Redbank Copper Limited

# REDBANK COPPER LIMITED

# NORTHERN TERRITORY

**EL 26965 ANNUAL EXPLORATION REPORT ENDING 17TH JUNE 2011**

**TO**

**THE NORTHERN TERRITORY**

**DEPARTMENT OF PRIMARY INDUSTRY FISHERIES AND MINES**

**Authors: R Birrell, J Ceplecha**
**17th June 2011**
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**Title Page**

| | |
|---|---|
| Titles/Tenements | EL 26965 |
| Titleholder/Operator | Redbank Mine Operations Pty Ltd |
| Tenement Manager | M&M Consulting, PO Box 8197 Subiaco WA 6008 (08938158660 |
| Grant Date | 18th June 2009 |
| Area | 74 Blocks |
| Report Title | EL 26965 Annual Exploration Report Ending 17th June 2011 |
| Date of Report / Status | 17th June 2011, Year 2 |
| Personal Authors | R Birrell, J Ceplecha |
| Corporate Authors | Redbank Copper Limited |
| Target Commodities | Cu, Pb, Zn, Au, Ag, Co, Mn, Diamonds |
| Project Name | Claypan East |
| Datum/Zone | GDA94, Zone 53 |
| 250,000 sheet | Calvert Hills |
| 100,000 sheet | Nicholson River(6362) |
| Expenditure Commit. | $15,000 |
| Contact Details | J Ceplecha |
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**Executive Summary**

EL26965 is a granted lease within the Redbank Copper operational area in the Northern Territory, and currently is in its second year of tenure. An experienced regional exploration manager has been hired by the company and planning of mapping, geochemical sampling and geophysical surveys are underway for the 2011 dry season ahead of area reduction in 2011. Work undertaken during the period consisted of a regional compilation of open file and available data from all known sources completed by external consultants under the direction of the company's exploration and regional exploration managers. This compilation has been indexed and is currently undergoing geo-referencing and point extraction of data where required. Field review, although delayed and restricted by abnormally wet ground conditions, has been completed in preparation for the planned 2011 field sampling during the dry season. An assessment of digital data sets and the subsequent maps derived from the GIS compilation has been completed and detailed interpretation of existing geophysical information has commenced

## CONTENTS



### FIGURE LIST



### Appendix 1

**Plans List**

1:25,000 scale maps showing:

(i) Topography,
(ii) Geology,
(iii) Magnetics,
(iv) Radiometrics,
(v) Landsat 7 7242 II

# 1 BACKGROUND - REDBANK COPPER OPERATIONS

The Redbank Copper Mine is located in the north-east of the Northern Territory approximately 30 km from the Queensland border and 70 km from the coast of the Gulf of Carpentaria. It straddles the Savannah Way which connects the townships of Borroloola in the Northern Territory and Burketown in Queensland. It is around 1,200 km south east of Darwin by sealed and unsealed road.

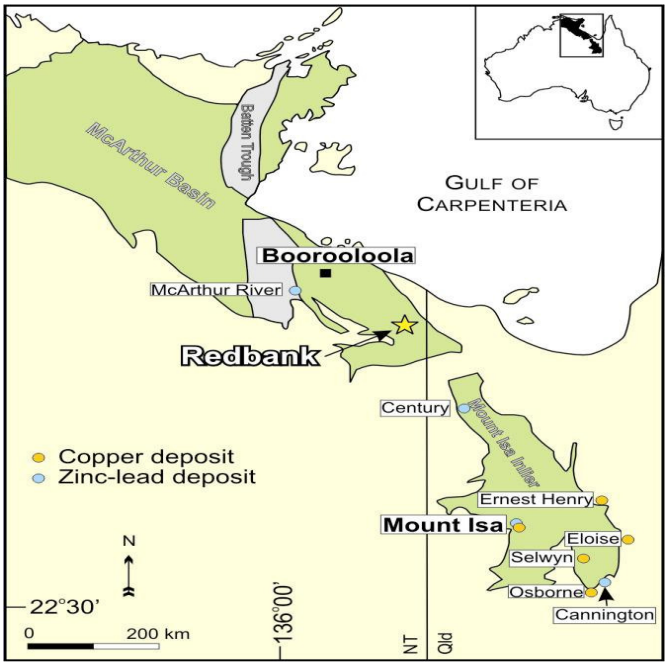


Figure 1: Location and regional setting of Redbank Copper Limited

The Redbank Copper field was discovered in 1916 and small scale mining was carried out until the early 1960's. Subsequently exploration was carried out during the late 1960's through to the 1990's by various groups, culminating in larger scale mining operations being undertaken in the mid 1990's when the Sandy Flat open pit was developed to supply oxide/sulphide ore to a 250,000 tpa flotation plant built on site. Some very high grade (>25% copper) ore was also direct shipped at this time. The operation ceased after less than 2 years because of declining copper prices. With the exception of the mill, the flotation plant and crushing circuit remain on site. Both are in reasonable condition and could be refurbished to operating condition with a redevelopment of the Project.

The most recent processing was a copper leaching operation that began producing on an intermittent basis in 2004 and utilised oxide ore that had been stockpiled during the previous mining. The current owners have operated the site since 2005 and some of the remaining ore stockpiles from the previous mining venture in the 1990's have been processed.

In 2010, with new funding and management arrangements, Redbank undertook the following:

- Placed the site on care and maintenance and embarked on a program to improve environmental compliance, in particular to remedy discharges of contaminated water from the site.
- Carried out a review of the project to determine the future direction of its development, and generate a mine study outlining the path to redevelopment.
- Embarked on a well-funded exploration program that aims to discover new resources and to upgrade the status of the existing resources.

The study undertaken by Redbank examined options for future development of the project. Redbank identified that the future of the project is primarily in processing sulfide copper ores, which comprise more than 86% of the current resources, to make quality copper concentrates. In addition copper cathode can be made from the oxide ores. Further work is required to establish additional resources and better define operating parameters. In May 2011 the total resource was estimated by SRK Consultants as 6,268,000 tonnes at a grade of 1.63% copper containing 96,500 tonnes of copper metal.

Figure 2: Redbank Infrastructure on ERL94, July 2011

The operational area consists of an Exploration Retention License (ERL94) and seven Mineral Leases (ML631, ML632, ML633, ML634, ML635, ML636 and ML1108) contained within the ERL. The company has recently applied for a Mining Lease (MLA27385) to replace ERL94 ahead of a decision to mine in 2011. Redbank Mine Operations Pty Ltd, the holder of EL26965, also has a number of exploration interests within the vicinity of the existing Redbank Mine site (EL24654, EL26758, EL26778, EL26779, EL26780, EL26781, EL26999, EL27240, EL27241, EL27329, ELA27737, ELA28003 andELA28024). These are located mostly to the north and west of the mine site as shown below in Figure 3.

## 2 REGIONAL GEOLOGICAL SETTING

Regionally the Redbank copper deposits lie within the Proterozoic sequences of the MacArthur River Basin (see Figure 1). The basin hosts a number of world class base metal deposits. The Redbank copper mineralisation is hosted by the Lower Proterozoic Gold Creek Volcanics, a sequence of predominantly intermediate sub volcanic intrusions, extrusions, breccia pipes, and intercalated sediments. The copper mineralisation identified to date has been principally interpreted as being contained in volcanic breccia pipes, of which 30 to 50 have been recognised by various explorers. Only a minority of the breccia pipes are mineralised and only some of those contain potentially economic concentrations of copper.

The Packsaddle Microgranites locally intrude the Gold Creek Volcanics and are present close to the known Redbank copper deposits. Gold Creek Volcanics are present in a significant portion of the regional tenements. Further east the Gold Creek Volcanics are obscured beneath surficial Cainozoic sequences. The Hobblechain Rhyolite, a member of the Masterton Formation overlies the Gold Creek volcanics to the west.

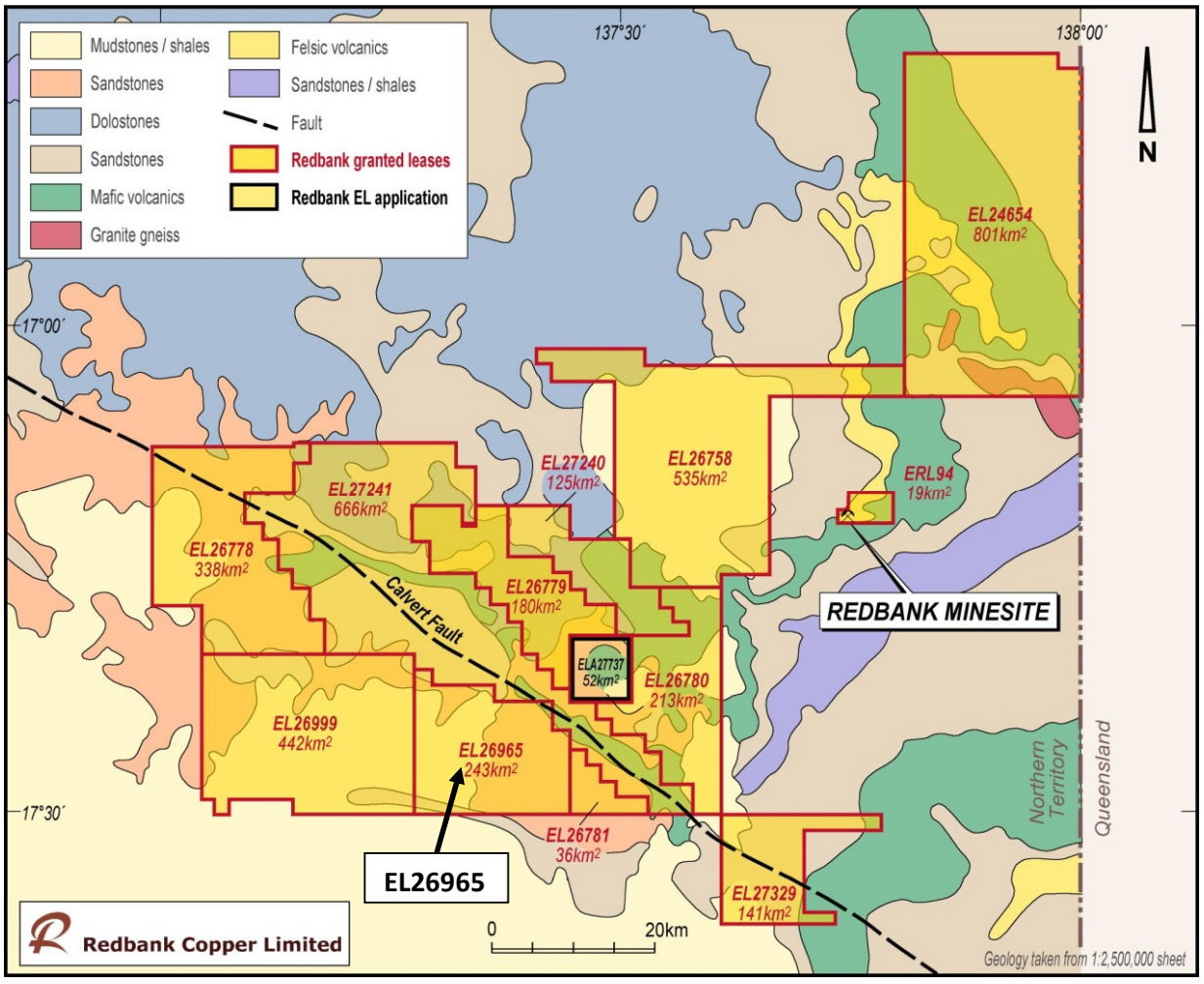


Figure 3: Location of EL26965 and Tenement Holding of Redbank Copper Limited

## 3 TENEMENT GEOLOGY

Within EL26965 exposure is limited and the topography is dominated by Cainozoic surficial deposits, predominantly lateritic (pisolitic and nodular) duricrust with skeletal sandy soils and ferruginous cemented detritus developed above. A well developed deep lateritic weathering profile is evident in areas with deep creek incisions into the landscape.

Other lithologic units observed but with limited outcrop include:

(i) Mullaman Beds – early Cretaceous shallow marine fluvial sediments, typically siltstones, sandy siltstones, quartz sandstones and pebble to conglomerate beds.

(ii) Bukalara Sandstone – early Cambrian shallow marine fluvial sediments, typically feldspathic sandstones, quartz sandstones and pebble to cobble conglomerates.

(iii) Sly creek sandstone – Proterozoic McArthur Basin Sequence, Tawallah Group lithic and quartz sandstone, fine to medium, flaggy, locally feldspathic with minor conglomerates.

## 4 EXPLORATION MODELS

The consensus of most of the modern era (post-1970) explorers in the Redbank area is that the mineralisation is contained in the approximately circular volcanic breccia pipes as the result of fluid circulation in the breccia. The breccia pipes development has also been interpreted as involving largely autochthonous brecciation of the trachyandesite host rock, with little displacement.

There is some suggestion that there has been post volcanic slumping in some pipes causing minor (<10m) vertical displacement of sediments overlying the Gold Creek volcanics into the pipes. Minor normal faults and jointing have been interpreted as exerting a control on the location and form of the pipes. A peculiarity of the more comprehensively mineralised pipes is the association of the mineralisation with pyrobitumen. The origin of the pyrobitumen has been variously speculated as resulting from intense reduction of carbonate to a high temperature derivative of an organic precursor.

RC and diamond core drilling by Redbank on deposits in the area during 2006 to 2010, has indicated that the mineralisation does not display all the characteristics that could be expected solely from the circulation of mineralised fluids through the prepared breccia pathways. While there are clearly veins of sulphidic copper mineralisation contained within the breccia they are typically fragmented. Also much of the primary mineralisation consists of chalcopyrite and chalcocite grains disseminated through the host trachyandesite. The oxide mineralisation retains the characteristics of the primary mineralisation structures and fabrics with cuprite largely replacing the disseminated chalcocite and chalcopyrite, with a minor amount of azurite and malachite vein formation following ground water migration along open weathering fractures.

More detailed studies of petrogenesis and ore formation are planned but the initial indications are that there may be a precursor disseminated style of mineralisation emplaced in the breccia pipes. The source of the precursor mineralisation could represent a major target for large scale disseminated copper mineralisation. As a corollary exploration should not only focus on finding mineralised breccia pipes but should also be trying to discover the source of the precursor disseminated mineralisation which has the potential to be a much larger target.

Conceptually, the possibility exists for 'Manto' style stratabound deposits forming at depth below the limit of breccia formation, as a primary mineralisation focus over structural décollements from fluid travelling laterally from major through-going lineaments, such as the Calvert Hills fault immediately north of the EL26965.

A stromatolitic dolomite bed in the McDermott Formation immediately below the Sly Creek sandstone, reports consistently elevated copper and cobalt levels over a few km south of the Calvert Hills homestead.

Packsaddle Microgranite (or rhyolitic) intrusions occur in close association with the Redbank copper Mineralisation. It is not yet apparent if there is any paragenetic significance in this spatial association. The Packsaddle Microgranites have interpreted as associated with a regional 1,725Ma felsic intrusive event in the Macarthur River Basin (Page *et al*, 2000).

## 4: PREVIOUS EXPLORATION ON REGIONAL TENEMENTS

Review of the available historic data indicated that it was disjointed and compilation into a modern GIS system was required. Principal explorers were Carpentaria, Rio Tinto, and then later CRA, mainly exploring for base metals, uranium and diamonds in the general area. Several generations of work starting in the 1960's can be grouped according to commodity as follows:

(i) 1956 to 1960 – predominantly uranium exploration,
(ii) 1965 to 1971 – again mainly uranium with another focus on copper, particularly at Redbank,
(iii) 1978 to present – uranium, diamonds, gold and base metal, manganese and industrial minerals (phosphates)

Apparently no broad approach to the current land package has been effectively applied, and with no application of new generation of geophysics and deep sensing geochemical methods..

## 5 EXPLORATION FOR THE PERIOD 18th June 2010 TO 17th June, 2011

Work undertaken during the period consisted of:

(i) Regional compilation of open file and other available company data from all known sources by an external consultant directed by the company's exploration manager. A comprehensive search

(ii) Indexing and geo-referencing of all data accumulated with point extraction of data where required,

(iii) Production of relevant maps for interpretation and ground survey planning,

(iv) Commissioning and commencement of a re-interpretation of available geophysical information including magnetic, radiometric and gravity data and target generation by external consultants,

(v) Field review of access, ground conditions, sample media and field program planning for the 2011 dry season.

## 6 PROPOSED EXPLORATION FOR THE NEXT 12 MONTHS

The company has appointed an experienced regional exploration manager to direct the exploration within its regional tenement package including EL 26965. This work will include but not necessarily be restricted to:

(i) Detailed review and interpretation of available geophysical data,

(ii) Part of the project area will be flown by high resolution magnetic and radiometrics as part of a co-contribution program with the NTGS,

(iii) Compilation and integration of historic geochemical data with geology and the targets and interpretations derived from the geophysical interpretation,

(iv) Regional geological mapping along and adjacent to the Calvert fault is expected to impinge into EL 26965,

(v) Ground magnetic surveys on targets identified from the compilation exercise, geochemical techniques, and structural interpretations from remote sensing techniques,

(vi) Geochemical sampling surveys including:

   a. Rock chip sampling,
   b. stream sediment and catchment analysis,
   c. reconnaissance laterite sampling to define chalcophile corridors in areas with extensively ferruginized landforms,
   d. deep sensing ionic geochemical soil analyses,

(vii) Acquisition of new airborne geophysical data where appropriate,

(viii) Drill testing of prospective targets.

**REFERENCES**

Ahmad M and Wygralak AS (1989) Calvert Hills, Northern Territory. 1:250 000 metallogenic map series explanatory notes SE 53-08. Northern Territory Geological Survey, Darwin

Orth K, 2011. Geology, vulcanology and mineral potential of the Cliffdale and Seigal volcanics, Calvert Hills 1:250 000 geological mapsheet, SE 53-08, Northern Territory Geological Survey, Record 2011-003.

Page R. W., Jackson M. J., Krassay A. A. (2000) Constraining sequence stratigraphy in north Australian basins: SHRIMP U-Pb zircon geochronology between Mt Isa and McArthur River. Australian Journal of Earth Sciences 47 (3), 431–459.

# NORTHERN TERRITORY EXPLORATION EXPENDITURE FOR MINERAL TENEMENT

| ***Section 1. Tenement type, number and operation name: (One licence only per form even if combined reporting has been approved)*** | |
|---|---|
| **Type** | *EL* |
| **Number** | *26965* |
| **Operation Name (optional)** | *Claypan East* |

| ***Section 2. Period covered by this return:*** | | | |
|---|---|---|---|
| **Twelve-month period:** | | **If Final Report:** | |
| From | *17th June 2010* | From | |
| To | *17th June 2011* | To | |
| Covenant for the reporting period: | | $**20,000** | |

| ***Section 3. Give title of accompanying technical report:*** | |
|---|---|
| Title of Technical Report | EL 26965 Annual Exploration Report Ending 17th June 2011 |
| Author | *R Birrell, J Ceplecha* |

| ***Section 4. Locality of operation:*** | |
|---|---|
| Geological Province<br>Geographic Location | ***McArthur Basin***<br>***Calvert Hills*** |

***Section 5. Work program for the next twelve months:***

**Activities proposed** (please mark with an "X"):

| | | | |
|---|---|---|---|
| [x] | Literature review | [x] | Airborne geophysics |
| [x] | Geological mapping | [x] | Ground geophysics |
| [x] | *Rock/soil/stream sediment sampling*<br>***Note:*** *Exact program dependant on progressive exploration results* | [x] | Other: |
| [x] | Drilling and/or costeaning | | |

**Estimated Cost**: $20,000

***Section 6. Summary of operations and expenditure:***

Please include salaries, wages, consultants fees, field expenses, fuel and transport, administration and overheads under the appropriate headings below. Mark the work done for the appropriate subsections with an "X" or similar, except where indicated. Complete the right-hand columns to indicate the data supplied with the Technical Report. Note overheads are not to exceed 15% of total.

**Do not include the following as expenditure (if relevant, these may be discussed in Section 7):**

- Insurance
- Company Prospectus
- Rent & Department Fees
- Bond
- Transfer costs
- Title Search
- Legal costs
- Advertising
- Land Access Compensation
- Meetings with Land Councils
- Payments to Traditional Owners
- Fines

| Exploration Work type | Work Done (mark with an "X" or provide details) | | Expenditure | Data and Format Supplied in the Technical Report | |
|---|---|---|---|---|---|
| | | | | Digital | Hard copy |
| **Office Studies** | | | | | |
| Literature search | **x** | | 2000 | **x** | |
| Database compilation | **x** | | 4000 | **x** | |
| Computer modelling | | | 800 | | |
| Reprocessing of data | **x** | | 3000 | **x** | |
| General research | **x** | | 2500 | **x** | |
| Report preparation | **x** | | 2050 | **x** | |
| Other (specify) | **Overheads** | | 2153 | **x** | |
| | **Subtotal** | | **$16,503** | | |
| **Airborne Exploration Surveys (state line kms)** | | | | | |
| Aeromagnetics | | kms | | | |
| Radiometrics | | kms | | | |
| Electromagnetics | | kms | | | |
| Gravity | | kms | | | |
| Digital terrain modelling | | kms | | | |
| Other (specify) | | kms | | | |
| | **Subtotal** | | **$** | | |
| **Remote Sensing** | | | | | |
| Aerial photography | | | | | |
| LANDSAT | **x** | | 3000 | **x** | |
| SPOT | | | | | |
| MSS | | | | | |
| Other (specify) | **Overheads** | | 450 | **x** | |
| | **Subtotal** | | **$3450** | | |
| **Ground Exploration Surveys** | | | | | |
| ***Geological Mapping*** | | | | | |
| Regional | | | | | |
| Reconnaissance | **x** | | 6000 | **x** | |
| Prospect | | | | | |
| Underground | | | | | |
| Costean | | | | | |
| ***Ground Geophysics*** | | | | | |
| Radiometrics | | | | | |
| Magnetics | | | | | |
| Gravity | | | | | |
| Digital terrain modelling | | | | | |
| Electromagnetics | | | | | |
| SP/AP/EP | | | | | |
| IP | | | | | |
| AMT/CSAMT | | | | | |
| Resistivity | | | | | |
| Complex resistivity | | | | | |
| Seismic reflection | | | | | |
| Seismic refraction | **3** | | | | |
| Well logging | | | | | |
| Geophysical interpretation | | | | | |
| Petrophysics | | | | | |
| Other (specify) | | | 900 | | |
| | **Subtotal** | | **$6900** | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Geochemical Surveying and Geochronology (state number of samples)*** | | | | | | | | |
| Drill (cuttings, core, etc.) | | | | | | | | |
| Stream sediment | | | | | | | | |
| Soil | | | | | | | | |
| Rock chip | | | | | | | | |
| Laterite | | | | | | | | |
| Water | | | | | | | | |
| Biogeochemistry | | | | | | | | |
| Isotope | | | | | | | | |
| Whole rock | | | | | | | | |
| Mineral analysis | | | | | | | | |
| Laboratory analysis (type) | | | | | | | | |
| Petrology | | | | | | | | |
| Other (specify) | | | | | | | | |
| | **Subtotal** | | | | | | | |
| | **Total** | | | | **$0** | | | |
| **Ground Exploration Subtotal** | | | | | **$26,853** | | | |
| **Drilling (state number of holes & metres)** | | | | | | | | |
| Diamond | | holes | | metres | | | | |
| Reverse circulation (RC) | | holes | | metres | | | | |
| Rotary air blast (RAB) | | holes | | metres | | | | |
| Air-core | | holes | | metres | | | | |
| Auger | | holes | | metres | | | | |
| Other (specify) | | holes | | metres | | | | |
| | **Subtotal** | | | | $ | | | |
| **Other Operations** | | | | | | | | |
| Costeaning/Trenching | | | | | | | | |
| Bulk sampling | | | | | | | | |
| Mill process testing | | | | | | | | |
| Ore reserve estimation | | | | | | | | |
| Underground development (describe) | | | | | | | | |
| Mineral processing | | | | | | | | |
| Other (specify) | | | | | | | | |
| Vehicle costs | | | | | 2100 | | | |
| Tenement Manage | | | | | 1000 | | | |
| Travel | | | | | 1460 | | | |
| Overheads | | | | | 795 | | | |
| | **Subtotal** | | | | **$5355** | | | |
| **Access and Rehabilitation** | | | | | | | | |
| Track maintenance | | | | | | | | |
| Rehabilitation | | | | | 900 | | | |
| Monitoring | | | | | | | | |
| Other (specify) | | | | | | | | |
| | **Subtotal** | | | | $**6255** | | | |
| **TOTAL EXPENDITURE** | | | | | **$33,108** | | | |

***Section 7. Comments on your exploration activities:***

Access to the area for the 2011 field season was delayed because of wet ground conditions.

I certify that the information contained herein, is a true statement of the operations carried out and the monies expended on the above mentioned tenement during the period specified as required under the *Northern Territory Mining Act* and the Regulations thereunder.

[x] I have attached the Technical Report

| | | | |
|---|---|---|---|
| 1. Name: | Russell Birrell | 2. Name: | John Ceplecha |
| Position: | Regional Exploration Manager | Position: | Exploration Manager |
| Signature: | | Signature: | |
| Date: | 12th August 2011 | Date: | 12th August 2011 |