21. CHALLENGER (EL 2370)

21.1 Introduction

At Challenger One, semi-detailed exploration by rotary air blast (RAB) drilling, composite rock chip (CRC) sampling and costeaning focused on an area of poorly developed Davidson Beds following the discovery of shallow prospecting pits and dry blowings. Results at Challenger One indicated weak gold anomalies (highest value is 51 ppb in 3m drill composite sample) but without accompanying elevated arsenic values noted from iron formation gold deposits.

Broader spaced exploration followed including: horizontal loop electromagnetics (HLEM); ground magnetic traverses; as well as, lag sampling and RAB drilling designed to locate favourable stratigraphies of the Tanami Group metasediments. Six regional traverses from 4 to 7km long at 2 to 4km spacings were completed across the broad arcuate trend of magnetic interpreted horizons.

Reconnaissance lag traverses from this regional programme returned elevated Au, U, W, Mo and Co in an area associated with a Middle Proterozoic unconformity between gently dipping sandstones (Gardiner Sandstone) and Tanami Group metasediments. A similar elevated lag response, although deficient in gold, was noted at Challenger One. Interpretation of multielement lag data is in progress. The unenhanced airborne radiometric data identifies uranium and thorium anomalies (as 1% clip population) not only in the Challenger One and Two areas but elsewhere in the Challenger-Rabbit Flat belt.

The follow up phase of RAB drilling at Challenger Two located anomalous gold in the Cambrian volcanics (Antrim Plateau Basalt) and the Middle Proterozoic Gardiner Sandstone above an unconformity with metasediments of the Tanami Group. Deeper infill drilling to below the base of the unconformity intersected gold mineralisation and anomalous PGE hosted by Tanami Group metasediments.

21.2 Work Undertaken

Rock Chip Sampling

6 composite rock chip samples were collected for assay and sixty individual petrological investigations were undertaken.

RAB Drilling

151 RAB holes were drilled for a total of 4680 metres and 1525 samples.

RAB drilling consisted of two phases, each with different objectives.

The first phase of exploration RAB drilling was at both traverses C5 and C6. Drilling at C5 was undertaken to determine the width and depth extent of the previously defined anomalous zone in Gardiner Sandstone and the overlying Antrim Plateau Volcanics. Drilling at traverse C6, was designed to test the magnetic interpreted shear zone which further to the east truncates the Challenger magnetic horizons at Challenger Two.

At traverse C5 an angle hole was attempted beneath a recent intersection of 6m @ 1.4g/t Au within Tanami Group sediments. This hole failed to reach its target depth owing to unstable ground conditions caused by an interpreted fault breccia. Section 14600N was drilled to test for extensions of gold anomalies to the south of traverse C5. In addition, RAB sections 16200N and 17800N were drilled to the north of C5 to test a magnetics interpreted doubley plunging fold nose on either side of a shear zone under Cambrian basalts.

All drill samples were three metre composites requiring multielement analysis for Au by method 334 (30g aqua regia with carbon rod finish), As by method 115 (perchloric acid digestion/hydride generation with AAS finish), U by method 201 (aqua regia digestion with ICP-OES finish) and Au, Pt, Pd by method 333 (50g fire assay/lead collection with ICP-MS finish) .Gold and arsenic are reliable "path finders" for locating iron formation hosted type of mineralisation, and the Au-U-Pt-Pt association is expected to reflect unconformity related mineralisation.

The second phase of RAB drilling at Challenger 2 was designed on a 100m x 100m grid spacing to determine the following:-

a) the geochemical response of both cover units in relation to metasomatic alteration,

b) the tenor of the pathfinder elements proximal to the unconformities, and

c) the areal extent of the geochemical anomaly.

Samples were submitted for analysis for Au by method 334, As by 115, and U and Mg by 222 (aqua regia digestion with ICP-MS finish). Mg was assayed to detect for Mg metasomatism, common to many unconformity related deposits. Samples with primary gold values >1.0 ppm were submitted for Au, Pt and Pd assay by method 333.

CHALLENGER - SUMMARY OF WORK COMPLETED

					Vacuum Drilling				Geophysics		Costeans		RAB Drilling		
PERIOD ENDING	LATERITE	LAG	CRC	PETROLOGY	HOLES	METRES	SAMPLES	BCL	MAG	EM	METRES	SAMPLES	HOLES	METRES	SAMPLES
JUNE 89	11	-	51	-	-	-	-	-	-	-	253.2	125	629	6105	2075
DEC 90	-	182	15	-	111	844.2	119	56	40	50	-	-	-	-	-
JUNE 90	68	-	27	-	192	1611	197	197			-	-	-	-	-
DEC 91	-	115	4	-	-	-	-	-	-	-	-	-	193	3384	1129
JUNE 92	-	-	1	32	-	-	-	-	-	-	-	-	151	4679.5	1525
DEC 92	-	-	40	28	-	-	-	-	-	-	-	-	-	-	-
TOTAL	**49**	**297**	**138**	**60**	**308**	**2455.2**	**316**	**253**	**40**	**50**	**253.2**	**125**	**973**	**14135.5**	**4729**

21.3 **Results**

Significant RAB drilling results are summarised as follows:

HOLE NO.	DEPTH(m)	AU(ppm)	Pd(ppb)	Pt(ppb)	GEOLOGICAL UNIT
CIRB834	34-37	0.178			Pdg
844	0-4	0.136			Pdg
849	13-16	0.162			Pdg
851	13-16	0.103			Pdg
854	28-31	2.040	28.5	80.6	Ptb
-	31-34	1.000	16.1	40.7	Ptb
-	34-37	0.518	13.8	29.5	Ptb
-	37-40	0.285	10.4	18.2	Ptb
-	40-43	0.430	8.98	13.6	Ptb
856	19-22	0.362			Ela
929	16-19	0.25			Ela/Pdg
931	28-31	0.44			Ptb
-	43-46	0.16			Ptb
932	37-40	0.22			Ptb
942	4-7	0.36			Ela/Pdg

Pdg = Gardiner Sandstone
Ptb = Blake Beds
Ela = Antrim Plateau Volcanics

Discussion - Geology

Three geological units are recognised at Challenger Two: the cover sequences consisting of Antrim Plateau Volcanics and Gardiner Sandstone, and the basement metasediments of the Tanami Group.

Antrim Plateau Volcanics.

The basalt at Challenger Two is part of an extensive sub-aerial Cambrian tholeiitic lava flow of the Antrim Plateau Volcanics. These rocks are known to extend for over 400km to the north west as a discontinuous zone up to 30km wide and are locally restricted to a few kilometres east of Challenger Two. The known thickness of the basalt in the drilled area is at least 50m in the north and west thinning eastwards into tongues of only a few metres thick. The basalts overlie the Gardiner Sandstone and Tanami Group metasediments. Fresh basalt is green to grey, porphyritic medium grained with amygdaloids and feldspar phenocrysts up to 2mm in diameter.

Gardiner Sandstone

The Gardiner Sandstone forms the lower part of the Middle Proterozoic Birrindudu Group. Measured thickness is in excess of 1200m at the nearby Farrands Hills. Its depositional environment is considered to be fluviatile at the base to shallow marine at the top.

The Gardiner Sandstone consists of fine to coarse quartz and quartz lithic sandstones and shales. Conglomerates are developed locally and contain material derived from Tanami Group metasediments. Medium to coarse sequences are rounded to subrounded, well sorted and clast supported with very little matrix. These units contain a shale component. Quartz overgrowth cement is common where the sandstone is well indurated. Glauconite is present in the top 500m of the Gardiner Sandstone sequence at Farrand Hills marking a shallow marine setting. The sequence dips shallowly at 10 degrees to the east and rests unconformably over Tanami Group metasediments.

Tanami Group Metasediments

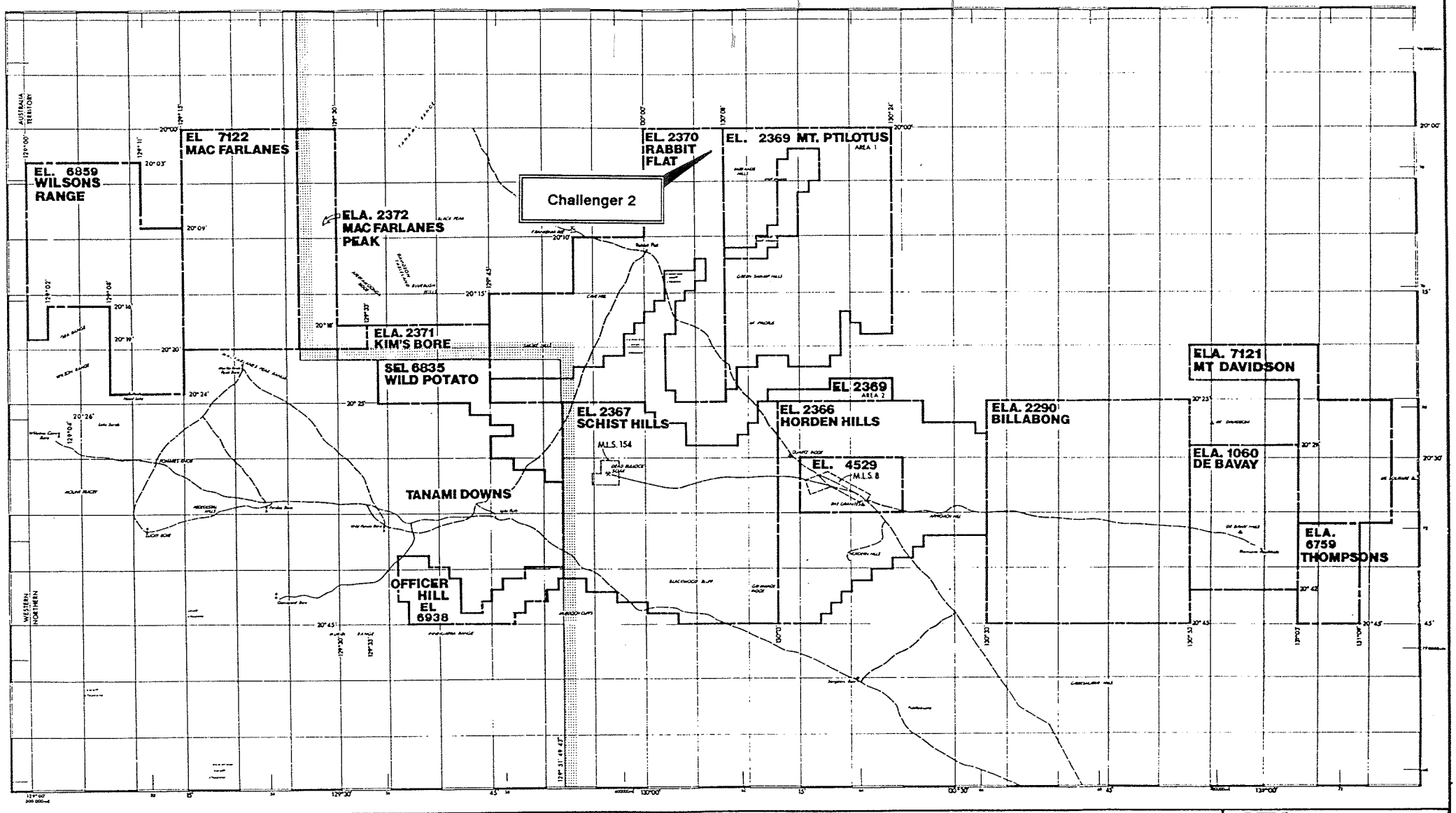
The basement sequence consists of vertically dipping, foliated fine grained metasediments containing sericite and Fe Mg metasomatised yellow clays (?phengitic), possibly silicified and showing evidence of a retrograde metamorphic event. The presence of basic and lesser acidic subaerial/subaqueous tuffs is suggested on the basis of field evidence.

At Challenger Two the Tanami Group metasediments coincide with a magnetic horizon which is along strike from poorly developed ?Davidson Beds at Challenger One. The lack of chemical sediments and graphitic horizons in the drilling and outcrop , coupled with the occurrence of claystone with occasioinal leucoxene, suggests the possibility of Blake facies comprising the basement lithology at Challenger Two. Iron-rich shales and chloritic tuffs may provide the effective traps for gold-PGE mineralisation.

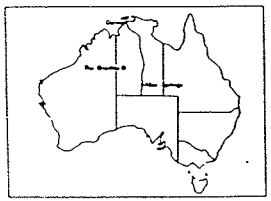
Mineralisation (>1ppm Au) within the Challenger-Rabbit Flat Belt is known only at the Challenger Two Prospect where it is located at the intersection between steep structures and unconformably overlying rock unit boundaries. Mineralisation is also associated with structures wholly within each unit. The best assay results are in the basement units, within iron-rich schists and green ?tuffaceous siltstones.

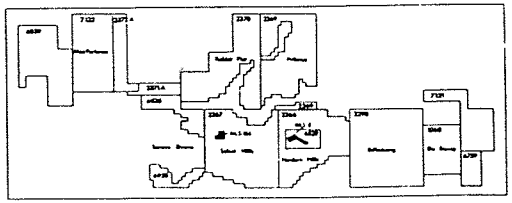
21.4 Plans

Drawing No.	Title	Scale
1000-1539	Challenger 2 RAB Geology & Assay 13800E	1:500
1000-1435	Challenger 2 RAB Geology & Assay 14200E	1:500
1000-1436	Challenger 2 RAB Geology & Assay 14300E	1:500
1000-1437	Challenger 2 RAB Geology & Assay 14400E	1:500
1000-1438	Challenger 2 RAB Geology & Assay 14500E	1:500
1000-1420	Challenger 2 RAB Geology & Assay 14600E	1:500
1000-1439	Challenger 2 RAB Geology & Assay 14700E	1:500
1000-1440	Challenger 2 RAB Geology & Assay 14800E	1:500
1000-1441	Challenger 2 RAB Geology & Assay 14900E	1:500
1000-1442	Challenger 2 RAB Geology & Assay 15000E	1:500
1000-1443	Challenger 2 RAB Geology & Assay 15100E	1:500
1000-1444	Challenger 2 RAB Geology & Assay 15200E	1:500
1000-1538	Challenger 2 RAB Geology & Assay 15400E	1:500
1000-1421	Challenger 2 RAB Geology + Assay 16200E Sht 1	
1000-1422	Challenger 2 RAB Geology & Assay 16200E Sht 2	1:500
1000-1423	Challenger 2 RAB Geology & Assay 17800E	1:500
1000-1518	Drillhole Plans Sheet A	1:5000
1000-1519	Drillhole Plans Sheet B	1:5000
1000-1520	Drillhole Plans Sheet C	1:5000
1000-1521	Drillhole Plans Sheet D	1:5000
1000-1329	Traverse C5 RAB Cross-Sections Sheet I	1:500
1000-1332	Traverse C5 RAB Cross-Sections Sheet II	1:500
1000-1333	Traverse C5 RAB Cross-Sections Sheet III	1:500



LOCATION MAP





LEGEND

NORTH FLINDERS MINES LIMITED

Tanami Reconnaissance : Northern Territory

EL LAYOUT

Fig. 21.1

Drg No. 20-1