



## Quarterly Activities Report – December 2008

### Sandfire Resources NL

ABN 55 105 154 185

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SFR  
SFRCA

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Western Australia

#### Issued Capital:

Ordinary Shares	82.5M
Contributing	12.7M
Options	11.6M

Cash (Dec 2008) \$4.039

#### Major Shareholders:

POSCO	19.99%
Founders/Board	12.00%
High net worth	20.00%

#### Directors:

**Miles A Kennedy**  
Chairman

**W. John Evans**  
Technical Director

**John R. Hutton**  
Director

**Jonghun Jong**  
Director

**Karl M Simich**  
Director

## HIGHLIGHTS

### BORROLOOLA PROJECT (Northern Territory)

#### Manganese

- Extensive 2008 drilling program (435 holes) completed.
- Extensive areas of shallow manganese mineralization confirmed at **Rosie Creek** and **Rosie Creek SW Reconnaissance** prospects.
- Volumes of manganese mineralization estimated:  
*Rosie Creek:* **2.1 million cubic metres**  
*Rosie Creek SW Reconnaissance:* **1.1 million cubic metres**
- Preliminary analytical results received, subject to ongoing review.
- Highly encouraging assays ranging from **37.7% to 45.6% Mn** (average **40.6% Mn**) returned from hand-picked nodules.
- Preliminary metallurgical test work planned to test upgrade potential.

### DOOLGUNNA GOLD PROJECT (Western Australia)

#### Gold

- Extensive trenching program planned to advance the high-grade gold potential at Doolgunna.
- Focus on a priority gold prospects at Old Highway (800m strike length) and DeGrussa (200m strike length), where previous high-grade gold intersections included:  
*Old Highway:* **10m @ 7.15g/t gold**  
**23m @ 4.07g/t gold**  
*DeGrussa:* **8m @ 8.80 g/t gold**  
**12m @ 2.83g/t gold**  
**24m @ 6.80g/t gold**

#### Iron Ore

- Inquiries received from several companies on the iron ore potential at Doolgunna.

### CORPORATE

- Cash reserves of **A\$4.039 million** at end of the December 2008 Quarter.

## OVERVIEW

During the December 2008 Quarter, Sandfire Resources NL (**Sandfire**) [ASX: **SFR**] continued to progress exploration activities across its portfolio of manganese, gold, iron ore and base metal projects in Western Australia and the Northern Territory.

The focus of exploration during the Quarter was the completion of an extensive program of shallow Rotary Air Blast (RAB) and aircore drilling at the **Borrooloola Project** in the Northern Territory. A total of 435 shallow drill holes were completed during the second half of 2008 in the Rosie Creek catchment testing six manganese targets, including the Rosie Creek and Rosie SW Reconnaissance targets, where BHP previously announced the occurrence of manganese.

This drilling has confirmed the presence of widespread near-surface manganese mineralisation at Rosie Creek, Rosie SW Reconnaissance. The setting of the mineralization is similar to the world-class Groote Eylandt manganese deposit located 190km to the north east.

The Company has estimated volumes of mineralization at Rosie Creek and Rosie SW Reconnaissance and is currently compiling a detailed analysis of the drilling results. This process is continuing in conjunction with planned metallurgical test work to assess the potential to upgrade the ore to export grade.

While the main focus of exploration activity during the Quarter was at Borrooloola in order to progress exploration for both manganese and base metals prior to the northern wet season, the Company has also stepped up its planned gold exploration activities at the **Doolgunna Project** in Western Australia.

The Company believes that the high-grade mineralization identified at up to seven priority prospects, including the Old Highway and DeGrussa Prospects, presents a strategic opportunity for the Company in the current strong gold price environment. A major program of trenching is planned during the first half of 2009 across the major identified gold zones as a prelude to planned RC drilling.

Following the completion during 2008 of the Strategic Alliance with Posco Australia, a subsidiary of the Korean-based POSCO, the world's fourth largest steel producer, Sandfire remains in a strong position and uniquely placed in the junior exploration sector in Australia.

In light of the continued impact of the global financial and economic crisis, Sandfire continued during the Quarter to introduce measures to reduce costs across all of its operations in order to conserve its cash resources. Net operating cash outflows for the Quarter of \$2.007 million reflected payment for drilling and exploration activities from invoices for work performed mainly in the previous quarter but which fell due and were paid in the current quarter.

As at 31 December 2008, the Company had cash reserves of \$4.039 million. The Company is reviewing its ongoing exploration priorities and budgets. This review will be completed once the full results from the recent manganese drilling program have been reviewed and assessed.



## 2. BORROLOOLA PROJECT, Northern Territory (Sandfire - 100%)

The Borroloola Project comprises a 13,400km<sup>2</sup> tenement area in the Northern Territory which encompasses a significant proportion of the Batten Fault Zone. This important geological structure hosts the world-class McArthur River Mine, the second largest SEDEX hosted base metal deposit in the world. Sandfire's tenements also cover a coastal strip which is considered highly prospective for cretaceous-style manganese deposits, similar to the world-class Groote Eylandt manganese deposits (BHP Billiton).

### 2.1 Manganese Exploration

While the initial focus of exploration at the Borroloola was for base metal deposits, since acquiring the Project Sandfire has recognized the potential of the area for Cretaceous-aged sedimentary manganese mineralization, located typically at the base of Cretaceous succession that overlies the basement McArthur Basin rocks. The flat-lying Cretaceous inter-fingers around the hills that are formed from the ancient basement rocks.

During the second half of 2008, Sandfire completed a comprehensive program of RAB and aircore drilling at six target areas considered prospective for manganese mineralisation in the Rosie Creek and Rosie Creek SW areas. Historical exploration, including by BHP, had located manganese mineralization at Rosie Creek.

The drilling program commenced in August and was completed in early November 2008. A total of 435 holes were drilled in this period. During the December 2008 Quarter, Sandfire completed a total of 295 holes for 5,674 metres (an average of 19.2 metres per hole) – all of which was aircore drilling to bedrock.

This drilling has confirmed the presence of **extensive areas of generally flat-lying, basal Cretaceous sedimentary manganese mineralisation at the Rosie Creek Deposit** (see Figure 3). Similar mineralization has also been delineated at the **Rosie Creek SW Reconnaissance area**, located some 4km south west of the Rosie Creek deposit.

A total of 163 drill holes have intersected near-surface basal Cretaceous manganese mineralization at Rosie Creek and the SW Reconnaissance deposits. This mineralization, comprising distinctive black manganese nodules within sandy and clayey manganeseiferous sediments, occurs regionally within the middle reaches of the Rosie Creek catchment.

Aircore drilling at the two prospects was undertaken at intervals of 100m by 100m and 200m by 200m. The estimated volumes of manganese mineralisation in the two deposits are estimated as follows:

<b>Rosie Creek:</b>	<b>2.1 million cubic metres</b>
<b>Rosie Creek SW Reconnaissance:</b>	<b>1.1 million cubic metres</b>

Drilling appears to have closed off the Rosie Creek mineralisation, while the Rosie Creek SW Reconnaissance deposit has the potential for additions to these volumes with further drilling (Figure 3).

All 1 metre manganiferous drill intersections (a total of 456 samples) were submitted for analysis and assaying for manganese, iron, phosphorous, silica alumina and loss-on-ignition (LOI). The analytical results were received in late January 2009 and are still being reviewed by the Company.

During the drilling program, Sandfire hand picked manganese nodules from a selection of 24 of the drill samples. Eight of the nodular concentrate samples returned highly encouraging assays of between **37.7% Mn and 45.6% Mn** (average **40.6% Mn**), with phosphorous of between 0.09% P and 0.25% P (average 0.157% P).

The Company is continuing to process the drilling data and expects to release full comprehensive/meaningful results during the March 2009 Quarter. In addition, Sandfire intends to conduct preliminary metallurgical test work including screening out of various size fractions, scrubbing and heavy media separation of lump and fine fractions to determine if a manganese product can be produced meeting market specifications.

## 2.2 Base Metal Exploration

The primary exploration targets within the Borroloola Project were sedimentary zinc and lead deposits similar to the giant McArthur River Mine deposit, located south of the Project. Sandfire has delineated an area of high lead, zinc and silver prospectivity flanking the Emu Fault Zone, which extends some 100 kilometres through the property (see Figure 2).

During the Quarter, Sandfire completed a diamond drilling program at the Yalco and Warramana Prospects, with two holes (747.7m) completed in October 2008. While no significant base metal mineralisation was intersected, ongoing exploration continues to confirm the prospectivity of this region for potentially world-class base metal deposits.

During the Quarter, results were received and assessed from a detailed soil geochemistry program over the Alice Prospect. The Prospect covers an 800 metre length of the middle units of the Balbarini Dolomite of the Nathan Group.

Anomalous lead-in-soil results to a peak value of 514 parts per million (ppm) were reported from the soils, forming a discrete zone of anomalism. Further field work will be carried out on this target during the 2009 northern dry season.

Processing of the results of the airborne electromagnetic survey (VTEM) flown during August 2008 was also completed during the Quarter. This 1,235 line km survey was flown over the Rosie Creek lower catchment area, north of the Warramana Prospect. This sector of the McArthur Basin is underlain by the Barney Creek Formation and is highly prospective for lead-zinc-silver mineralisation.

Sandfire is planning to interpret this survey data during the March 2009 Quarter in order to define stratigraphic and structural elements of the underlying geology and identify possible targets for future drill testing.

## 2.3 Borroloola Uranium Project

Sandfire has identified a 40km strike length of the basal unit of the McArthur Basin which is prospective for uranium mineralisation.

The Yiyintyi Sandstone is in unconformable contact with the underlying Scrutton Volcanics. This geological setting is comparable to that of the basal McArthur Basin, Paleoproterozoic unconformity related uranium deposits in the East Alligator Uranium field, some 420 kilometres to the northwest.

The unconformity occurs at shallow depths, typically under 20 to 50 metres of flat-lying Cretaceous cover which would have concealed any uranium mineralisation from ready detection by airborne radiometric surveys.

Interpretation of Sandfire's airborne electromagnetic survey data over the prospective Scrutton Volcanics indicates that conductive features in these basement rocks that may have acted as focus localities for deposition of uranium.

## 2.0 DOOLGUNNA PROJECT, Western Australia (Sandfire - 100%)

*Sandfire's wholly owned Doolgunna Project is located some 900km north of Perth. The property is prospective for gold and iron ore. Two principal gold prospects, Old Highway and DeGrussa, have been discovered by Sandfire together with five other gold prospects for which the Company has reported high grade drill intersections. The iron ore at Doolgunna is high grade, low phosphorus, hematite-goethite mineralisation located in the banded iron formations of the Robinson Range.*

### 2.1 Gold Exploration

While no field activities were undertaken during the December Quarter at Doolgunna given the Company's strategic focus on the Borroloola Project prior to onset of the Northern Australia wet season, Sandfire commenced planning for an active exploration program during 2009 to progress the high-grade gold potential of this area.

The two main identified gold prospects at Old Highway and DeGrussa, together with at least five other reported gold prospects, offer a significant exploration opportunity for Sandfire and even more so in the current strong gold price environment.

Sandfire has previously reported a number of high-grade gold drill intersections for these projects, including:

Old Highway: **10m @ 7.15g/t gold**  
**23m @ 4.07g/t gold**

DeGrussa: **8m @ 8.80 g/t gold**  
**12m @ 2.83g/t gold**  
**24m @ 6.80g/t gold**

The mineralisation at Old Highway is known to extend over a strike length of 800 metres, while the mineralized zone at DeGrussa extensive over a 220 metre strike length.

The Company is planning extensive trenching programs across the known mineralization, primarily to enhance geological understanding of the controls of mineralisation and assist planning for future RC drilling.

## 2.2 Iron Ore Exploration

Seven separate zones of iron ore mineralisation have been mapped by Sandfire within the Doolgunna Project. The total area of outcropping hematite goethite iron ore mineralisation is in excess of 200,000 square metres, in two moderate sized deposits and five small deposits and with several areas where the mineralisation extends under superficial cover.

The mineralisation comprises hematite-goethite enrichments of the primary banded iron formations that form the Robinson Range. The mineralisation is low in phosphorus and considered as a probable source of direct shipping lump and fines ore.

The Doolgunna Project straddles the Great Northern Highway and is ideally located for a small mining operation, trucking to either railheads or export ports. Sandfire has received a number of inquiries from larger iron ore focused organisations regarding the Company's future plans for the iron ore at Doolgunna.

### 3. URANDY PROJECT: Western Australia (Sandfire 100%)

The Urandy Project, located in the West Pilbara region, was initially acquired by Sandfire because of its prospectivity for primary gold mineralisation north of a granite intrusion into the meta-sedimentary rocks of the Ashburton Formation.

During the September 2008 Quarter Sandfire carried out two reconnaissance geochemical surveys – one testing a widespread zone of anomalous gold-in-bedrock, the other an area of elevated lead and zinc values reported by Sandfire from wide-spaced rock chip and bedrock sampling.

A total of 1,755 soil samples were collected over the gold target and 1,303 samples from the base metals target. The results received during the December 2008 Quarter, established the following points:

- the gold assay results do not materially improve the gold target with only low-order gold values reported; and
- the lead values over the Ashburton Formation which, in this locality, includes dolomite units, included a 300m long sequence (12 samples) of elevated lead-in-soil values ranging from 221 to 671ppm and averaging 421ppm lead. On the adjacent sample traverse line, 500m to the west, a 100m long sample interval ranged from 230 to 349ppm averaging 277ppm lead. Zinc values were generally low.

Detailed field reconnaissance and sampling is planned during 2009 on the lead anomaly.

### 4. YANNARIE PROJECT: Western Australia (Sandfire 100%)

Field work during the December 2008 Quarter was limited to a small ground magnetic survey over a discrete, dipolar magnetic feature within the basement Gascoyne Complex rocks identified in reprocessing of aeromagnetic survey data previously acquired by Sandfire over the project.

A total of 3,000m of magnetic surveying was completed, together with geological reconnaissance of the sparse rock outcrops. Processing and integration of the ground magnetic survey data with the airborne data has been completed confirming the initial discrete feature.

Further follow-up including geological mapping, geochemistry and extensions to the ground magnetic data is justified on what is an unusual complex and discrete intrusive into the basement rocks.

During the Quarter, Sandfire has thoroughly reviewed the Yannarie Project and initiated a reduction of the tenement holding.

Sandfire will be retaining all of the, as yet untested, separate lead and zinc soil geochemical anomalies. These soil anomalies extend over a strike length of 2,500 metres with both lead and zinc values greater than 1,000ppm up to a peak lead-in-soil value of 3,680ppm.

#### **5. SANDFIRE PROJECT: Western Australia (Sandfire 100%)**

No field work was carried out on the Sandfire Prospect during the Quarter.

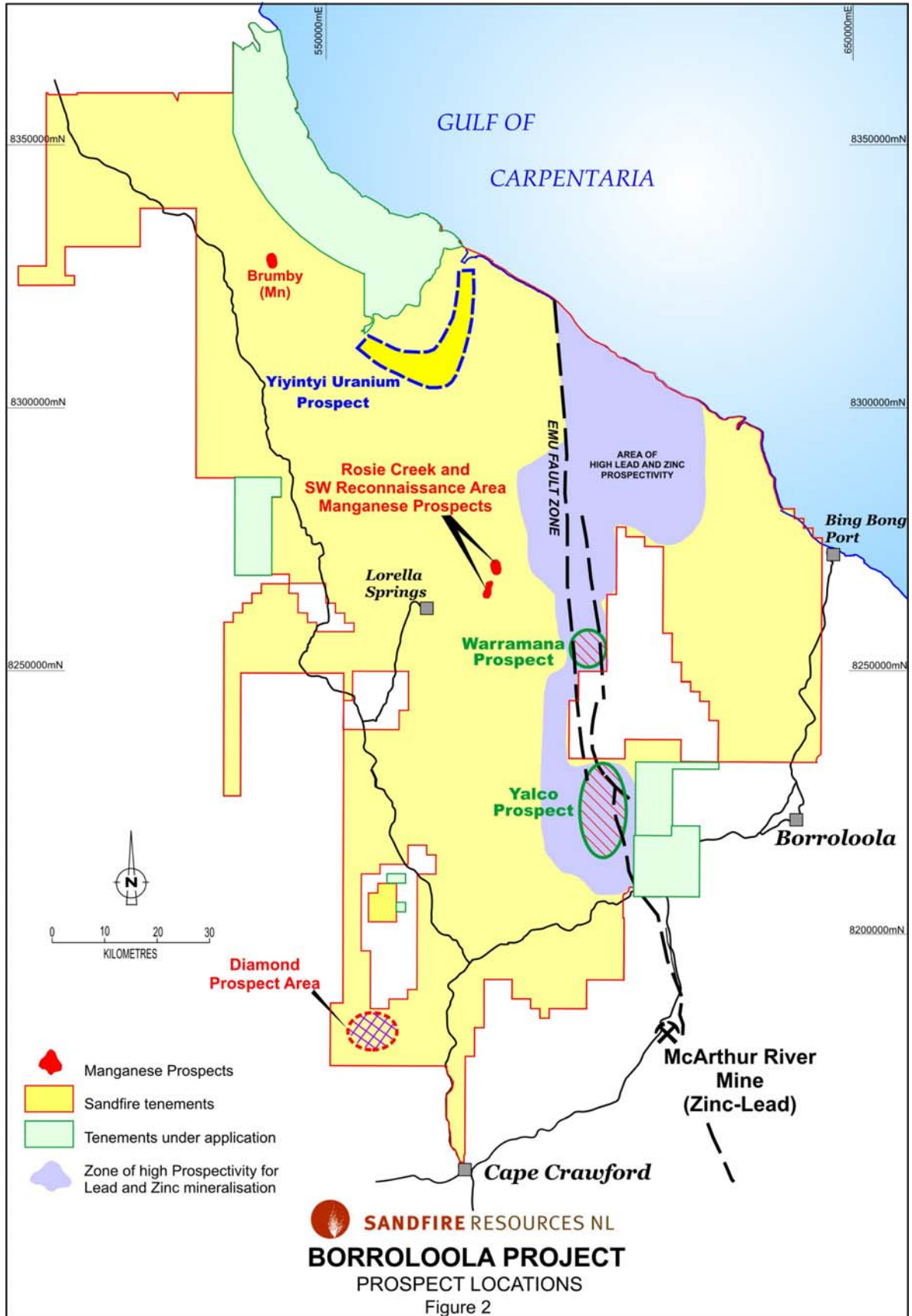
**JOHN EVANS  
TECHNICAL DIRECTOR**

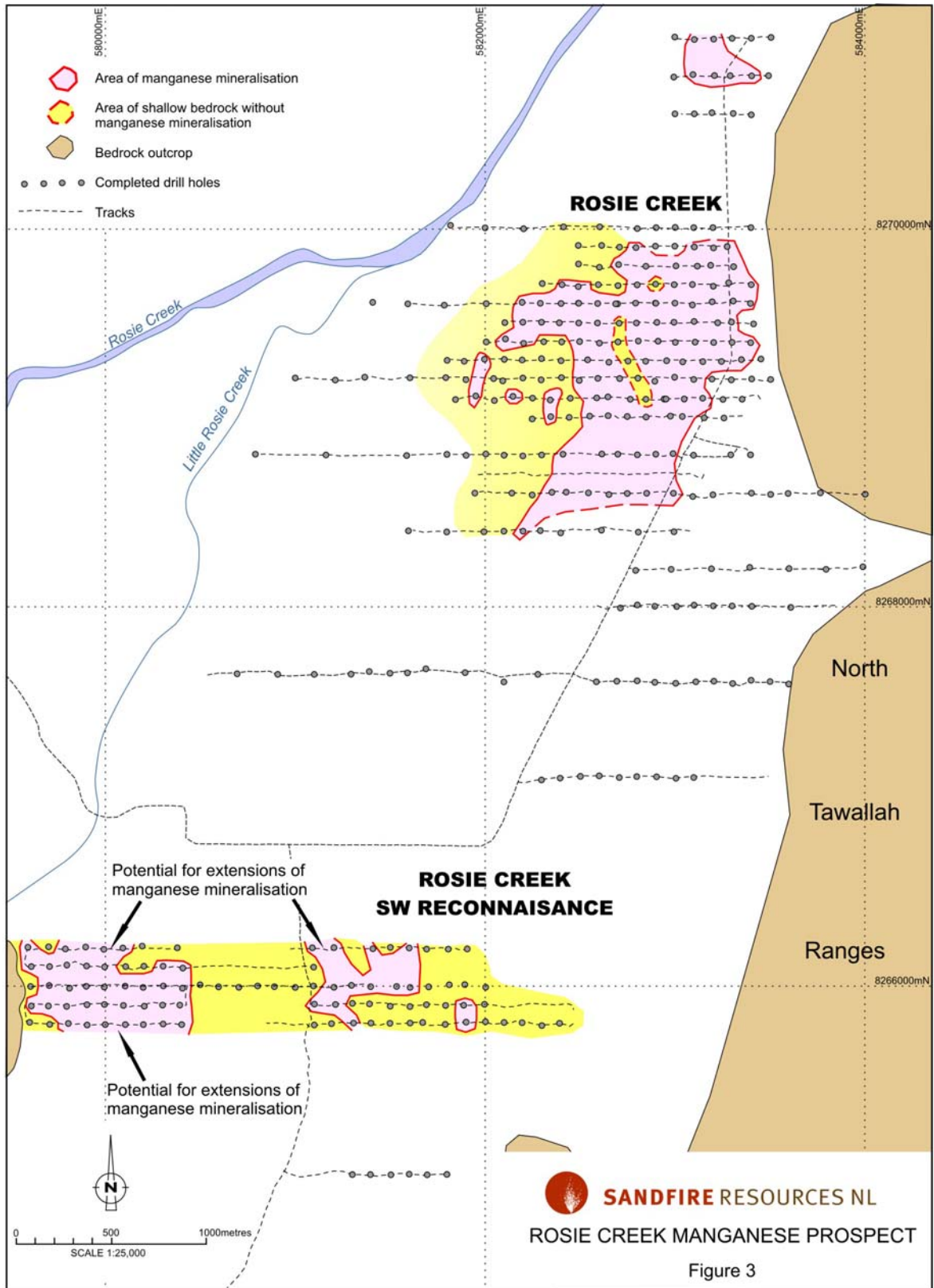
30 January 2009

#### **Competent Person's Statement**

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 of 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.









SCHEDULE OF MINING TENEMENTS – 31 DECEMBER 2008			
PROJECT AND TENEMENT	NOTES	AREA (Graticule Blocks)	Date of Grant
<b>BORROLOOLA</b>			
MLN624		16.18ha	4/8/1971
E110121		5	05/09/2002
EL24349		367	10/04/2005
EL24373		45	10/04/2005
EL24374		79	10/04/2005
EL24401		413	03/06/2005
EL24402		433	03/06/2005
EL24664		139	21/12/2005
EL24700		310	21/12/2005
EL24714		18	01/12/2005
EL24778		143	27/04/2006
EL24942		161	23/08/2006
EL24943		146	01/08/2006
EL24946		70	18/04/2006
EL24996		39	15/08/2006
EL24997		106	15/08/2006
EL25070		488	15/08/2006
EL25312		48	01/06/2007
EL25328		37	06/03/2007
EL25462		159	02/08/2007
EL25501		37	Application
EL25590		38	13/07/2007
EL25591		11	13/07/2007
EL25592		23	13/07/2007
EL25647		16	02/08/2007
EL26298		29	05/03/2008
EL26299		52	Application
EL26321		30	21/04/2008
EL26480		3	07/07/2008
EL26481		4	07/07/2008
EL26482		11	07/07/2008
EL26486		10	07/07/2008
EL26555		312	11/09/2008
EL26587		25	11/09/2008
EL26599	Moratorium	326	Application
EL26637		47	22/08/2008
EL26908		2	Application
EL26909		1	Application
EL26953		42	Application
SEL26831		402	Application
SEL26833		380	Application
SEL26835		413	Application
SEL26836		500	Application
SEL26837		473	Application
SEL26938		437	Application
SEL26939		393	Application
<b>DOOLGUNNA</b>			
E52/1698		14	01/08/2005
E52/1699		54	01/08/2005
E52/1715		54	22/06/2005
P52/1123		200ha	Application
E52/2208		1	Application
E52/2209		1	Application
<b>MT ANDERSON</b>			
E04/1828		140	Application

E04/1829		190	Application
<b>MT BOGGOLA</b>			
E08/1433		68	11/10/2005
<b>SANDFIRE</b>			
E04/1344		35	20/10/2003
E04/1425		24	10/01/2005
E04/1449		35	13/04/2005
E04/1451		34	13/04/2005
<b>URANDY</b>			
E08/1462		7	26/07/2005
E08/1463		6	26/07/2005
<b>YANNAIRE</b>			
E08/1374		13	01/08/2005
E08/1409		35	24/05/2004
E09/1111		35	22/06/2005