MELBA FLATS EL 43/1992

ANNUAL REPORT
FOR THE PERIOD ENDING 16th March 2014

Author: Kim Denwer

Date: 15th March, 2014

Submitted To: Exploration Manager - Australia

Copies To: Tasmanian Regional Exploration Office Library
Mineral Resources Tasmania, Hobart
MMG – Melbourne Group office

Submitted By: Neil Rankine

CONTENTS

LIST OF FIGURES

1. SUMMARY

EL 43_1992 Melba Flats was under am exploration expenditure moratorium until 30th June 2013. Since that date exploration work on the Melba Flats area has involved several field visits and the commencement of two research programs- one by professor Reid Keays and the other a Masters study on the Melba Flats deposits. Both of these research programs have commenced but results have not yet been received.

INTRODUCTION

The Melba Flats area is located 17km WSW of Rosebery Township and is 9km NE of Zeehan Township in Western Tasmania (Figure 1). Access to the project area is from the Murchison Highway via tracks established by Forestry Tasmania roads. EL 43/1992 is a 6 sq. km Exploration Licence surrounding former mining lease, ML 2/2007, now RL02/2009 with an area of 3 sq. km. These areas were acquired to facilitate development of identified resources at Melba Flats. Minerals and Metals Group Limited (MMG) hold both licences. Mining Lease 2M/2007 was granted on 22 August 2007 for a 10-year period. Due to the prevailing economic conditions in 2009 and the current size of the resource at Melba Flats, during 2009, MMG gained approval for conversion of ML 2/2007 into a Retention Licence – RL5 / 2009.

Prior to its takeover by Zinifex in 2008 (and the subsequent Zinifex/Oxiana transaction that resulted in formation of OZ Minerals in 2008) Allegiance Mining had been exploring and evaluating the Melba Flats area since 1997. Prior to 1997 Rio Tinto Exploration (CRA Exploration) had been exploring the area since 1993. Annual Reports written by Rio Tinto provide comprehensive summaries of any work completed in the area prior to their period of tenure. Allegiance Mining compiled their regional drill hole database from information provided in the Rio Tinto Reports.

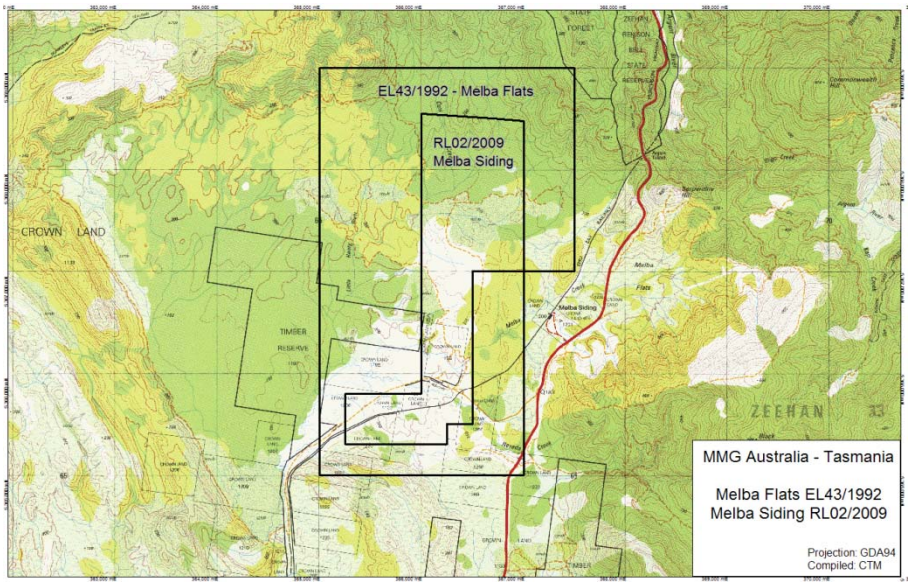

Figure 1: EL43/1992 location on 1:25K topographic map

2. LAND TENURE

EL43/1992 is coincident with state forest under management of Forestry Tasmania and administered under the Forestry Act (45 of 1998).

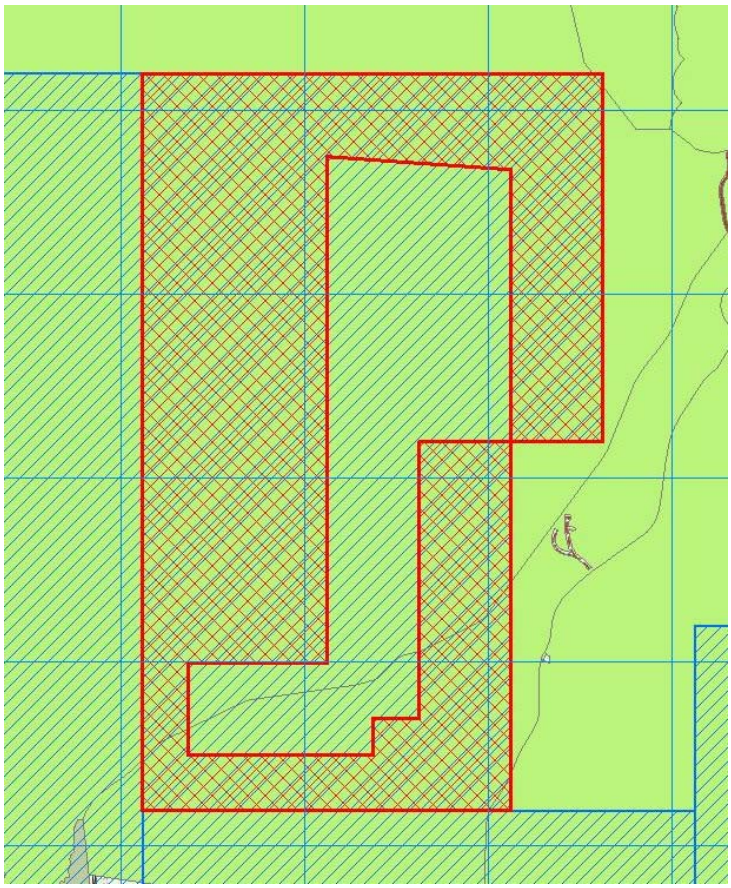

Figure 2: EL43/1992 overlain on Public Land Classification/Cadastral Classification

3. GEOLOGY

The Melba Flats area consists of Cambrian Crimson Creek Formation sediments intruded by a number of gabbro dykes of unknown age. The dykes are considered as genetically associated with the Serpentine Hill and Razorback Ultramafic bodies east of the area of interest. It is possible the dykes are alternatively associated with the Henty Dyke Swarm. Turbiditic sediments dip to the east and generally strike north-south. District folding and common small-scale faulting commonly cause local variations to this trend.

The gabbro dykes are intrusive, often with chilled, brecciated margins, and are both concordant and discordant to sediments. The dykes, proximal sediments and ultramafics are pervasively carbonate and carbonate-talc altered with ubiquitous late stage carbonate veining.

The Melba Flats Ni-Cu mineralisation is typically disseminated throughout the gabbro dyke host rock, and more concentrated on footwall contact positions. Mineralisation is principally pentlandite-millerite-chalcopyrite-pyrite. Significant cobalt, gold and PGE are associated with either (or both) nickel and copper sulphides. Late-stage carbonate alteration and veining is

also accompanied by coarse galena-sphalerite-chalcopyrite occurrences. The body of existing petrologic data suggests the Melba Flats sulphides are hydrothermal replacement deposits, derived from a larger magmatic source.

Historical production of 10,000t @ 9.5% Ni and 3.5% Cu to a maximum depth of 50m has been estimated for the Melba Flats field. Exploration to date by Allegiance has shown the Ni-Cu mineralisation to be more widespread and persistent to greater depths than previously thought. Drilling by Allegiance, complemented by surface exposure and former mine workings has identified modest shallow resources at Nickel Reward and North Cuni-Genets. The district is regarded as highly prospective for extensions of these resources and for more substantial bodies at depth associated with larger gabbro and ultramafic intrusives.

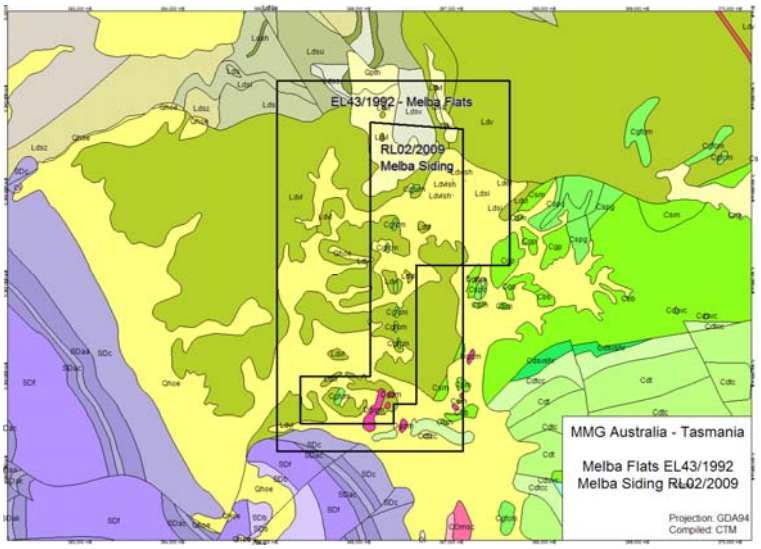

Figure 3: MRT 1:25K Geology with tenement location

4. CURRENT EXPLORATION

Work Completed in the 2013-2014 Period:

Work during the current reporting period has concentrated on two research programs. One is a Masters Project to be completed by Marcus Phia from Melbourne University with the focus of this research as outlined below:

<u>Masters Study</u>

Petrogenesis of the gabbroic sills hosting magmatic Ni-Cu-PGE sulphides at Melba Flats, Western Tasmania.

Supervisors: Reid Keays, Dave Phillips (University of Melbourne) and Kim Denwer (MMG)

Field of Study: Economic Geology/ Igneous Petrogenesis

This project focuses on a series of gabbroic sills that host magmatic Ni-Cu-PGE sulphides at Melba Flats where mineralization was discovered in 1893 and worked intermittently until 1948. Although total production was small (~6050 tonnes) the ore was high grade, averaging 9.7 % Ni and 4.7% Cu. The gabbroic sills are narrow and occur in clastic sedimentary rocks. The aims of the project are to establish the tectonic setting, magmatic affiliations and age of the sills. These aims will be accomplished by logging of diamond drill core, petrographic investigations, and whole rock geochemical studies; the ages of the sills will be establishing by U-Pb dating of accessory minerals such as zircon, baddelyite and rutile.

The following work will be included in this project:

- A structural study of sill orientations will be carried out with the aim to produce a 3D model of the sills

- The whole rock geochemistry of the sills will be assessed to determine if there is a difference in the compositions of the rocks hosting mineralisation and those that do not, -limited geochemical data (Crawford and Keays, 2010) and examination of Melba Flats drill core indicate the mineralised rocks are more primitive than the non-mineralised rocks

- Whole rock geochemical analyses together with PGE, Cu, Ni, S and Se will be carried out on samples from the gabbroic sill intersected in A254 that lies below and appears to intrude the Avebury serpentinite. Sections of the sill carry magmatic Ni-Cu sulphides and a xenolith of some type. These analyses will be undertaken to answer the following questions:

    - what, if any, is the relationship between these sills and those at Melba Flats?
    - was the magma that formed the sills a “pregnant” magma, transporting magmatic Ni-Cu sulphides?
    - is the xenolith a metasomatised serpentinite or is it something else?
    - do these gabbroic rocks carry the same granite-related metasomatic overprint as the serpentinites?
    - It may be possible to establish an age for this gabbroic sill. Minerals suitable for age dating will be searched for using the SEM in samples of the fractionated gabbro collected on this trip
    - if an age can be established, it will provide a minimum age for the Avebury serpentinite
    - a search will be made for minerals suitable for age determination in the xenolith observed in the gabbro sill

This research has commenced and Marcus Phia has commenced field work on 3rd March 2014.

An additional study will be completed by Reid Keays as outlined below:

The PGE, Cu, Ni, S and Se will be determined in both mineralized and non-mineralized samples in order to establish whether or not the mineralisation at Melba Flats was formed at depth or locally, if the mineralisation was formed at depth it is possible that significant amounts of Ni-Cu-PGE sulphide mineralization lies at depth below Melba Flats. This work will be completed by Reid Keays and made available to the student doing the masters study.

Four days were spent logging core and collecting samples for Keays research. The samples have been sent to the Acme Laboratories in Vancouver to have them analysed in December 2013. The reason for sending the samples there is that they generate excellent Au, Pd and Pt data at very low detection limits for Pd (0.5 ppb) and Pt (0.1 ppb).

PROPOSED EXPLORATION for 2014-2015.

For the next tenement year the above research by Keays will be completed and reported and results from the first year of the Masters Research will be reported. An annual expenditure of $20,000 is estimated.

ENVIRONMENTAL

No rehabilitation work was required during the period.

5. EXPENDITURE

The expenditure for EL43/1992 for the 2013/2014 term was $23,498.