ANNUAL MINERAL EXPLORATION REPORT
BORROOLOOLA PROJECT MLN624
TENEMENT HOLDER: SANDFIRE RESOURCES NL
OPERATOR: SANDFIRE RESOURCES NL
REPORTING PERIOD: 1 JANUARY TO 31 DECEMBER 2008

31 May 2009

1:250,000: MOUNT YOUNG (SD53-15)
1:100,000: Tawallah Range (6066)

Commodities: Cu, Zn

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Tenement Holder: Sandfire Resources NL

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Date of report: 31 May 2009

1:250,000 map sheet: MOUNT YOUNG (SD53-15)

1:100,000 map sheet: Tawallah Range (6066)

Target Commodity: Cu

Keywords: Air Photo, Airborne EM, Diamond Drilling

Prospects drilled: Gordon’s Prospect

List of Assays

ABSTRACT

Location: Gordon’s Prospect north-west of Borroloola, NT

Geology: Middle Proterozoic sediments of the Tawallah, McArthur and Roper Groups of the McArthur Basin, the Scrutton Volcanics, and Cretaceous and Tertiary cover sediments.

Work done: Air Photograph acquisition and interpretation Airborne EM acquisition and processing Retrieval of Diamond Drill Core Orthophotography EM Profiles
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1 Summary

MLN624 makes up part of Sandfire Resources NL Borroloola Project, tenements of which cover approximately 13,000 sq km in the Gulf Country, west of Borroloola, NT. Exploration during 2008 continued an integrated exploration program for base metals along the Coppermine Creek Fault which began in 2004.

Following tenement acquisition, geological mapping, research of historical exploration, and a ground IP survey were followed by drilling of an RC / diamond drillhole BRCD1 on MLN624 in September 2004 in which copper sulphide mineralisation was intersected along a steeply dipping structure within units of the Proterozoic McArthur Group sequence. An infill ground IP was carried out during 2006. A further ground IP survey along the Coppermine Creek Fault was carried out during 2008.

Integration and re-interpretation of prior airborne Magnetic – Radiometric and EM surveys over the McArthur Basin sequence within the Borroloola Project tenement area was completed during 2007.

During 2008, aerial photography, captured in 2005 at a nominal scale of 1:40,000, was acquired for processing to orthophotographs for use in the field for logistics and further geological mapping.

A helicopter borne versatile time domain electromagnetic (VTEM) survey was flown in July and August 2008 along north - south lines at a nominal spacing of 200 metres to integrate with interpretation of the previous airborne Magnetic-Radiometric and EM surveys.

In order to satisfy statutory requirements, all previous diamond core from BRCD1 not already submitted to the NTGS Darwin Core Library was retrieved and transported to Darwin in November.

Activities undertaken on MLN624 during the period from 1 January to 31 December 2008 were:

<table>
<thead>
<tr>
<th>Exploration Activity</th>
<th>MLN624</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial Photography</td>
<td>Part of Image 2805</td>
</tr>
<tr>
<td>Diamond Drilling</td>
<td>Retrieval of 45 trays (m) from BRCD1</td>
</tr>
<tr>
<td>VTEM Survey</td>
<td>Parts of three N-S lines (total of 814m)</td>
</tr>
</tbody>
</table>

Table 1 Exploration Activities
Figure 1. Exploration Activity Index
2 Location

MLN624 covers the Gordons Copper Prospect and is located about 660 km southeast of Darwin, 85 km west of Borroloola and 100 km north of Cape Crawford in the “Gulf Country” of the Northern Territory, Australia (Figure 1). It, along with 42 contiguous Exploration Licences, forms the Sandfire Resources’ Borroloola Project which covers a total of approximately 13,000 sq km.

Access is excellent via bitumen and unsealed roads. From Darwin access can be gained by travelling about 590 km southwards along the Stuart Highway to Daly Waters and then eastwards along Carpentaria Highway to Cape Crawford (270 km). The unsealed Roper Bar Road crosses the tenement area approximately 100 km north of Cape Crawford, and continues north and west to Katherine, providing an alternate access route during the dry season.
Figure 2. Tenement Location
3 Tenure

MLN624 was granted to R. Biddlecombe on 4/08/1971, and transferred to Sandfire Resources NL on 16/04/2004. Title was renewed on 22/03/2002 for 5 years to 31/12/2006. The most recent application for renewal of MLN624 was lodged on 11 September 2006 and further renewed until 31/12/2031.
4 Cadastre and Native Title

MLN624 lies within the Perpetual Pastoral Lease PPL1069 [BILLENGARAH], held by the NT Land Corporation.

With respect to exploration activities including grading of access tracks and test drilling, Authority Certificate 48146 from the Aboriginal Areas Protection Authority was granted on 30 September 2004.
5 Geological Framework

The geology of MLN624 is discussed within the Borroloola Project area with reference to both MLN624 and EL10121 along the Coppermine Creek Fault.

The project area geology consists of middle Proterozoic sediments of the Tawallah, McArthur and Roper Groups of the McArthur Basin. They rest unconformably on the Scrutton Volcanics and are partially concealed by Cretaceous and Tertiary deposits.

Early Proterozoic acid to intermediate volcanics and volcanioclastics of the Scrutton Volcanics, which are considered the basement of the area, outcrop immediately south-east of EL 10121, as detailed in the Mt. Young 1:250,000 and Tawallah Range 1:100,000 geological map series of the NTGS. This formation displays a strong radiometric and aeromagnetic signature and probably continues at depth in the central and north-western part of the current tenements. It consists mainly of rhyolitic to dacitic pyroclastics, dacitic flows, minor intrusive and rare basaltic lavas.

Within the project area this formation crops out along the Coppermine Creek Fault as sporadic up-faulted blocks, close to the Four Archers Fault contact. It has been identified as felsic volcaniclastic, strongly silicified and with traces of malachite, possibly representing a hydrothermal sinter cap, as described in the B28 petrographic sample (C. Vieru, 2004).

The Tawallah Group crops out on the western part of the project area, and outside the eastern boundary of EL10121, bounding a graben-like structure consisting of McArthur Group rocks to the south and Roper Group rocks to the north. They comprise coarse clastic sediments as sandstones and microconglomerates. The Tawallah Group also contains mafic volcanics which are not exposed within the current tenements, but could offer an explanation for the copper mineralization within the area.

The McArthur Group is the dominant unit in the project area. The rocks are dominantly dolomitic and are bounded to the west by the Tawallah Group and to the north by the Roper Group. According to the NTGS regional mapping, three major formations outcrop in the area; Amelia Dolomite, Tatool Sandstone and Tooganinie Formation. The underlying Mallapunyah Formation was intersected by the BHP Minerals Ltd MYD 007 diamond drill hole under the Amelia Dolomite and consists of reddish mudstones, siltstones and calcarenitic sandstones (D. Stephens, 1997). The Amelia Dolomite is considered from previous drilling to be about 125 metres thick and consists of dolomite, dololutite, dolarenite and stromatolitic dolostone. The rocks are generally silicified, chertified and laminated.

The Tatool Sandstone is dominantly a siliciclastic unit and consists of medium-coarse grained sandstone with interbedded calcarenitic, dololutitic, dolarenitic and dolomitic sequences. It is assumed not to exceed 150 metres in thickness.

The Tooganinie Formation is deeply weathered, silicified and poorly exposed, consisting of a rhythmic alternation of dolostone and siliciclastic rocks estimated at 150-200 metres.
in thickness. Detailed mapping within the project area assigned those rocks previously thought to belong to this unit to the Tatoola Formation.

The Roper Group outcrops mainly north of the Coppermine Creek Fault and is represented by the Mainoru Formation. The lithology comprises red-brownish micaceous and glauconitic mudstone and siltstone. It is estimated to measure about 500 metres in thickness. One of the best sections through this formation is displayed in the DDH McA15 diamond drill hole undertaken by BHP Co. Ltd in 1983 (BHP, 1983).

Cretaceous sedimentary rocks crop out in the southern part of the project area concealing the tectonic contact between the Tawallah Group, to the west, and the McArthur Group, to the east. They consist of conglomerate, polymictic breccias and lithic sandstone. A marked unconformity is present between this sequence and the underlying Proterozoic formations.

Tertiary deposits have limited outcrop distribution over the current tenure. They are present as small remnants of lateritic caps on the western and north-eastern parts of the exploration licence.
6 Work undertaken by Sandfire

6.1 Aerial Photography

Four hundred and thirty aerial photographs with a nominal scale of 1:40,000 captured in 2005 were scanned at high quality to create colour digital images for the area of Borroloola Project tenements. These were georeferenced to the published 1:50,000 scale topographic surveys using a softcopy photogrammetric system.

The Air Photo Centre relevant to the coverage of MLN624 is shown on Figure 1. The relevant digital is submitted to the NTGS as part of the Borroloola Project Combined Annual and Surrender Reports for 2009.

6.1.1 Orthophotography

Using terrain elevations stereoscopically measured across the area, orthophotographs and hill-shaded relief visualisations were produced to aid geological and terrain landform interpretation across the tenements and general logistics including access. As of May 2009, orthophotographs and hill-shaded landform maps have been produced for some 60% of the Borroloola Project tenement areas.

6.2 Airborne Geophysics

Airborne Magnetic-Radiometric and EM surveys flown during prior exploration over the Batten Trough have been re-interpreted, as reported in the Combined Annual Report for 2007-08. Ground Induced Polarisation Surveys have been carried out by Sandfire Resources across the Coppermine Creek Fault (CMC) during 2004, 2006 and 2008, and have been reported in previous Annual and Combined Annual Reports.

A further VTEM Survey was proposed along the CMC Fault, including MLN624, with two aims:

- to integrate with interpretation of previous airborne surveys, geological mapping and downhole geological logging of diamond drilling, and
- to obtain conductive targets for follow up ground geophysical surveys and possible drilling.
6.2.1 VTEM Survey

Geotech Airborne Limited carried out a total of approximately 1,235 line km helicopter borne VTEM survey over eight locations between 26th July and 6th August 2008, as detailed in the Survey and Logistics Report in Appendix 1.

Along the CMC Fault survey lines were oriented north – south at a spacing of 200m, of which three lines passed over MLN624 for a total coverage of 814m (Figure 1). The relevant lines from Survey A452_2 which transect MLN624 are 556480mE, 556680mE, and 556880mE. Electromagnetic, magnetic and digital terrain model data was obtained. The raw and gridded digital data are submitted to the NTGS as part of the Borroloola Project Combined Annual and Surrender Report for 2009.

Interpretation of the resultant EM profiles along the CMC Fault is presented in the Combined Annual and Surrender Report for 2009.

6.3 Drilling

One RC / Diamond drillhole BRCD1 was drilled on MLN624 in September 2004 to a total depth of 405.50m. Copper sulphide mineralisation was intersected along a steeply dipping structure related to the Coppermine Creek Fault.

6.3.1 Retrieval of BRCD001 Diamond Drill Core

The diamond cored interval in BRCD1 between 132.00m and 405.20m was stored in 56 core trays as tabulated in Appendix 3. Several intervals containing sulphide mineralisation were transported in 11 trays to Darwin for half core cutting at AGES, followed by analysis at NAL, Katherine. These trays were subsequently offered to the NTGS Core Library, Darwin, in November 2004 (C. Vieru, pers. comm.). The remaining 45 trays, also indicated in Appendix 2, were retrieved in November 2008 and transported to the NTGS Core Library, Darwin.
7 Conclusions and Recommendations

Interpretation of the VTEM profiles along the CMC Fault is presented in the Combined Annual and Surrender Report for 2009. Continuing exploration will integrate the geology derived from previous mapping and drilling with the geophysical interpretation.
8 Digital Data


Digital data for the Air Photographs and VTEM Survey is included with Combined Annual and Surrender Report for 2009.

9 Reference


10 Bibliography of Annual Reports


Appendix 1

Geotech Airborne Limited VTEM Survey Operations Report

Appendix 2

BRCD001 Diamond Drillhole Core Trays
Digital Data CD