



# SANDFIRE RESOURCES NL

ABN 55 105 154 185

QUARTERLY REPORT FOR THE PERIOD ENDED 30 September 2007

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## YALCO LEAD-ZINC PROSPECT BORROLOOLA, NORTHERN TERRITORY

- ✚ Drilling of a broad airborne electromagnetic (AEM) target at Yalco intersected a 50m thickness of carbonaceous pyritic shale similar to the host rock of the world class HYC deposit at the McArthur River Mine, some 30 km to the southeast.

## DOOLGUNNA GOLD PROJECT, WESTERN AUSTRALIA

- ✚ RC drilling at the Old Highway and East Shed Well Prospects showed intersections of up to 4 metres grading 13.17 g/t gold, in a broader interval from 34 to 50 metres grading 5.76 g/t gold.
- ✚ A further RAB, vacuum and aircore drilling program is underway. This Project continues to reveal areas of anomalous gold, geochemistry.

## URANDY GOLD PROJECT, WESTERN AUSTRALIA

- ✚ Soil and bedrock geochemical programs have showed continuity of anomalous gold geochemistry over broad areas on widely spaced lines.
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## **INTRODUCTION**

Exploration during the quarter ending 30 September 2007 focussed upon:

- i. A program of diamond core drilling of selected geophysical targets and target zones at the Borroloola Project, Northern Territory.
- ii. A program of 37 reverse circulation drill holes at the Doolgunna Project, targeted to infill along the gold mineralised structures of the Old Highway and East Shed Well Prospects, Western Australia.
- iii. Extending and infilling the zones of bedrock gold anomalism at the Urandy Project, Western Australia by further shallow vacuum drilling.

### ***Borroloola Project, Northern Territory***

Sandfire holds exploration title to in excess of 10,000 square kilometres of the Meso Proterozoic Batten Fault Zone, that hosts the giant McArthur River lead, zinc and silver mine in northern Australia.

The program of airborne electromagnetic surveying, data processing and in-house interpretation, carried out by Sandfire in 2007, identified target zones for the first phase of reconnaissance diamond drilling that commenced in the September quarter. In particular, the Yalco Prospect, adjacent to the Emu Fault, some 30 kilometres north of the McArthur River Mine was a large, highly-rated prospect for initial test work.

Six holes were drilled on this Prospect, two of which intersected the Barney Creek Shale Formation that hosts the McArthur mineralisation.

The Formation consisted of a wide thickness of pyritic carbonaceous shale in places with micro-veinlets of galena. The two holes, BD-19 and BD-20, are widely spaced (greater than 1 kilometre) and well west of the Emu Fault. Some 6 kilometres south of these two holes, BD-16, drilling to test a conductive target south of the main Yalco trend (refer Fig. 2), was stopped in the top of the Barney Creek Formation.

Although no elevated assay results were reported from the 30 samples submitted to date, the drilling program has significantly enhanced the value of the Borroloola Project to Sandfire.

### ***Doolgunna Project, Western Australia***

The results of the RC drilling program on the two Doolgunna prospects were disappointing. Sandfire had hoped to establish the continuity of gold mineralisation along the two established zones of mineralisation. Several acceptable gold intersections are reported, however correlation of these with adjacent holes and sections is not readily apparent. Further RC drilling is planned for the March 2008 quarter after a thorough review of the historic and recent drilling results.

### ***Urandy Project, Western Australia***

The extent and continuity of shallow bedrock gold geochemical anomalism was confirmed by the September quarter drilling program. Future work will be focussed on defining and testing the mineralised structures.



### ***Sandfire Project, Western Australia***

The Sandfire Project targets deep lead-zinc mineralisation that may be associated with the Admiral Fault in this locality. Southeast of the Sandfire Project, Kagara Zinc Ltd continues to test their Admiral Bay Project, reporting encouraging thickness and grades of lead and zinc mineralisation. The Sandfire Project has not been drill tested by the Company and the prospects for discovery of a large lead-zinc occurrence remain intact.

### ***EXPLORATION OVERVIEW***

During the September Quarter, Sandfire continued intensive exploration activities across its portfolio of quality projects in Western Australia and the Northern Territory (Fig.1) including:

#### ***Borrooloola Project***

- The planned reconnaissance diamond drilling program was completed at Copper Mine Creek, Apollo and Yalco prospects - 10 holes for 3,195.9 metres.
- Drilling of a large airborne electromagnetic (AEM) conductive anomaly at the Yalco Prospect intersected 50m of carbonaceous, very fine pyritic shale in two holes, BD-19 and BD-20, approximately 1 km apart.
- Analysis of a 30 m section from the top of the first of these holes (BD-19) showed low lead and zinc values.
- Deeper in the holes fine-grained galena can be seen on fracture planes.
- Further core from the drilling program is being cut and samples will be submitted to laboratory for analysis of a range of diagnostic elements of the type of stratiform mineralisation being sought.
- These diagnostic elements will assist in planning further exploratory drilling of the Yalco Prospect and the geochemical analysis will be used to vector towards possible mineralisation.
- Reprocessing of airborne magnetic data has been completed.
- New structural interpretation of the part of the McArthur Basin covered by Sandfire's tenements is underway.
- A three dimensional inversion study of the 2004-2005 induced polarisation data at Gordons Prospect was completed.
- Joint venture partner, Gravity Diamonds Limited (with respect to diamonds only) has carried out an indicator mineral drainage sampling program. They have reported one sample, from a 24 square kilometre catchment, containing possible kimberlitic chromites and a single macro diamond (i.e. greater than 0.4mm in diameter).

The intersection of a unit similar to the HYC Pyritic Shale member of the Barney Creek Formation, in two widely spaced holes into the Yalco Prospect (BD-19 and BD-20) within the airborne electromagnetic anomaly trending southwesterly from the Emu fault, is very significant. Further, the presence of lead sulphides (galena) in fracture planes in drill core within the pyritic carbonaceous shales of the Formation highly encourages further exploration for a primary base metal sulphide deposit.

#### ***Doolgunna Gold Project***

- RC drilling program finished and results received from the laboratory.
- A new bedrock sampling program commenced in late October. This program includes angled RAB to 40m across anomalous gold zones detected by regional bedrock sampling.
- Detailed photo interpretation at prospect scale and outcrop mapping is in progress at Old Highway, Cow Hole Bore and East Shed Well gold prospects.



### **Urandy Project**

Following encouraging gold anomalism from a vacuum drilling program completed in the first half of 2007, a follow-up program to infill between the wide spaced lines was completed by September 2007. Geochemical results received from the laboratory confirm large areas of anomalous gold up to 87ppb in samples from the top of bedrock.

### **Yannarie Project**

Soil geochemistry September 2007

- A total of 88 soil samples taken from the Two Peaks Prospect were submitted for copper lead and zinc analysis. Slightly anomalous copper results were recorded in some of the samples.
- A review of data is in progress and planning underway for the 2008 program. This program is expected to include deeper drilling of the lead-zinc anomaly, previously tested by shallow drilling.

## **DETAILED EXPLORATION ACTIVITIES**

### **Borrooloola Lead-Zinc Project, Northern Territory (Sandfire 100%)**

Sandfire Resources holds Exploration Licences covering in excess of 10,000 square km in the Borrooloola district of the Northern Territory (Fig. 2). Further tenements were applied for during the quarter. The area covers a large part of the South McArthur Basin, host to the Xstrata McArthur River HYC deposit, one of the world's largest lead-zinc-silver deposits. Sandfire Resources tenements cover a large part of the Emu fault zone recognised as the probable structure controlling the HYC mineralisation.

Exploration activities carried out by Sandfire during 2007 include the IP survey completed in early 2007 along the Copper Mine Creek fault, the regional geophysical survey and the diamond drilling program at the end of the September 2007 quarter. These have significantly enhanced the value of the Borrooloola Project.

#### **Ground geophysics**

An induced polarization (IP) survey completed in early 2007 along the Copper Mine Creek fault, east of work undertaken in 2004 and 2006, confirmed the chargeability anomaly and that possible sulphide mineralisation continues 5 km to the east, in a structurally complex area. At the Apollo prospect, within the Tawallah pocket east of Copper Mine Creek prospect, four lines of IP, each 3km long, were completed early in the field season of 2007. A chargeability anomaly was detected and subsequently tested by hole BD-15 without identifying a cause for the anomaly.

#### **Airborne Geophysics**

As announced previously, open file AEM data were reprocessed and approximately 4,000 line kms of new TEMPEST AEM data was collected over a large area west of Borrooloola. The geophysical target was conductive rock units which may host sulphide mineralisation of the style of the McArthur River Mine mineralisation. Electromagnetic surveys locate electrical conductors in the earth that may include conductive metal sulphide deposits.



Processing and interpretation of the airborne electromagnetic (AEM) data identified a broad conductive zone extending at depth from the Emu Fault zone towards the south-west at the Yalco Prospect (Fig 2). The structure appears analogous to a similar conductive zone some 35 km to the south which hosts the McArthur River Mine HYC deposit (Fig 2). Other AEM anomalies were noted for follow-up in 2008 program.

**Drilling**

Using the interpretation of the ground and airborne geophysics, 20 targets for drill testing were selected. Nine target sites have been tested with diamond drilling. A total of 3195.9 metres was completed in 10 drill holes (Fig.2) that are summarised in Table 1.

**Table 1 Borroloola Project Diamond Drilling Program, September-October 2007**

Hole ID	Target	Total Depth (m)	Geology & Comments
<b>Copper Mine Creek Prospect</b>			
BD-12	IP	499.8	Roper Group formations before entering the Copper Mine Creek Fault at 474.5-492.0m. The drill intersection has not accounted for the IP anomaly.
BD-13	IP	270.4	Approx. 5.95 km east of BD-12 hole; intermittent weak to intense silica overprinting is accompanied by strong bleaching down to 68m; coarse patchy pyrite and galena is visible intermittently between 34-87m downhole.
BD-14	IP	201.5	Approx. 3.45 km east of BD-12; significant mineralization was not observed; will be logged with downhole IP in November 2007.
<b>Apollo Prospect</b>			
BD-15	IP	351.5	No explanation was detected for the IP anomaly.
<b>Yalco Prospect</b>			
BD-16	AEM	293.5	Targeted a deep AEM conductor within the Emu fault zone; at approx. 275m very fine wispy sulphides (pyrite) occur in a few black shale bands and further downhole the dolomitic units also host pervasively disseminated pyrite; will be surveyed with downhole geophysics.
BD-17	AEM	302.4	Testing 15km long zone of elevated conductivity that extends southwest from the Emu Fault zone; no significant sulphides intersected; extensive leaching that may be due to late hydrothermal action.
BD-18	AEM	350.5	As for BD-17, no significant sulphides intersected.
BD-19	AEM	281.0	Testing 15km long zone of elevated conductivity that extends southwest from the Emu Fault zone; northeast (and towards the Emu Fault from BD17 and BD18); leached horizons to approx. 120m followed by the thick sequence of black carbonaceous shale probably equivalent to the HYC Pyritic member of the Barney Creek Formation; dominantly pyrite, minor galena and other sulphide minerals fill brittle fractures and may be present as primary sulphide within the carbonaceous layers; 30m of core was split and submitted for analysis. No significant values for Au, Cu, Pb, Zn and Ag were reported.
BD-20	AEM	272.0	located as for BD-19; intersected a narrower sequence of black carbonaceous shale
BD-21	AEM	373.3	located approximately 600m southwest of holes BD-19 and BD-20 to test the down-dip extensions of the black pyritic shale horizon; intersected 76.9 metres of the corresponding horizon between 225.1 metres and 302 metres; cased with 50mm PVC pipe for downhole geophysical surveys
Total		3,195.9	



### **Copper Mine Creek (CMC)**

Copper mineralisation at the Copper Mine Creek gossan is considered to be localised in the footwall of a thrust ramped from the south. Previous north-directed drilling by Carpentaria (1 DDH) and Mount Carrington Mines Pty Ltd (10 shallow RC holes), confirms the overall mineralised zone dips southwards. Sandfire's first (2004) drill hole, BD-1 also suggests the main zone dips 70 degrees south. Historical assays highlight anomalous cobalt and nickel with high copper values. As noted in the 2004 Annual Report, the source of mineralisation is possibly Scrutton Volcanics basement. An up-dated evaluation of available data is required to determine the potential for moderate resources.

### **Apollo**

BD-15 targeted an induced polarisation (IP) anomaly in which no significant mineralisation was detected. A re-evaluation of the IP results will be carried out as well as downhole IP logging.

### **Yalco**

Drilling at the Yalco Prospect has identified large areas of hydrothermal leaching/alteration as well as a 50m thick section of pyritic carbonaceous shales (Barney Creek Formation). Minor lead mineralisation as galena occurs in minor secondary fractures but any primary sulphides are too fine for identification in hand specimen. Some 30m of core from the upper parts of the pyritic shale was split and submitted to NAL Laboratory in Pine Creek for analysis. No anomalous values were measured for Pb, Zn, Ag or Cu. However, values from these analysis and further geochemistry of this year's drilling samples, along with historical assays, will be used to vector towards potential primary base metal mineralisation utilising the results of research carried out at the Centre for Ore Deposit Research at the University of Tasmania.

The Barney Creek Formation is host to the HYC deposit at McArthur River Mine some 35km to the south of the Yalco Project along the Emu Fault. At HYC the sulphide mineralisation is often very fine-grained (<4 microns) in carbonaceous shale with high-grade ore indistinguishable from barren pyritic shale in hand specimen.

### **Indicator Mineral sampling**

Gravity Diamonds Limited has commenced indicator mineral sampling in the southern portion of the Sandfire Resources, Borroloola tenements with 14 gravel samples and 1 loam sample collected to date. Sampling has been focussed on areas where historic sampling returned anomalous kimberlitic indicator minerals and in significant drainages of greater than 20km<sup>2</sup> where limited, or no, historic sampling has been reported. The 40 to 60 kg sieved samples of less than 1.6mm sediment collected from the best available drainage trapsites has been transported to Diatech Laboratories in Perth for processing through a micro-DMS plant.

Observation results and microprobe data from these samples is currently incomplete, however 3 samples observed to date have returned low counts of possibly kimberlitic indicator minerals with one sample, from a 24 square kilometre catchment, reporting 3 possibly kimberlitic chromites and 1 (plus 0.4 mm) diameter diamond. The significance of these results will be further assessed when full observation and microprobe results are received.

### ***Doolgunna Gold Project, Western Australia (Sandfire 100%)***

Surface geochemistry consisting of rock chip and soil sampling has been used effectively to locate the three gold prospects at Old Highway (best previous drill intercept of 48m @ 5.9g/t), East Shed Well (best previous drill intercept of 14m @ 10.4g/t) and Cow Hole Bore (best previous drill intercept of 4m @ 7.43g/t).

In addition to the bedrock work, programs of deeper RAB and RC drilling were completed during August-September 2007. The RC drilling (37 holes for 2531m) tested the known gold prospects at



Old Highway and East Shed Well and procedures were adopted so that these results can be used to estimate the potential gold resource at these prospects. Table 2 shows significant gold intercepts at the Old Highway and East Shed Well Prospects.

A regional geological map was completed over the tenements in July 2007. Subsequently, detailed photo-interpretation and geological mapping of Old Highway, East Shed Well and Cow Hole Bore prospect areas commenced in September.

**Table 2  
Drill intersections from RC program September 2007 (at 1 g/t cut-off)**

**Old Highway**

Section	Hole ID	From / To (m)	Interval (m)	Gold Grade (g/t)	Geology & Comments
717200E	DGRC055	5-12	7	1.91	silcrete, weathered schist moderate quartz veining
		<b>14-18</b>	<b>4</b>	<b>2.12</b>	
		65-70	5	1.53	
717250E	DGRC054	<b>34-50</b>	<b>16</b>	<b>5.76</b>	silcrete, weathered schist fresh chloritic schist moderate quartz veining
		<b>incl. 44-48</b>	<b>4</b>	<b>13.17</b>	
		<b>68-70</b>	<b>2</b>	<b>3.42</b>	
717300E	DGRC049	<b>1-15</b>	<b>14</b>	<b>3.25</b>	silcrete, weathered schist <b>strong quartz veining</b>
		<b>incl. 9-15</b>	<b>6</b>	<b>5.99</b>	
		20-21	1	1.70	
		<b>23-26</b>	<b>3</b>	<b>4.64</b>	
		30-31	1	1.12	
		45-46	1	1.01	
		<b>55-56</b>	<b>1</b>	<b>28.24</b>	

**East Shed Well**

Section	Hole ID	From / To (m)	Interval (m)	Gold Grade (g/t)	Geology & Comments
726200E	DGRC036	0-6	1	3.26	silicified siltstone, sandstone, chlorite-sericite schist, <b>moderate-strong quartz veining</b>
		10-11	1	13.55	
		<b>19-28</b>	<b>9</b>	<b>5.60</b>	
		<b>incl. 19-22</b>	<b>3</b>	<b>10.31</b>	
726240E	DGRC040	14-15	1	1.23	silcrete, silicified siltstone, sandstone, chlorite schist, <b>moderate-strong quartz veining</b>
		<b>26-35</b>	<b>9</b>	<b>11.40</b>	

**Urandy Gold Project, Western Australia (Sandfire 100%)**

A program of vacuum drill sampling of bedrock for geochemistry was carried out in July to September, 2007.

- Bedrock vacuum drilling of 2,714 holes at 50m intervals for 5,420m over a total length of 186 km of traverses.
- This was followed by angled vacuum drilling over some areas of interest - 7 holes for 137m were drilled to test to two gold anomalous zones located during previous geochemical program. A total of 69 samples were submitted for assay. Assays are awaited.
- A total of 2,827 samples were submitted for analysis from this program. A total of 35 soil samples were also collected.
- Best result so far is 87 ppb gold.
- Results received to date indicate multiple zones anomalous in gold geochemistry which will require further work.



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The sampling lines are one kilometre apart but indicate broad zones of anomalous gold (up to 86 ppb) across the southwest of the tenement as well as further zones along geological structures in the north (up to 87ppb).

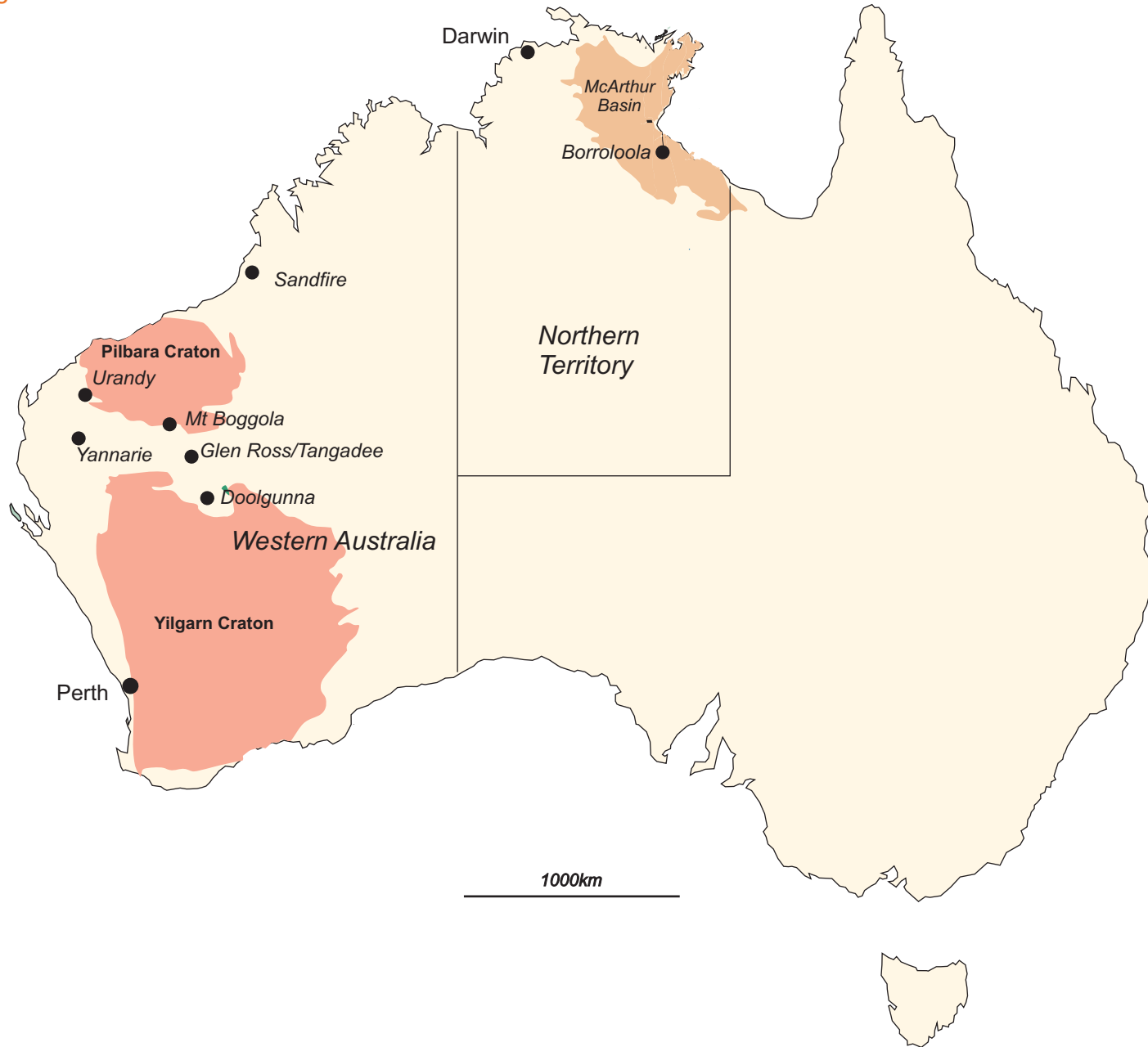
***Yannarie Copper-Lead-Zinc Project, Western Australia (Sandfire 100%)***

Field mapping was completed in July 2007 to further investigate the extent of the uranium mineralisation. In addition, a total of 88 soil samples were taken from the Two Peaks prospect and submitted for copper, lead and zinc analysis. Slightly anomalous Cu values were measured. The source of the lead and zinc mineralisation at Yannarie remains unexplained.

**JOHN EVANS**  
**TECHNICAL DIRECTOR**  
31 October 2007

The information in this report that relates to Exploration Results is based on information compiled by John Evans who is a Fellow of the Australasian Institute of Mining and Metallurgy. John Evans has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. John Evans consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Project Locations



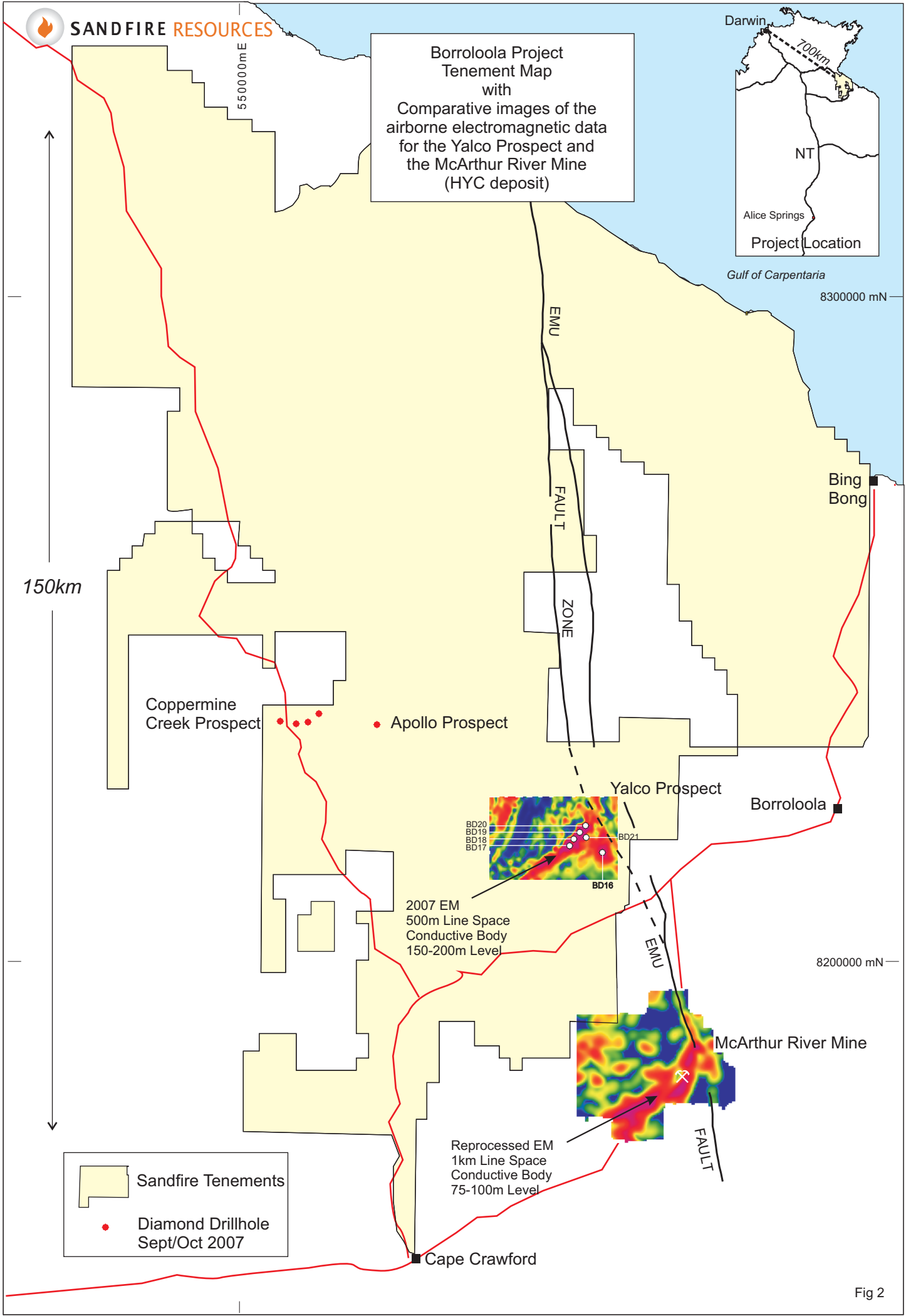


Fig 2



Very fine grained carbonaceous shale with fine pyritic sulphide bands

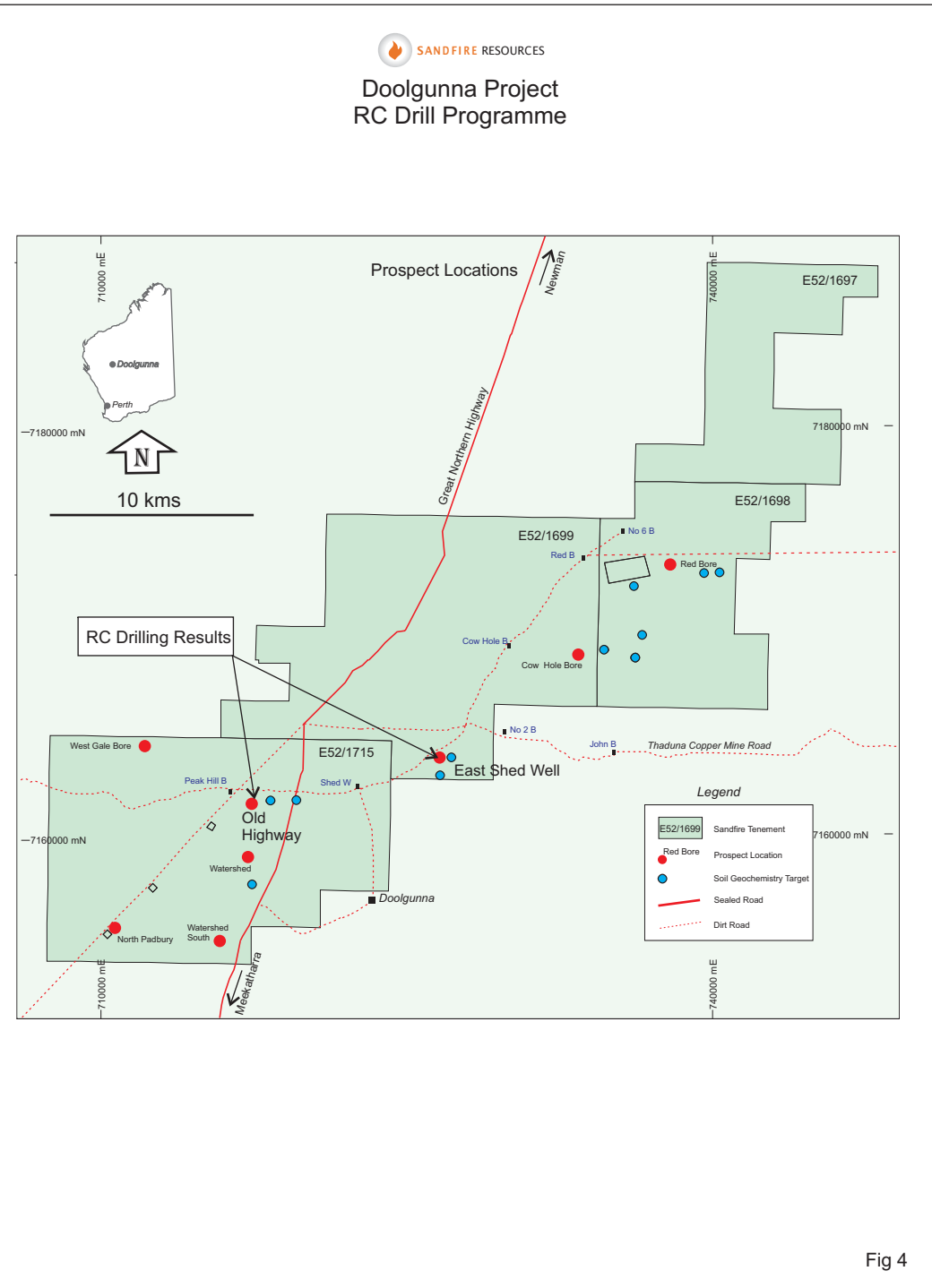
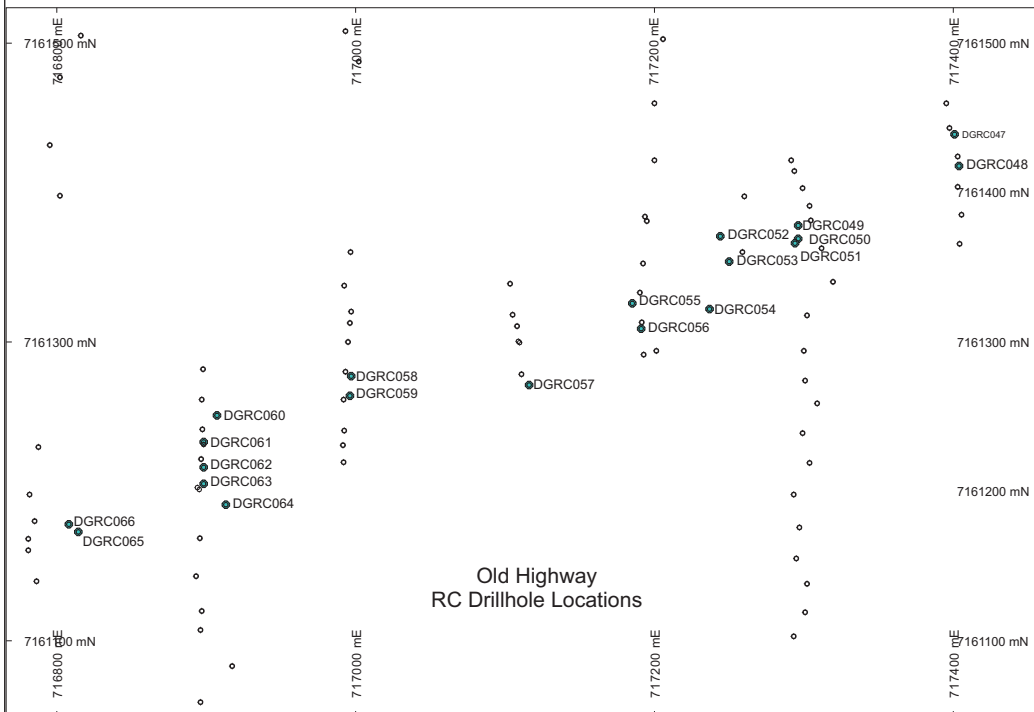
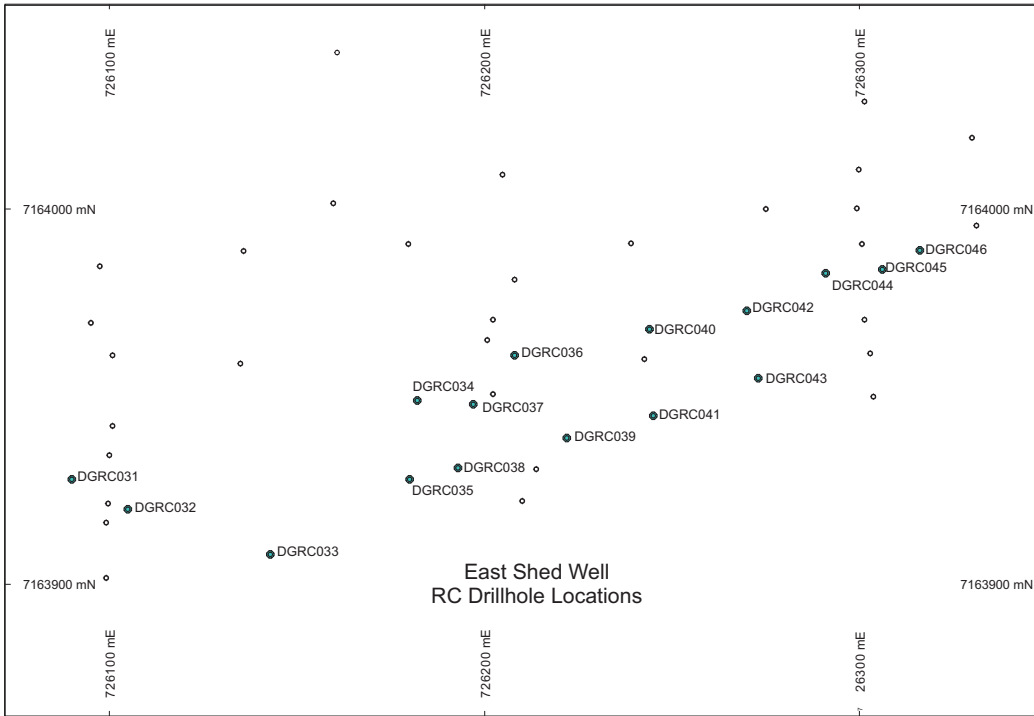


Fig 4