



Tim Callaghan – Resource and Exploration Geology



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**RL1/2012**

**KARA NO 2 SOUTH**

**ANNUAL REPORT**

**NW TASMANIA**

**Prepared for: Tasmania Mines Limited**

**Tim Callaghan, September 2013**

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## **EXECUTIVE SUMMARY**

The Kara No2 South deposit is a high grade magnetite skarn currently held by Tasmania Mines Ltd on RL1/2012. The RL was converted from previous Mine Lease 20M/1991 which expired on 30 April 2012.

The deposit consists of a north striking, 60-70 degree west dipping lens of high grade (>60% Fe) magnetite skarn. The deposit was delineated by a ground magnetic survey, geological mapping and a series of shallow auger holes in 1991 and 1992. Several bulk samples were taken for metallurgical testwork for various potential off take partners. The high iron magnetite mineralisation and low silica content makes it suitable for iron ore production and for specialist uses.

During the mid 1990's a narrow pit was opened up on the skarn an estimated 60-100 000t of ore had been produced. Low iron ore prices forced the cessation of operations in the late 1990's and the site was rehabilitated.

A formal site survey was not available so a map of the access roads and rehabilitated pit was completed during 2012.

A pre-mining resource of 0.5Mt of high grade Fe was quoted in several historic references. The simple geology of the deposit, bulk sample testwork, production history and low variance of the Fe assays suggests the deposit contains a remnant Inferred Resource of 2-400,000t of >60% Fe in accordance with the 2004 edition of the JORC Code.

Work proposed for 2013-2014 includes the drilling of 600m of delineation drilling followed by resource and reserve estimation and economic modeling. If the results are favorable then the completion of a Development Proposal and Environmental Management Plan (DPEMP) and mine lease application will follow.



Tim Callaghan – Resource and Exploration Geology

## **MAP CONVENTIONS**

Coordinates in this report and in digital data associated with this report are recorded as AGD\_66 Zone 55



## **EXECUTIVE SUMMARY**

### **CONTENTS**

Executive Summary	3
1 Introduction	5
1.1 Tenure	5
1.2 Data Provided	7
2 Geology	9
2.1 Regional Geology	9
2.2 Local Geology	12
3 Drilling Data	17

### **LIST OF FIGURES**

### **LIST OF TABLES**



## **1 INTRODUCTION**

Tasmania Mines Limited hold RL1/2013 located approximately 5km east of Hampshire, 30km South of Burnie in NW Tasmania (Figure 1 and 2). Access to the RL is via all weather unsealed forestry roads Rogetta Road or the Blythe River Road of the sealed Upper Natone Road. The RL lies east of the Kara Mine Site. The Magnetite deposits on the Kara Mine site are referred to as the Kara No 1 deposits and those in the Blythe River area are the Kara No 2 Deposits.

The magnetite deposits in the Upper Blythe River have been known for many years e.g. Reid (1924). Modern exploration began in the 1970's by McIntyre Mines Ltd who delineated the skarns through a program of aero-magnetics, ground magnetics and geological mapping. Three separate magnetite deposits were identified including the Kara No 2 Main, Kara No 2 East and Kara No 2 South.

### **1.1 TENURE**

RL1/2013 was acquired after the previous ML 20M/1991 expired in May 2012. The RL was granted for a period of 2 years and is due to expire on the 3/8/2014. A renewal will be required.

Mine Lease 20M/1991, consisting of 38 hectares was excised from former EL39/1989 held by Tasmania Mines Limited in 1991 and was granted for a 5 year term effective from the 1<sup>st</sup> April 1992.

An application for license to operate scheduled premises (LOSP) was submitted to the environment department in 1992 along with a proposed mine plan and an environmental impact statement. The LOSP was not granted but a notice of registration No 1206 was granted on the 27<sup>th</sup> April 1992 allowing for the 1 off extraction of a 2000t bulk sample. Permission was provided by the department of Environment and planning was granted in December 1992 to extract a further 5000t.

The ML had been renewed twice since granting. An Exemption from Conditions on a Mining Lease was submitted along with a renewal of the Mining lease on 30<sup>th</sup> April 2005. The ML is due to expire on 30<sup>th</sup> April, 2012.

The area around 20M/1991 is currently held as EL18/2007 and EL53/2007 by Iron Mountain Mining Ltd.



## 2 GEOLOGY

### 2.1 REGIONAL GEOLOGY

The Kara Mine is located on the western margin of the Dial Range Trough and is underlain by lithologies of the Late Proterozoic Oonah Formation, Owen Group Siliciclastics, Gordon Group Limestone, Devonian Granites and Tertiary Basalt (Figure 1). The Dial Trough is a structurally interesting basin that includes a possible Northern Extension of the Hellyer Fault, and significant basin bounding faults on the western and eastern sides. The Devonian post orogenic Husetop Granite dominates the geology to the south of the project area and is considered to underlie much of the southern dial trough. The Dial Trough has been poorly mapped and stratigraphic correlations are uncertain for many units.

#### *Oonah Formation*

The oldest rocks in the district are the Proterozoic Oonah formation, consisting of poly-deformed quartzwacke, siltstone and pelite with lesser dolerite intrusives. These are overlain by a sequence of pelite-carbonate with minor mafic volcanics and conglomerate. This association is host to replacement deposits at Mt Bischoff and near Zeehan and consequently represents a potential host for similar styles of skarn mineralisation.

#### *Mt Read Volcanics*

Mt Read Volcanic associations have been correlated with the felsic volcanoclastics of the Western Volcano-sedimentary sequence and the Tyndall Group quartz-feldspar phyrlic volcanoclastics.

#### *Owen Group*

The Late Cambrian to Ordovician Owen Group overlies the Mt Read Volcanics and is comprised dominantly of siliciclastic conglomerate and sandstone. Locally volcanic derived conglomerates are associated with basal members. The Moina Sandstone, comprised of coarse to fine siliciclastic sandstone with minor intercalated conglomerate is the uppermost siliciclastic unit of the Owen Group and has a gradational contact with the overlying Gordon Group.

#### *Gordon Group Limestone*

Conformably overlying the Owen Group is the Gordon Group limestone and dolomite sequence which is the host of the Kara district magnetite skarns. The stratigraphic thickness of the limestone is regionally variable ranging between 50-1000m.

#### *Husetop Granite*



Tim Callaghan – Resource and Exploration Geology

The Housetop granite outcrops in much of the Kara District and is believed to extend below much of the area (Leaman, 1993). Leaman concludes that the Housetop granite is anomalously dense and highly magnetic, which may explain the abundance of iron metasomatism in the district. The granite is responsible for massive Magnetite-Sn-WO<sub>3</sub> mineralisation of the Kara District. The association of Tasmanian Devonian granites with Magnetite, Sn-WO<sub>3</sub>, Pb-Zn-Ag and Au mineralisation is well documented.

### *Tertiary Basalt*

Basaltic flows are widespread throughout the area, flooding Tertiary palaeo-topographic lows. The basalts vary widely in thickness and frequently have a high magnetic susceptibility creating difficulties for magnetite exploration below basaltic cover. Resource and exploration drilling at the Kara Mine indicates that the magnetite skarn extends below basalt cover at Eastern Ridge, Location 5 and the Northern Magnetite Anomaly.

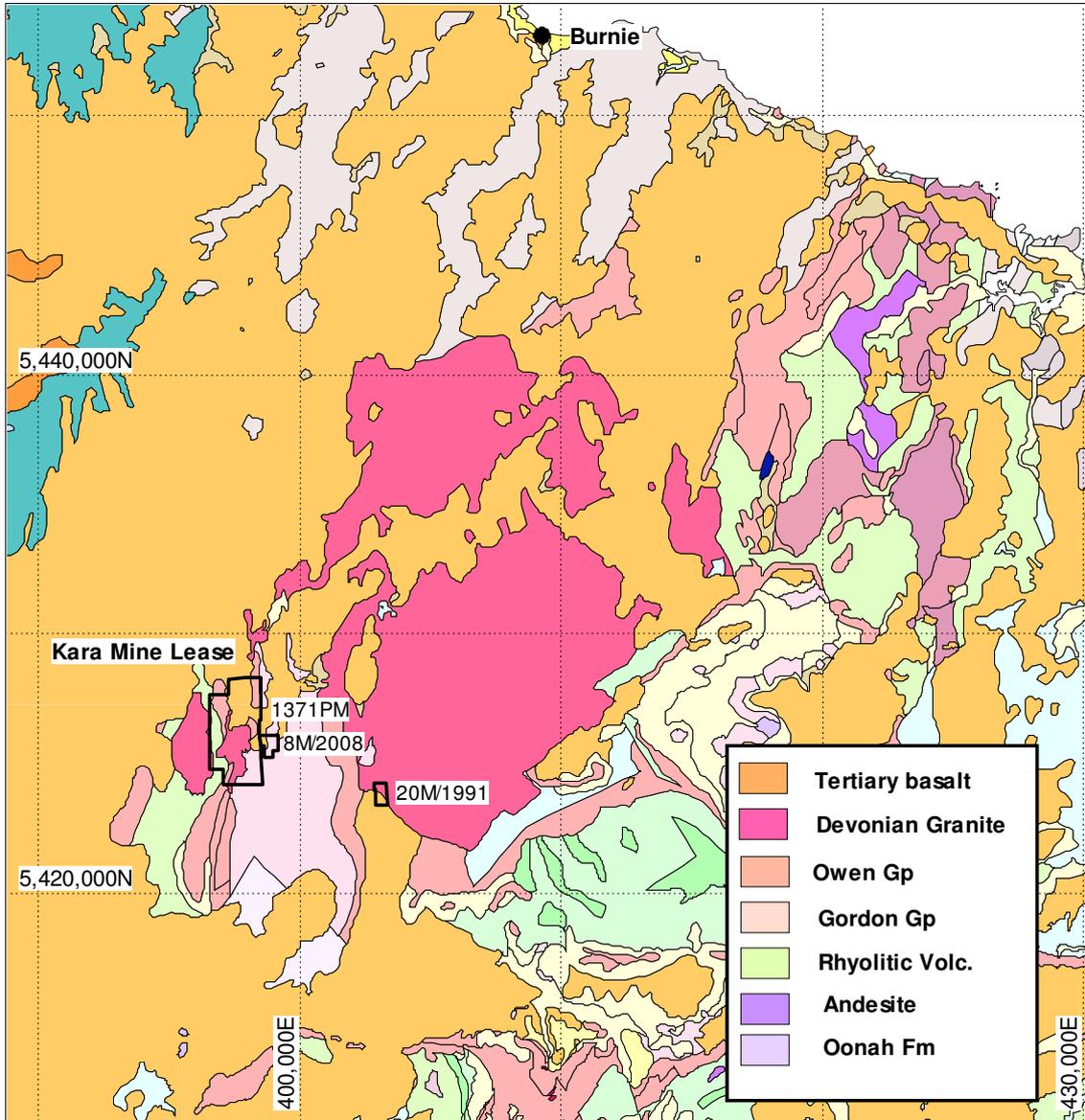


Figure 1. Kara Mine Lease location and MRT 250k Geology.

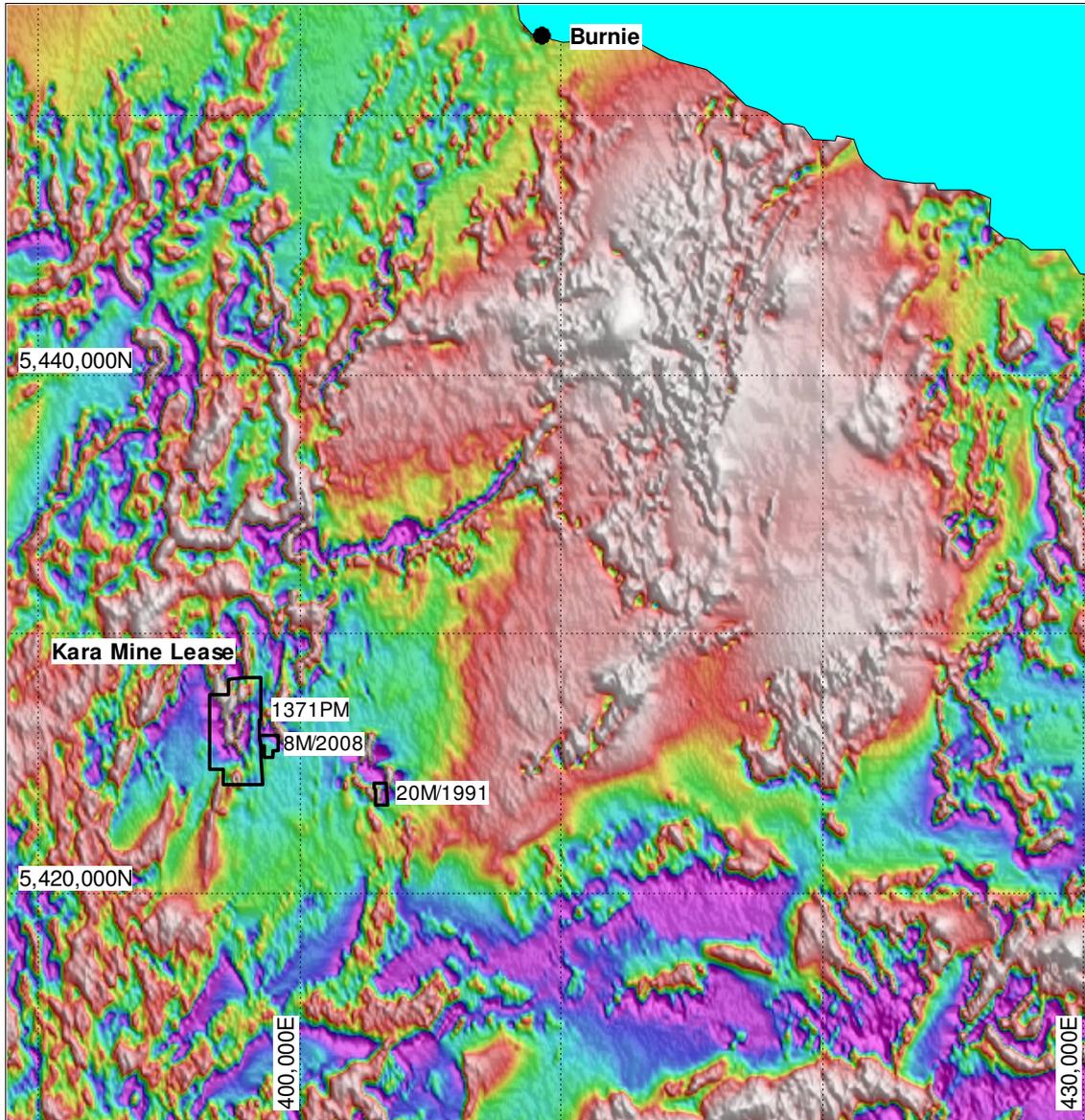


Figure 2. Kara Mine Lease location and TMI image.



## 2.2 LOCAL GEOLOGY.

The Kara No 2 South deposit is one of a cluster of magnetite-calc-silicate skarns on the western margin of the Husetop Granite known as the Kara No 2 Deposits. The Kara No 2 skarns are hosted in folded roof pendants of Gordon Limestone and Moina Sandstone inliers within the Husetop Granite batholith.

Geological mapping consists of company 1:10 000 and 1:1000 map sheets completed by MacIntyre Mines in 1982 (Whitehead, 1982) and modified by field observations made by the author.

The deposit has been delineated at shallow levels by percussion drill holes with a mean depth of 6m over a strike length of over 300m and has been opened up in a 250m long box cut type pit (now rehabilitated). The deposit consists of high grade (>60% Fe) magnetite skarn of 5 to 20m width, striking north and dipping at 60-70 degrees to the west (Whitehead, 1991). The skarn is bound to the east by the Husetop Granite and the western contact is masked by Tertiary basalt (Figure 3). Gangue lithologies are indeterminate clay after calc-silicate skarn. No significant scheelite or tin is associated with the skarn.

Magnetite skarns obviously have a very high magnetic susceptibility and form prominent aeromagnetic highs (Figure 4). The magnetic anomaly associated with the deposit extends northwards beneath the basalt cover suggesting the deposit extends northwards for up to 200m. A prominent western ground and aeromagnetic anomaly also suggests there may be a second western magnetite skarn under basalt cover to the west. Most of this anomaly is hosted on EL 18/2007 held by Iron Mountain Mining Ltd.

Mineralogical studies confirm the magnetite skarn to consist of 70% magnetite, 15-20% hematite and 15-20% goethite with very low silica (<3%).

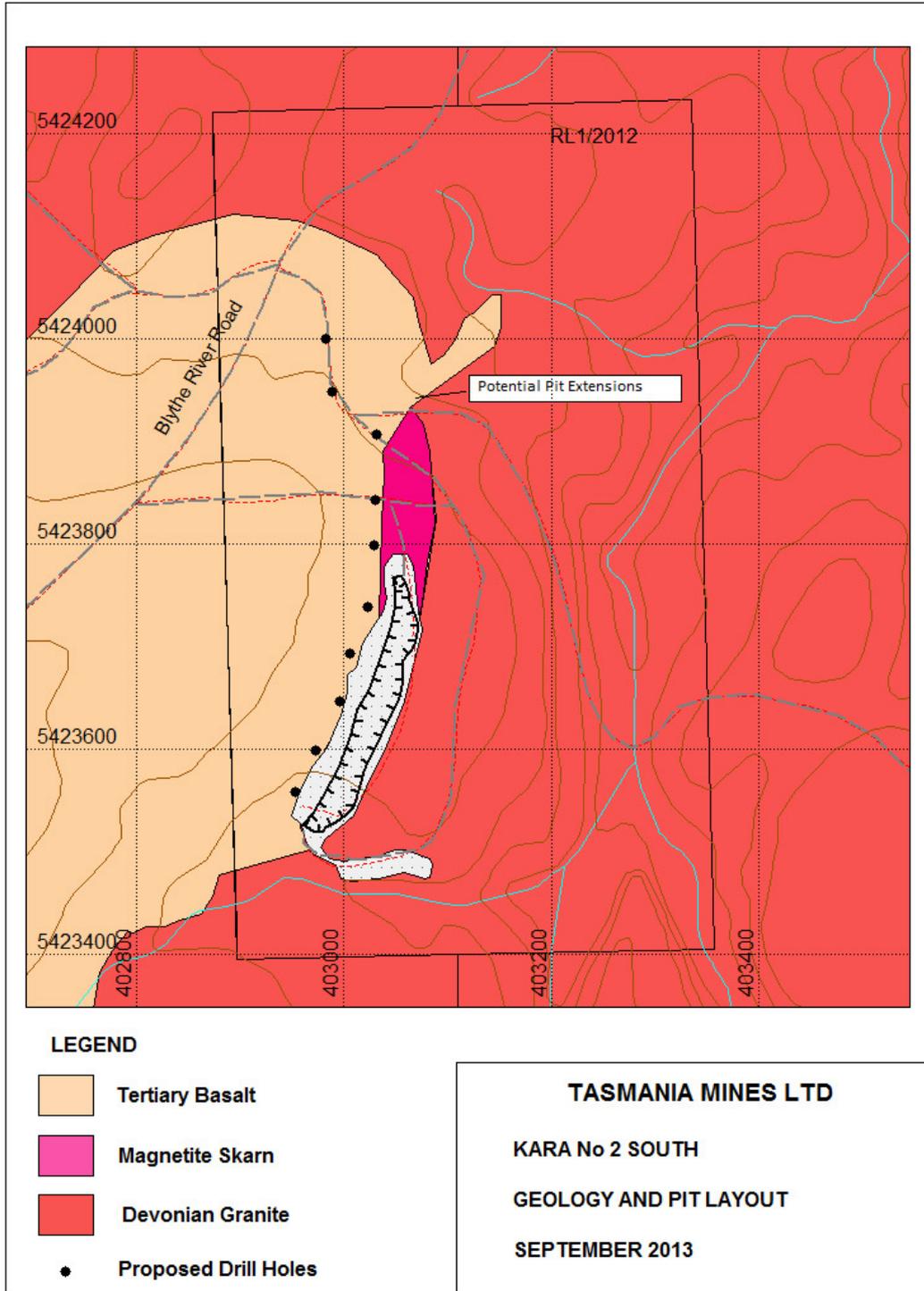


Figure 3. Kara No 2 South Geology and Pit Location.



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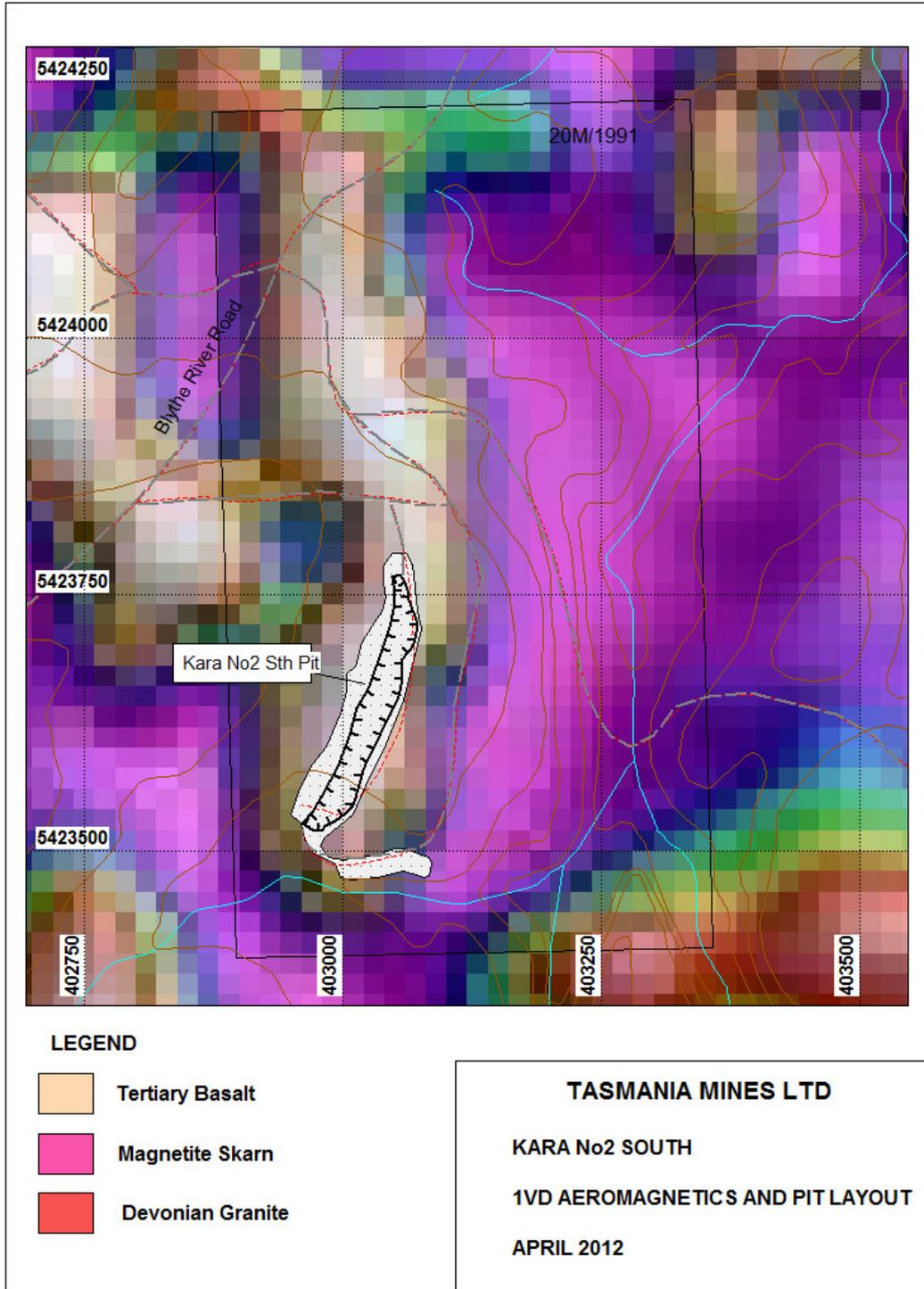


Figure 4. Kara No 2 South Pit Location and TMI.



### **3 WORK COMPLETED BY TASMINES, 1990-2013**

20M/1991 covers the Kara No 2 South magnetite deposit which was delineated by a ground magnetic and percussion drilling program in 1990 (Whitehead, 1991). The ML was excised from former EL39/1989.

#### **3.1 DRILLING PROGRAMS**

A total of 40 percussion holes for 213.5m were drilled in two campaigns during 1990 (Whitehead, 1991). The holes were drilled on a systematic grid designed to delineate the deposit for resource estimation. No drill logs or assay data is available for the second drilling campaign. Whitehead (1991) concluded that the Kara No 2 South deposit consisted of a narrow (7-25m) thick zone of magnetite-hematite over a 375m strike length, possibly extending further under basalt cover to the north. The drill holes have a mean grade of 62.7% Fe, a median of 63.5% Fe, minimum value of 56.2% Fe and a maximum value of 67.0% Fe. The low variance of the drillhole data suggests the deposit has an Fe grade of 62-63%. Silica grades are uniformly low with a mean value of 1.9% SiO<sub>2</sub>.

#### **3.2 METALLURGICAL TESTWORK**

Several bulk samples were taken for metallurgical testwork from 1990 to 1992 to determine if the magnetite was suitable for commercial use. Samples were sent to several potential buyers including APPM for their Direct Alkali Reduction Process (DARS), TEMCO for ferromanganese production and BHP Raw Materials Supply Department, Port Kembla for steel production. The testwork demonstrated that the ore could be sold commercially to TEMCO or APPM. Iron grades from the bulk samples are consistent with the percussion drilling program (>60% Fe).

##### **BHP**

A 3kg sample of lump ore was sent to BHP Raw Materials Supply in Port Kembla to assess its suitability for steel making and specifically to see if beneficiation was possible through sizing. Results of the testwork are in McKeown (1993). No appreciable beneficiation was observed. More specifically BHP noted that the zinc content was too high for their blast furnace feed. No further testwork for iron ore production was undertaken. (Iron ore prices have increased significantly since then so there may be potential for the deposit to be a viable feed source for steel production).

##### **APPM**

A 3-4 kg composite sample from the percussion drill holes was submitted to APPM in 1990. The sample was considered to be suitable for their DARS program and a larger 100t test sample was submitted in 1991 followed by a 200t sample in 1992. The sample was required to assess comminution requirements and to assess the chemical content of a fines fraction at <2.5mm. The sample was found to be amenable for APPM's DARS



project. Results of the testwork are in McKeown (1993). A follow up 200t concentrate sample was used for the process in 1992 and a firm order for supply of material followed.

## TEMCO

Initially TEMCO tested a small 20 litre sample of 6-17mm lump ore for ferromanganese production. The results were encouraging so a second 742t sample was submitted in May 1992 and again the results were encouraging. A third 546t sample was sent in November 1992. The samples were found to have satisfactory Fe and low SiO<sub>2</sub> even in lump form. Sales of magnetite ore to TEMCO commenced in 1993.

### 3.3 RESOURCE ESTIMATION

Whitehead (1991) estimated the deposit to host a resource of 500,000t of 'high grade Fe' (>60% Fe). McKeown (1993) quotes an Indicated Resource of 500 000t of 'high grade Fe' (>60% Fe).

It is the Authors opinion that the Kara No2 South deposit is sufficiently defined to be classified under the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code") as an **Inferred Resource**. It should be noted that the short falls for resource classification include:

- The drilling program did not test the deposit below 6m depth.
- Percussion holes appear to be poorly located and the second round of holes were not assayed. Hole collar coordinates do not match the pit location or aeromagnetic anomaly location. It is possible that the collars may have been surveyed by chain and compass.
- No geological map of the mine workings
- No drillholes defining the thickness and depth of the deposit
- Lack of QAQC data
- Lack of Density data

There is however sufficient confidence from the production history of the deposit and the geological and metallurgical testwork completed in the early 1990's to confidently surmise that there is a **remnant Inferred Resource of 2-400 000t of >60% Fe**. The consistency of the Fe grades from both the percussion holes and the bulk metallurgical testwork suggests there is unlikely to be much variation in the grade of the deposit. The morphology of the deposit is simple so it is likely that the deposit continues down dip for at least 20m lending confidence to the estimated tonnage. Given a strike length of 400m, a width of 10m and down dip extension of 20m, the deposit occupies a volume of 80,000m<sup>3</sup>. The SG of magnetite skarn from the Kara No1 pit is 4. Assuming a conservative SG of 4 for the high grade Kara No 2 South Mineralisation it is estimated that the deposit contains an estimated tonnage of 320 000t.



### **3.4 PRODUCTION**

Production of Magnetite ore from the Kara No 2 South deposit commenced in 1993, supplying low silica lump ore for Ferro-manganese production at TEMCO, magnetite fines for cement production at Goliath Cement Railton and as mill feed for Tasmania Mines' Kara operation. Some sales of magnetite were apparently made to specialty operations such as APPM's Direct Alkali Reduction Program (DARS) and as ragging for Renison Bells Kelsey Jigs.

No production details have been cited but sales records should be available in Tasmanian Mines records.

No site plan or pit survey was cited. Ore was produced from a simple box cut type open pit of shallow depth (6-10m maximum depth). A GPS pickup of the rehabilitated site was made in April 2012 to get an idea of the site layout and attempt to estimate the production from the site. A pit length of 250m suggests production in the order of 60-100,000t of high grade magnetite.

The site was rehabilitated in 1998 with significant re-growth on the backfilled pit and leveled waste sites. Access roads have been rehabilitated and closed off.

### **3.5 CESSATION OF ACTIVITIES AND REHABILITATION**

Low iron ore prices forced the cessation of activities in 1998. The pit was backfilled and the site rehabilitated with the revegetation of contoured waste dumps, access roads and the backfilled pit. The site is weed free with re-growth well advanced.

### **3.6 WORK COMPLETED 2013**

Field mapping, literature reviews and site surveys were completed in 2012-2013 culminating in the submission of the RL application and this annual report.



#### 4.0 PROPOSED WORK 2013-2014

It is recommended that a resource delineation drilling program be completed on the deposit followed by formal resource estimation. Drillholes should be spaced on 50m sections and test the deposit to a depth of 50-60m. All holes should be analysed for a minimum of Fe, SiO<sub>2</sub>, CaO, WO<sub>3</sub>, Sn, Zn, Pb and Bulk Density.

Proposed Drill collars are listed in Table 1 and displayed in figures 3 and 4.

<b>Hole_id</b>	<b>Easting</b>	<b>Northing</b>	<b>Azm</b>	<b>Dip</b>	<b>Length</b>
1	402950	5423550	90	-55	60
2	402970	5423600	90	-55	60
3	402990	5423650	90	-55	60
4	403000	5423700	90	-55	60
5	403020	5423750	90	-55	60
6	403030	5423800	90	-55	60
7	403030	5423850	90	-55	60
8	403030	5423900	90	-55	60
9	402980	5423950	90	-55	60
10	402980	5424000	90	-55	60
<b>Total</b>					<b>600</b>

Resource estimation, reserve definition and metallurgical testwork should follow the drilling program. A new ML may be required if the high grade magnetite is suitable for iron ore production.



## **5 RECOMMENDATIONS**

The following work program is recommended:

- Resource delineation drilling.
- Resource estimation.
- Mine design and Reserve Estimation
- Investigation of potential off take partners
- Economic modeling
- Development Proposal and Environmental Management Plan
- Apply for renewal of the Mine Lease or a Retention License



Tim Callaghan – Resource and Exploration Geology

## **ADDITIONAL NOTES**

### ***LIMITATIONS AND CONSENT***

This report is provided to Tasmania Mines Ltd in the context of a Geological Review and should not be used or relied upon for any other purpose.

This report has been prepared using information available to the Author at the time of writing. The opinions stated herein are given in good faith and with the belief that the basic assumptions are factual and correct and the interpretations reasonable.

This report is not intended for use as a public document nor, in whole or in part, in a public document without written consent to the form and context in which it appears.

### ***COMPETENT PERSON AND JORC CODE***

This report was prepared by Tim Callaghan, who is a Member of The Australian Institute of Mining and Metallurgy (“AusIMM”), has a minimum of five years experience in the assessment of Mineral Prospects and Resources of this style and is a competent Person as defined in the JORC Code.

### ***STATEMENT OF INDEPENDENCE***

Tim Callaghan has no material interest or entitlement in the securities or assets of Tasmania Mines Ltd or any associated companies.



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