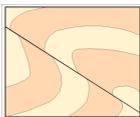Tim Callaghan – Resource and Exploration Geology

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**KARA 2 SOUTH**

**MINERAL RESOURCE ESTIMATION**

**SEPTEMBER, 2014**

**Prepared for:  Tasmania Mines Ltd.**

**Tim Callaghan, September 2014**

**MAP CONVENTIONS**

Coordinates in this report and digital data associated with this report are recorded as GDA94 Zone 55

Relative Levels in this report are recorded as MSL

**EXECUTIVE SUMMARY**

The Kara No2 South Magnetite Deposit is a carbonate hosted metasomatic skarn located in Ordovician sedimentary rocks on the south edge of the Devonian Housetop Granite in North Western Tasmania. Numerous magnetite skarns are located within the district with two main clusters, the Kara No1 and the Kara No2 skarns hosting most of the known resources. The Kara No2 South skarn strikes north-south and dips steeply west. It is composed of stratabound lenses of magnetite-calcsilicate-skarn located in what is interpreted to be a roof pendant on top of the southern margin of the Housetop Granite. Weathered granite and lesser calc-silicate skarn forms the hangingwall and footwall to the host sequence. The skarn extends approximately north-south for 500m in strike length and has been drilled to approximately 80m depth. The mineralised lenses vary from 5 to 15m in thickness.

The deposit was first drilled by Tasminex in early 1990. Small scale production for magnetite uses occurred on Mine Lease 20M/1990during the early to mid 1990's. Production records are sparse. The ML lapsed in 2012 and has been retained as an RL.

A further nine diamond drillholes for 557.2m were drilled by Tasmania Mines in 2014 which forms the basis of the current resource estimation. All data for this estimation was captured electronically and uploaded to an access database. All recent drill collars used for the estimation were surveyed by licensed surveyors. Drill collar details and significant intersections are listed in Table 1.

**Table 1. List of Drill collars and Intercepts Kara No2 South 2014**

| BHID | Easting | Northing | RL | Depth m | From m | To m | Length m | FeO% |
|------|---------|----------|------|---------|--------|------|----------|------|
| KE001 | 403060.3 | 5423748.1 | 545.9 | 59.7 | 40.0 | 51.0 | 11.0 | 66.1 |
| KE002 | 403081.4 | 5423796.0 | 549.6 | 67.3 | 42.0 | 64.0 | 22.0 | 56.2 |
| KE003 | 403094.3 | 5423835.8 | 552.4 | 73.8 | 17.0 | 20.0 | 3.0 | 55.3 |
| | | | | | 49.0 | 71.0 | 22.0 | 58.4 |
| KE004 | 403105.9 | 5423887.8 | 554.4 | 80.6 | 24.0 | 27.0 | 3.0 | 74.6 |
| | | | | | 66.0 | 79.0 | 13.0 | 52.3 |
| KE005 | 403123.4 | 5423933.1 | 556.1 | 67.5 | 23.0 | 33.0 | 10.0 | 61.8 |
| | | | | | 48.0 | 62.0 | 14.0 | 54.8 |
| KE006 | 403145.1 | 5424080.1 | 550.6 | 49.0 | 39.0 | 44.0 | 5.0 | 33.2 |
| KE007 | 403146.4 | 5423971.4 | 555.5 | 41.5 | 22.0 | 40.0 | 18.0 | 55.2 |
| KE008 | 403098.0 | 5424138.5 | 549.5 | 72.3 | 13.0 | 18.0 | 5.0 | 43.1 |
| KE009 | 403104.8 | 5424174.6 | 550.1 | 45.5 | 11.0 | 17.0 | 6.0 | 43.0 |

Mineralised domains were modeled with Surpac(TM) software from cross sectional interpretations, drillhole data and 1m composited assay data using a 30% FeO boundary and a minimum width of 3m. Internal dilution was kept to a minimum of 3m with some allowances for continuity. Only 3 mineralised domains were present, a large southern lens with a sub parallel subsidiary lens and a northern lens of thinner magnetite skarn offset by an interpreted sinistral strike slip fault with of 50m displacement.

Drillhole data was composited on 1m intervals. Univariate statistical analysis was completed on all domains. Variogram modeling was completed on the largest Magnetite Lens only as the other lenses contained insufficient data. Variogram models had typical low nugget effects and moderate ranges typical of this style of mineralisation.

FeO was interpolated into a block modeled resource estimation using an Inverse Distance Squared algorithm. Potential penalty elements S were estimated using an Inverse Distance Squared algorithm ($ID^2$). The resource is reported in accordance with the 2012 edition of the JORC Code above a block cutoff of 30% FeO (Table 2).

**Table 2. Kara No 2 Sth Mineral Resource Estimation FeO > 30% cut off**

| Classification | MTonnes | FeO % | WO3 ppm | S % | CaO % |
|---|---|---|---|---|---|
| Indicated Resource | 1.29 | 55.6 | 454 | 0.02 | 11.4 |

Bulk density measurements were completed by ALS Laboratories using the Archimedes method. A weak grade-density relationship is apparent. Bulk density of mineralised domains has been estimated from 1m composited data using $ID^2$.

No metallurgical testwork was completed for this phase of the program. Previous production and visual assessment suggests it is likely to be similar to the Kara No 1 magnetite mineralisation.

The resource has been classified as Indicated Resource as the simple geological model is well constrained by the 50m spaced drilling. The resource has not been classified as measured due to the uncertainty of the base of the mineralisation and the lack of detail on the depth of previous operations.

There is a high degree of confidence in the simple geological model. There is moderate confidence in the grade and bulk density estimation.

The outcropping resource is amenable to conventional drill blast load haul open cut mining similar to that at Tasmania Mines Kara operation.

There is limited potential for additional resources through continued exploration and infill drilling along strike and down dip of the Kara No 2 South. The main limitations are the small size of the RL. Numerous and larger Magnetite skarns are known and drill defined in the immediate Kara No2 locality.

Recommendations for further work include:

- Metallurgical testwork

- Waste rock and mineralisation environmental characterization

- Pit Design

- ML application

- Scoping study

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## 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 1st 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 27th 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 30th April 2005.

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

### 1.2     EXPLORATION HISTORY

EL39/1989 was acquired by Tasminex and exploration commenced for Kara style Sn-WO3 skarn deposits adjacent to the Housetop and Ringwood granite stocks.  The Kara No 2 South magnetite deposit was delineated by a ground magnetic and percussion drilling program in 1990 (Whitehead, 1991).  ML 20M/1991 was excised from former EL39/1989.

 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 tape and compass 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% $SiO_2$.

A 9 hole resource delineation diamond drilling program was completed by Tasmania Mines in 2014. The program was designed to test the Kara No 2 deposit on 40-50m centers below the rehabilitated pit.

## 1.3    PREVIOUS ESTIMATIONS

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 the 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 80,000$m^3$. 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.

## 1.4 MINING METHOD AND PREVIOUS PRODUCTION

The Kara No2 South deposit is amenable to convention blast-load-haul open cut mining methodology, similar to the Kara Mine operation. Previous production demonstrates the viability of the simple mining method.

Previous 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.

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

## 1.5 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 were 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 communion 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 $SiO_2$ even in lump form.  Sales of magnetite ore to TEMCO commenced in 1993.

## 1.5    SCOPE OF WORK

REG propose to carry out the following work on the Kara No 2 South deposit:

- Load and validate drill data
- Prepare three dimensional solid models of geological elements required for resource estimation
- Undertake statistical and geostatistical investigations
- Prepare a block model of the deposit
- Estimate total Fe, S, CaO, $WO_3$ and SG into the model.
- Validate the model
- Report the mineral resource in accordance with the 2012 edition of the JORC Code

## 1.6    DATA PROVIDED

Data provided for this estimate includes:

- Topographic DTM created by licensed surveyors using Differential GPS and topographic data from the lands department.
- Access Database
- Geology maps and data
- Historic Exploration Reports (pdf)

Data provided with this report includes:

- Access database used for the estimate
- Solid Models of Mineralisation Domains (Surpac)
- Surface DTM
- Block modeled Resource Estimate (Surpac)
- Mineral Resource Estimate Report (pdf)

## 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 Housetop 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 volcaniclastics of the Western Volcano-sedimentary sequence and the Tyndall Group quartz-feldspar phyric volcaniclastics.

*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.

*Housetop Granite*

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$_3$ mineralisation of the Kara District. The association of Tasmanian Devonian granites with Magnetite, Sn-WO$_3$, 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.
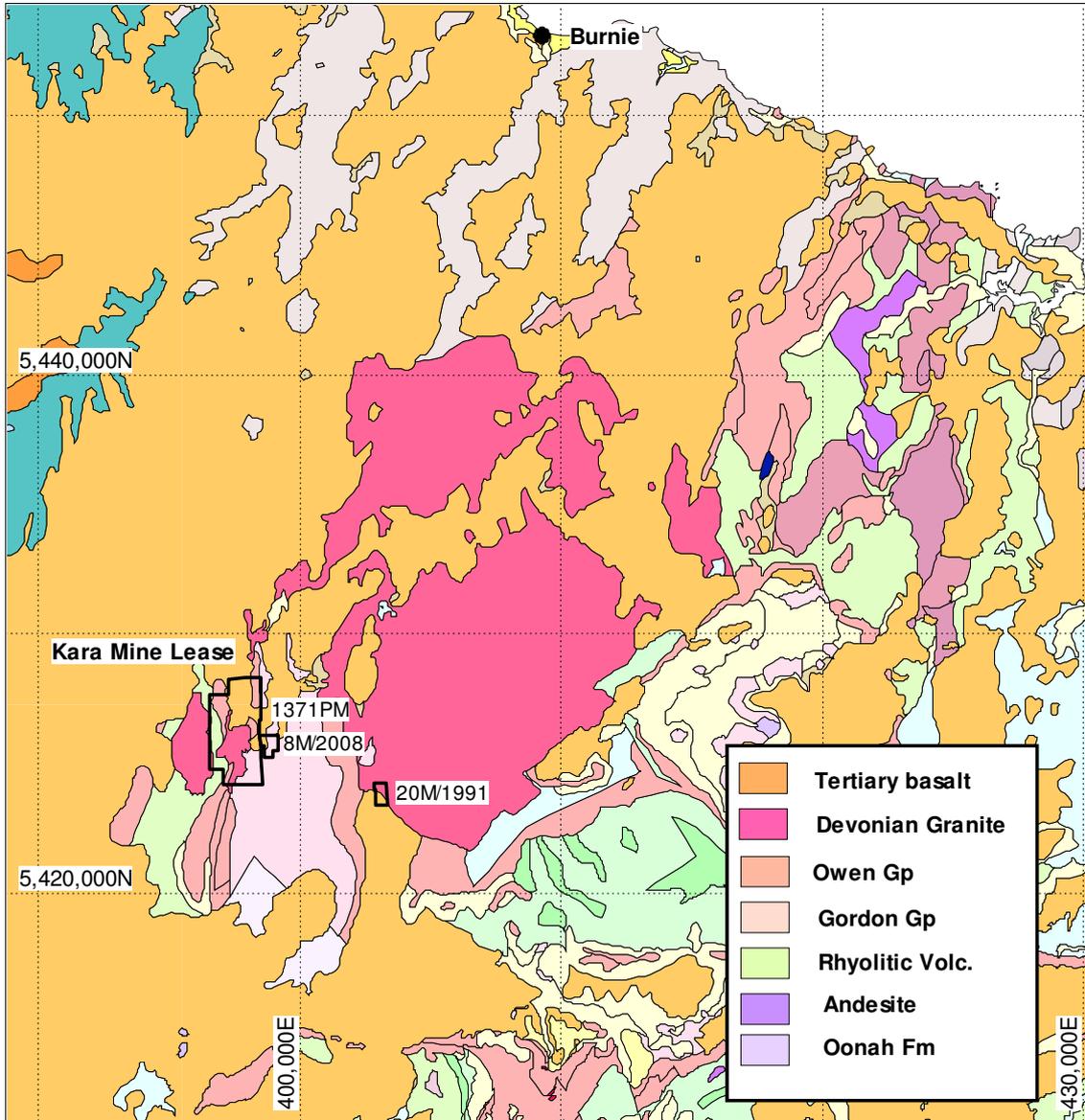
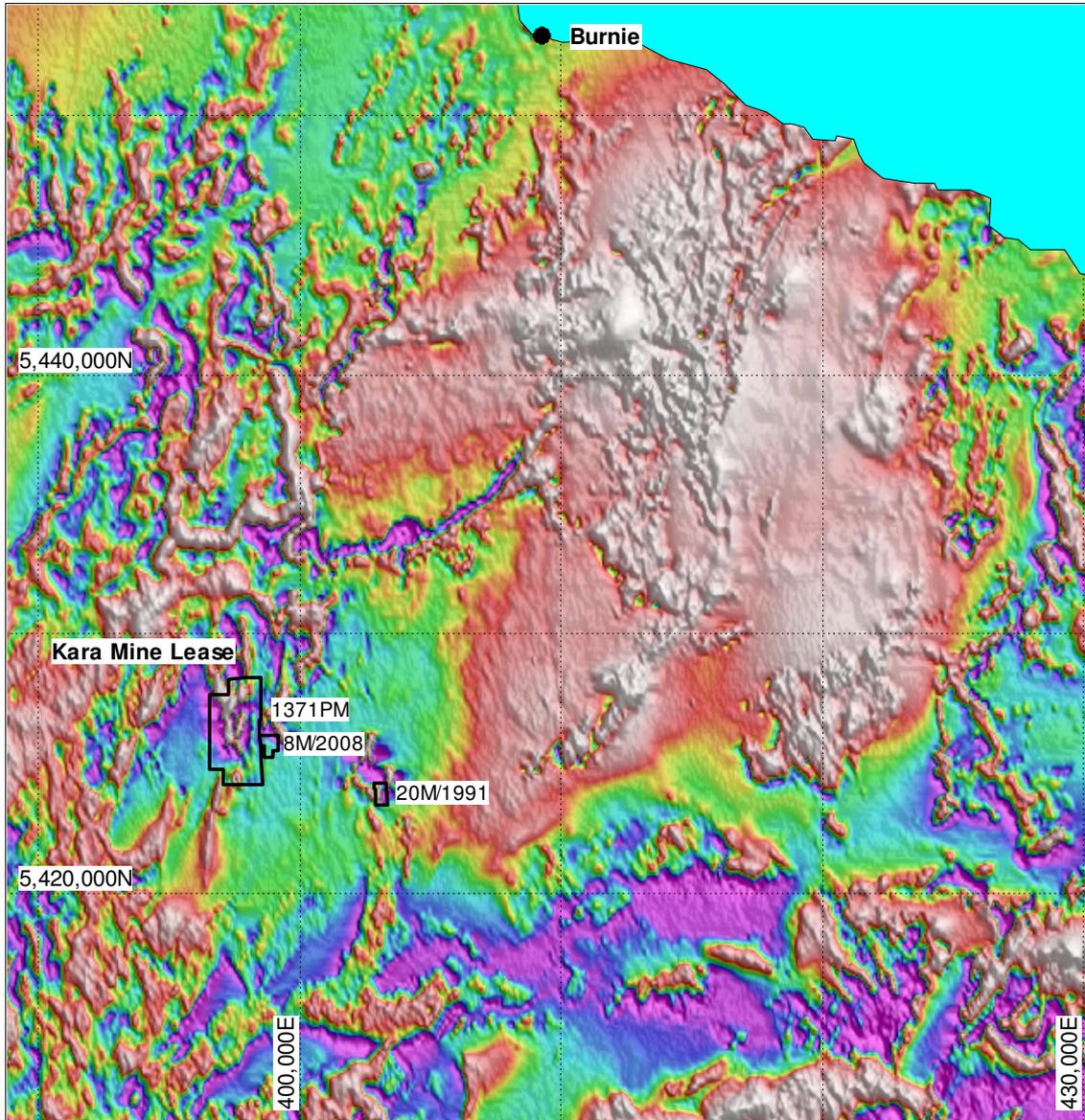**Figure 1. Kara Mine Lease location and MRT 250k Geology.**

**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 Housetop 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 Housetop 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 Housetop 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%).

Several bulk samples were taken for metallurgical testwork for various potential off take partners in the 1990's.  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.
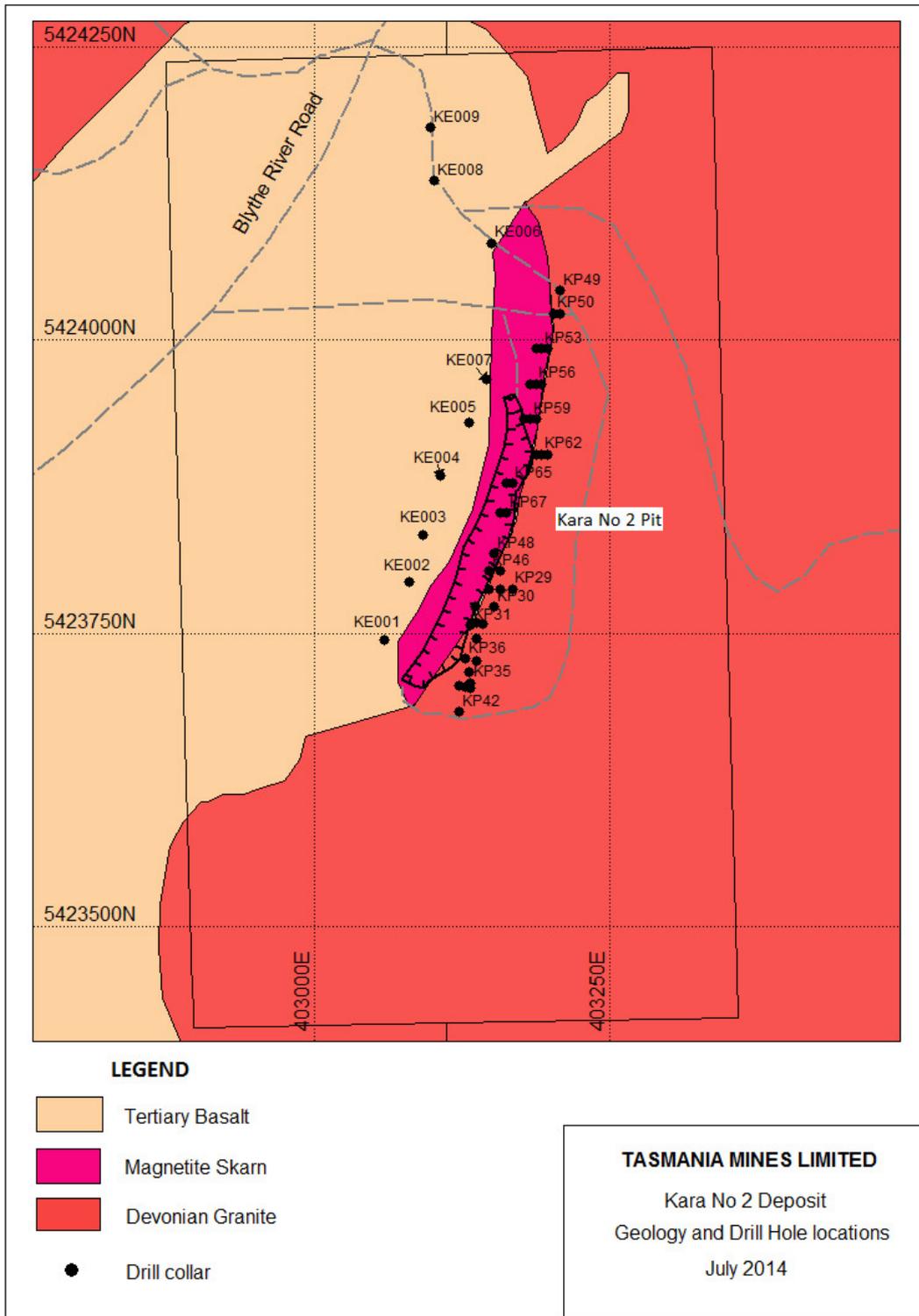
**Figure 3.  Kara No 2 South Geology and Pit Location.**
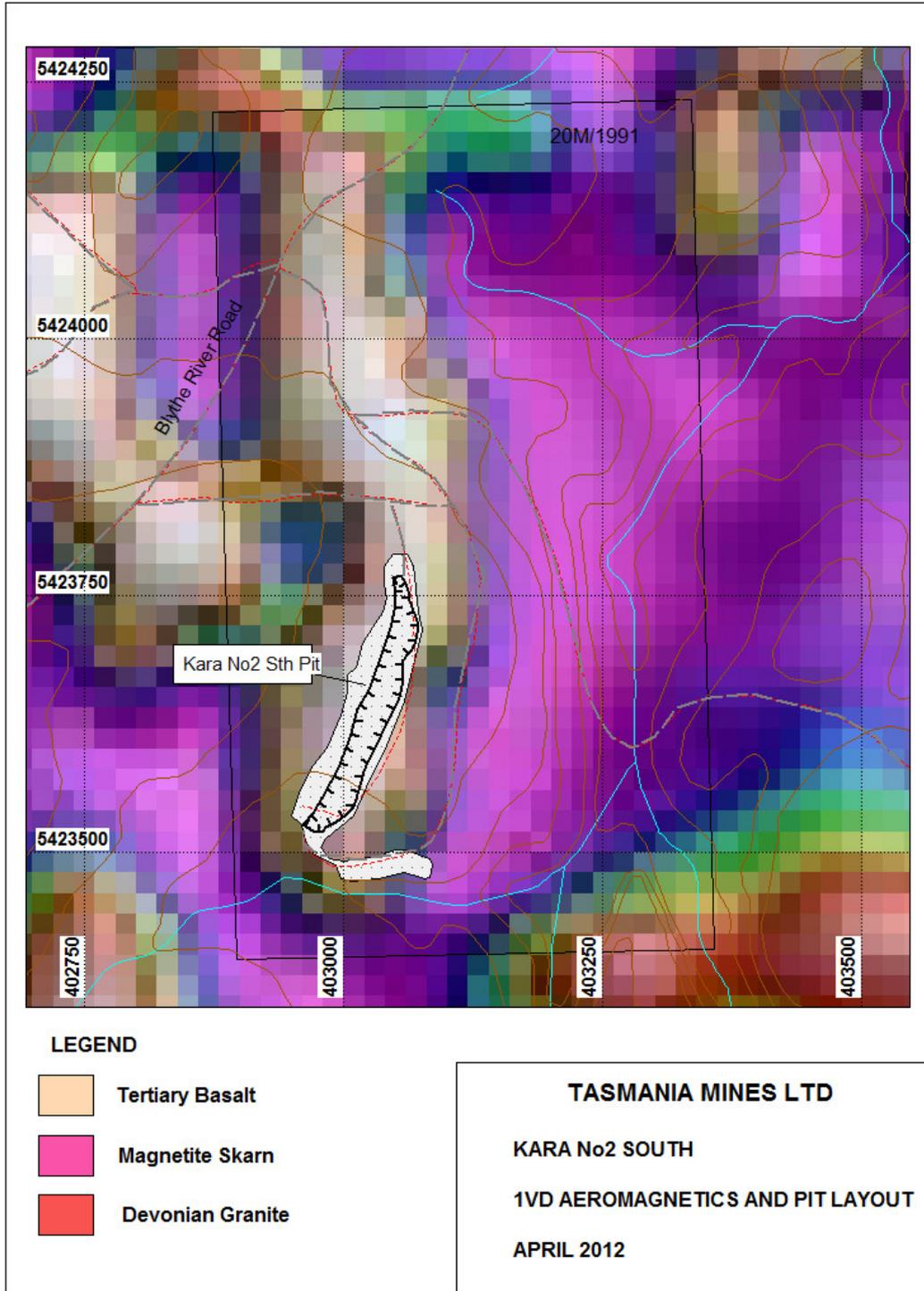
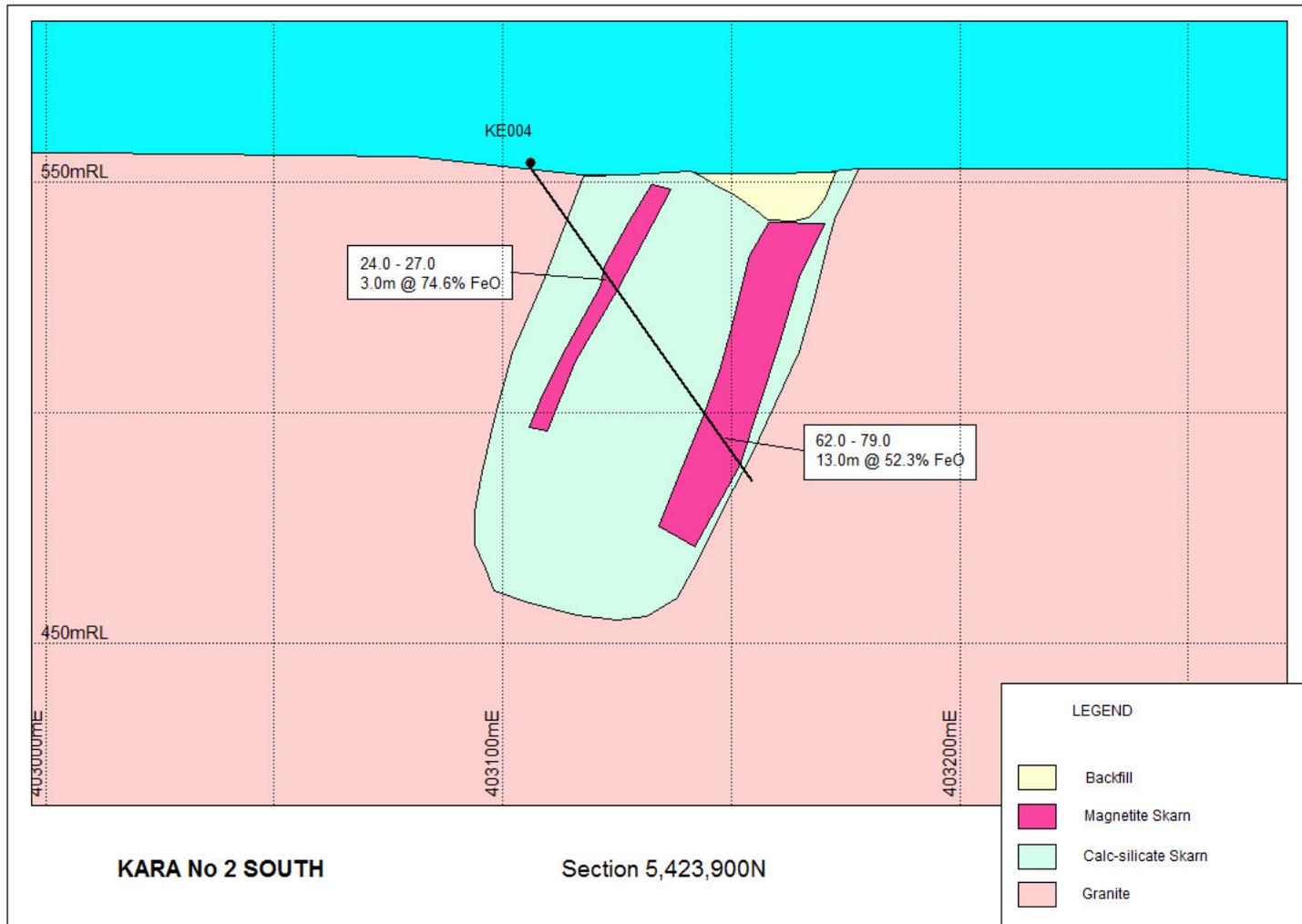**Figure 4.  Kara No 2 South Pit Location and TMI.**

**Figure 5. Section 5,423,900N**

## 3 DRILLING DATA

An Access database was created to manage the drilling data by Tim Callaghan of REG. A total of 39 historic percussion drillholes were completed by Tasmania Mines in 1992. Only the first series of holes had analyses. No logs were available for the drilling. Drill collars were located on a tape and compass grid and collar positions are approximate and apparently offset 10-20m east of the actual open pit. 7 of which are within the project are for this resource estimation.

All the historic drilling data was uploaded to the Access database by REG. Historic data was not used in the estimation due to the poor location and lack of detail.

A total of 9 diamond drillholes were drilled by Tasmania Mines between May and July 2014. These holes and the surface mapping from the basis of this resource estimation.

### 3.1 DRILLING TECHNIQUES

All drillhole data used for this estimation was derived from diamond drill core. Details of collar locations, core sizes and core recoveries are listed with the drill logs in Appendix 1.

Drilling conditions were challenging, within the upper weathered zone where changes in rock hardness and competency were caused by strong development of clay. Mineralised core recoveries were excellent with recoveries of 100% in most holes with the exception of KE005 with 87% recovery, a thin upper oxidised lens in KE007 with recoveries of 18% and oxidised mineralisation in KE009 with recoveries of 78%.

Tasmania Mines drilled 9 triple tube wire-line diamond drill holes into the Kara No2 South prospect in 2014. Drill logs were compiled by REG and assay data was uploaded to the database by REG. The holes were drilled conventionally with HQ collars and NQ tails with the majority of intersections being of NQ size. All mineralised intercepts were analysed for Fe. There were no downhole surveys due to the intense magnetic local field. All collars were located by licenced surveyor.

### 3.2 DATA LOCATION

All drill collars used for resource estimation were located by licenced surveyors under instruction from Tasmania Mines using a differential GPS. Drill collars are recorded in the database as GDA94.

Historic percussion holes appear to have been located by tape and compass and recorded collar positions are located 10-20m east of the historic mine workings. Percussion holes were not used in the estimation.

Downhole surveys are problematic due to the very strong local magnetic field. Given the short length of most drillholes, the drill spacing and the nature of the mineralisation the lack of downhole surveying is not considered to have a material impact on resource estimation.

Drill spacing is approximately 50 x 50m in the well-drilled Mineralised Lode.

A topographic DTM of the Kara No2 South area was created from drill hole collars and survey control and data. The area of the digital terrain model was expanded using lands Department 10m contours to cover areas of potential waste dumps and pit walls.

## 3.3    SAMPLING TECHNIQUES AND LOGGING

All drill core was transported to the Tasmines core storage facilities at the.   Kara Mine Site. Core was reconstituted and marked up for logging. REG measured the core for recovery and RQD.

All drill core was geologically and geotechnically logged by AHL REG on personalized software using laptop computers. Logs were uploaded to the customised database on completion. Standard lithology codes have been used for all logging.   Logs were validated in cross sectional analyses.

Mineralised drill core was marked up and spit with a diamond core saw as per industry standard. Core was sampled generally on a 1m basis as per industry standard although core from weathered/broken zones was sampled between core blocks. The cut core was ticketed, bagged and delivered to ALS for analysis.

## 3.4    ASSAY DATA

The early Tasmania Mines percussion holes were analysed for Fe only. No details of analytical techniques were recorded. None of the early holes have been used in the estimation due to poor data location and lack of detail on data quality. The mean (60.8% FeO) and median grades (63.4% FeO) are significantly higher for the historic data than the recent data (mean 53.2% FeO, Median 54.4% FeO) suggesting sample bias from the percussion drilling.

Half drill core weighed and had SG measurements taken using the Archimedes method. The core then dried and crushed before a 250g sub sample was riffle split and pulverised to >85% passing 75 micron.   A sub sample was used to create a borate fusion disc. All analyses were completed by ALS using their lithium borate fusion disc XRF. Analyses included Fe, $WO_3$, Sn, S, CaO, Mo, Pb, Bi and As. All pulps and rejects were returned to Tasmania Mines.

The assay data is recorded digitally and uploaded to the database from laboratory reports ensuring sample security.

All lithological, geochemical and metadata has been captured into the AHL database and validated against old plans and sections.

## 3.5    QAQC

No routine QAQC analysis involving certified reference material or blank submission was performed during the drilling program.  QAQC protocols were not to industry standards.

| Table 3.  Sampling Techniques and Data | | |
|---|---|---|
| **Criteria** | **JORC Code Explanation** | **Commentary** |
| Sampling Techniques | • Nature and Quality of sampling (eg cut channels, random chips or specific specialized industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or hand held XRF instruments etc).<br>• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.<br>• Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverized to produce 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems.  Unusual commodities or sampling types (eg submarine nodules) may warrant disclosure of detailed information. | • The Kara No2 South deposit has been sampled through 1 recent and 1 historic diamond drilling campaigns in 2014, and 1992.  The historic data was not used for resource estimation due to its poor quality.<br>• 9 wire-line HQ, NQ diamond core for 557.2m<br>• Approximately 1m samples of 2-3kg were taken from diamond saw cut drill core whilst respecting geological boundaries.  Broken core was sampled on between core blocks. |
| Drilling Techniques | • Drill type (eg core, reverse circulation, open hole hammer, rotary air blast, auger, Bangka, sonic etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face sampling bit or other type, where core is oriented and if so by what method | • 9 wire-line HQ, NQ diamond core for 557.2m.<br>• Core not oriented. |
| Sample recovery | • Method of recording and assessing core and chip sample recoveries and results assessed.<br>• Measures taken to maximize sample recovery and ensure representative nature of the samples.<br>• Whether a relationship exists between sample | • Core reconstituted, marked up and measured in all drilling campaigns<br>• Recovery generally excellent (100%) with three, poor to good (17-87%) in weathered broken zones<br>• No relationship between recovery and grade was observed |

| | | |
|---|---|---|
| | recovery and grade and whether sample bias may have occurred. | |
| Logging | • Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.<br>• Whether logging is qualitative of quantitative in nature. Core (or costean, channel etc) photography. | • Core geologically logged by experienced geologists over all campaigns.<br>• Standard lithology codes used for interpretation.<br>• RQD and recoveries logged<br>• Logs loaded into customised spreadsheets and uploaded into access database. |
| Sub-Sample techniques and sample preparation | • If core, whether cut or sawn and whether quarter of half taken.<br>• If non core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry<br>• For all sample types, the nature, quality and appropriateness of the sample preparation technique.<br>• Quality control procedures adopted for all sub sampling stages to maximize representivity of samples.<br>• Measures taken to ensure that the sampling is representative of the insitu material collected, including for instance results of field duplicate/second half sampling.<br>• Whether sample sizes are appropriate to the grain size of the material being sampled | • Half core split by diamond saw on 1.0m samples while respecting geological contacts. Broken core bagged between core blocks<br>• Bagged core delivered to ALS Laboratories in Burnie<br>• Whole core crushed then a 250g subsample riffle split and pulverized to >85% passing 75micron |
| Quality of assay data and laboratory tests | • The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.<br>• For geophysics tools, spectrometers, hand held XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibration factors applied and their derivation etc.<br>• Nature of quality control procedures adopted | • All samples analysed by fusion disc XRF at ALS Laboratories Burnie.<br>• QAQC analysis by independent laboratory tests at SGS Perth.<br>• Good correlation between original and independent laboratories. |

| | | |
|---|---|---|
| | (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established. | |
| Verification of sampling and assaying | • The verification of significant intersections by either independent or alternative company personnel<br>• The use of twinned holes<br>• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols<br>• Discuss any adjustment to assay data | • Independent laboratory analyses completed with good repeatability observed.<br>• No twinned holes were completed<br>• Primary assay data was received electronically and stored by consultant geologist.<br>• All electronic data uploaded to access database<br>• Historic data loaded onto spreadsheets and uploaded to Access database.<br>• Data validation with Surpac software, basic statistical analysis and comparison with historic plans and sections.<br>• Negative results for below detection limit assay data has been entered as detection limit |
| Location of data points | • Accuracy and quality of surveys used to locate drill holes (collar and downhole surveys) trenches, mine workings and other locations used in mineral resource estimation<br>• Specification of grid system used<br>• Quality and accuracy of topographic control. | • All hole collar surveys used in this estimation located by licensed surveyor.<br>• All coordinates in local grid and GDA94<br>• RL's as MSL<br>• No down hole surveys completed. Short hole lengths should not provide any material error through lack of downhole surveys.<br>• Topographic dtm created by licensed surveyor and extended with lands department 10m contour maps adjusted for known survey points (eg. drill collars) |
| Data Spacing and distribution | • Data spacing for exploration results<br>• Whether data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for Mineral Resource and Ore Reserve estimation procedures and classifications applied.<br>• Whether sample compositing has been applied | • Drillhole spacing approximately 50 x 50m across resource area.<br>• Sample spacing not clustered.<br>• Drill spacing is considered to be appropriate for the estimation of Indicated to Inferred Mineral resources.<br>• Samples have been composited on 1m intervals for the resource estimation. |

| | | |
|---|---|---|
| Orientation of data in relation to geological structure | • Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.<br>• If the relationship between drilling orientation and the orientation of key mineralised structures is considered to have introduced sampling bias, this should be assessed and reported if material. | • All of DDH have been drilled west-east sub-perpendicular to vein strike.<br>• Drill hole orientation is not considered to have introduced any material sampling bias. |
| Sample Security | • The measures taken to ensure sample security | • Samples ticketed and bagged on site.<br>• Delivered to ALS or AGS laboratories in Burnie by staff.<br>• All historic data captured and stored in customised access database<br>• Data integrity validated with Surpac Software for EOH depth and sample overlaps.<br>• Manual check by reviewing cross sections with the historic drafted sections and plans.<br>• Basic statistical analysis supports data validation |
| Audits or Reviews | • The results of any audits or reviews of sampling techniques and data | • No audits or reviews of sampling data and techniques completed. |

### 3.6    BULK DENSITY

Bulk Density determinations were made using the Archimedes method on half core by ALS Laboratories Burnie.  Calibrated electronic scales were used for all determinations.

Bulk Density data was collected for magnetite skarn only.  Unmineralised calc-silicate skarn and granite has been assigned an SG of 2.8.  Calc-silicate skarn is likely to have a bulk density in the range of 3 – 3.2 however compared to the granite it is volumetrically small.

Statistical analysis of the 1m composites for the magnetite skarn are displayed in Table 5 in the section on basic statistics.

Magnetite skarn has a mean value of 3.42 and a median of 3.48.  There is a weak association between SG and Fe grade (Figure 7).  Bulk density for the mineralised skarn is best represented through the algorithm SG = (0.0112 x FeO%) + 2.60.  The significant scatter is attributed to the significant component of oxidised skarn.
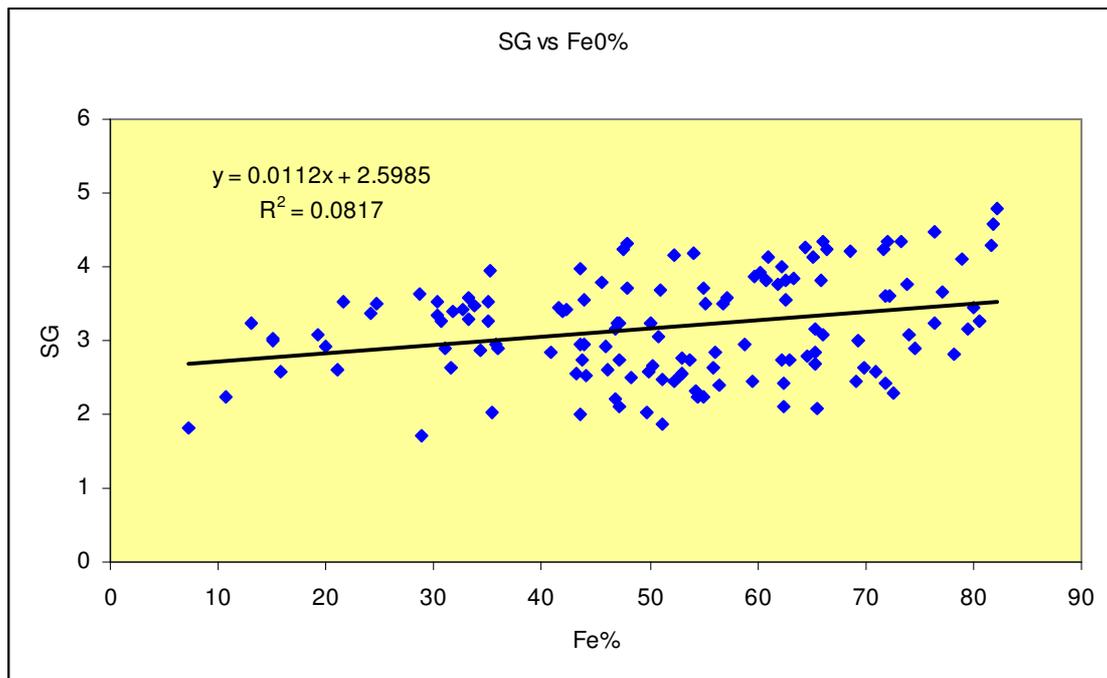


**Figure 7.  Magnetite skarn SG vs FeO%.**

## 4    GEOLOGICAL DOMAINING

Wire-framed solid models of geological and mineralisation domains were created from sectional cross sections utilizing drill hole data, geological string files and a topographic digital terrain model.

Mineralized Fe domains are delineated using a >30% FeO cutoff and a minimum downhole length of 3m with some allowances for geological continuity.  Internal dilution was restricted to a maximum of 3m where possible, again maintaining geological continuity.

Solid models have been 'snapped' to drill holes where possible to accurately capture and model data and eliminate sectional projection inaccuracies.

Solid models used for this resource estimation include:

- Topographic dtm                2575_12_8_14-south.dtm
- Magnetite Lode                Kara2_fe.dtm
- Granite surface                granite.dtm

Domain codes were assigned to the blockmodel using the wireframe solids. Corresponding intercept and composite string codes were assigned for each mineralised shell.  Mineralisation solid intercepts are stored in the access database according to their code.

Domain codes are listed in Table 4.

| Table 4.  Blockmodel Zone Codes and Composite String Numbers | | | | |
|---|---|---|---|---|
| Lithogy | Code | Solid Model | Object No | Composite String |
| Surface | 0 | topo.dtm | 5 | na |
| Waste | 1 | | | na |
| Granite | na | Granite.dtm | 7 | na |
| Magnetite Lode | 101 | Kara2_Fe.dtm | 1 | K2_1 |
| | 102 | magnetite_central | 2 | K2_2 |
| | 103 | magnetite_central | 3 | K2_3 |

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# 5      SAMPLE STATISTICAL STUDIES

Sample statistical studies have been completed with composited diamond drill hole data. DDH intercepts of solid models have been flagged with Surpac Software and relevant intervals stored in the access database.   Assay data has been composited on 1m lengths.

Composites of less than 0.25m were not included in statistical studies or in the resource estimate.

Composited data is located as .csv files on the attached data disc.

A histogram of composited data for Fe in the Magnetite Lode - Lens 1, are displayed in Figure 8.   Descriptive statistics for all three Fe lenses of the magnetite lode are listed in Table 5.

The majority of the Kara No 2 mineralisation is contained in Magnetite lode Object 1 which contains a total of 108 1m composite samples over an area of approximately 400m strike length by 80m vertical by 20m width.

The 1m composites of Fe for the Magnetite Lodes – Lens 1 demonstrate a broad Gaussian distribution typical of iron deposits (Figure 8).  No sub populations are evident within the larger Magnetite Lodes – Lens 1 histograms and further high-grade domain modeling is not considered necessary.  There are insufficient 1m composites in the other two Lenses of the Magnetite Lode to provide significant basic statistical analysis.

The cumulative frequency histogram and the low coefficient of variation (CV) for 1m composited Fe suggests that no top cutting is considered necessary.  The mean and median values are very similar at 55.2 and 56.9% Fe respectively reflecting the essentially normal distribution.

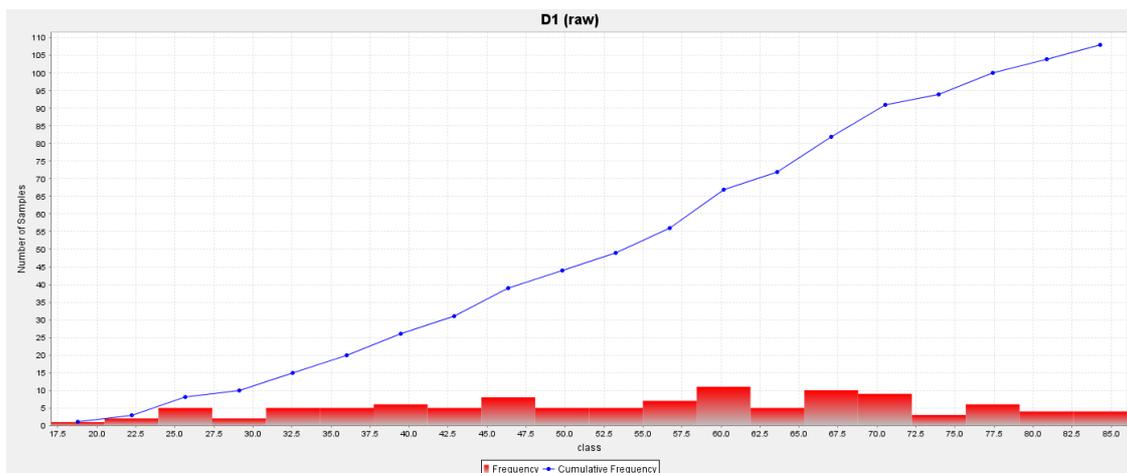$WO_3$ levels are generally low with minimum and maximum values of 300 and 600ppm.



**Figure 8.  Kara No2  Magnetite Lode 1m composite Fe histogram.**

**Table 5.  Kara 2 Sth 1m composite Basic Statistics**

| Variable | FeO % | WO$_3$ ppm | SG | S % | CaO % |
|---|---|---|---|---|---|
| Number of samples | 108 | 108 | 108 | 104 | 108 |
| Minimum value | 17.04 | 300 | 1.62 | 0.01 | 0.02 |
| Maximum value | 86.03 | 600 | 5.01 | 0.16 | 31.30 |
| Mean | 55.20 | 453 | 3.42 | 0.02 | 9.78 |
| Median | 56.91 | 500 | 3.48 | 0.02 | 8.73 |
| Geometric Mean | 52.24 | 445 | 3.32 | 0.02 | 3.77 |
| Variance | 285.71 | 6752 | 0.64 | 0.00 | 63.57 |
| Standard Deviation | 16.90 | 82 | 0.80 | 0.02 | 7.97 |
| Coefficient of variation | 0.31 | 0.18 | 0.23 | 0.93 | 0.82 |

## 5.2    VARIOGRAPHY

The data density and data spacing is insufficient to construct meaningful semi-variograms other than in the y direction.  A variogram model for the y direction of the Magnetite Lode 1 lens is shown in Figure 9.   The variogram model has a zero nugget effect with a long range of 75m to the sill.
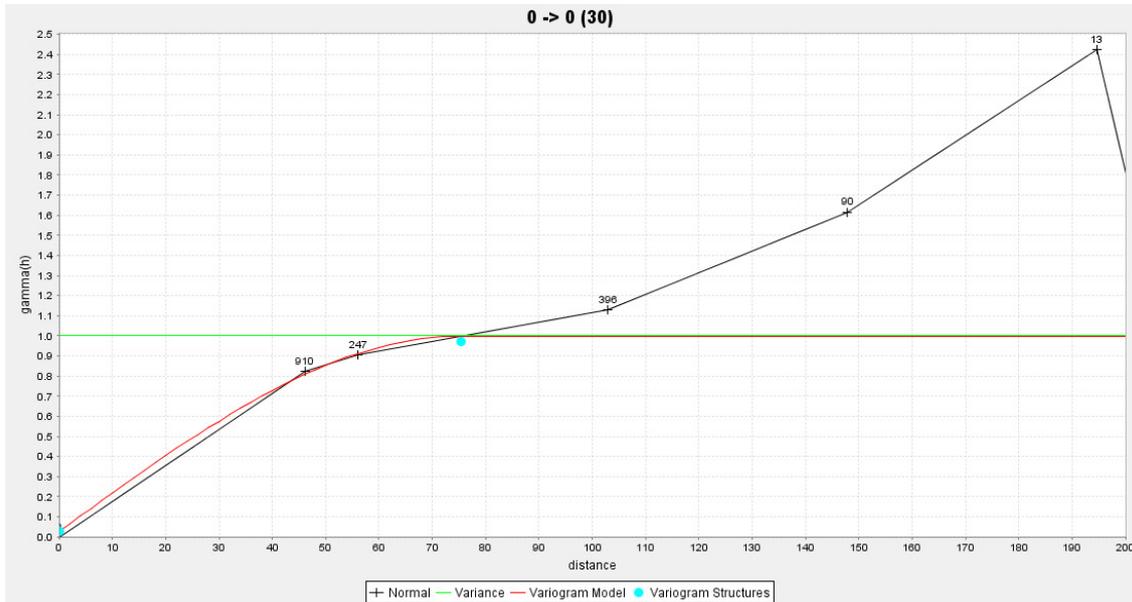


**Figure 9.  Variogram model of 1m composite Fe data for the Magnetite Lode Lens 1.**

## 6       RESOURCE ESTIMATION PROCEDURE.

The Kara No 2 South Mineral Resource has been estimated using a block model created with Surpac$^{tm}$ software licensed to Tim Callaghan.  The block model extends between 5,423,600 to 5,424,250N, 403,000 to 403,250E and 400 to 600m RL.  Block sizes were set at 5m x 10m x 10m (xyz) with sub-celling to 1.25m in the x direction and 2.5m in the y and z and directions.

The block dimensions used are considered appropriate for the shape and thickness of the mineralisation being modeled and the block size is considered appropriate for the better drilled portion of the resource.

FeO, WO$_3$, S and CaO metal grades were interpolated into the blockmodel using an ID$^2$ algorithm.   Variogram parameters used for determining the search ellipse were determined from 1m composite data and are detailed in Section 5.2.  A 100m spherical search ellipse was employed to ensure most blocks in the model were populated. Discretisation points of 3 by 3 by 3 were used for each block.  A minimum of 3 and a maximum of 10 samples were used for the estimation.

No top cutting was employed for the estimation.

Deleterious elements estimated include only S.   Al, SiO2 and P data is not available for this estimation.  Production history from the similar Kara No1 skarn suggests these elements are present in very low levels in the metasomatised limestone.  Metallurgical testwork also supports the low levels of deleterious elements.

**Table 6. Table 1. Section 3, JORC Code Estimation and Reporting of Mineral Resources**

| *Criteria* | **Explanation** | **Status** |
|---|---|---|
| Database Integrity | • Measures to ensure the data has not been corrupted by, for example transcription or keying errors, between its initial collection and its use for Mineral Resource estimation.<br>• Data Validation and procedures used. | • All data captured and stored in customised Access database.<br>• Drop down menu validation in customised software.<br>• Digital data uploaded from laboratory reports to Access database.<br>• Data integrity validated with Surpac Software for EOH depth and sample overlaps and transcription errors.<br>• Data validated against plans and sections<br>• Negatives in database converted to half the detection limit. |
| Site Visits | • Comment on any site visits by the competent person and the outcome of any of those visits.<br>• If no site visits have been undertaken indicate why this is the case. | • REG completed drilling program and supervised all exploration activities. |
| Geological Interpretation | • Confidence in (or conversely the uncertainty of) the geological interpretation of the mineral deposit.<br>• Nature of the data used and any assumptions made.<br>• The effect if any of alternative interpretations on Mineral Resource estimation<br>• The use of geology in guiding and controlling the Mineral Resource estimation<br>• The factors effecting continuity of both grade and geology | • High confidence in the simple geological model.<br>• No alternative geological interpretations were attempted.<br>• Geology model used for mineralised domain modeling.<br>• Brittle faulting and facies changes effect grade and location of mineralisation.<br>• Lack of drilling and the aeromagnetic image constrain the resource down dip and along strike. |
| Dimensions | • The extent and variability of the mineral resource expressed as length (along strike | • The deposit consists of A main lenses and 2 subsidiary stratabound lenses extending 300m |

| | | |
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| | or otherwise) plan width and depth below surface to the upper and lower limits of the Mineral Resource | by 20m with a N-S strike and with steep west dip (70°). Mineralised width between 5 and 12m. |
| | | • South Lens extends 500m strike by 90m depth with a WNW strike and steep 70o north dip. Mineralised width between 1 and 12m. |
| | | • Northwest Lens 100m strike by 60m depth with 7m average width. |
| Estimation and Modelling techniques | • The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. | • Block modeled estimation completed with Surpac™ software licensed to Tim Callaghan. |
| | | • Wire-framed solid models created from surface geology, sectional interpretation and composited sample data |
| | | • Solid models snapped to drill holes |
| | | • minimum mining width of 3m x 30% FeO whilst respecting geological continuity |
| | • The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. | • Internal dilution restricted to <1m while respecting geological continuity |
| | | • Data composited on 1m composites |
| | | • No top cutting based on CV and grade histograms |
| | • The assumptions made regarding recovery of by products | • Good correlation between FeO WO3 and SG. Poor correlation between FeO and S and CaO. |
| | • Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterization). | • Block Model extent of 5,423,600 to 5,424,250N, 403,000 to 403,250E and 400 to 600m. Block dimensions of 5mE x 10mN x 10mRL block size with sub-celling to 1.25m in the x and 2.5m in the y and z directions. |
| | • In the case of blockmodel interpolation the block size in relation to the average sample spacing and search employed. | • Variogram models constructed y direction only due to insufficient data. Well constructed model with zero nugget effect and moderate range of 75m to sill. |
| | • Any assumptions behind modeling of selected mining units | • Search ellipse set at 100m spherical range to |

| | | |
|---|---|---|
| | • Any assumptions about correlation between variables<br>• Description of how the geological interpretation was used to control the resource estimates.<br>• Discussion of the basis for using or not using grade cutting or capping<br>• The process of validation, the checking process used, the comparison of model data to drill hole data, and the use of reconciliation data if available. | • ensure all blocks populated with no anisotropy<br>• Ellipse strike 0°, dip -70° west, plunge 0°<br>• ID$^2$ estimated model constrained by geology solid model<br>• Block grades validated visually against input data |
| Moisture | • Whether the tonnages were estimated on a dry basis or with natural moisture, and the method of determination of moisture content. | • The estimate based on a dry tonnage |
| Cut-off Parameters | • The basis of the adopted cutoff grades or cutoff parameters | • Results are reported on a 30% Fe cut off. |
| Mining Assumptions | • Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or if applicable external) mining dilution.  It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters made when estimating Mineral Resources may not always be rigorous.  When this is the case, this should be reported with an explanation of the basis of the mining assumptions made. | • Conventional open cut mining techniques assumed. |
| Metallurgical | • The basis for assumptions or predictions | • Test work demonstrates that the liberation of |

| assumptions | regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods methods, but the assumptions made regarding metallurgical treatment processes and parameters made when estimating Mineral Resources may not always be rigorous. When this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made. | the magnetite is excellent.<br>• Conventional crushing and grinding followed by a single roughing, cleaning and scavenging circuit with low intensity magnetic separation is recommended. |
|---|---|---|
| Environmental assumptions | • Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status for early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made. | • No formal environmental studies have been conducted at this stage.<br>• Processing is envisaged to occur on the permitted facilities located on the Kara Mine Site. |
| Bulk Density | • Whether assumed or determined. If assumed the basis for the assumptions. If determined the methods used, whether wet or dry, the frequency of measurements, the | • Bulk density determinations made by ALS using the Archimedes Method for all mineralised samples.<br>• Determinations made of un-weathered core |

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| | nature size and representativeness of the samples. | with no appreciable voids or porosity. |
| | • The bulk density for bulk materials must have been measured by methods that adequately account for void spaces (vugs, porosity etc), moisture and difference between rock and alteration zones within the deposit. | • Waste assigned Mean SG of 2.9 |
| | | • Mineralised domains bulk density interpolated from 1m composites using $ID^2$ weighting. |
| | • Discuss assumptions for bulk density estimates used in the evaluation process of the different materials. | |
| Classification | • The basis for the classification of the Mineral Resource into varying confidence categories. | • Confidence in the geological model and data quality is considered to be sufficient for drill defined Mineral Resource to be classified as Indicated Resource. |
| | • Whether appropriate account has been taken of all relevant factors (ie relative confidence in continuity of Geology and metal values, quality, quantity and distribution of the data). | • The Resource Classification appropriately reflects the views of the Competent Person |
| | • Whether the result appropriately reflects the Competent Persons view of the deposit. | |
| Audits or Reviews | • The results of any Audits or Reviews of the Mineral Resource estimates. | • No audits or reviews have been completed for this estimation |
| Discussion of relative accuracy/confidence | • Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource Estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an | • The geological model and data quality within 60m of drill data is well understood and modeled. The effects of localised brittle faulting is difficult to predict but given the proposed mining method should not affect resource recovery. |
| | | • There is reasonable confidence in the global tonnage estimation as the geology is reasonable well constrained and simple. |

| | |
|---|---|
| approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy of the estimate.<br><br>• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available. | • Limitations on the resource include the uncertainty of the depth extent and the depth of previous mining activities. |

## 7    RESULTS

The total, insitu estimated Mineral Resource for the Kara No2 South Magnetite Skarn classified as Indicated Resource in accordance with the 2012 edition of the JORC Code at a 30% FeO block cut off is listed in Table 7:

**Table 7.  Kara No 2 Sth Mineral Resource Estimation FeO > 30% cut off**

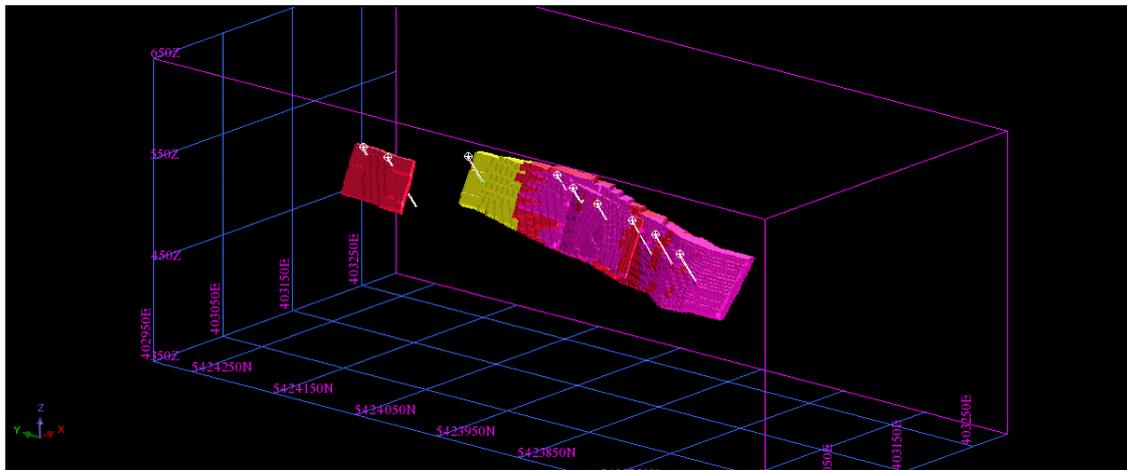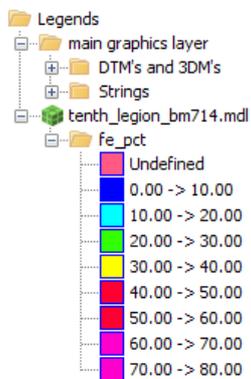| Classification | MTonnes | FeO % | WO3 ppm | S % | CaO % |
|---|---|---|---|---|---|
| Indicated Resource | 1.29 | 55.6 | 454 | 0.02 | 11.4 |



**Figure 10.  Kara No 2 South Magnetite Skarn**



## 7.1    VALIDATION

The resource estimation was validated by visually checking the interpolation results against drill hole data in plan and section, comparing input and output statistics.  The estimate is considered to be robust on the basis of the above checks.

Confidence in the geological model on a global level is high as the structure and mineralisation style are relatively simple given the style of mineralisation and the mining technique proposed.  The low nugget effect and moderate range of the variogram models support the classification of the resource.  There is moderate confidence in the grade and bulk density estimation.

Data quality is considered to be of high industry standards.

## 7.2 CLASSIFICATION

No metallurgical testwork was completed for this phase of the program. Previous production and visual assessment suggests it is likely to be similar to the Kara No 1 magnetite mineralisation. The outcropping resource is amenable to conventional drill blast load haul open cut mining similar to that at Tasmania Mines Kara operation.

The resource has been classified as Indicated Resource as the simple geological model is well constrained by the 50m spaced drilling. The resource has not been classified as measured due to the uncertainty of the base of the mineralisation and the lack of detail on the depth of previous operations.

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## 8    RECOMMENDATIONS

There is limited potential for additional resources through continued exploration and infill drilling along strike and down dip of the Kara No 2 South.  The main limitations are the small size of the RL.  Numerous and larger Magnetite skarns are known and drill defined in the immediate Kara No2 locality

Recommendations for further work include:

- Metallurgical testwork

- Waste rock and mineralisation environmental characterization

- Pit Design

- ML application

- Scoping study

## References

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## ADDITIONAL NOTES

### *LIMITATIONS AND CONSENT*

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 the 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 in accordance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") 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 estimation and assessment and evaluation of Mineral Resources of this style and is the competent Person as defined in the JORC Code.  This report accurately summarises and fairly reports his estimations and he has consented to the resource report in the form and context it appears.

### *STATEMENT OF INDEPENDENCE*

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

**Competent Person's Consent Statement**
**Pursuant to the requirements of ASX listing rules 5.6, 5.22 and 5.24 and clause 9 of 2012 JORC code**
**("Consent statement")**

**Report name:** Kara No 2 South Mineral Resource Estimate, **Dated:** 24th October 2014

I, Timothy John Callaghan confirm that:

- I have read and understood the requirements of the 2012 edition of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves ("2012 JORC Code").

- I am a competent person as defined by the 2012 JORC Code, having five years experience which is relevant to the style of mineralization and type of deposit described in the report, and to the activity for which I am accepting responsibility.

- I am a member or fellow of the *Australasian Institute of Mining and Metallurgy* or the *Australian Institute of Geoscientists* or a *'Recognized Overseas Professional Organization'* ('RPO') included in a list promulgated by the ASX from time to time.

- I have reviewed the report to which this consent statement applies.

- I am a full time employee of OR I am a consultant working for **Tim Callaghan – Resource and Exploration Geology** and have been engaged by **Tasmania Mines Ltd** *to* prepare the documentation for **Tasmania Mines Ltd** *on* which the report is based for the period ended **October 2014**.

- I have disclosed to the reporting company the full nature of the relationship between myself and the company, including any issue that could be perceived by investors as a conflict of interest.

- I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears the information in my supporting documentation relating to Mineral Resources.

- I consent to the release of the report and this consent statement by the directors of: **Tasmania Mines Ltd**

Signature of Competent Person:                        Date:  29th October 2014
Professional Membership:        ***Australian Institute of Mining and Metallurgy***
Membership Number:        ***222210***
Signature of Witness:

**Appendix 1.**

**Drill Hole Intercepts.**

**Table 1. List of Drill collars and Intercepts Kara No2 South 2014**

| BHID | Easting | Northing | RL | Depth m | From m | To m | Length m | FeO% |
|------|---------|----------|-----|---------|--------|------|----------|------|
| KE001 | 403060.3 | 5423748.1 | 545.9 | 59.7 | 40.0 | 51.0 | 11.0 | 66.1 |
| KE002 | 403081.4 | 5423796.0 | 549.6 | 67.3 | 42.0 | 64.0 | 22.0 | 56.2 |
| KE003 | 403094.3 | 5423835.8 | 552.4 | 73.8 | 17.0 | 20.0 | 3.0 | 55.3 |
| | | | | | 49.0 | 71.0 | 22.0 | 58.4 |
| KE004 | 403105.9 | 5423887.8 | 554.4 | 80.6 | 24.0 | 27.0 | 3.0 | 74.6 |
| | | | | | 66.0 | 79.0 | 13.0 | 52.3 |
| KE005 | 403123.4 | 5423933.1 | 556.1 | 67.5 | 23.0 | 33.0 | 10.0 | 61.8 |
| | | | | | 48.0 | 62.0 | 14.0 | 54.8 |
| KE006 | 403145.1 | 5424080.1 | 550.6 | 49.0 | 39.0 | 44.0 | 5.0 | 33.2 |
| KE007 | 403146.4 | 5423971.4 | 555.5 | 41.5 | 22.0 | 40.0 | 18.0 | 55.2 |
| KE008 | 403098.0 | 5424138.5 | 549.5 | 72.3 | 13.0 | 18.0 | 5.0 | 43.1 |
| KE009 | 403104.8 | 5424174.6 | 550.1 | 45.5 | 11.0 | 17.0 | 6.0 | 43.0 |

**Appendix 2.**

**Blockmodel Sections.**

**Appendix3**

**JORC ASX Tables**

Tim Callaghan – Resource and Exploration Geology

**JORC (2012) Table 1 Report**

| Section 1.  Sampling Techniques and Data | | |
|---|---|---|
| **Criteria** | **JORC Code Explanation** | **Commentary** |
| Sampling Techniques | • Nature and Quality of sampling (eg cut channels, random chips or specific specialized industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or hand held XRF instruments etc).<br>• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.<br>• Aspects of the determination of mineralisation that are Material to the Public Report.  In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverized to produce 30g charge for fire assay').  In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems.  Unusual commodities or sampling types (eg submarine nodules) may warrant disclosure of detailed information. | • The Kara No2 South deposit has been sampled through 1 recent and 1 historic diamond drilling campaigns in 2014, and 1992.  The historic data was not used for resource estimation due to its poor quality.<br>• 9 wire-line HQ, NQ diamond core for 557.2m<br>• Approximately 1m samples of 2-3kg were taken from diamond saw cut drill core whilst respecting geological boundaries.  Broken core was sampled on between core blocks. |
| Drilling Techniques | • Drill type (eg core, reverse circulation, open hole hammer, rotary air blast, auger, Bangka, sonic etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face sampling bit or other type, where core is oriented and if so by what method | • 9 wire-line HQ, NQ diamond core for 557.2m.<br>• Core not oriented. |
| Sample recovery | • Method of recording and assessing core and chip sample recoveries and results assessed.<br>• Measures taken to maximize sample recovery and ensure representative nature of the samples. | • Core reconstituted, marked up and measured in all drilling campaigns<br>• Recovery generally excellent (100%) with three, poor to good (17-87%) in weathered broken zones<br>• No relationship between recovery and grade was |

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| | • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred. | observed |
| Logging | • Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.<br>• Whether logging is qualitative of quantitative in nature. Core (or costean, channel etc) photography. | • Core geologically logged by experienced geologists over all campaigns.<br>• Standard lithology codes used for interpretation.<br>• RQD and recoveries logged<br>• Logs loaded into customised spreadsheets and uploaded into access database. |
| Sub-Sample techniques and sample preparation | • If core, whether cut or sawn and whether quarter of half taken.<br>• If non core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry<br>• For all sample types, the nature, quality and appropriateness of the sample preparation technique.<br>• Quality control procedures adopted for all sub sampling stages to maximize representivity of samples.<br>• Measures taken to ensure that the sampling is representative of the insitu material collected, including for instance results of field duplicate/second half sampling.<br>• Whether sample sizes are appropriate to the grain size of the material being sampled | • Half core split by diamond saw on 1.0m samples while respecting geological contacts. Broken core bagged between core blocks<br>• Bagged core delivered to ALS Laboratories in Burnie<br>• Whole core crushed then a 250g subsample riffle split and pulverized to >85% passing 75micron |
| Quality of assay data and laboratory tests | • The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.<br>• For geophysics tools, spectrometers, hand held XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibration factors applied and their derivation etc. | • All samples analysed by fusion disc XRF at ALS Laboratories Burnie.<br>• QAQC analysis by independent laboratory tests at SGS Perth.<br>• Good correlation between original and independent laboratories. |

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| | • Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established. | |
| Verification of sampling and assaying | • The verification of significant intersections by either independent or alternative company personnel<br>• The use of twinned holes<br>• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols<br>• Discuss any adjustment to assay data | • Independent laboratory analyses completed with good repeatability observed.<br>• No twinned holes were completed<br>• Primary assay data was received electronically and stored by consultant geologist.<br>• All electronic data uploaded to access database<br>• Historic data loaded onto spreadsheets and uploaded to Access database.<br>• Data validation with Surpac software, basic statistical analysis and comparison with historic plans and sections.<br>• Negative results for below detection limit assay data has been entered as detection limit |
| Location of data points | • Accuracy and quality of surveys used to locate drill holes (collar and downhole surveys) trenches, mine workings and other locations used in mineral resource estimation<br>• Specification of grid system used<br>• Quality and accuracy of topographic control. | • All hole collar surveys used in this estimation located by licensed surveyor.<br>• All coordinates in local grid and GDA94<br>• RL's as MSL<br>• No down hole surveys completed. Short hole lengths should not provide any material error through lack of downhole surveys.<br>• Topographic dtm created by licensed surveyor and extended with lands department 10m contour maps adjusted for known survey points (eg. drill collars) |
| Data Spacing and distribution | • Data spacing for exploration results<br>• Whether data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for Mineral Resource and Ore Reserve estimation procedures and classifications applied.<br>• Whether sample compositing has been applied | • Drillhole spacing approximately 50 x 50m across resource area.<br>• Sample spacing not clustered.<br>• Drill spacing is considered to be appropriate for the estimation of Indicated to Inferred Mineral resources.<br>• Samples have been composited on 1m intervals |

| | | for the resource estimation. |
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| Orientation of data in relation to geological structure | • Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.<br>• If the relationship between drilling orientation and the orientation of key mineralised structures is considered to have introduced sampling bias, this should be assessed and reported if material. | • All of DDH have been drilled west-east sub-perpendicular to vein strike.<br>• Drill hole orientation is not considered to have introduced any material sampling bias. |
| Sample Security | • The measures taken to ensure sample security | • Samples ticketed and bagged on site.<br>• Delivered to ALS or AGS laboratories in Burnie by staff.<br>• All historic data captured and stored in customised access database<br>• Data integrity validated with Surpac Software for EOH depth and sample overlaps.<br>• Manual check by reviewing cross sections with the historic drafted sections and plans.<br>• Basic statistical analysis supports data validation |
| Audits or Reviews | • The results of any audits or reviews of sampling techniques and data | • No audits or reviews of sampling data and techniques completed. |

| Section 2 Reporting of Exploration Results | | |
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| **Criteria** | **JORC Code Explanation** | **Commentary** |
| Mineral tenement and land tenure status | • Type reference, name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.<br>• The security of tenure held at the time of reporting along with known impediments to obtaining a license to operate the area | • RL1/2013 is 100% owned by Tasmania Mines Ltd.<br>• The area is a historic magnetite/scheelite mining district and there are no known or experienced impediments to operating a license in this area<br>• RL1/2013 requires bi-annual renewal. |
| Exploration done by other parties | • Acknowledgement and appraisal of exploration by other parties | • The Kara No2 South deposit operated intermittently as a small scale open cut during the mid 1990's by Tasmania Mines Ltd.<br>• Early exploration by Tasminex and Tasmania Mines. |
| Geology | • Deposit type, geological setting and style of mineralisation | • The Kara No2 South Deposit is a carbonate hosted metasomatic magnetite skarn hosted in hornfelsed Ordovician sedimentary rocks on the eastern edge of the Housetop Granite. The deposit forms a roof pendant located on the surface of the granite. The skarn consists of layered magnetite skarn, garnet skarn and pyroxene-garnet skarn replacing two principal carbonate horizons. Magnetite occurs as coarse grained massive skarn . |
| Drill Hole Information | • A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes<br>• easting and northing of the drill hole collar<br>• elevation or RL of the drill hole collar<br>• dip and azimuth of the hole<br>• downhole length and interception depth<br>• hole length | • See Table 2 in this report. |

| Section 2 Reporting of Exploration Results | | |
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| **Criteria** | **JORC Code Explanation** | **Commentary** |
| | • If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case | |
| Data aggregation methods | • In reporting of Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cutoff grades are usually material and should be stated.<br>• Where aggregate intercepts include short lengths of high grade results and longer lengths of low grade results, the procedure used for aggregation should be stated and some examples of such aggregations should be shown in detail<br>• The assumptions used for any reporting of metal equivalent values should be clearly stated. | • Mineralised zones are reported as length weighted intercepts. |
| Relationship between mineralisation widths and intercept lengths | • These relationships are particularly important in the reporting of Exploration Results with respect to the drill hole angle is known, its nature should be reported.<br>• If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. down hole length, true width not known) | • Intercept lengths have been reported as downhole lengths.<br>• Most holes have been drilled to intercept the deposit at high angles to best represent true widths.<br>• Refer to the section included in the body of the announcement to view the relationship between downhole lengths and mineralisation orientations. |
| Diagrams | • Appropriate maps and sections (with scales) and tabulated intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill collar locations and appropriate sectional views. | • See body of the announcement for relevant plan and sectional views and tabulated intercepts. |

| Section 2 Reporting of Exploration Results | | |
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| **Criteria** | **JORC Code Explanation** | **Commentary** |
| Balanced reporting | • Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/ or widths should be practiced to avoid misleading reporting of Exploration Results | • Not applicable |
| Other substantive exploration data | • Other exploration data, if meaningful and material, should be reported including (but not limited to); geological observations, geophysical survey results, geochemical survey results, bulk samples – size and method of treatment, metallurgical results, bulk density, groundwater, geochemical and rock characteristics, potential deleterious or contaminating substances. | • Aeromagnetic image defining magnetic highs associated with massive magnetite skarns (see body of the announcement for relevant plan) |
| Further work | • The nature and scale of planned further work (e.g. test for lateral extensions or depth extensions or large scale step out drilling)<br>• Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive. | • Further resource extension drilling west and south east of Indicated Resource. |

| Section 3.  Reporting Of Mineral Resource Estimations | | |
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| *Criteria* | **Explanation** | **Status** |
| Database Integrity | • Measures to ensure the data has not been corrupted by, for example transcription or keying errors, between its initial collection and its use for Mineral Resource estimation.<br>• Data Validation and procedures used. | • All data captured and stored in customised Access database.<br>• Drop down menu validation in customised software.<br>• Digital data uploaded from laboratory reports to Access database.<br>• Data integrity validated with Surpac Software for EOH depth and sample overlaps and transcription errors.<br>• Data validated against plans and sections<br>• Negatives in database converted to half the detection limit. |
| Site Visits | • Comment on any site visits by the competent person and the outcome of any of those visits.<br>• If no site visits have been undertaken indicate why this is the case. | • REG completed drilling program and supervised all exploration activities. |
| Geological Interpretation | • Confidence in (or conversely the uncertainty of) the geological interpretation of the mineral deposit.<br>• Nature of the data used and any assumptions made.<br>• The effect if any of alternative interpretations on Mineral Resource estimation<br>• The use of geology in guiding and controlling the Mineral Resource estimation<br>• The factors effecting continuity of both grade and geology | • High confidence in the simple geological model.<br>• No alternative geological interpretations were attempted.<br>• Geology model used for mineralised domain modeling.<br>• Brittle faulting and facies changes effect grade and location of mineralisation.<br>• Lack of drilling and the aeromagnetic image constrain the resource down dip and along strike. |
| Dimensions | • The extent and variability of the mineral resource expressed as length (along strike or otherwise) plan width and depth below surface to the upper and lower limits of the Mineral Resource | • The deposit consists of A main lenses and 2 subsiduary stratabound lenses extending 300m by 20m with a N-S strike and with steep west dip (70º). Mineralised width between 5 and 12m.<br>• South Lens extends 500m strike by 90m depth with a WNW strike and steep 70o north dip.  Mineralised |

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| | | • width between 1 and 12m. <br> • Northwest Lens 100m strike by 60m depth with 7m average width. |
| Estimation and Modelling techniques | • The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. <br> • The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. <br> • The assumptions made regarding recovery of by products <br> • Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterization). <br> • In the case of blockmodel interpolation the block size in relation to the average sample spacing and search employed. <br> • Any assumptions behind modeling of selected mining units <br> • Any assumptions about correlation between variables <br> • Description of how the geological interpretation was used to control the resource estimates. <br> • Discussion of the basis for using or not using grade cutting or capping <br> • The process of validation, the checking process used, the comparison of model data to drill hole data, and the use of reconciliation data if | • Block modeled estimation completed with Surpac™ software licensed to Tim Callaghan. <br> • Wire-framed solid models created from surface geology, sectional interpretation and composited sample data <br> • Solid models snapped to drill holes <br> • minimum mining width of 3m x 30% FeO whilst respecting geological continuity <br> • Internal dilution restricted to <1m while respecting geological continuity <br> • Data composited on 1m composites <br> • No top cutting based on CV and grade histograms <br> • Good correlation between FeO WO3 and SG. Poor correlation between FeO and S and CaO. <br> • Block Model extent of 5,423,600 to 5,424,250N, 403,000 to 403,250E and 400 to 600m. Block dimensions of 5mE x 10mN x 10mRL block size with sub-celling to 1.25m in the x and 2.5m in the y and z directions. <br> • Variogram models constructed y direction only due to insufficient data. Well constructed model with zero nugget effect and moderate range of 75m to sill. <br> • Search ellipse set at 100m spherical range to ensure all blocks populated with no anisotropy <br> • Ellipse strike 0º, dip -70º west, plunge 0º <br> • $ID^2$ estimated model constrained by geology solid model <br> • Block grades validated visually against input data |

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| | available. | |
| Moisture | • Whether the tonnages were estimated on a dry basis or with natural moisture, and the method of determination of moisture content. | • The estimate based on a dry tonnage |
| Cut-off Parameters | • The basis of the adopted cutoff grades or cutoff parameters | • Results are reported on a 30% FeO cut off which is the cutoff used for the similar Kara No1 deposit operated by Tasmania Mines Ltd. |
| Mining Assumptions | • Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or if applicable external) mining dilution.  It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters made when estimating Mineral Resources may not always be rigorous. When this is the case, this should be reported with an explanation of the basis of the mining assumptions made. | • Conventional open cut mining techniques assumed. |
| Metallurgical assumptions | • The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods methods, but the assumptions made regarding metallurgical treatment processes and parameters made when estimating Mineral Resources may not always be rigorous. When this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made. | • Previous testwork completed on the ore processed in the mid 1990's. <br> • Test work demonstrates that the liberation of magnetite is excellent. <br> • Conventional crushing and grinding followed by a single roughing, cleaning and scavenging circuit with low intensity magnetic separation. |
| Environmental assumptions | • Assumptions made regarding possible waste and process residue disposal options.  It is always necessary as part of the process of determining reasonable prospects for eventual | • No formal environmental studies have been conducted since the site was rehabilitated in the late 1990's. <br> • Previous permitting allowed production of magnetite |

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| | economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status for early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made. | for direct sale and processing at Tasmania Mines Kara Mill.<br>• Processing is envisaged to occur on the permitted facilities located on the Kara Mine Site. |
| Bulk Density | • Whether assumed or determined. If assumed the basis for the assumptions. If determined the methods used, whether wet or dry, the frequency of measurements, the nature size and representativeness of the samples.<br>• The bulk density for bulk materials must have been measured by methods that adequately account for void spaces (vugs, porosity etc), moisture and difference between rock and alteration zones within the deposit.<br>• Discuss assumptions for bulk density estimates used in the evaluation process of the different materials. | • Bulk density determinations made by ALS using the Archimedes Method for all mineralised samples.<br>• Determinations made of un-weathered core with no appreciable voids or porosity.<br>• Waste assigned Mean SG of 2.9<br>• Mineralised domains bulk density interpolated from 1m composites using $ID^2$ weighting. |
| Classification | • The basis for the classification of the Mineral Resource into varying confidence categories.<br>• Whether appropriate account has been taken of all relevant factors (ie relative confidence in continuity of Geology and metal values, quality, quantity and distribution of the data).<br>• Whether the result appropriately reflects the Competent Persons view of the deposit. | • Confidence in the geological model and data quality is considered to be sufficient for drill defined Mineral Resource to be classified as Indicated Resource.<br>• The Resource Classification appropriately reflects the views of the Competent Person |
| Audits or Reviews | • The results of any Audits or Reviews of the Mineral Resource estimates. | • No audits or reviews have been completed for this estimation |
| Discussion of relative accuracy/confidence | • Where appropriate a statement of the relative accuracy and confidence level in the Mineral | • The geological model and data quality within 60m of drill data is well understood and modeled. The |

| | | Resource Estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy of the estimate.<br>• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available. | effects of localised brittle faulting is difficult to predict but given the proposed mining method should not affect resource recovery.<br>• There is reasonable confidence in the global tonnage estimation as the geology is reasonable well constrained and simple.<br>• Limitations on the resource include the uncertainty of the depth extent and the depth of previous mining activities. |
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**COMPETENT PERSON'S STATEMENT**

This Mineral Resource Estimation report was prepared in accordance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code") by Tim Callaghan. *Mr Callaghan has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the Australian Code for Reporting Exploration Results, Mineral Resources and Ore Reserve. Mr Callaghan consents to the inclusion in the report of matters based on his information in the form and context it appears.*