tompkins Prospect. These bodies are characterised by magnetic highs (both ground and Aero magnetic) and elevated levels of Ni (15-45ppm) Cr (<1900ppm) Cu (<105 ppm) detected in surface (lag sampling) geochemistry.

During lag sampling it was noted that the magnetic highs are associated with small hills capped with ferruginised pisolitic duricrust. This may represent an outcrop of weathered and ferruginised mafic-ultramafic rock.

Following the results of the surface geochemistry, the major anomalies were drill tested by WMC in 11 RC holes (TTRC0017-27). A thin layer of transported cover (0-5m) exists with the base of weathering varying from 2 -15m in depth with ultramafic rocks having deeper weathered profiles than the basalts. All holes penetrated into fresh rock with depths vary between 30 – 63m. Drilling intersected pyroxenite, peridotite, serpentinised ultramafic, ultramafic schist, minor gabbro and dolerite. These rocks appear mostly fresh with olivines and cumulate textures preserved.

Interesting geochemical anomalism has been intersected (See table below) within these drill holes. High Ni and Cu values within the holes TTRC0024 (Ni < 2450 ppm & Cu < 2150 ppm) and TTRC0025 (Ni < 4800 ppm & Cu < 6500 ppm) are coincident with a more weathered lithology. The low iron and cobalt values associated with these Ni-Cu values indicate this may be a part of a nickel sulfide rather than a product of supergene enrichment. Further drill testing in this area is required to determine if the high Ni-Cu values are part of a larger mineralized system.

Information gathered by WMC and ARL including rock chips, regolith mapping, lag sampling and vacuum drilling from Tompkins and Tompkins west (WMC); Conical Hill and Mt Rennie Swamp areas (ARL). ARL reported intersection of some gabbros and ultramafic lithologies in the vacuum drilling in the Conical Hill prospect.

Summary of Significant intersections

Hole ID	Depth to	Depth From	Width (m)	Lithology	Ni ppm	Cu ppm	Cr ppm
TTRC0018	14	24	10	Wcy-Us	1425	529	1533
TTRC0023	14	25	16	Wcy-Us	1820	1948	2829
TTRC0024	13	19	6	Wcy-Us	2525	1568	10 550
	20	24	5	WcyU- Us	1200	513	2850
TTRC0025	7	18	12	Wcy-U - Usoc	2445	2410	3508
TTRC0026	30	48	19	Wcy-U	3581	496	1756

Ti Tree Project Data Availability

Data Type	Availability	Required
RC drilling	.txt files containing assay, magsus, collar and geology	Transcribe WMC logging codes to AMEx codes. Validate database, several inconsistencies found.
Regolith Map	Scanned Image	If further Surface sampling undertaken, map should be updated and digitized.
Surface Chemistry	Scanned data sheets and maps only	Require data in a digital format over project area, before better evaluation can be made.
Geophysics	Raster images, some modeling of intrusive bodies complete	
Rock Chip sampling	Scanned data sheets from WMC & ARL	Require data in a digital format over project area.
Vacuum Drilling	Scanned Data sheets from ARL	Require data in a digital format over project area.

Exploration History

CRA 1970 -1983

CRA conducted two phases of Uranium exploration. The first phase of exploration included regional (1:80 000) geological mapping, aerial photograph interpretation, Aeromagnetic / radiometric survey. Work yielded poor results (U < 33ppm) and work ceased until 1979.

Renewed interest in the area led to a second phase (1979-1983) of exploration. This phase of work included further aeromagnetic/radiometric surveys, stream sediment sampling, rock chip/ soil geochemistry and some diamond drilling. An anomalous rock chip sample (1.1ppm U) in hematitic shale was found, however the ground was relinquished following this work.

1992

Report CR 1993 –085A

The first year Tenements EL 7557, 7558 & 7559 had been granted to WMC. Exploration targeted gold and Base metal deposits associated with Proterozoic iron rich rocks.

Exploration Activities

Reconnaissance geological mapping and rock chip sampling of outcrops within the project area. Further detailed mapping was planned for 1993.

Based geological interpretations of the regional geophysics and reconnaissance mapping four areas of interest were determined. A program of broad spaced (1600 x 100m comprising of 3000 samples) surface geochemical sampling (Lag, SCANT & soil concentrate) was planned in these four areas. Due to adverse weather conditions sampling of only “high priority areas” occurred. Soil sampling (1220 samples) included the Tompkins and Green prospects was undertaken, the assay scheme included the following elements: Mn, Fe, Co, Ni, Cu, Zn, As, Mo, Ag, Sb, Ba, Pb and Bi. Weak Au anomalism was detected.

1993.

Report CR 1994 –383

The Barrow Creek Project consists of Five prospects have been identified these are Green, Tompkins, Mckay, cooper and Mt Ester. The highest priority prospects are Green, Tompkins and Mt Ester. The prospects have been identified by anomalies identified in geophysics and in anomalous surface geochemistry.

Exploration Activities

Variable depositional regimes were identified during lag and scant sampling programs during 1992. To obtain more meaningful results and to better target surface geochemistry a 1:100 000 scale regional regolith map was prepared. Mapping was conducted using BW aerial photographs and reconnaissance field checking.

Open file aeromagnetic and radiometric from a CRA survey (1979) data was merged into existing BMR and NTDME regional datasets. A semi regional gravity survey was completed over the entire region with detailed measurements made at Green, Tompkins and Mt Esther prospects.

Green Prospect

	Activity	Description
Geophysics	Gravity	800 x 500m spaced stations
Geochemistry	Auger Drilling	99 auger holes drilled (<6.3m depth) for 339 m on a 50 x 50m grid over best results following scant sampling. Assay for Au only (?)

Tompkins

	Activity	Description
Geophysics	Gravity	800 x 500m spaced stations

Mt Ester

	Activity	Description
Geophysics	Gravity	200 x 250m spaced stations
Geochemistry	Soil Sampling	Soil sampling using Au, Bi, Cu, Fe, Mn, Pb, Zn & Au assay scheme.

Results

Rock chip sampling identified Cu-Bi (Au) anomalous ironstones with coincident gravity and aeromagnetic anomalies.

Surface anomalism in the identified at Green prospect was followed up by auger drilling, but no further anomalism was identified and no other work was continued.

1994

Report CR 1995 – 107

Barrow project renamed Ti Tree project.

Exploration Activities

Regional gravity survey with a total of over 500 stations measured on 500 x 500/1000m station intervals was made over the reporting year. Detailed ground and airborne geophysical survey were made over the prospect areas.

Green Prospect

Method	Activity	Description
Geophysics	Aeromagnetic	Airborne magnetic/radiometric
	Gravity	500 x 100m spaced stations
Geochem	Auger Drilling	99 auger holes drilled (<6.3m depth) for 339 m on a 50 x 50m grid over best results following scant sampling. Assay scheme Au only (?)
Drilling	RC	Previous (1993) auger drill holes were deemed ineffective and did not penetrate basement. Five deeper RC holes for 490m (TTRC12 – 16) were drilled across a magnetic anomaly with penetrating basement. No reason for the magnetic anomaly is stated?

Tompkins

Method	Activity	Description
Geophysics	Ground mag	N-S orientated 200m spaced lines over the individual anomalies
	Aeromag	Airborne magnetic/radiometric
	Gravity	500 x 500 m spaced stations
Geochem	Lag	100 x 1600m spaced north – south orientated lines. Samples analysed for Ag, As, Au, Ba, Bi, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Zn. Elevated Ni-Cr-Cu across magnetic highs, other results erratic. Note: low hills capped with pisolitic ferruginous duricrusts (weathered Umafic?) are associated with this anomalism.
Drilling	RC	12 holes for 660m were drilled to test bull's eye anomalies. Holes intersected pyroxenite, peridotite and a gabbro with fresh olivine preserved. Elevated levels Ni (-)Cu(-)Cr(-) occur in fresh umafic and at weathered/fresh rock interface.

Mt Ester

Work following up anomalous Cu/Bi/Au rock chip sampling conducted in 1993.

Method	Activity	Description
Geophysics	Gravity	100 x 100m spaced stations
	IP	Six lines of nine electrodes collected using either 100 or 50m dipoles. Identified NW polarisable zone corresponding to the anomalous geochemistry.
	Ground Mag	18 line Km collected on 19 100m spaced lines with readings taken at 5m intervals.
	TEM	Data collected 100m spacing along 100m spaced lines. Traverse used to test method.
Geochem	Soils	Soil sampling using Au, Bi, Cu, Fe, Mn, Pb, Zn & Au assay scheme.
Drilling	RC	11 holes for 660m testing coincident geochemical, IP, mag and gravity anomalies. Holes intersected granite with magnetite – sulfide alteration.

Results

Aeromagnetic data shows a cluster of small magnetic anomalies, these anomalies are thought to have similarities to the Tennant Creek ironstone lodes or Kimberlite/lamprophyre intrusions. These anomalies have been followed up by a detailed ground magnetic survey in the Tompkins area.

Drilling in the Tompkins area intersected mafic–ultramafic intrusive rocks associated with a “bulls eye” magnetic anomalies and anomalous geochemistry.

1995

Report CR 1996 – 47

Work aimed at improving existing data sets and defining prospective stratigraphy in areas of shallow transported cover. An aeromagnetic survey flown over EL8869 & 7558 for a total of 1,468 line km. Anomalies were then modeled to prioritise stratigraphic drilling. Remodelling of drilling at B.H.P. 's Nottarowa prospect indicated this drilling had tested this target effectively.

Sapper Soak South Prospect

Method	Activity	Description
Drilling	RC	Twenty holes (TTRC29-31, 44-60), intersected sheared granites

Sapper Soak Prospect

Method	Activity	Description
Drilling	RC	Twelve holes (TTRC32-43), intersected sheared granites.

Mckay Prospect

Method	Activity	Description
Drilling	RC	Five holes were drilled at Mckay prospect (TTRC61-65). Intersecting a granite in the west and Adelaidian quartzites.

Green Prospect

Method	Activity	Description
Drilling	RC	Three holes (TTRC130 – 132) for ?m. Extending work north of that completed. Two holes (TTRC13-15) deepened to further test stratigraphy.

Tompkins- West

Method	Activity	Description
Geology	Rock Chip sampling	Sampling of outcrops
Drilling	RC	Fifty-seven holes (TTRC66 – 116, TTRC133-138). Some mafic small intrusives intersected (Lander beds).

Tompkins -East

Method	Activity	Description
Geophysics	Aeromagnetic	Airborne magnetic/radiometric
Drilling	RC	Thirteen holes (TTRC117 – 166, TTRC133-138). Some mafic small intrusives intersected (Lander Beds).

1996

Report CR 1997 – 205

Partial relinquishment report for exploration licenses 7557 & 7558.

Review of existing geological, geochemistry, geophysics and RC. Some further modeling of geophysical survey.

No new work presented.

Tompkins Prospect

Method	Activity	Description
Geochemistry	Soils?	Infill sampling retesting geochemical anomalism found in early phases of sampling. Unable to replicate original anomalism.

1997

Report CR 1998 – 060

A JV. between W.M.C. and Aberfoyle Resources Ltd. (ARL. as managers) was entered into. ARL's work during this period included data compilation, gridding, clearing, native title negotiations and a program of vacuum drilling. ARL rename most of the prospect areas. Tompkins is named Mt Rennie swamp and Tompkins west is named Conical Hill

Method	Activity	Description
Drilling	Vacuum	A total of 382 holes for 1007m were completed over a large area. Including Salt well EL7557 (26 holes); Conical Hill EL7559 (337 holes); Mt Rennie South EL 88969 (4 holes) and Mt Rennie Swamp EL8870 (15 holes). In the Conical hill area EL7559 Ultramafic rocks were intersected.

1998

Report CR 1999 – 028 (WMC Report)

Surrender Report.

Report CR 1999 – 029 (ARL Report)

ARL decide to end JV agreement.

	Activity	Description
Geophysics	Modeling	Remodeling of WMC EM, IP and magnetic data sets. Some Errors found in the interpretation of Mt Ester IP modeling
Geochemistry	Soil sampling	72 soil samples taken on tenements EL8869 – 8870. Samples assayed for by Au & As.
	Rock Chip	Four rock chip samples taken