

**EL 22/2003**

**Lyndhurst**

**Annual Report on exploration activity,  
August, 2003 to July, 2004**

**Grant MacDonald  
on behalf of  
Mr F. (Frank) C. Bardenhagen**

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## **Summary and Recommendations**

Work has focussed on the eastern reef of the old Southern Cross mine and has consisted of:

- Nine excavator trenches (for 169m) were dug over the eastern reef of the old Southern Cross goldfield exposing a quartz+sulphide reef.
- Fourteen rock samples were collected and assayed with best results 9.95g/t Au and 7.2g/t Au.
- Three diamond drill holes, LH 1 (125.9m), LH 2 (197.8m) and LH 3 (237.0m) were drilled to test this reef and to look for parallel reefs.
- LH 2 and LH 3 successfully intersected the reef. Sampling and assaying of the reef is to be carried out in the next few weeks.
- The reef has the potential to host an economic gold resource.

Further work should include:

- Sampling and assaying the reef intersected in LH 2 and LH 3
- Sampling and assaying the reef exposed in the trenches
- Further shallow RC drill testing of the reef along strike in order to look for high grade/width shoots

**Introduction**

This report details gold exploration carried out by Mr Frank Bardenhagen on EL 22/2003, and in particular the results of trenching, rock sampling and diamond drilling on the old Southern Cross mine prospect. The goldfield lies towards the northern end of the Lyndhurst-Alberton-Mathinna-Mangana gold lineament

The author's role in this work has been simply to briefly log the diamond drill holes and to write this report. The bulk of the work has been carried out by Frank Bardenhagen, a man who has backed his own dreams of finding a mine in the northeast which would provide work for people in the district, with his own time, money and passion. This is not the first time that Frank, assisted by his prospecting colleagues Lloyd Davies and Joe Jensen, has followed his dream, and God willing, it will not be his last. Their efforts can only be commended.

The licence contains the old Southern Cross and North Southern Cross mines and it is the former which has been the focus of Frank Bardenhagen's work.

**Tenement Information**

EL 22/2003 consist of 6 square kilometres in northeastern Tasmania in the Land District of Dorset, vicinity of Lyndhurst. The licence commences at the southwest corner at grid coordinates 551 000mE 5 464 000mN thence grid north to 5 468 000mN grid east to 552 500mE grid south to 5 464 000mN aforesaid thence grid west to the point of commencement (Coordinate datum – AGD 1966 AMG zone 55). The licence was granted to F.C Bardenhagen on 29<sup>th</sup> August 2003 and expires on 29<sup>th</sup> August 2008.

**Previous Work**

Previous exploration has been described in detail in Turner (1996) and the reader is referred to this report.

Placeco carried out a Huminex soil sampling programme (Morrison and Hofto, 1990) in the area of the old Southern Cross mine. Herald Resources also carried out soil sampling at Southern Cross (Turner, 1996) with spotty values up to 1g/t Au reported. Herald dug 4 trenches for 374m with values up to 4m at 0.13g/t Au reported. Herald subsequently drilled 4 RC holes for 219 metres with a best result 1m @ 0.6g/t Au from massive, white, arsenopyritic quartz from the eastern reef.

## **Work Done/Results**

The work carried out by Frank Bardenhagen on EL 22/2003 in the 2003-2004 year consisted of:

- Collection and assaying of 14 rock samples.
- Digging of 9 trenches for 169 metres across the eastern reef of the old Southern Cross mine.
- Drilling and sampling of 3 diamond drill holes for 560.7 metres. 38 samples were submitted for assay.

### *Rock Sampling*

14 samples of quartz vein float in the vicinity of the eastern reef of the old Southern Cross mine were collected and assayed. Samples 1L, 2L, 3L, 4L 5L, "Feb – A", "Feb – B", "Feb- C", "A – DCS", "B – QSRB", "C – SULQ", "D – NSGQ" were fire assayed (50g charge) with AAS finish by SGS, Burnie. Assay result sheets are appended. Samples "Rock" and "Feb – D" were fire assayed (50g charge) with AAS finish and also whole rock assayed using XRF, by SGS, Burnie. Result sheets are appended. Best results were 7.20g/t Au from sample "Rock" and 9.95g/t Au for sample 4L (repeating at 9.7g/t Au). The approximate locations from which these samples were collected is shown on figure 1.

### *Trenching*

Nine trenches were dug by Bob Smith of Bridport by his excavator for a total of 169m. Trenches were examined and the position of the reef exposed noted. Detailed sampling of these trenches is planned for later in the year with the trenches to be filled and rehabilitated following the sampling. Locations of these trenches is shown on figure 1.

### *Diamond Drilling*

Three diamond drill holes were drilled to test the reef exposed in the trenches.

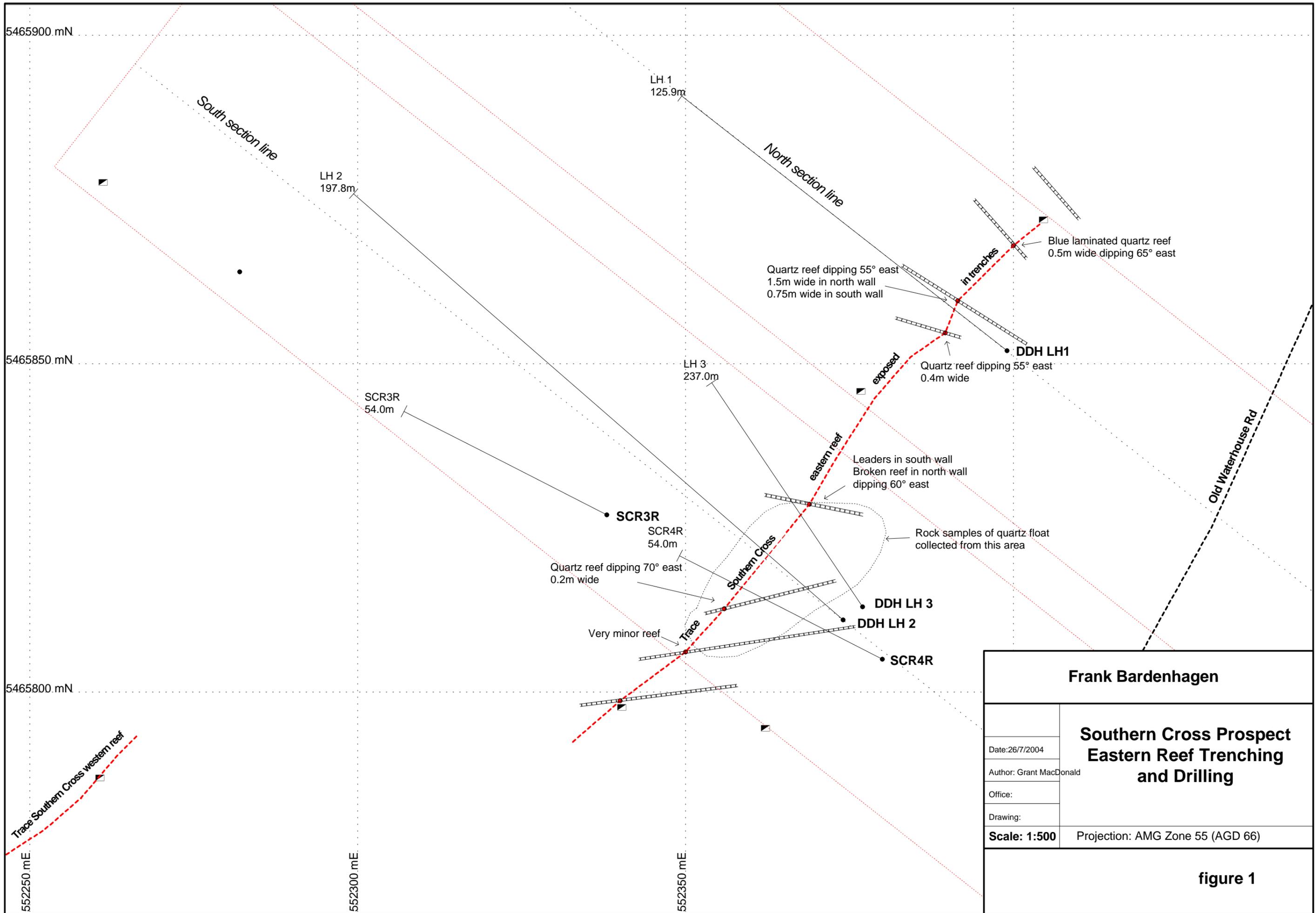
LH 1 collared at 55 552 399mE 5 465 852mN, was drilled at -60° to 308° (AMG) for 125.9m.

LH 2 collared at 55 552 374mE 5 465 811mN, was drilled at -60° to 311° (AMG) for 197.8m.

LH 3 collared at 55 552 377mE 5 465 813mN, was drilled at -80° to 326° (AMG) for 237.0m.

Drill hole locations and traces are shown on figure 1. Drill sections are presented in figures 2 and 3. Brief drill logs are appended.

Hole collar coordinates were surveyed by Ron Gregory using a Magellan GPS and have an accuracy of +/-5m. Hole azimuth was surveyed by hand compass and hole inclinations were those given by the drillers when setting up the holes. No down the hole surveys were undertaken. The drill sections in figures 2 and 3 assume a straight hole, however, this is almost certainly not the case and some lift and swing is probable. Before the data from these holes can be used for resource definition the holes must be correctly surveyed.



<b>Frank Bardenhagen</b>	
Date: 26/7/2004	<b>Southern Cross Prospect Eastern Reef Trenching and Drilling</b>
Author: Grant MacDonald	
Office:	
Drawing:	
<b>Scale: 1:500</b>	Projection: AMG Zone 55 (AGD 66)

**figure 1**

Quartz reef - 1.5m wide in north wall  
0.75m wide in south wall, dipping 55° to east

Trench

LH 1

75 mRL

50 mRL

25 mRL

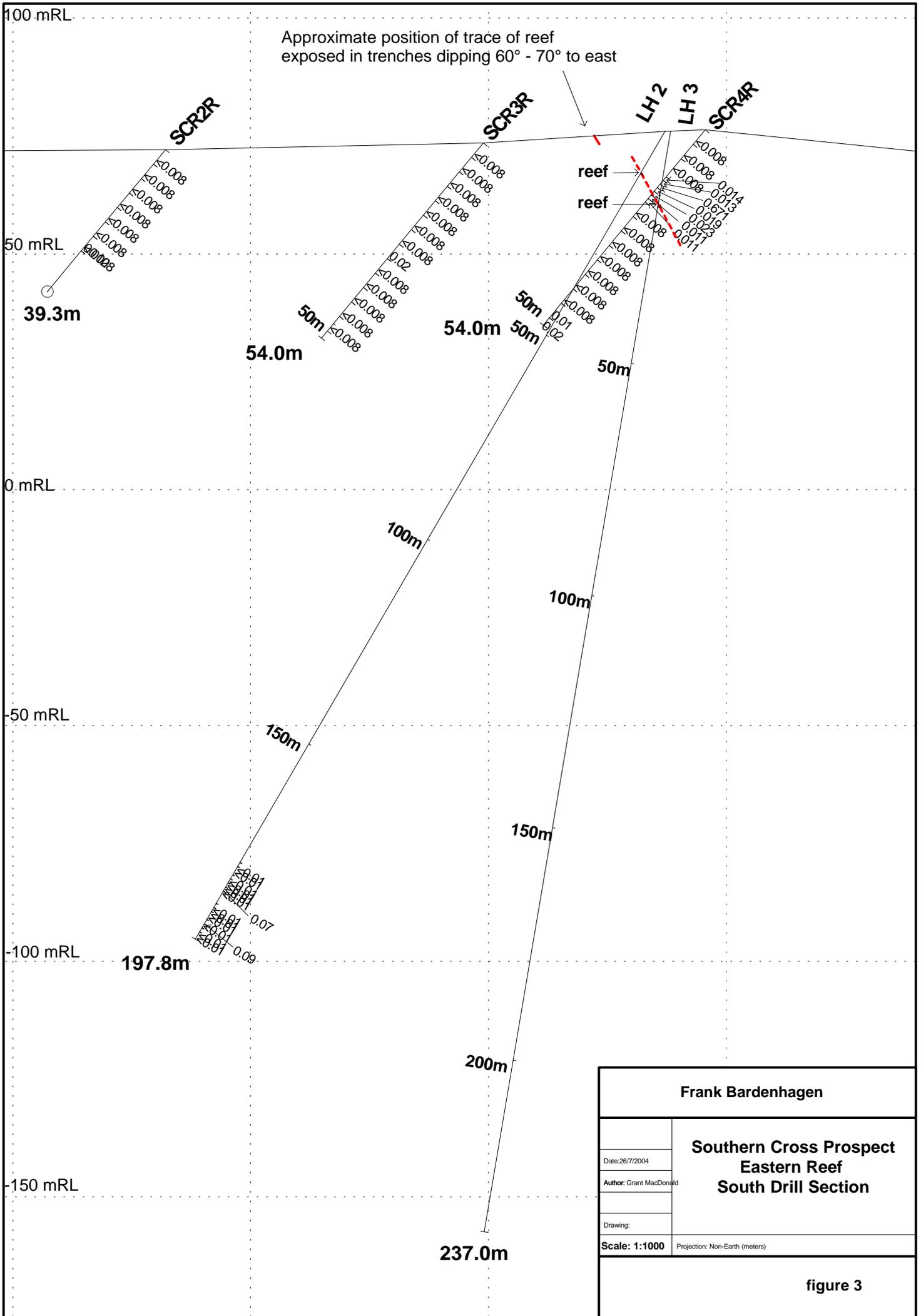
0 mRL

-25 mRL

<0.01 - Au assay results, g/t Au

125.9m

<b>Frank Bardenhagen</b>	
Date: 26/7/2004	<b>Southern Cross Prospect Eastern Reef North Drill Section</b>
Author: Grant MacDonald	
Drawing:	
<b>Scale: 1:500</b>	Projection: Non-Earth (meters)
<b>figure 2</b>	



<b>Frank Bardenhagen</b>	
Date: 26/7/2004 Author: Grant MacDonald Drawing:	<b>Southern Cross Prospect          Eastern Reef          South Drill Section</b>
<b>Scale: 1:1000</b> Projection: Non-Earth (meters)	

figure 3

## 6.

All holes intersected a similar sequence of folded, dark grey, generally thickly bedded sandstones and thinner interbeds of black shale of the Mathinna Group. LH 2 intersected some thin beds of tuff or reworked tuff with feldspar crystals and pumice. All three holes contained a number of generally thin (<20mm thick) quartz+/-chlorite+/-pyrite veins of two distinct types.

(1) Tension veins with often well developed fibrous growth perpendicular to vein orientation. Commonly contain clots of green chlorite and occasionally contain minor pyrite. These occur at varying densities but rarely even approach a density which might justify consideration of them as a potential orebody.

(2) Bedding parallel laminated veins. These are almost invariably hosted in the thin black shale interbeds and consist of finely laminated quartz and wallrock septa with occasionally minor pyrite. The reef intersected near the top of holes LH 2 and LH 3 is considered to be of this type.

Both LH 2 and LH 3 intersected a quartz+arsenopyrite+stibnite reef, LH 2 from 10.2m to 10.275m, LH 3 from approximately 15.3m to 15.55m. Whilst figure 3 suggests that the reef intersected in drilling is not that exposed in the trenches, it is considered that this may well be the case with either survey discrepancy or structural offset the reason for the separation.

To date 24 samples of veining intersected in LH 1 and 14 samples of veining intersected in LH 2 were submitted to SGS, Burnie for assay. Samples were taken of the actual vein, without any emphasis placed on intervals, in order to see whether these carried gold. Samples were fire assayed (50g charge) with AAS finish. All samples in LH 1 assayed <0.01g/t Au. Samples from LH 2 were similarly assayed with only two samples assaying greater than 0.01g/t Au with the vein from 186m assaying 0.07g/t Au and that from 194m assaying 0.09g/t Au. Assay results are included as appendix A.

Further samples of the reef intersected near the top of holes LH 1 and LH 3 are to be submitted for assay.

24 samples of veins intersected in LH1 were submitted for assay. These all assayed <0.01g/t Au. Samples of the reef intersected between 15.3m and 15.55m have been submitted for assay.

14 samples of veins intersected in LH 2 were submitted for assay. All samples assayed <0.01g/t Au except for veins at 186m and 194m which assayed 0.07g/t Au and 0.09g/t Au respectively. Samples from the reef intersected between 10.2m and 10.475m have been submitted for assay.

**Expenditure**

Geology	\$564.00
Earthmoving	\$6141.00
Drilling	\$74 793.65
Assaying	\$577.50
Total	\$82 076.15

**Conclusions**

Trenching and drilling has successfully exposed/intersected a potentially economic quartz+arsenopyrite+stibnite reef. Further sampling and assaying is required to determine the true potential of this reef. Such work is relatively inexpensive and will be carried out in the next few weeks. The prospect has the potential to host an economic resource, either on this reef or on parallel or along strike structures. Further exploration of the Southern Cross prospect is considered warranted.

**References**

- Morrison, K.C. and Hofto, V., 1990, EL 27/86 – Lyndhurst. Annual Report, year 3. Placeco Australia Pty Ltd. [Mineral Resources Tasmania TCR 90-3190]
- Turner, N.J., 1996, EL 24/94 – Boobyalla. Annual Report 1994-95. Herald Resources Ltd. [unpub. rept.]

## **Appendix A: Assay results**

## **Appendix B: Drill logs**

## **LH 1 (-60° to 308° AMG for 125.9m)**

HQ from 0.00m to 30.2m

NQ from 30.2m to EOH

### **0.00m 125.9m Sandstone, minor shale, with occasional veins**

Sequence of folded sandstones, generally thickly bedded, with thin black shale interbeds (generally 0.05m to 0.2m thick). Medium dark grey to ~73.5m, dark grey below this.

Bedding is 20° to core axis at 15m, 20° @ 20m, 15° @ 25m, 30m, 35m, 20° @ 40m, 35° @ 55m, 30° @ 60m, 10° @ 65m, 40° @ 68.5m, 70° @ 75m, 70° @ 80m, 85m, 90m, 95m, 75° @ 100m, 70° @ 105m, 65° @ 100m and 70° @ 117m.

There are two types of veins intersected, both generally only up to 20mm thick. Type 1 are quartz+/- minor chlorite+/-trace pyrite tension veins. These are generally <20mm thick. They commonly have fibres growing perpendicular to orientation of vein. Occasionally there is subtle bleaching of wallrock (sericite alteration of dark chloritic matrix to sandstone). There are not enough of these to consider them to be a potential orebody. These veins are commonly at moderate angles to core axis.

Type 2 are thin, generally <10mm thick, finely laminated quartz+wallrock septa veins which are found almost exclusively in shale interbeds. These laminated veins are occasionally folded tightly but generally are conformable to bedding. In places slickenlines can be seen indicating either reverse or normal movement on these bedding plane faults (reverse is favoured).

There are less veins in this hole than in LH 2 or LH 3.

Quartz+/-chlorite+/-sulphide (pyrite) tension veins are from 13.8m to 19.0m with ~4/m at 40° to core axis, 48.5m to 50.0m, ~55.0m, 69.5m to 73.0m with ~2/m at 25° to core axis, 99.4m to 105.0m with ~2/m to 50mm thick at 35° - 40° to core axis and 115.2m to 117.2m with ~2/m to 20mm thick at 70° to core axis.

Laminated veins in shale are at 72.5m @ 75° to core axis, 73.3m @ 80°, 96.7m @ 75°, 112.1m @ 70° and 112.8m @ 70° to core axis.

### **125.9m EOH**

## **LH 2 (-60° to 311° AMG for 197.8m)**

NQ for whole hole

### **0.00m to 10.2m Shale and sandstone**

Leached and weathered shale and sandstone as described for unit below reef.

### **10.2m to 10.475m Quartz+arsenopyrite+stibnite reef**

Quartz reef with ~2-4% arsenopyrite and minor stibnite. In mostly coherent core. Contains arsenopyrite and lesser stibnite in coarse grained crystals. Upper contact is sharp and unshaped at 85° to core axis. Lower contact is similarly sharp and unshaped at 85° to core axis. Vitreous quartz which is cut by 5mm thick later milky quartz veinlets at 45° to core axis. Only very weak fabric defined by wallrock septa near lower contact at septa at 85° to core axis. Reef is 0.275m true width. Looks to be of bedding parallel type (see discussion below). On the reefs downhole side is a zone of leached, silicified, chloritic sandstone with veinlets completely leached out at 45° to core axis – these leached cavities are cut by quartz veinlets parallel to core axis.

### **10.475m to 197.8m Sandstones, minor shales, zone of tuff or reworked tuff, and occasional veins.**

Sequence of folded sandstones, generally thickly bedded, with thin black shale interbeds (generally 0.05m to 0.2m thick). Medium grey to ~60m due to leaching by groundwater, dark grey below this to 163.5m. Between 163.5m and 183.5m are zones of more dark greenish grey due in part to some wallrock alteration around tension veins, in part due to more tuffaceous nature of sandstones. From 176.3m to 179.7m are three beds of tuff or reworked tuff with feldspar crystals and pumice.

Bedding is 60° to core axis at 11m, 45° @ 17m, 20° @ 22m, 40° @ 25m, 32m and 35m, 35° @ 40m, 30° @ 43m and 47.5m, 15° @ 51.5m, 70° @ 58.5m, 75° @ 71.5m, 70° @ 78.5m, 75° @ 91.5m, 70° @ 101m, 130.5m, 158m and 191m.

There is a minor puggy fault at 23m, probably associated with folding.

There are two types of veins intersected, both generally only up to 20mm thick. Type 1 are quartz+/- minor chlorite+/-trace pyrite tension veins. These are generally <20mm thick. They commonly have fibres growing perpendicular to orientation of vein. Occasionally there is subtle bleaching of wallrock (sericite alteration of dark chloritic matrix to sandstone). There are not enough of these to consider them to be a potential orebody. These veins are commonly at moderate angles to core axis.

Type 2 are thin, generally <10mm thick, finely laminated quartz+wallrock septa veins which are found almost exclusively in shale interbeds. These laminated veins are occasionally folded tightly but generally are conformable to bedding. In places slickenlines can be seen indicating either reverse or normal movement on these bedding plane faults (reverse is favoured).

The only concentration of tension veins is below 167.5m with ~1/m up to 20mm thick and generally 30° to 50° to core axis.

Laminated veins in shale are at 61.5m @ 60° to core axis, 76.9m @ 75°, 83m @ 70°, 84.3m @ 80°, 97.2m @ 70°, 99.8m @ 75°, 106.2m, @ 75°, 107.4m @ 75°, 112.7m @ 75°, 120.3m @ 75°, 127.6m

@ 80°, 135.3m @ 75°, 140.9m @ 75°, 144.2m @ 75°, 145.9m @ 70°, 147.9m @ 70°, 148m @ 70°, 163m @ 80°, 163.1m @ 80°, 170.5m @ 70° and 187.2m @ 80° to core axis.

**197.8m EOH**

### **DDH LH 3 (-80° to 326° AMG for 237.0m)**

NQ for whole hole

#### **0.00m 15.3m Shale and sandstone**

Leached, weathered shale and sandstone as for unit described below reef.

#### **15.3m 15.55m Quartz+arsenopyrite+stibnite reef**

Quartz reef with ~1% arsenopyrite and trace stibnite. In rubbly broken core so width is an estimate and there is core loss on the downhole side. Contains arsenopyrite in coarse grained crystals. Fabric is defined by chloritic septa at 40° to core axis. Reef is probably 0.25m to 0.3m true width. There is a similar vein downhole at 15.8m which is 0.06m true width.

#### **15.55m 237m Sandstones, minor shales and occasional veins**

Sequence of folded sandstones, generally thickly bedded, with thin black shale interbeds (generally 0.05m to 0.2m thick). Medium dark grey to ~47.5m, dark grey below this. Bedding is 40° to core axis at 5m and 10m, 35° @ 15m, 40° @ 20m, 35° @ 25m, 40° @ 30m and 35m, 25° @ 40m, 30° @ 45m, 30° @ 45m, 35° @ 50m, 30° @ 151m, 35° @ 171.5m, 70° @ 195m, 60° @ 200m and 25° @ 220m.

There is a zone of rubbly broken core between 220.0m and 220.5m.

There are two types of veins intersected, both generally only up to 20mm thick. Type 1 are quartz+/- minor chlorite+/-trace pyrite tension veins. These are generally <20mm thick. They commonly have fibres growing perpendicular to orientation of vein. Occasionally there is subtle bleaching of wallrock (sericite alteration of dark chloritic matrix to sandstone). There are not enough of these to consider them to be a potential orebody. These veins are commonly at moderate angles to core axis.

Type 2 are thin, generally <10mm thick, finely laminated quartz+wallrock septa veins which are found almost exclusively in shale interbeds. These laminated veins are occasionally folded tightly but generally are conformable to bedding. In places slickenlines can be seen indicating either reverse or normal movement on these bedding plane faults (reverse is favoured).

Tension veins are between 51m and 72.5m with ~2/m, 96.5m to 108.0m and 179.4m to 180.7m. Tension vein parallel to core axis between 212.5m and 212.9m.

Laminated bedding parallel veins are at 17.1m at 40° to core axis, 63.8m @ 15°, 79.2m @ 15°, 113.3m @ 25°, 118.7m @ 25°, 118.9m @ 25°, 119.7m @ 25°, 119.9m @ 25°, 121.3m @ 25°, 129.4m @ 25°, 135m @ 25°, 142.5m @ 25°, 160.7m @ 30°, 162.1m @ 35°, 162.3m @ 40°, 177m @ 40°, 178.5m @ 70°, 178.8m @ 70°, 183.3m @ 70°, 188.8m @ 75° 203m @ 55° and 214.9m @ 25° to core axis. Veins at 113.3m, 118.7m, 118.9m and 135m have slickenlines parallel to the long axis of the ellipse i.e. indicating reverse or dip-slip with reverse movement favoured.

#### **237m EOH**