FINAL REPORT

EL 2708

WANDIE CREEK

R.P. Singer
Denehurst Limited
November, 1991.

RPS061:sr

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1. INTRODUCTION

The Wandie Creek Exploration Licence (EL 2708) was initially granted to Territory Resources N.L. on 08/09/87 for a period of four years. Denehurst Ltd subsequently acquired the tenement and included it as part of the Pine Creek Joint Venture with The Shell Company of Australia Limited on the 30/06/89. Billiton Australia, The Metals Division of The Shell Company of Australia Limited are managers and operators of the JV. The Licence was subsequently dropped from the JV in August 1990 and reverted to 100% Denehurst ownership.

The tenement is located approximately 35 km east of Pine Creek and on granting covered twelve (12) blocks or approximately 39km^2 (Figure 1). A fifty percent reduction of the tenement was made on the 8th August 1989 and a further 50% reduction on 8th August 1990.

Access to the tenement is via two dirt tracks from Pine Creek. Unfortunately, access within the tenement is restricted to one 4WD track along the western boundary of the licence area. Off-road driving is possible throughout the remaining area but is slow and restricted by steep topography.

This report encompasses a brief description of the physiographic setting, geology and mineralisation within the tenement, accompanied with a review of all work completed, results and conclusions.

2. PHYSIOGRAPHY

Two physiographic setting have been recognised within the area: (i) Lowlands; and (ii) Dissected Foothills (Stuart-Smith et al., 1988). The Lowlands are developed in peneplaned and deeply weathered sedimentary rocks of the Burrell Creek Formation and granites.

The ground surface consists of shallow gravelly loams or skeletal soils with eucalypt woodlands of tall deciduous, mixed or scrubby open forest, and grasses (Stuart-Smith et al., 1988). This type of setting is extensively developed in the northwest corner of the tenement and covers approximately ten per cent of the licence area.

The Dissected Foothills covers approximately 90% of the tenement and is characterised by steep resistant strike ridges and hills of metasediments, bouldery granite hills and undulating rubble-strewn rises (Stuart-Smith et al., 1988). Vegetation is mostly tall to stunted semi-deciduous eucalypt woodland and tall to mid-height perennial grasses (Stuart-Smith et al., 1988).

3. GEOLOGY & MINERALISATION

The tenement is underlain dominantly by Early Proterozoic Burrell Creek Formation (Figure 1) consisting of intebedded, phyllite, slate, siltstone, feldspathic greywacke, volcanolithic pebble conglomerate, decitic volcanics and rare banded ironstone.

Bedding within the area is parallel to the regional trend which strikes between west and northwest. Beds dip between 40-80° to the north and south.

Three syn- to post-orogenic granitic intrusions are exposed within the old tenement area. Two of these are members of the Wandie Granite which have been described as pink medium equigranular biotite granites. They exist on the eastern and western boundaries, respectively.

The third pluton is a member of the McCarthy's Granite and is exposed in the mid-southern quarter of the area (Figure 1). During emplacement the pluton was fractionated into a pink, green coarse porphyritic hornblendebiotite granite an pink coarse porphyritic biotite leucogranite.

Contact metamorphism of country rock to hornblende hornfelsed facies adjacent to the plutons is common, and decreases outwards to albite-epiote hornfels facies. Stuart-Smith et al., (1988) calculated that plutonism occurred at depths of less than 6km with shallow dipping granitic margins - i.e., sub-horizontal northeast of the Wandie Granite.

Structurally the tenement lies in a region which is totally influenced by the early-phase (F_1) folding event which is characterised by symmetrical and upright or inclined axial planes.

S_1 cleavage planes which represent axial plane surfaces to F_1 folds, are penetrative and develop slaty to phyllitic texture in pelitic rocks and less prominent, spaced fracture cleavage in sandstone.

No folds have been mapped within the tenement, although a strong cleavage does not exist through the area.

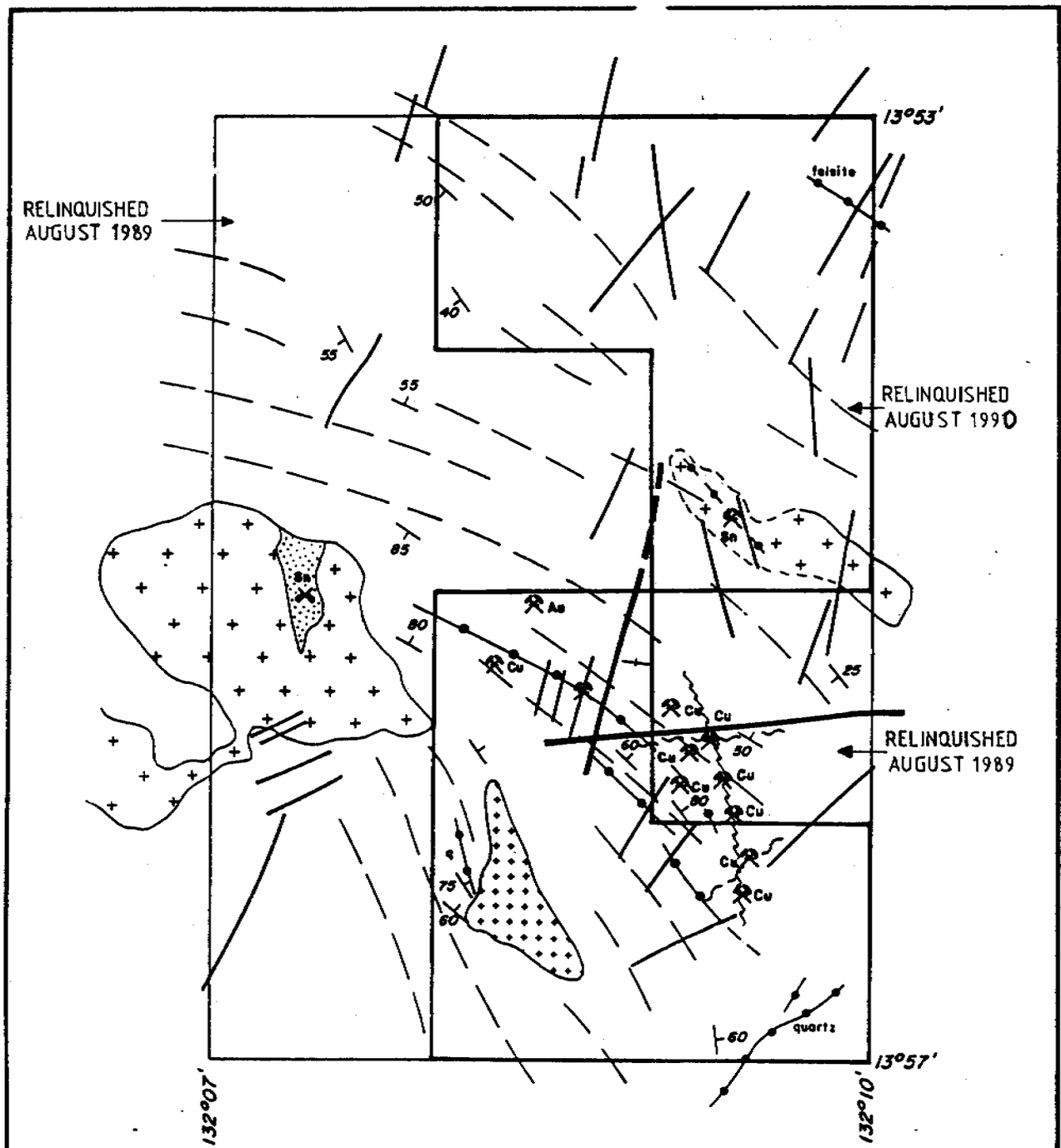
Two prominent northsouth and eastwest faults occur in the southern part of the tenement (Figure 1). Additionally, numerous northsouth and north to northeasterly trending photolineaments have been recognised throughout the area. There appears to be no direct relationship between regional-scale structures and known mineralisation in the area.

A number of small copper workings known as the Fergusson Prospects (Stuart Smith et al., 1988) occur in the southern part of the tenement (Figure 1). No records of production exist for these mines which consist of shallow shafts and diggings, approximately two to three metres wide. Mineralisation occurs as 1-2 metre wide, subvertical gossans and Fe-rich quartz - breccia lodes with strong malachite and azurite staining, and minor native copper. The host rocks are hornfelsed greywacke and siltstone of the Burrell Creek Formation.

4. WORK COMPLETED & RESULTS

Work completed within Wandie Creek (EL 2708) included regional and infill stream sediment sampling, regional soil sampling and reconnaissance mapping and rock chip sampling. All samples were assayed by Classic Laboratories Limited except those collected by Denehurst Ltd which were analysed by Analabs.

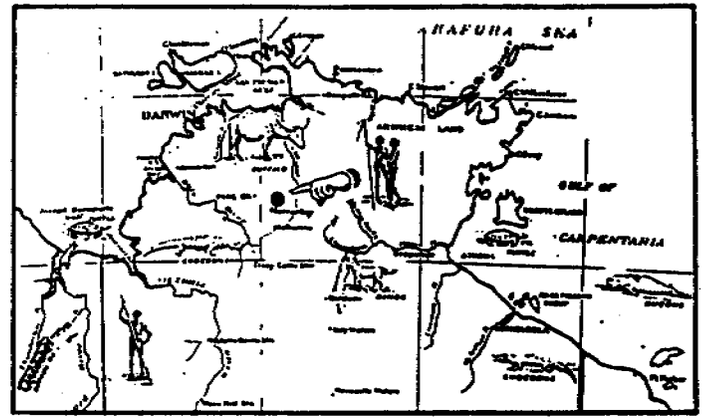
Stream sediment samples consisted of collecting 5 kg of active sediment, sieving to -8# and analysing for gold using the Bulk Cyanide Leach (BCL) technique.



GEOLOGICAL LEGEND

- Alluvial
- Burrell Ck Fmn
- Wandie Granite
- McCarthys Granite
- Fault
- Shear Zone
- Photolineament
- Bedding trace
- Strike & Dip of bedding
- Vein or Dyke
- Mylonitic zone
- Old workings (abandoned)
- Alluvial workings (abandoned)

0 3km



Billiton Australia

Project: PINE CREEK J.V.
NORTHERN TERRITORY

Title:
WANDIE CREEK EL 2708
REGIONAL GEOLOGY

Author S.M	Date 11/89	Scale 1:50 000	
Drawn K.J.	Office CNS	Revised B.F.	Date 6/90
Drawing No C/HJ11/8		Fig. No.	

A -80# portion was also extracted form the 5 kg sample and analysed for base metals, tin, tungsten and arsenic by Atomic Absorption Spectrometry (AAS).

Soil samples were collected every 25m over 200m zones, sieved to -8# and combined to produce a "composite" soil sample. The samples were analysed for gold using the BCL technique.

4.1 Stream Sediment Sampling

Results from initial sediment sampling in 1988 were generally less than 1 ppb Au and thus not considered anomalous. However, one isolated high order stream anomaly (61.9 ppb Au) was recorded in the southeast portion of the tenement (Figure 2).

Gold results from in fill stream samples carried out in 1989 were also low, including a repeat from the same location as the 61 ppb Au value.

Results from -80# samples highlighted a copper, tungsten and two tin anomalies. The copper anomaly occurs in the southeastern portion of the tenement, in the vicinity of the Fergusson copper prospects.

The tungsten anomaly is located on the mid-northern boundary of the tenement (Figure 3). Its source is not fully understood.

The larger of the two tin anomalies occurs over the mid-eastern boundary of the area where several small tin workings were discovered during the field work.

The second, smaller tin anomaly lies directly in the drainage path of the alluvial tin deposit within the Wandie Granite.

Results from -80# infill samples did not contain any anomalous values (Figure 3.).

4.2 Regional Soil Sampling

A regional soil sampling programme was completed over the northeast and southeast corners of the tenement in 1989 (Figure 2). BCL gold results from the soil samples were very low and contained, on average, < 0.01 ppb Au. Unfortunately no base metals or tin were assayed from the soil samples.

4.3 Reconnaissance Mapping

A reconnaissance mapping exercise was carried out within the vicinity of the 61.9 ppb Au stream anomaly. Rock chip samples taken from a narrow (1-2m wide), quartz-haematite lode, over 150-200m contained values of < 0.1 ppm Au. However, anomalous grades of copper, lead, zinc, silver, tin, tungsten and arsenic were recorded (Figures 1, 2 & 3). Further follow up of this polymetallic quartz vein in 1990 resulted in the identification of four NW-trending Cu-mineralised linear structures (Figure 1).

The main linear structure was traced continuously for 2.5km and is still open to the NW. The remaining three average 1km long.

Each system is hosted in retrogressed cordierite facies pelites and psammopelites of the Burrell Creek Formation.

The 3 western most systems are of quartz & haematite + malachite + cuprite reef/lode which varies from 2cm to 2m wide.

The eastern most system is a Cu-rich mylonite lode which varies between 0.5 - 1.5m wide.

All systems are vertical and progressively rotate from NNW to NW along strike (Figure 1). When the systems are extrapolated southwards they appear to converge under black soil plain in the SE corner of the tenement.

Numerous old workings exist along each system with two adits occurring on the major (2.5km long) system. Mineralisation in the three western systems consist of strong malachite and cuprite staining in a quartz-Fe-breccia lode; minor azurite does occur in some prospects. The eastern lode consists of malachite and azurite staining in an Fe-rich mylonite lode.

Numerous rock chip samples were taken along each system. The gold results were low (<0.1 g/t Au) with only one sample containing 0.6 g/t Au.

A suite of elements were analysed by AAS and XRF including Platinum, Paladium, Chromium, Titanium and Bismuth. The results are listed in Appendix 1 and samples locations on Figure 4.

Two magnetic anomalies identified from regional BMR aeromagnetic data over the Wandie tenement were followed up in June 1990.

No evidence of mineralisation associated with the magnetic anomalies was found but a regional soil line was conducted across the anomalies with the chance of identifying any low order, subsurface mineralisation. Results from the soil line were low for gold and base metals (Figure 1).

It appears that the two magnetic anomalies are a contact metamorphic effect associated with the emplacement of the Cullen Granite into the Burrell Creek Formation. Albite-epidote facies hornfelsing is widespread through the area and magnetic contact aureoles are a common occurrence in the Pine Creek Geosyncline.

Reconnaissance mapping and rock chip sampling in the northeast corner of the tenement (tin and tungsten stream anomalies) led to the discovery of two small tin workings not previously known.

The first tin working consisted of two shallow diggings approximately 1m deep, 2m wide and 3m long within a hornblende-rich fractionated granite (Figures 1 & 3). The ore zone was ~0.5m wide, striking 317° and consisted of Fe-rich quartz stringers.

The structure was traced to the north and south over a total length of 600m but unfortunately only reached a maximum thickness of 0.5m. Samples and results taken from the workings and along strike are listed below (see Figure 4 for location).

Sample No.	Sn(ppm)	As(ppm)	Cu(ppm)	Pb(ppm)
*241302	1.76%	213	80	70
*241303	1.57%	1011	217	617
241304	1624	3405	1060	442
241305	957	293	105	71
241306	334	90	151	54

*Within workings

The second tin working consisted of one vertical shaft into Burrell Creek Formation near a creek which returned 2030 ppm Sn from a stream sample (Sample No: 095; Figure 4). No evidence of mineralisation or favourable structures were recognised in or near the shaft. Rock chip samples from what appeared to be a small stock pile of ore returned grades of only 31 ppm Sn and <0.01 ppm Au.

Rock chip results for the remaining area to the north (tungsten anomaly) did not contain any anomalous tungsten results and consequently the source of the tungsten anomaly was not recognised. However, it is interpreted that the anomaly could reflect the presence of anomalous tungsten commonly found in high temperature quartz veins and pegmatites associated with granites; since contact metamorphism to hornblende-hornfels facies and albite-epidote hornfels facies is common in the area.

Additional reconnaissance samples taken by Denehurst staff following the withdrawal of Billiton provided anomalous results in copper and silver.

5. CONCLUSIONS

Following the decision by Shell to withdraw from the project, and after field reconnaissance by Denehurst staff, it was initially concluded that there was merit in retaining the property and a proposal was made to the Department to conduct further exploration at Fegusson's Prospect.

Following further review however, it was decided not to proceed with this prgramme. Due to the limited thickness (<0.5m) of the Cu-rich vein and the absence of gold it was considered that the prospect was of insufficient size to justify further expenditure. It was thus recommended that the Licence be allowed to lapse.

6. REFERENCES

Daly M.R., 1970 NOTES ON THE WANDIE CREEK TIN PROSPECT. Geological Survey Report - G.S. 70/3 Unpubl.

Stuart-Smith P.G., BAGAS L. & NEEDHAM R.S. 1988 RANFORD HILL - 1:1000,000 GEOLOGICAL MAP COMMENTARY. Department of Mines and Energy, N.T., Australian Government Publishing Service Canberra.

APPENDIX 1

ASSAY RESULTS

CLASSIC LABORATORIES LTD

RESULTS - ROCK CHIP

Sample No.	Au	Pt	Pd
230361	41	<5	<1
230362	<1	<5	<1
230363	100	<5	<1
230364	5	<5	<1
230365	27	<5	<1
230366	38	<5	<1
230367	4	<5	<1
230871	200	<5	<1
230872	39	<5	<1
230873	65	<5	<1
230874	38	<5	<1
230875	180	<5	<1
230876	500	<5	<1
230877	170	<5	<1
230878	75	<5	<1
230879	8	<5	<1
230880	17	<5	<1
230881	15	<5	<1
230882	29	<5	<1
230883	55	<5	<1
230884	600	<5	<1
230885	35	<5	<1
230886	28	<5	<1
230887	13	<5	<1
230888	4	<5	<1
230889	15	<5	<1
230890	4	<5	<1
230891	140	<5	<1
230892	16	<5	<1
230893	1	<5	<1
230894	76	<5	<1
230895	L.N.R.	L.N.R.	L.N.R.
230896	1	<5	<1
230897	<1	<5	<1
230898	1	<5	<1
230899	<1	<5	<1
230900	<1	<5	<1
UNITS	ppb	ppb	ppb
DET.LIMIT	1	5	1

HJ11.11/.01

CLASSIC LABORATORIES LTD

RESULTS

Sample No.	Cu	Pb	Zn	Ag	Bi
230361	9830	12	33	8	103
230362	2.38%	66	260	29	37
230363	280	9	31	1	<10
230364	460	20	22	<1	78
230365	240	60	22	<1	106
230366	520	129	17	2	780
230367	280	31	23	<1	18
230871	5310	24	51	12	1660
230872	2641	32	68	2	420
230873	1120	31	28	2	740
230874	1.49%	84	90	8	153
230875	1060	24	25	6	1700
230876	3.42%	26	9	47	5440
230877	1020	22	74	2	172
230878	1.37%	52	51	2	320
230879	1220	17	3	9	16
230880	260	7	19	2	190
230881	4491	62	240	2	400
230882	3837	119	340	25	780
230883	4482	280	280	2	2041
230884	8.68%	92	2336	156	900
230885	2.26%	47	54	<1	1760
230886	2274	106	30	2	1020
230887	3101	41	24	1	132
230888	1.00%	50	111	3	300
230889	2027	7	27	3	100
230890	780	12	29	3	111
230891	1060	13	8	8	740
230892	1320	22	18	1	280
230893	8130	11	22	3	76
230894	70	<4	10	<1	<10
230895	L.N.R.	L.N.R.	L.N.R.	L.N.R.	L.N.R.
230896	7480	36	34	3	580
230897	151	4	37	<1	12
230898	38	<4	32	<1	<10
230899	114	32	45	<1	33
230900	640	33	11	3	65
UNITS	ppm	ppm	ppm	ppm	ppm
DET.LIMIT	2	4	2	1	10

HJ11.11/.01

CLASSIC LABORATORIES LTD

RESULTS

Sample No:	Sn	W	As	Mo	Cr	Ti	V
230361	360	2750	1.84%	5	165	280	45
230362	2000	1560	4150	12	13	90	50
230363	16	20	130	4	250	70	45
230364	370	20	9500	2	100	4050	155
230365	195	10	1.54%	8	185	1860	85
230366	68	25	3050	3	68	2700	120
230367	9900	20	250	2	115	3750	210
230871	160	9600	1.19%	6	32	40	35
230872	300	2.355	7200	5	98	820	50
230873	710	8000	3000	8	62	1100	65
230874	420	4450	5600	13	155	65	45
230875	1340	2800	1060	22	68	380	45
230876	115	1.05%	10.5%	12	135	35	25
230877	600	290	2050	58	28	1260	70
230878	800	2700	4900	19	350	1400	115
230879	200	610	540	7	36	210	35
230880	92	145	300	8	230	135	55
230881	22	<10	165	<2	32	1500	200
230882	110	25	570	3	12	85	270
230883	52	10	1020	<2	22	470	350
230884	580	30	1140	10	22	680	125
230885	105	5800	5.4%	3	56	2450	70
230886	320	200	8400	3	88	2100	100
230887	510	1100	8900	4	26	680	60
230888	1380	860	8300	7	88	450	125
230889	210	4150	1.44%	2	50	1440	70
230890	990	420	2200	4	155	550	85
230891	440	2950	7500	7	66	230	35
230892	270	2550	5400	4	120	1340	90
230893	380	1480	1.07%	3	40	280	50
230894	3.25%	90	40	4	60	2400	90
230895	L.N.R.	L.N.R.	L.N.R	L.N.R.	L.N.R.	L.N.R.	L.N.R.
230896	200	600	1.30%	4	46	110	50
230897	92	<10	145	<2	85	3300	120
230898	15	<10	42	<2	42	3250	120
230899	18	<10	26	2	135	50	40
230900	640	180	1360	5	36	155	40
230870	610	2150	3850	7	180	75	35
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DET.LIMITS	4	10	2	2	2	10	5

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	2496.0.21.04440	16/08/90	41201	1 OF 2

	SAMPLE No.	Co	Ni	Cu	Cu	Ag	Ag	Sn	Sb	Te
1					-		-			
2					-		-			
3					-	-			-	
4					-		-			
5					-	-				
6	320480	<5	<5	650	-	-	14.0	0.033	<3	<5
7	320481	40	15	945	-	-	16.5	0.038	<3	<5
8	320482	125	65	-	14.1	-	140.0	0.019	<3	<5
9	320483	35	15	2600	-	1.0	-	0.044	3	<5
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	5	5	0.1	0.5	0.5	0.005	3	5
24	UNITS	PPM	PPM	PPM	%	PPM	PPM	%	ppm	ppm
25	METHOD	101	101	101	103	101	103	403	401	401

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	2496.0.21.04440	16/08/90	41201	2 OF 2

TUBE No.	SAMPLE No.	Ta	W	Au	Hg	Au(R)	Au(S)			
1						–	–			
2						–	–			
3							–			
4						–	–			
5						–				
6	320480	0.008	0.033	0.308	0.005	–	–			
7	320481	0.006	0.164	0.233	0.020	–	–			
8	320482	0.046	<0.005	0.156	0.040	–	–			
9	320483	0.007	0.007	0.087	0.030	–	–			
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.005	0.005	0.008	0.005	0.008	0.008			
24	UNITS	%	%	PPM	ppm	PPM	PPM			
25	METHOD	403	403	309	122	309	309			

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
– = element not determined

AUTHORISED OFFICER

132°00'00"

13°58'30"

13°55'

132°05'00"

132°07'00"

132°10'00"

13°52'30"

13°53'00"

13°55'00"

13°57'00"

Wandie Creek

River

Ferguson

RELINQUISHED AREA

ABANDONED WORKINGS

140652 REGIONAL SOIL TRAVERSE SAMPLE LOCATIONS

X 240801 ROCK CHIP SAMPLE LOCATION & NUMBER.

425 STREAM SEDIMENT SAMPLE LOCATION & NUMBER

0 0·5 1 1·5 km

Billiton Australia

The Metals Division of the Shell Company of Australia Limited

Project: **WANDIE CREEK EL 2708**
NORTHERN TERRITORY

Title: **SAMPLE LOCATIONS**

Author A.J.T.	Dept. Cns	Scale 1:25000	
Drawn P.J.W.	Date 9/88	Revised B.J.F.	Date 10/89
Checked	Date	S'ceded	Date
Sheet No.		Drawing No. C/HJ 11/02	


132°00'00"
132°05'00"
132°07'00"
132°10'00"
13°52'30"
13°53'00"
13°55'00"
13°57'00"
Wandie
Creek
River
Fergusson
Repeat Samples
Au (alluvial)
RELINQUISHED AREAS
ABANDONED WORKINGS
ROCKCHIP RESULT (ppm)
TRAVERSE RESULT (ppb Au)
STREAM SEDIMENT RESULT (ppb Au)
SAMPLE RESULT BELOW DETECTION
0 0.5 1 1.5 km
Billiton Australia
Project WANDIE CREEK EL 2708
NORTHERN TERRITORY
Title
ROCKCHIP, SOIL &
STREAM SEDIMENT
BCL GOLD RESULTS
Author A.J.T.
Dept Cns
Scale 1:25000
Drawn P.J.W.
Date 9/88
Revised B.J.F.
Date 10/89
Checked
Sheet No 2
Drawing No C/HJ11/03


132°00'00"
13°52'30"
132°05'00"
132°07'00"
132°10'00"
13°53'00"
13°55'
13°55'00"
13°57'00"
14°00'
132°00'00"
132°05'00"
132°07'30"
E.L.2708
Au (alluvial)
River
Fergusson
RELINQUISHED AREAS
ABANDONED AREA
1100/14/40680/ 230/1550/1
ROCKCHIP SAMPLE LOCATION RESULTS(ppm) Cu/Pb/Zn/Sn/W/ As/Ag
18/31/19/-/-/8
STREAM SEDIMENT RESULTS IN (ppm) Cu/Pb/Zn/Sn/W/As
(–) SAMPLE TAKEN, RESULT BELOW DETECTION.
Billiton Australia
Project WANDIE CREEK EL 2708
NORTHERN TERRITORY
Title ROCKCHIP & STREAM SEDIMENT -80# RESULTS
Author A.J.T./S.M. Dept. Cns
Scale 1: 25000
Drawn P.J.W. Date 10/88
Revised B.J.F. Date 10/89
Checked Date
S'ceded Date
Sheet No. 3
Drawing No. C/HJ11/05