EXPLORATION LICENCE 39/89

ANNUAL REPORT FOR 1992

(23 February 1992 to 23 February 1993)

TASMANIA MINES LTD

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SUMMARY

Exploration Licence EL 39/89, covering nine square kilometres, south of Upper Natone, has been in force for three years.

The Licence covers part of the Devonian Housetop Granite and adjacent Ordovician sedimentary rocks. Tertiary basalt masks the older rocks in part.

The main exploration targets within the Licence are magnetite rich skarns formed by the metasomatism of calcareous sedimentary rocks by the intruding granite. These skarns are similar in origin to those at Kara No 1 at Hampshire.

In the past, the area of the Licence had been explored using geological mapping, stream and rock sampling, ground and aerial magnetics and percussion and diamond drilling. This work identified three separate and distinct skarn zones known as Kara No 2 Main, Kara No 2 East and Kara No 2 South.

During the currency of EL 39/89, exploration has continued using geological mapping, surface rock sampling, detailed ground magnetics and percussion drilling. In 1992, most effort was aimed at continuing bulk sampling of ore from Kara No 2 South. Promising results led Tasmines to apply for a Mining Lease over this orebody and 20M/91 was granted in 1992.

The magnetite orebody at Kara No 2 South is high in iron, and low in silica, making it a commercially useful source of iron for specialist applications. Ore produced from Kara No 2 South will be supplied to APPM, Burnie, for use in the Direct Alkali Reduction System, and to TEMCO, Bell Bay, for production of ferro-manganese alloy.

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N

LEGEND

- >64,000 GAMMAS
- 63,000 – 64,000
- 62,000 – 63,000
- 61,000 – 62,000
- <61,000

AREA OF STRONG MAGNETIC DISTURBANCE

AREA OF PHASE 2 PERCUSSION DRILLING

AREA OF PHASE 1 PERCUSSION DRILLING

LOW

5 cm

KARA No.2 SOUTH SKARN ZONE

GROUND MAGNETIC GRID SURVEY

DATE: NOV. 1990 SCALE: 1:1000

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1 INTRODUCTION

Exploration Licence 39/89 was originally acquired on 23rd February 1990. The Licence covers an area of 9 square kilometres to the west of the Blythe River and lies about 30 kilometres south of Burnie: see Figure 1. Access to the area is principally by way of the Blythe Road from the Upper Natone Forestry Commission Reserve. There are several old forestry tracks which provide access throughout the Licence but access to most of the area is by foot.

Vegetation on the Licence is mainly buttongrass with eucalypt forest both in plantations and as regrowth.

The Licence lies to the east of the Kara mine site. Tasmania Mines (Tasmines) refers to the magnetite skarns at the Kara mine site as the Kara No 1 deposits, while those in the Blythe River area are the Kara No 2 deposits.

The occurrences of magnetite in the Upper Blythe River area have been known for many years e.g. Reid (1924). The surface limits of the magnetite skarns were outlined in the 1970's by McIntyre Mines (McIntyre) based on geological mapping, aeromagnetics and ground magnetics and were classified as three separate zones:

- Kara No 2 Main, formerly known as Pearson's: this zone can be divided into six smaller zones based on magnetic anomalies;
- Kara No 2 East, about one kilometre to the south-east of Kara No 2 Main;
- Kara No 2 South, just over one kilometre to the south west of Kara No 2 East.

These zones are shown in Figure 3.

Tasmines is continuing a programme of evaluation of these skarns with the aim of bringing the orebodies into production where it is economically feasible to do so. In 1992, a Mining Lease 20M/91 was granted over Kara No 2 South and bulk sampling of the magnetite was undertaken.

This report not only details the work undertaken during 1992, but also summarises the results of the investigations by Tasmines and earlier workers to February 1993.

2 TENURE

Exploration Licence EL 39/89 was granted to Tasmines on the 23rd of February 1990 following application under ETA No 120. The location of the Licence is shown in Figure 1. The Licence falls entirely within the boundaries of an expired Exploration Licence, EL 17/68, which was formerly held by Tasminex.

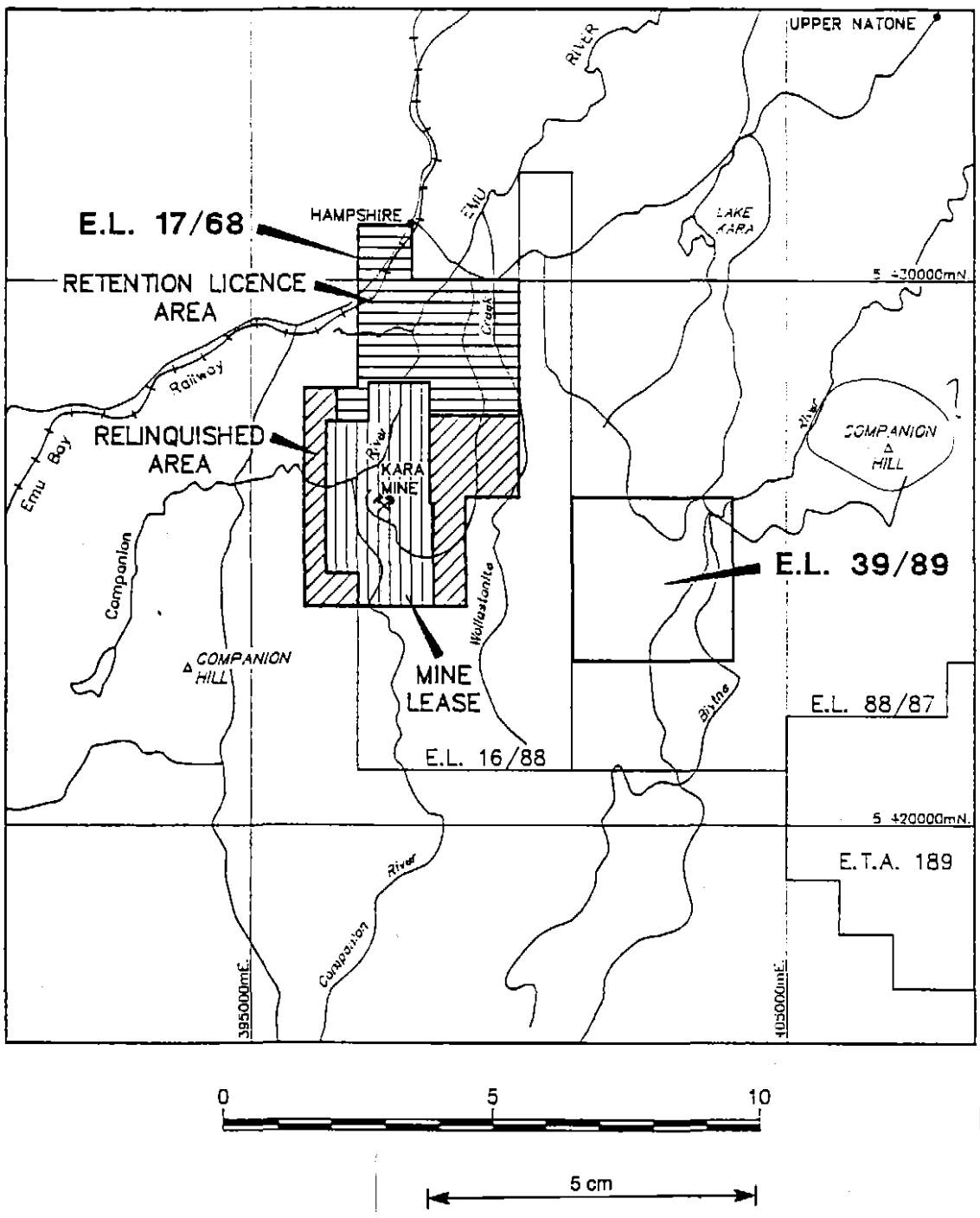

Figure 1. Location of EL 39/89

Three Mining Leases had been applied for by Tasmines in 1987: 81M/87, 82M/87 and 87M/87. The applications for these Leases were withdrawn following the granting of EL 39/89 to Tasmines.

At the date of granting, the area covered by EL 39/89 was mostly classified as Crown Land with the balance being private land. On the 11th of May 1992, Tasmines was informed that most of the Crown Land had been reclassified as Multiple Use Forest Land with an area in the western part of the Licence being classified as a Recommended Area for the Protection of Species: see Appendix 1.

An application for the granting of a Mining Lease was made in December 1991 and , on the 17th September 1992, Mining Lease 20M/91 was granted to Tasmines, effective from the 1st of April 1992, for a term of 5 years. This Lease, which has an area of 38 hectares, covers the Kara No 2 South orebody: see Figure 2.

An application for Licence to Operate Scheduled Premises (LOSP) was submitted to the Department of the Environment in January 1992 together with a draft mine plan and an environmental impact statement. The LOSP was not granted but Notice of Registration No. 1206 was granted on the 27th April 1992. The Notice of Registration allowed for the one-off extraction of a 2000 tonne bulk sample by Tasmines. Further permission from the Department of Environment and Planning on 18th December 1992 allowed the extraction of a further 5000 tonnes of material. A Licence to Operate Scheduled Premises will be required for an ongoing mining operation.

3 EARLY WORK

EL 39/89 includes the outcrops of three magnetite skarn zones. Prior to Tasmines taking up this Licence the skarns had been investigated by the Tasmania Department of Mines and later by Tasminex and Mcintyre Mines during the currency of EL 17/68. The Department of Mines had briefly visited the area in 1924 (Reid) and 1952 (Hughes). In 1963, Jack carried out a ground magnetics survey over what are now known as Kara No 2 Main Zone and Kara No 2 East Zone (Jack, 1964). In 1964, the magnetic survey was followed up by a short diamond drilling programme to test part of the Kara No 2 Main Zone (Jack, 1965).

The Main Zone had been covered by a Consolidated Mining Lease, 26M/64, until 1985. This Lease was taken up in the name of A. and D.D'O. Pearson and, consequently, the Kara No 2 Main Zone is referred to as 'Pearson's' in some older reports: see Appendix 2.

During the 1970's, Tasminex undertook an exploration programme within EL 17/68. The programme included geological mapping and geochemical sampling of the creeks and rivers. McIntyre Mines, at the time a joint partner of Tasminex, carried out an aerial magnetic survey which led to the delineation of the third skarn, the Kara No 2 South Zone.

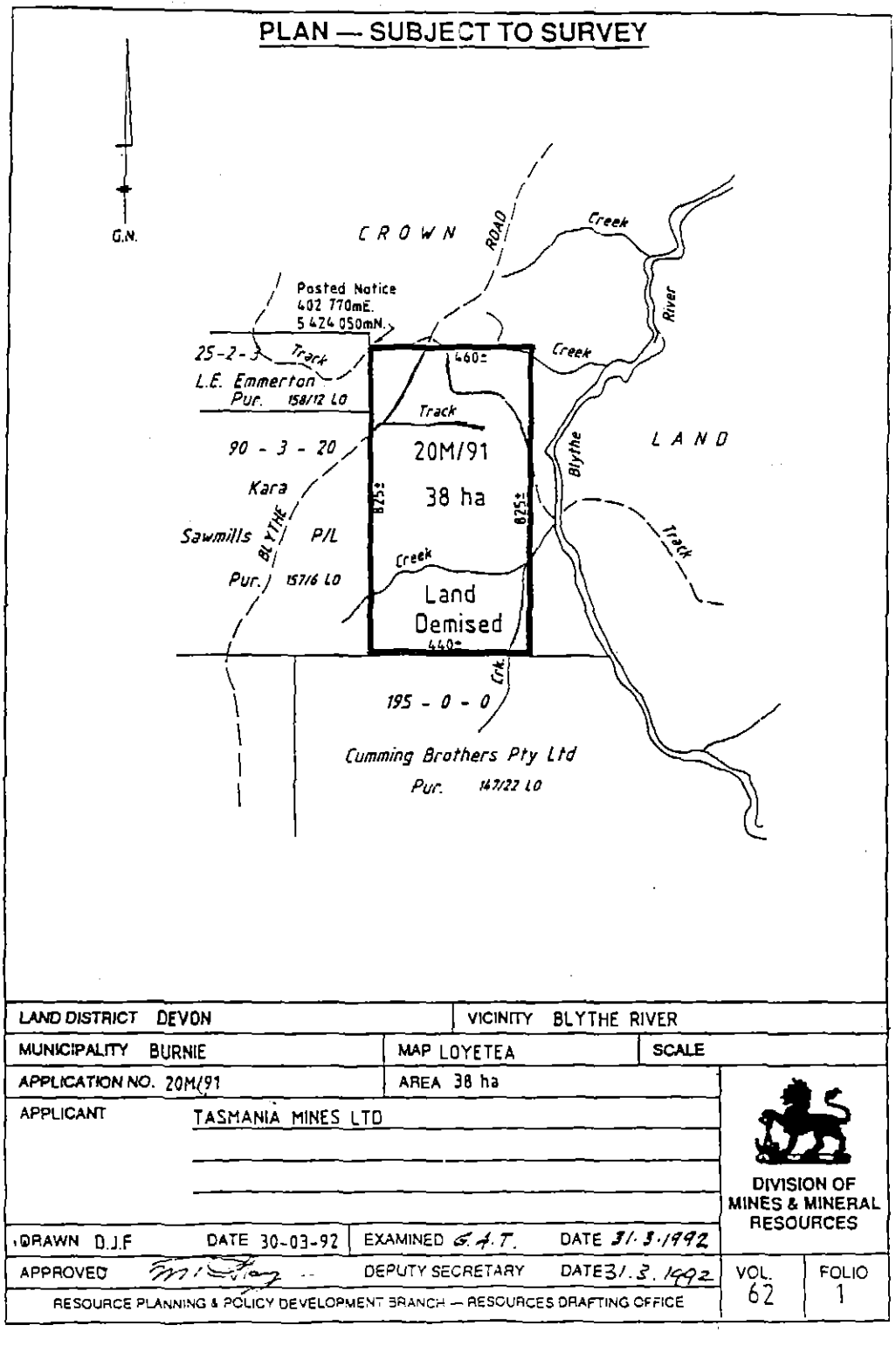

Figure 2. Location of 20M/91

McIntyre was sufficiently encouraged by the results of the aerial magnetics to initiate detailed exploration of Kara No 2 Main Zone. This entailed geological mapping, a ground magnetic survey, trenching and sampling, percussion drilling and diamond drilling. The results of this programme were reported to the Department of Mines at the time.

4 EXPLORATION AIMS

The Kara No 2 Zones were first delineated during the existence of EL 17/68. At that time, exploration was directed at finding tungsten mineralisation within magnetite skarns and greisenised granite. No scheelite bearing ore was found as a result of this work. However, the Kara No 2 Main Zone was identified as a resource of near surface, high grade magnetite (Whitehead, 1991a).

When EL 39/89 was granted, the aims of the exploration effort were:

- to estimate the tonnage and grade of each of the Kara No 2 Zones,
- to determine the metallurgical characteristics of Kara No 2 Zones by treating bulk samples of the ores in the Kara No 1 mill,
- to determine whether, on a commercial basis, the Kara No 2 Zones could provide ore feed for the Kara No 1 mill.

The Kara No 1 skarn is not a typical tungsten skarn. The magnetite content of the skarn sets it apart from typical scheelite skarns e.g. those of the King Island type or those of the Cantung-Mactung type as described by Einaudi et al. (1981). The skarns are hybrid between the scheelite skarn model and the iron skarn model as described in Cox and Singer (1986): see Appendix 3.

The hybrid nature of the skarns raises the possibility of the occurrence of other metals within the skarns. Consequently, a more comprehensive exploration effort would involve the search for:

- magnetite, especially magnetite which meets commercial specifications for special applications,
- tungsten as scheelite,
- tin, although tin in skarns often occurs as metallurgically problematic tin silicates,
- gold.

5 GEOLOGY OF EL 39/89

The brief description of the geology given here should be sufficient for an understanding of the occurrence of the skarn resources which occur in EL 39/89. A more complete geological description can be found in Seymour (1989).

The general geology of EL 39/89 is shown in Figure 3 and the stratigraphic succession within EL 39/89 and adjacent areas is outlined in Table 1.

TABLE 1

EL 39/89 AND SURROUNDING AREA
STRATIGRAPHIC SUCCESSION

SEDIMENTARY ROCKS		
Tertiary	Sub-basalt sediments	siltstone, mudstone, claystone, minor gravels
	Unconformity	
Silurian	Eldon Group	sandstone, quartzite
Ordovician	Gordon Limestone	limestone, minor calcareous sandstone
Ordovician	Transition Series	calcareous sandstone, sandstone, siltstone, minor limestone
Ordovician	Moina Sandstone	sandstone, minor quartzite siltstone, shale, slate and conglomerate
Ordovician	Roland Conglomerate	conglomerate, sandstone
	Unconformity	
Cambrian		greywacke, slate, quartzite, acid lavas, tuff, mudstone, siltstone
IGNEOUS ROCKS		
Tertiary		vesicular basalt
Devonian	Housetop Granite	biotite granite, minor quartz-feldsdpar porphyry

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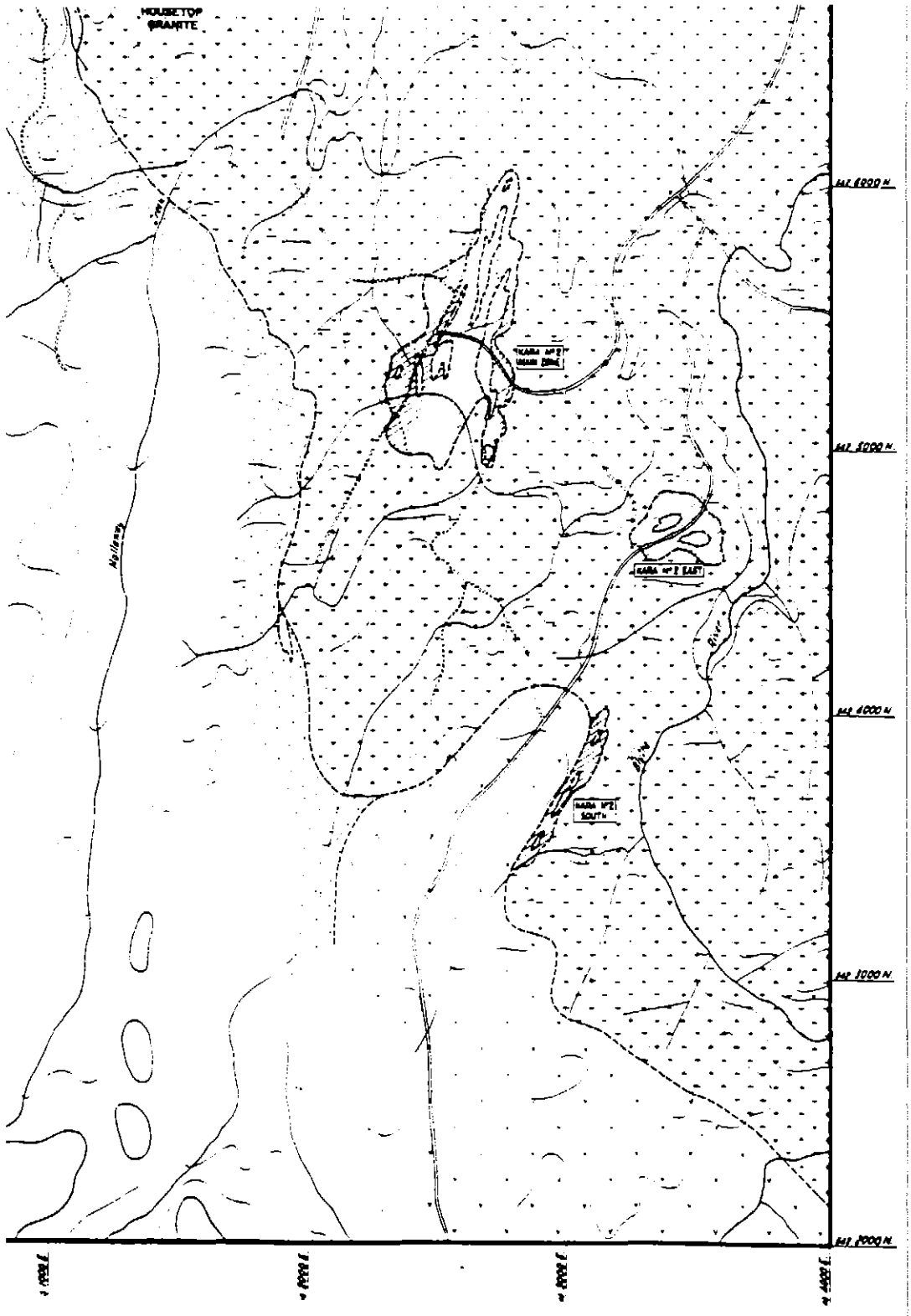

Figure 3. Geology plan of EL 39/89

The Kara No 2 magnetite skarns occur bounded by, or adjacent to, the western margin of the Devonian Housetop Granite. The Housetop Granite outcrops in the east and central part of the Licence: refer to Figure 3.

Generally, the Housetop Granite is a medium to coarse grained biotite granite although minor fine grained porphyry does occur. Radiometric dating indicates a Late Devonian - Early Carboniferous age for the granite (Seymour, 1989). The granite has intruded Ordovician sedimentary rocks, the Transition Series sequence, which are transitional between the siliceous Denison Group rocks and the overlying limestones of the Gordon Group: refer to Table 1.

Contact metasomatism of the intruded sedimentary rocks has produced magnetite skarns which, in places - for example at Kara No 1, have contained scheelite at commercially extractable grades: see Figure 4.

The skarns at Kara No 2 have been preserved as pendants within the granite mass (Jack, 1964): see, for example, Figure 5. The skarns consist of massive magnetite with diopside, andradite, garnet and amphibole and lesser epidote, calcite, chlorite and clinozoisite. Tungsten and tin are present in trace amounts only and no commercially viable deposits of these metals has been found so far within EL 39/89. Tin is known to occur, in part at least, as tin silicates (Turner, 1989 and Whitehead, 1991a).

The magnetite is medium to coarse grained and, at outcrop, has been variably oxidised to haematite and goethite. Davis Tube Recovery tests indicate that Kara No 2 skarns can contain up to about 95% magnetite.

6 MAGNETIC SURVEYS

EL 39/89 has been the subject of several airborne and ground magnetic surveys since 1964: see Table 2.

TABLE 2

EL 39/89 AND SURROUNDING AREA
MAGNETIC SURVEYS

YEAR	EXPLORER	TYPE	COVERAGE
1964	Tasmania Department of Mines (Jack,1964)	ground	Kara No 2 Main Zone
1977	McIntyre Mines	aerial	EL 17/68
1977	McIntyre Mines	ground	Kara No 2 Main Zone
1990	Tasmania Mines	ground	Kara No 2 South Zone

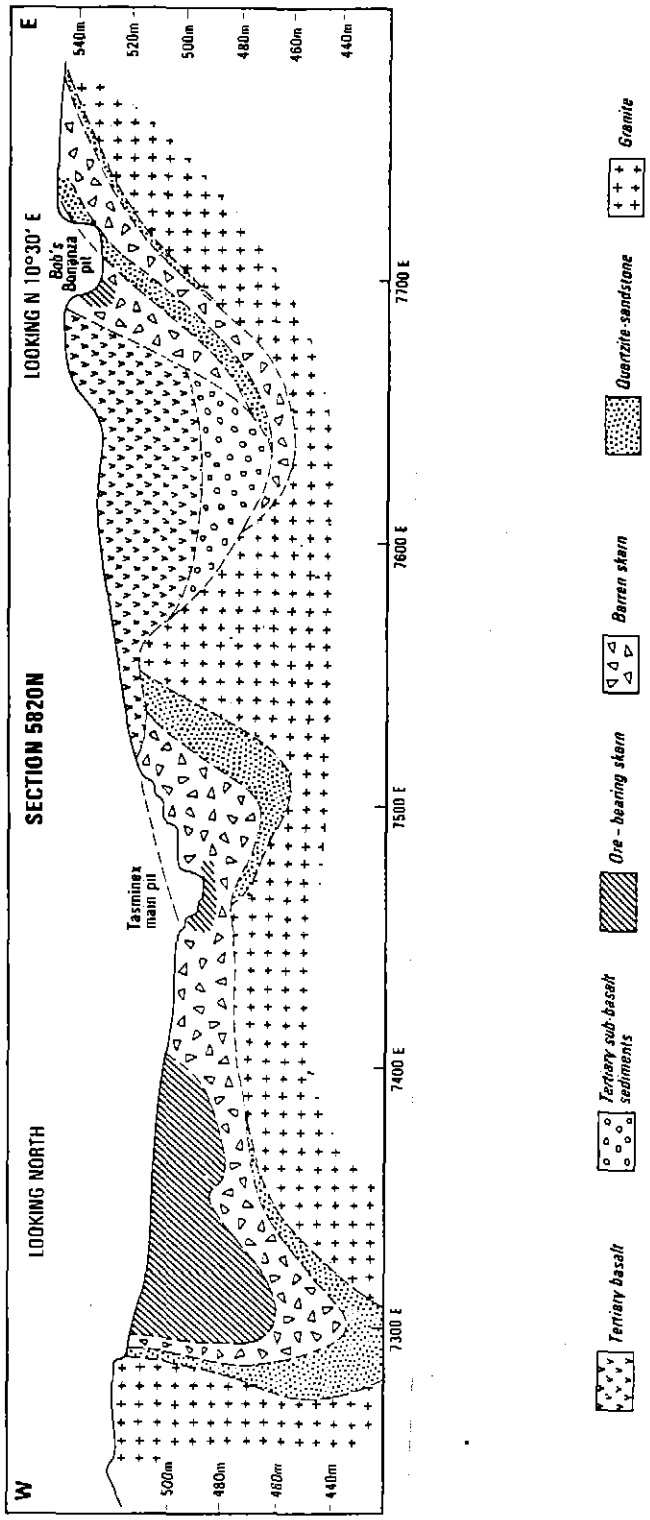

Figure 4. Kara No 1 cross section showing the relationships of the major lithological units (from Seymour, 1989)

As has been mentioned above, the main success of these magnetic surveys has been the delineation of the aerial extent of the known magnetite bodies, including the identification of the magnetite zone at Kara No 2 South. An additional important result of Jack's ground magnetic survey and subsequent drilling programme was his conclusion that, at Kara No 2 Main Zone, the limit of ore, with a grade greater than 50% iron, at the surface, approximates the 30,000 gamma contour. This is a useful guide to future drilling of other anomalies in the Kara No 2 Zones.

Tasmines' 1990 ground magnetic survey over Kara No 2 South was described by Whitehead (1991a). The contoured results are shown in Figure 6. The survey was not only successful in outlining the sub-outcrop of the magnetite but also "revealed another north-south linear running along the western margin of the grid beneath basalt cover, and could be related to a second magnetite horizon. This is an obvious future drill target" (Whitehead, 1991a)

7 DRILLING

The Tasmania Department of Mines and Tasminex completed at least 37 diamond drill holes in the Kara No 2 Main Zone: refer to Table 3. Unfortunately, not all the diamond drill hole logs are available, due to loss of the logs or to the core not being logged. The locations of the drill hole collars are shown on the plans in Appendix 4: the plans show the relative locations of the collars not the absolute locations. An attempt will be made during 1993 to locate the collars in AMG coordinates.

TABLE 3

KARA NO 2 MAIN ZONE
DIAMOND DRILL HOLES

HOLE NOS	DRILLED BY
DDH1 to DDH6	Tasmania Mines Department
DH1 to DH5	Tasminex
DH9 to DH11	Tasminex
DH13 to DH23	Tasminex
DH32 to DH36	Tasminex
DH40 to DH47	Tasminex
DH49 to DH50	Tasminex

Note: the drill hole numbers were taken from a Tasminex plan which shows the drill hole collar locations. The plan shows the existence of several holes with duplicated numbers: see Appendix 4. At present, drill logs are only available for Tasminex holes 6 to 10, 14, and 16 to 18.

In the last three years, 83 short percussion holes have been drilled to test the three magnetite zones. Table 4 lists the holes the holes which have been drilled so far.

TABLE 4

KARA NO 2
PERCUSSION DRILL HOLES
COMPLETED TO 23RD FEBRUARY 1993

1 to 21	Kara No 2 Main	121.5m	1990
29 to 48	Kara No 2 South	123.0m	1990
49 to 68	Kara No 2 South	90.5m	1990
69 to 90	Kara No 2 East	71.3m	1992

Note: collars of all holes have been located in AMG coordinates except those drilled at Kara No 2 East: these collar positions will be surveyed during 1993.

Assay results for samples from these percussion holes are attached in Appendix 5, except for those drilled at Kara No 2 East: samples from this campaign will be assayed during 1993.

8 THE SKARN ZONES

8.1 INTRODUCTION

All the exploration effort during the currency of EL 39/89 has been directed at the known magnetite skarns. The status of the investigation of each of the skarns is described here.

8.2 KARA NO 2 MAIN ZONE

Whitehead (1991a) concluded that

> "Results show that although WO_3 anomalism was found at the NW and NE extremities of the Kara No 2 Main Skarn, follow up work showed the anomalism to be related to disseminated low order concentrates within greisenous zones peripheral to the skarns.
>
> "A review of analytical work associated with past drilling at the Kara No 2 Main Skarn shows an anomalous tin zone along the western flank of the skarn zone. Although this can reach

> quite high Sn values (0.8 to 0.9%), the tin is in the form of silicate minerals rather than as cassiterite. No additional mineralisation (eg gold, molybdenite, bismuth) appears detectable at this skarn."

A series of percussion holes was drilled across the northern section of Kara No 2 Main in 1990 in an attempt to identify variations in the magnetite content of the skarn across strike. Unfortunately, the holes intersected only very weathered magnetite except for a five to seven metre zone along the western margin of the skarn. See Plan 1 for the positions of the drill holes.

The results of the work carried out so far suggest that the "magnetite content of the deposit is lower and the zone is more weathered than anticipated" (Whitehead, 1991a).

8.3 KARA NO 2 EAST ZONE

Surface geological mapping and sampling of this deposit was carried out during 1991. A resource of high grade magnetite with low silica content was indicated: limited surface sampling returned a result of 66% Fe and 0.5% SiO_2. A shallow percussion drilling programme to test the zone was undertaken in early 1992.

Approval to extract a 100 tonne bulk sample for testing was granted on the 29th of November 1991 by the Tasmania Department of Mines. This sample was to have been mined in 1992, but staff changes at Tasmines prevented this from being carried out. The bulk sample will be extracted during 1993.

8.4 KARA NO 2 SOUTH ZONE

A ground magnetic survey and a shallow percussion drilling programme were conducted over this zone in 1990. Whitehead (1991a) concluded:

> "A narrow (5-20m) zone of magnetite and haematite is readily recognisable over a strike distance of 75m, and 'suspected' over a total strike of 375m. The skarn is flanked by the Housetop granite intrusive along its eastern margin, but the actual western contact of the skarn zone cannot be determined due to masking by Tertiary basalt cover."

A detailed ground magnetic survey was undertaken in 1990: see Figure 6.

A second phase of percussion drilling during 1990 revealed that the zone extended to the north and has a total strike length of 375 metres before being masked by overlying Tertiary basalt. The drilling also indicated that the zone dips steeply to the west at 60 to 70 degrees: see Figure 5.

Surface sampling of the deposit indicated that the ore had a high iron grade with low silica content. Low silica iron ore such as this has been sought in Tasmania by the Tasmanian Electro Metallurgical Company (TEMCO) for the production of ferro-manganese alloy and by Associated Pulp and Paper Manufacturers (APPM) for use in their Direct Alkali Reduction Process (DARS) which is an anti-pollution process which reduces the emission of alkalis to the environment. The ore could also have been a source of iron ore for steel production by BHP.

An extensive programme of testing has been carried out over the last three years as described in Section 9 below.

9 SAMPLING OF KARA NO 2 SOUTH

9.1 INTRODUCTION

At Kara No 2 South, results of the percussion drilling programme over the south central part of the zone confirmed the high iron grades and low silica content which had been indicated by the surface sampling:

> "The in-situ Fe values of drill samples over the entire strike distance drilled were found to be remarkably high, varying between 58 and 66% Fe. More significantly the SiO2 content of the deposit was extremely low- invariably below 3%. Preliminary mineralogical work shows the iron to consist of 15-20% goethite, 15-20% haematite and 70% magnetite." (Whitehead, 1991a).

A programme of metallurgical assessment commenced in 1990 to determine whether the Zone was a commercial source of ore for APPM's DARS plant, BHP steelworks or TEMCO ferro-manganese production. This metallurgical testwork continued through 1992 and showed that the ore could be sold to both APPM and TEMCO. Once the ore was found to be commercially acceptable, a Mining Lease was applied for over the Kara No 2 South Zone. Further testing has been undertaken since the granting of the Mining Lease, 20M/91, and sales to both customers began by the end of 1992. A summary of the testing completed so far is shown in Table 5.

9.2 APPM COMPOSITE DRILL SAMPLE

APPM tested a 3 to 4 kilogram composite drill sample in 1990. The results are attached as Appendix 6. The sample, taken from cuttings from shallow percussion drillholes, was partially weathered. APPM staff reported that it consisted of 60 to 70% magnetite, 15 to 20% goethite and 15 to 20% haematite. APPM analyses showed that the sample consisted of over 90% Fe_2O_3 equivalent and less than 1% SiO_2. If sufficient ore of this

existed in the deposit, then it could be suitable for use in the DARS plant at APPM, Burnie. A larger sample was required to confirm these preliminary results, and this was tested during 1991 (see below).

TABLE 5

KARA NO 2 SOUTH
SAMPLING COMPLETED TO 23RD FEBRUARY 1993

SAMPLE SIZE	CUSTOMER	END USE	YEAR
composite drill sample	APPM, Burnie	DARS	1990
3 kilograms	BHP, Port Kembla	steel making	1991
100 tonnes	APPM, Burnie	DARS	1991
200 tonnes	APPM, Burnie	DARS	1992
20 litres	TEMCO, Bell Bay	ferro-manganese	Feb,1992
746 tonnes	TEMCO, Bell Bay	ferro-manganese	May,1992
529 tonnes	TEMCO, Bell Bay	ferro-manganese	Nov,1992

Note: the testwork of November 1992, by TEMCO, was undertaken after the granting of Mining Lease 20M/91 and the results are not included in this report. The fact of the testing is noted here as a matter of record.

9.3 BHP SAMPLE

A 3 kilogram sample was submitted to the BHP Raw Materials Supply Department at Port Kembla to determine its suitability for steel making and, in particular, to establish whether potential existed for beneficiation of the iron content of the ore by sizing. The results are attached as Appendix 7. The testwork revealed that the ore could not be beneficiated by size, although there was some concentration of the detrimental compounds, silica and alumina, into the finest size fraction tested, the -0.125mm fraction.

The tests by BHP did confirm the low silica content of the ore but also highlighted the presence of zinc in amounts which could preclude the use of the ore as blast furnace feed. No further testing of the ore for steel making feed has been undertaken.

9.4 APPM BULK SAMPLE 1991

Following the successful results of the 1990 test (see above), a 100 tonne bulk sample for further testing was mined in 1991. The objectives of taking the bulk sample were:

> "- to assess its crushing and grinding characteristics, and possibility of providing lump magnetite ore on a commercial grade;
>
> - to acquire a minus 2.5mm fines product and investigate its Fe and SiO_2 characteristics, and possible future use by APPM;
>
> - to acquire a minus 2.5mm fines product, and again evaluate its chemical content and recoverable amounts." (Whitehead, 1991a).

This sample was processed at the Kara No 1 mill as described by Whitehead (1992):

> "The largest proportion of the bulk sample was processed on two separate occasions through the Kara No 1 treatment plant.
>
> "On both occasions the ore was fed into the mill, passed through the primary jaw crusher, trommel, secondary jaw crusher and rod mill, attaining a minus 2.5mm - plus 0.5mm product. On the first test (Test A) the above size fraction was also passed over magnetic separators, and on the second occasion (Test B) this cleaning operation was avoided."

Sizing and analysis was carried out on the final products and the results are attached as Appendix 8.

The testing showed that a useful DARS feed could be produced by magnetic separation and screening the ore into a 0.5 to 2mm size fraction. The resulting concentrate was high in iron, greater than 65% Fe, low in silica, less than 1% SiO_2, and low in sulphur and phosphorous, less than 0.010% of each element. As a result APPM agreed to test another bulk sample in 1992, and, if the tests were again positive, to purchase the concentrate in the future.

The testing also showed that there was a possibility that ore could be mined and processed as a source of lump iron ore in the 6mm to 20mm size range.

9.5 APPM BULK SAMPLE 1992

A sized 200 tonne sample of concentrate was prepared for APPM for use in the DARS plant in 1992. The concentrate was found to be suitable as a make-up material in the anti-pollution process and a firm order for supply of the material followed.

9.6 TEMCO 20 LITRE SAMPLE FEBRUARY 1992

A 20 litre sample of lump ore, in the size range 6mm to 17mm, was tested by TEMCO in early 1992 to determine the suitability of the ore for ferro-manganese production. This preliminary test was encouraging (see Appendix 9) and, as a result, bulk testing of the ore was scheduled for later in 1992.

9.7 TEMCO BULK SAMPLE MAY 1992

A 746 tonne sample of lump ore was prepared and forwarded to TEMCO for testing in April 1992. The results of this test are attached in Appendix 10. The results were again encouraging, indicating a satisfactory iron grade and a low silica grade even when the ore was in lump form.

9.8 TEMCO BULK SAMPLE NOVEMBER 1992

This testwork by TEMCO was undertaken after the granting of Mining Lease 20M/91 and the results are not included in this report. The fact of the testing is noted here as a matter of record only.

10 RESOURCES AND RESERVES

10.1 INTRODUCTION

The resources and reserves detailed here have been classified for this report according to the Australian Code for Reporting of Identified Mineral Resources and Ore Reserves published by the Joint Committee of the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council: see Appendix 11.

The resource and reserve estimates which have been made so far are summarised in Table 6.

10.2 JACK 1964

Jack (1964) estimated that

inferred resources of 500,000 tons of iron ore

existed within 'nine areas of high magnetic anomalie' in Kara No 2 Main Zone. He calculated that there were 10,000 tons of ore per vertical foot and considered that his estimate was conservative. Current ore reserve terminology would classify this as an Inferred Resource.

TABLE 6

KARA NO 2
RESOURCE AND RESERVE ESTIMATES

KARA NO 2 MAIN ZONE

	Jack, 1964	
INFERRED RESOURCE	500,000 tons	iron ore
	Jack,1965	
INDICATED RESOURCE	70,000 tons	at least 50% Fe
INFERRED RESOURCE	200,000 tons	at least 45% Fe
	250,000 tons	lower grade material

KARA NO 2 SOUTH

	Whitehead, 1991	
INDICATED RESOURCE	500,000 tonnes	high iron content

10.3 JACK 1965

Following a short drilling programme, Jack (1965) revised his reserve estimate for the northern part of Kara No 2 Main Zone to

indicated resources of 70,000 tons containing 50% iron.

Following the drilling Jack had concluded that a reasonable resource estimate could be made using the ground magnetics contours: see 6 MAGNETIC SURVEYS. Using this information, he estimated that the eight largest anomalies contained

inferred resources of 200,000 tons of 45% Fe

and, in smaller anomalies

250,000 tons of lower grade material.

10.4 WHITEHEAD 1991

Following surface geological mapping, detailed ground magnetics and shallow percussion drilling of Kara No 2 South, Whitehead estimated that the Zone had a minimum tonnage potential of half a million tonnes over a strike length of 375 metres. He made no estimate of the grade of the deposit but noted that "in-situ material shows the ore to have a high Fe content 67.1/67.5%" (Whitehead, 1991b).

11 FUTURE WORK

The programme of work in 1993 will be aimed at addressing the aims of exploration detailed in Section 4 above. Both Kara No 2 Main and Kara No 2 East are at a relatively advanced stage of exploration. All existing geological, magnetic and assay data will be compiled into a useable, meaningful form, in a systematic manner, so that either a realistic estimate of the resources in these two zones can be made, or specific work can be undertaken to enable such estimates to be made.

There are several specific items, mentioned throughout this report which will be dealt with. These are:

- locating the collar positions, in AMG coordinates, of the diamond drill holes drilled into Kara No 2 Main,

- locating the collar positions, in AMG coordinates, of the percussion holes drilled into Kara No 2 East,

- assaying the percussion samples which are available from Kara No 2 East,

- extracting a 100 tonne bulk sample from Kara No 2 East for metallurgical testing.

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Whitehead, C.H., 1991b: High grade magnetite deposit - Kara No 2, NW Tasmania, unpublished Tasmania Mines Limited report

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APPENDIX 1

Maps showing change in status of Crown Land within EL 39/89

P.O. Box 68
BURNIE
1:25000 map

346345
DISTRICT FORESTER
LES.

TASMANIA

Department of Resources & Energy

DIVISION OF MINES & MINERAL RESOURCES

PO Box 56
ROSNY PARK
Tasmania 7018
Gordons Hill Road
ROSNY PARK
Ph (002) 30 8333
Fax (002) 44 2117

008027

11 May 1992

CHANGE IN LAND TENURE

Following the introduction of the Forest Reform Bill the Forestry Commission acquired managerial responsibilities of many areas which were formally unallocated Crown Land. All former unallocated Crown Land (i.e. white on land tenure maps) in the newly declared Multiple Use Wood Production Zones is now State Forest.

In addition, a number of areas were declared 'Deferred Forest'. This land, although now being listed on a Register of Deferred Forest, has not officially changed tenure. If the land used to be State Forest, it still is. If it used to be unallocated Crown Land, it still is.

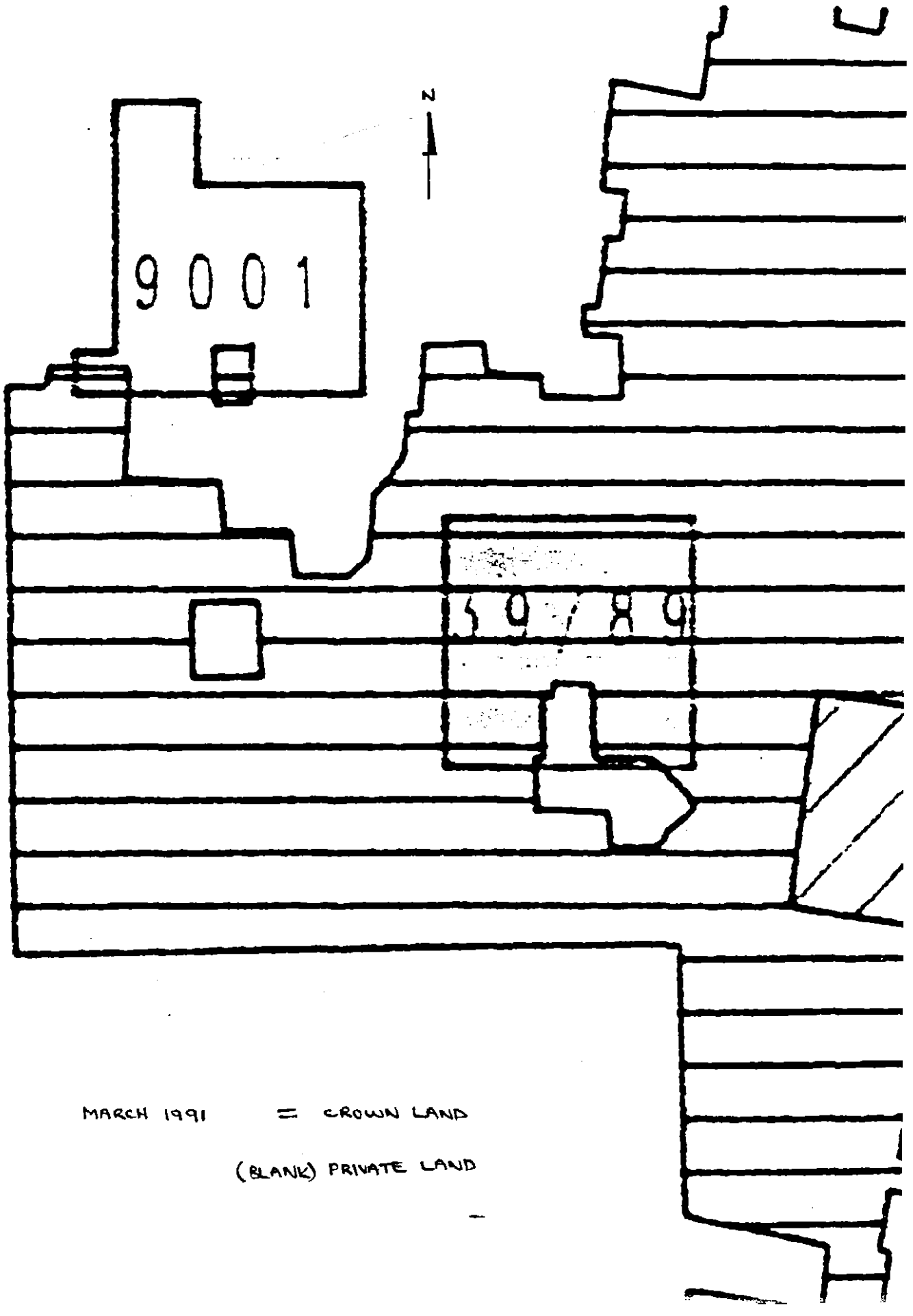
Unallocated Crown Land (including the pieces on the Register of Deferred Forest) are managed on the ground by staff of the Department of Parks Wildlife and Heritage, on behalf of the Department of Environment and Planning who still administer these lands.

RAPs are in the 'Deferred Forest' category and their land status has not changed.

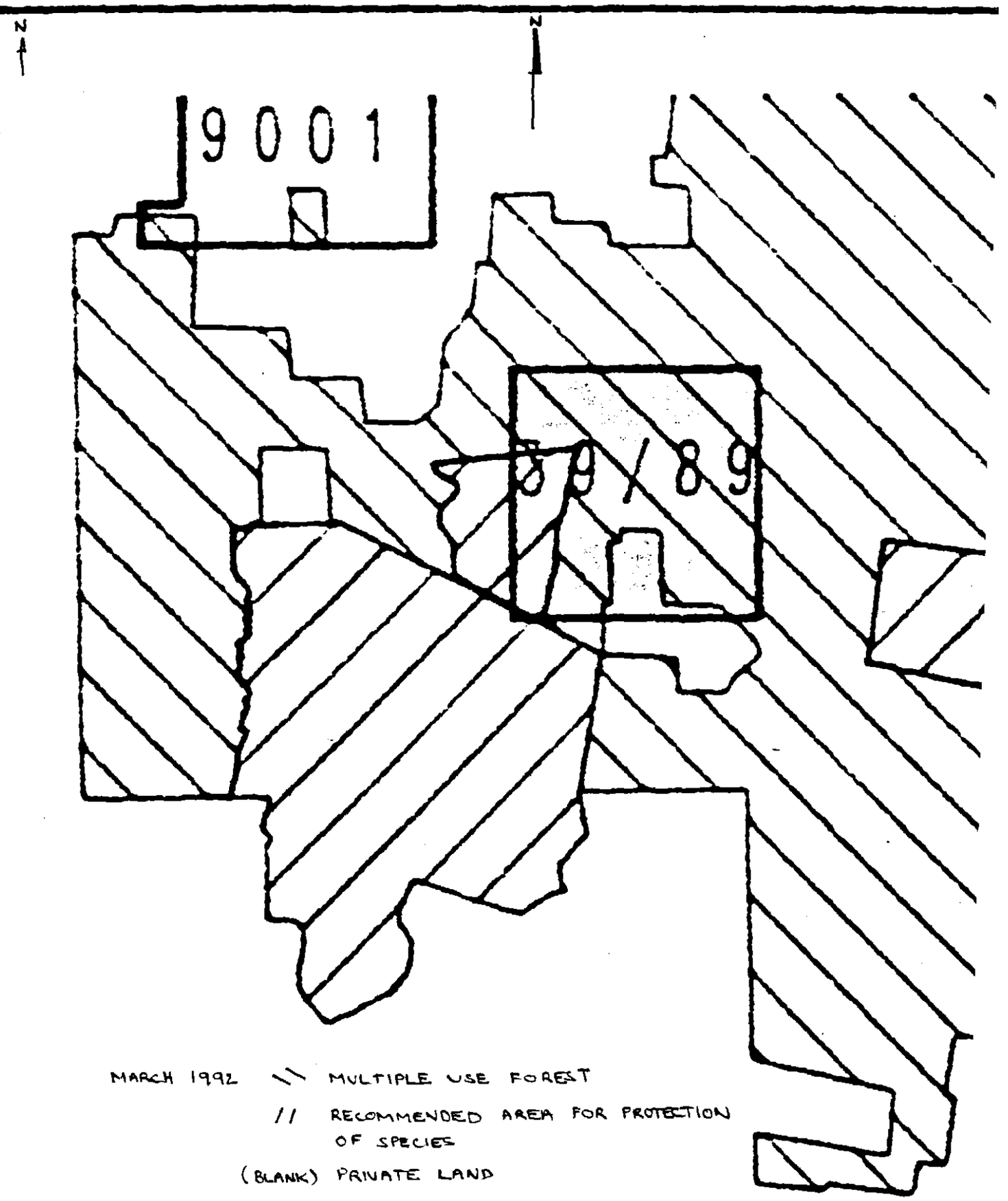
Pieces of chart are attached showing the 'old' and 'new' land tenure status of your exploration licence. If you have any queries relating to this I can be contacted on (002) 338326.

C.A. Bacon
ACTING SUPERVISING GEOLOGIST
ENVIRONMENTAL MANAGEMENT

Encl.


N
9001
MARCH 1991 = CROWN LAND
(BLANK) PRIVATE LAND

008029


N
N
9001
89/89
MARCH 1992
MULTIPLE USE FOREST
RECOMMENDED AREA FOR PROTECTION OF SPECIES
(BLANK) PRIVATE LAND

APPENDIX 2

Map showing the location of Pearson's Lease

49 . 3 . 9"

Tramway

P. A. Holloway Pur.

100 . 0 . 0

C. H. Stitz Pur

50 . 0 . 0.

E. Holloway Pur.

$\frac{3275}{M}$ 10.

$\frac{3274}{M}$ 5

Holloway Ck

E.L. 17/68 75 S.KM.
TASMINEX N.L.
4 11 79

BLYTHE RIVER

Consd Lease 26M 64 90.

Expired 1/5/85

A. & D. D'O.

Pearson

M.L.

24

Road

E0800 31

APPENDIX 3

Descriptive models of scheelite and tungsten skarn deposits

DESCRIPTIVE MODEL OF W SKARN DEPOSITS

By Dennis P. Cox

DESCRIPTION Scheelite in calc-silicate contact metasomatic rocks.

GENERAL REFERENCE Einaudi and Burt (1982), Einaudi and others (1981).

GEOLOGICAL ENVIRONMENT

Rock Types Tonalite, granodiorite, quartz monzonite; limestone.

Textures Granitic, granoblastic.

Age Range Mainly Mesozoic, but may be any age.

Depositional Environment Contacts and roof pendants of batholith and thermal aureoles of apical zones of stocks that intrude carbonate rocks.

Tectonic Setting(s) Orogenic belts. Syn-late orogenic.

Associated Deposit Types Sn-W skarns, Zn skarns.

DEPOSIT DESCRIPTION

Mineralogy Scheelite ± molybdenite ± pyrrhotite ± sphalerite ± chalcopyrite ± bornite ± arsenopyrite ± pyrite ± magnetite ± traces of wolframite, fluorite, cassiterite, and native bismuth.

Alteration Diopside-hedenbergite + grossular-andradite. Late stage spessartine + almandine. Outer barren wollastonite zone. Inner zone of massive quartz may be present.

Ore Controls Carbonate rocks in thermal aureoles of intrusions.

Geochemical Signature W, Mo, Zn, Cu, Sn, Bi, Be, As.

EXAMPLES

Pine Creek, USCA	(Newberry, 1982)
MacTung, CNBC	(Dick and Hodgson, 1982)
Strawberry, USCA	(Nokleberg, 1981)

GRADE AND TONNAGE MODEL OF W SKARN DEPOSITS

By W. David Menzie and Gail M. Jones

COMMENTS All mines associated with the contact zone of a particular intrusive with a favorable host rock were combined to form a single deposit. In the absence of detailed geologic information, mines within 10 km of each other were combined. See figs. 32, 33.

DEPOSITS

Name	Country	Name	Country
Bailey	CNYT	Lost Creek	USMT
Brejui	BRZL	Lucky Mike	CNBC
Cab	CNYT	Mactung	CNNT
Calvert (Red Button)	USMT	Maykhura	URTD
Cantung	CNNT	Milford area	USUT
Dublin Gulch (GSZ)	CNYT	Nevada-Massachusetts	USNV
Emerald-Dodger	CNBC	Nevada-Scheelite	USNV
Iron Mountain	USNM	Osgood Range	USNV
King Island	AUTS	Pine Creek	USCA

from Cox, D.P. & Singer D.A., 1986 : Mineral Deposit ... Models, USGS Bulletin No 1693

ıixaba	BRZL	Tyrny-Auz	URRS
ay Gulch	CNYT	Uludag	TRKY
ang Dong	SKOR	Victory	CNBC
tormy Group	CNYT	Yellow Pine district	USID
em Piute district	USNV	Ysxjoberg	SWDN

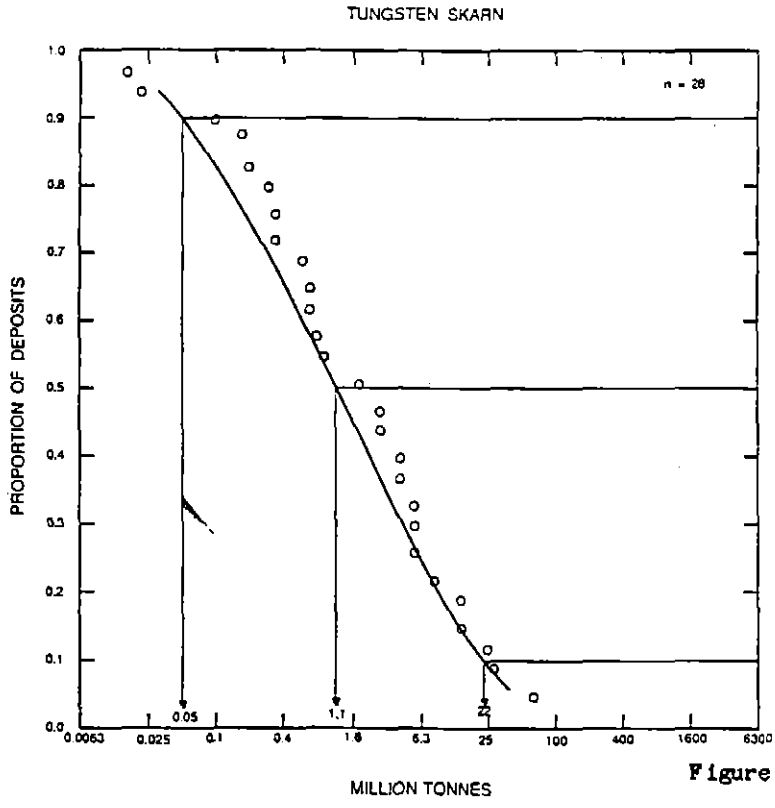


Figure 32. Tonnages of W skarn deposits.

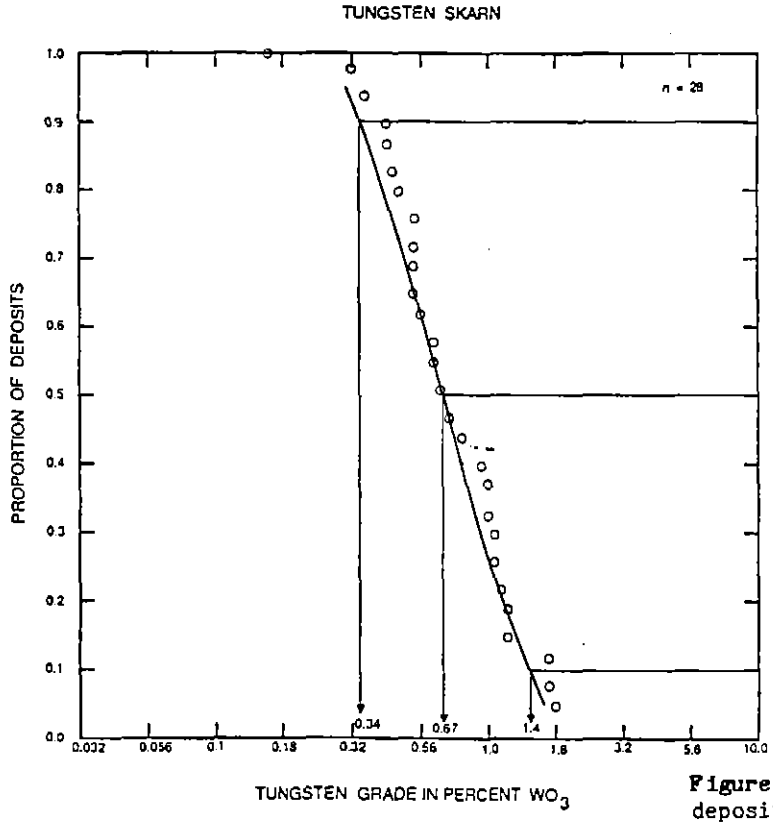


Figure 33. Tungsten grades of W skarn deposits.

Model 18d

DESCRIPTIVE MODEL OF Fe SKARN DEPOSITS

By Dennis P. Cox

DESCRIPTION Magnetite in calc-silicate contact metasomatic rocks.

GENERAL REFERENCES Einaudi and Burt (1982), Einaudi and others (1981).

GEOLOGICAL ENVIRONMENT

Rock Types Gabbro, diorite, diabase, syenite, tonalite, granodiorite, granite, and coeval volcanic rocks. Limestone and calcareous sedimentary rocks.

Textures Granitic texture in intrusive rocks; granoblastic to hornfelsic textures in sedimentary rocks.

Age Range Mainly Mesozoic and Tertiary, but may be any age.

Depositional Environment Contacts of intrusion and carbonate rocks or calcareous clastic rocks.

Tectonic Setting(s) Miogeosynclinal sequences intruded by felsic to mafic plutons. Oceanic island arc, Andean volcanic arc, and rifted continental margin.

DEPOSIT DESCRIPTION

Mineralogy Magnetite ± chalcopyrite ± Co-pyrite ± pyrite ± pyrrhotite. Rarely cassiterite in Fe skarns in Sn-granite terranes.

Texture/Structure Granoblastic with interstitial ore minerals.

Alteration Diopside-hedenbergite + grossular-andradite + epidote. Late stage amphibole ± chlorite ± ilvaite.

Ore Controls Carbonate rocks, calcareous rocks, igneous contacts and fracture zones near contacts. Fe skarn ores can also form in gabbroic host rocks near felsic plutons.

Weathering Magnetite generally crops out or forms abundant float.

Geochemical and Geophysical Signature Fe, Cu, Co, Au, possibly Sn. Strong magnetic anomaly.

EXAMPLES

Shinyama, JAPN	(Uchida and Iiyama, 1982)
Cornwall, USPA	(Lapham, 1968)
Iron Springs, USUT	(Mackin, 1968)

GRADE AND TONNAGE MODEL OF Fe SKARN DEPOSITS

By Dan L. Mosier and W. David Menzie

COMMENTS Some of the data represent districts. See figs. 66-67.

DEPOSITS

Name	Country	Name	Country
Adaevka central	URRS	Alagada	PORT
Adaevka north	URRS	Aleshinka	URRS
Adaevka south	URRS	Argonaut	CNBC
Agalteca	HNDR	Asvan	TRKY
Ain Mokra	ALGR	Auerbach	URUR
Ain Oudrer	ALGR	Ayazmant	TRKY
Akatani	JAPN	Baghain	IRAN

Baisoara	RMNA
Beck	USCA
Beni Douala	ALGR
Benkala	URRS
Bessemer	CNON
Bizmisen-Akusagi	TRKY
Blairton	CNON
Bolsherechensk	URRS
Bulacan	PLPN
Brynor	CNBC
Calabogie	CNON
Camiglia	ITLY
Capacmarca	PERU
Capitan	USNM
Carmen	CILE
Cave Canyon	USCA
Cehegin	SPAN
Chichibu	JAPN
Childs Mine	CNON
Colquemarca	PERU
Copper Flat	USNM
Cuchillo-Negro	USNM
Daiquiri	CUBA
Dammer Nissar	PKTN
Dannemora	SWDN
Dayton	USNV
Divrigi	TRKY
Dungun	MDGS
Dzama	URRS
Eagle Mountain	USCA
El Pedroso	SPAN
El Sol y La Luna	MXCO
El Volcan-Piedra Iman	MXCO
Eltay	URRS
Estyunin	URRS
Fierro-Hannover	USNM
Gallinas	USNM
Giresun	TRKY
Gora Magnitnaya	URRS
Gora Vysokaya	URRS
Hatillo	DMRP
Hierro Indio	AGTN
Huacravilca	PERU
Hualpai	CNBC
Huancabamba	PERU
Hull	CNQU
Imanccasa	PERU
Ino	JAPN
Iron Duke	CNBC
Iron Hat	USCA
Iron Mike	CNBC
Iron Mountain (Colfax Co.)	USNM
Iron Mountain (Sierra Co.)	USNM
Iron Springs	USUT
Jedway	CNBC
Jerez de los Caballeros	SPAN
Jib	CNBC
Jicarilla	USNM
Jones Camp	USNM
Juncos	CNBC
Kachar	URRS
Kalkan	TRKY
Kambaikhin central	URRS
Kambaikhin east	URRS
Kambaikhin north	URRS
Karamadazi	TRKY
Kaunisvaara-Masugnsbyn	SWDN
Kesikkopru	TRKY
Kozyrevka	URRS
Kroumovo	URRS
Kruglogorsk	URRS
Kurzhunkul	URRS
La Carmen	MXCO
La Laguna	DMRP
La Paloma	MXCO
La Piedra Iman	MXCO
Las Animas Cerro Prieto	MXCO
Las Truchas	MXCO
Larap-Calambayungan	PLPN
Lava Bed	USCA
Lebyazhka	URRS
Livitaca-Velille	PERU
Lomonosov	URRS
Maanshan	HONG
Mac	CNBC
Marbella	SPAN
Marmoraton	CNON
Martinovo	BULG
Maslovo	URRS
Mati	PLPN
Mogpog	PLPN
Monte Carmelo	NCRG
Munesada	JAPN
Nimpkish	CNBC
Novo Maslovo	URRS
Novo Peschansk	URRS
Ocna de Fier	RMNA
Old Dad Mountains	USCA
Orogrande	USNM
Osokino-Aleksandrovsk	URRS
Pambuhan Sur	PLPN
Pampachiri	PERU
Paracale	PLPN
Pena Colorada	MXCO
Perda Niedda	ITLY
Persberg	SWDN
Peschansk	URRS
Picila	MXCO
Piddig	PLPN
Plagia	GREC
Pokrovsk	URRS
Rankin	CNON
Recibimiento	MXCO
Rondoni	PERU
Rose	CNBC
Rudna Glava	YUGO
Sabana Grande	DMRP
Samli	TRKY
San Carlos	MXCO
San Juan de Chacna	PERU
San Leone	ITLY
Sankyo	JAPN
Santa Lucia	PERU
Santa Rita	USNM
Sarbay	URRS
Senor de Huarquisa	PERU

Model 18d--Con.

Severnoe I	URRS	Tepustete	MXCO
Severnoe II	URRS	Texada	CNBC
Severnoe III	URRS	Tovarnica	YUGO
Shagyrkul	URRS	Tsaitsukou	CINA
Shasta-California	USCA	Val Di Peio	ITLY
Shinyama	JAPN	Valuev	URRS
Silver Lakes	USCA	Vorontsovka	URRS
Sorka	URRS	Vulcan	USCA
Sosva	URRS	Vyhne	CZCL
South Sarbay	URRS	Wagasennin	JAPN
Takanokura	JAPN	Yellow Jacket	USNM
Tapairihua	PERU	Zanitza	MXCO
Techa	URRS	Zarikan	IRAN
Tecolote	USNM	Zeballos	CNBC

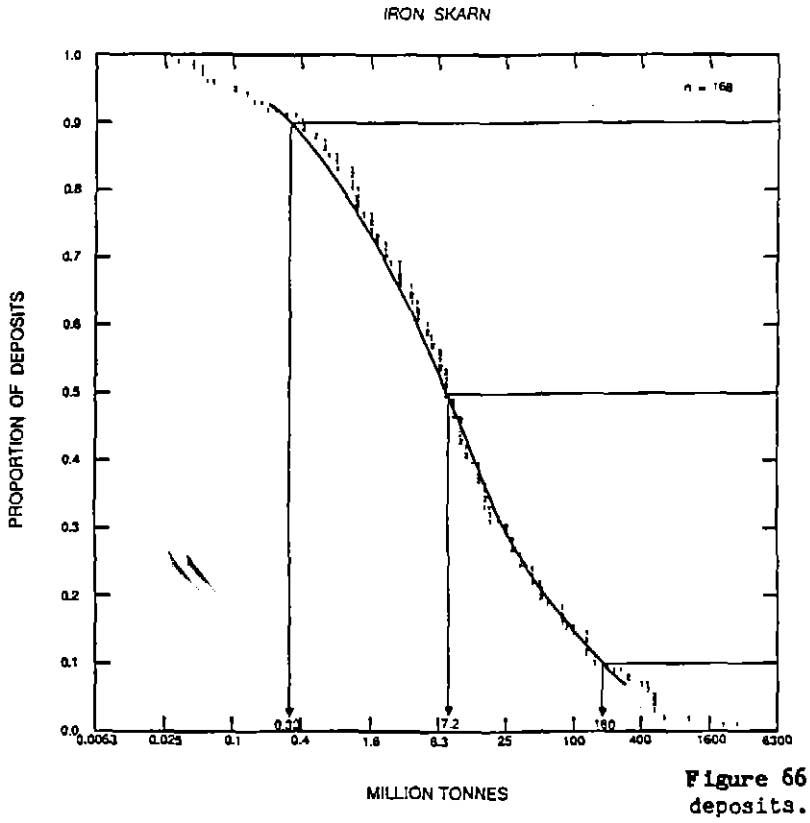


Figure 66. Tonnages of Fe skarn deposits. Individual digits represent number of deposits.

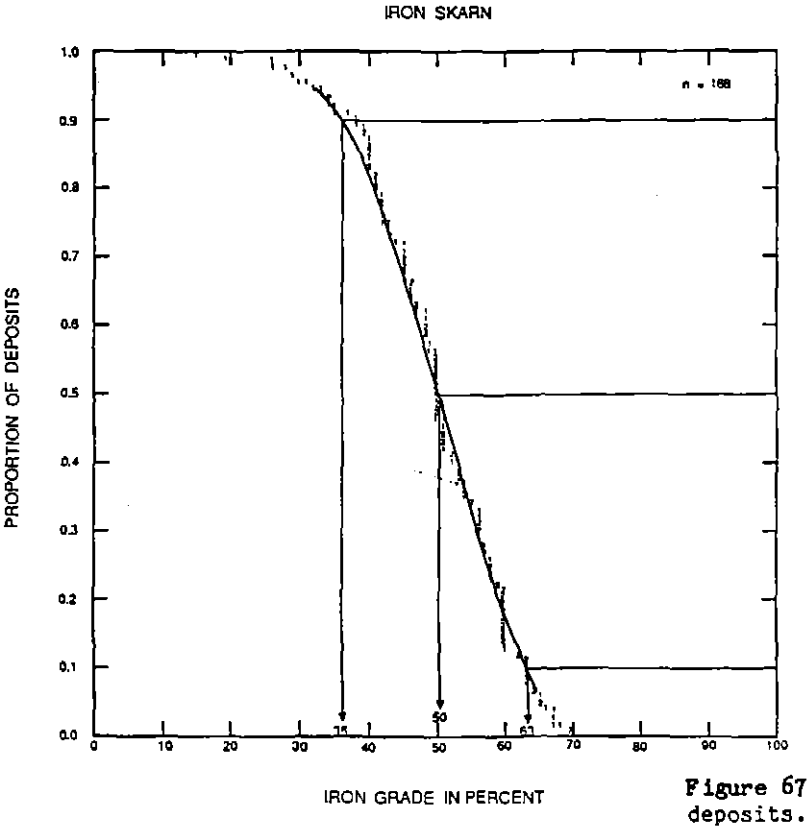


Figure 67. Iron grades of Fe skarn deposits. Individual digits represent number of deposits.

APPENDIX 4

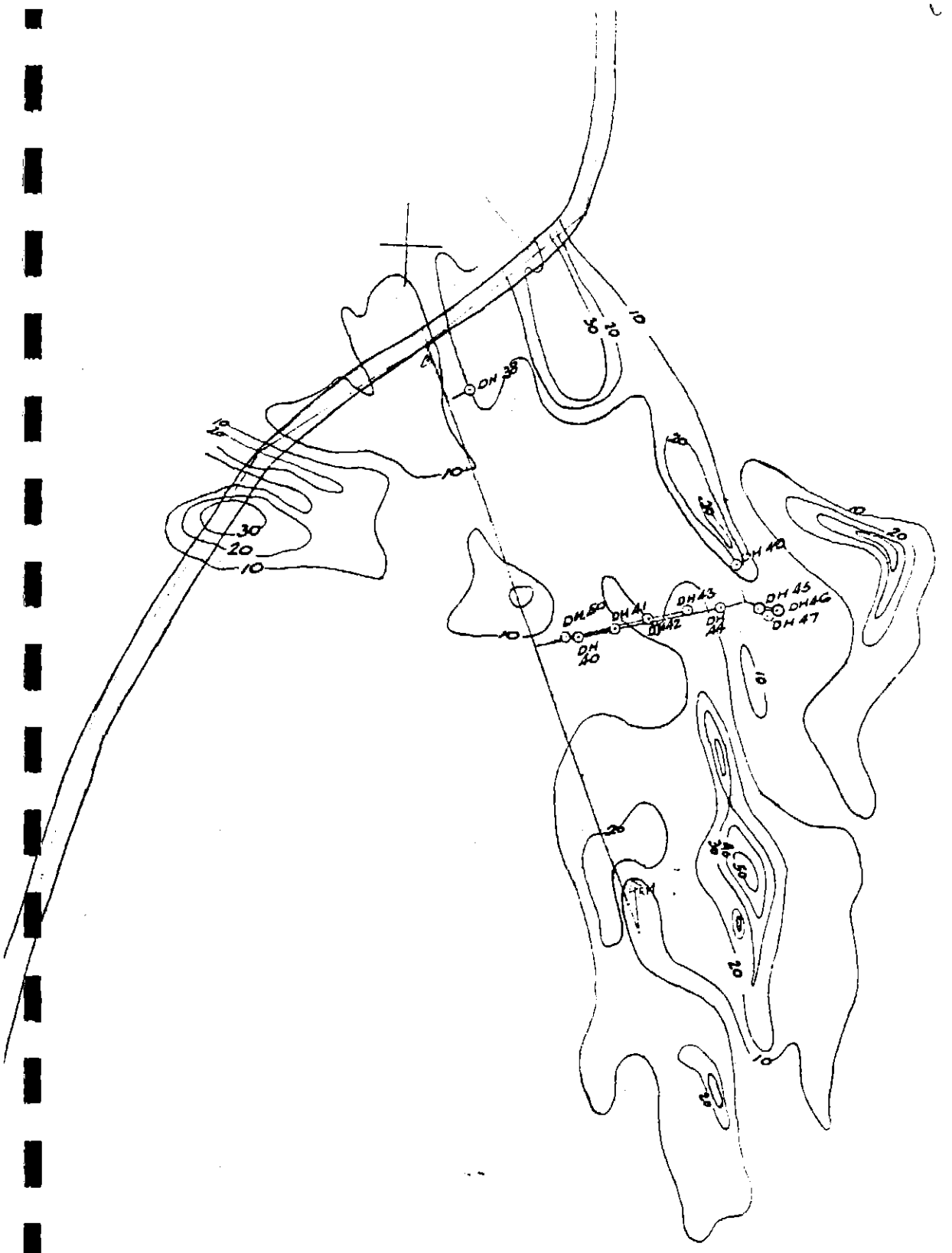
Maps showing locations of diamond drill holes at Kara No 2 North

008041

N

HAMPSHIRE

1:2400


N
DH 38
DH 39
DH 40
DH 41
DH 42
DH 43
DH 44
DH 45
DH 46
DH 47
DH 50
10
20
30
40
50
1:2400

APPENDIX 5

Results of percussion drilling completed between 1990 and 1992

KARA NO 2 MAIN SKARN

PERCUSSION DRILLING PROGRAMME - TASMANIA MINES LIMITED 1990

HOLE NO	E	N	DEPTH DRILLED	COMMENT
K2M-1	402550	425502	15.0m	Magnetite 0-15m
K2M-2	402571	425501	5.0m	Weathered Magnetite 0-5m
K2M-3	402600	425500	5.0m	Soft, oxidised magnetite 0-5m
K2M-4	402625	425500	4.0m	Weathered Fe-Garnet skarn 0-4m
K2M-5	402650	425499	4.0m	Soft weathered skarn 0-4m
K2M-6	402675	425499	3.0m	Skarn soft, no air
K2M-6A			14.0m	Soft skarn
K2M-7	402700	425498	3.0m	Skarn, soft oxidised, no air
K2M-8	402725	425497	5.5m	Garnet/Fe skarn 0-5.5m
K2M-9	402750	425496	8.0m	Skarn
K2M-10	402775	425495	4.0m	Granite
K2M-11	402500	425495	3.0m	Fe Skarn
K2M-12	402520	425472	2.0m	Fe Skarn
K2M-13	402550	425520	7.0m	Magnetite, oxidised 0-7m
K2M-14	402560	425545	6.0m	Weathered magnetite
K2M-15	402580	425572	9.0m	Massive magnetite
K2M-16	402590	425600	11.0m	Fe Skarn
K2M-17	402610	425620	8.0m	Fe Skarn
K2M-18	402620	425650	3.0m	Garnet skarn, weathered
K2M-19	402500	425497	3.0m	Granite
K2M-20	402460	425460	3.0m	Granite
K2M-21	402532	425530	3.0m	Magnetite

KARA NO 2 SOUTH 1ST PHASE PERCUSSION DRILLING TASMINES 1990

HOLE NO	E	N	DEPTH DRILLED (m)	COMMENT	ASSAY % Fe	ASSAY % SiO_2
29	403055	423605	0 - 3	Weathered Granite	N/A	
			3 - 6	Granite	N/A	
30	403040	423590	0 - 3	Granite	N/A	
			3 - 6	Granite	N/A	
31	403020	423574	0 - 3	Soft Granite	N/A	
			3 - 6	Granite	N/A	
32	403030	423575	0 - 3	Haematite/Magnetite	63.4	
			3 - 6	" "	64.3	
			6 - 9	Magnetite Skarn	65.9	
			9 - 11	Magnetite	65.2	
33	403025	423576	0 - 3	Weathered Skarn	64.1	
			3 - 6	Magnetite	63.8	
34	403025	43562	0 - 3	Fe Skarn	56.6	3.6
			3 - 6	Magnetite	64.6	1.8
35	403020	423545	0 - 3	Magnetite	65.1	1.0
			3 - 6	"	67.0	0.59
			6 - 8	"	66.9	0.55
36	403015	423546	0 - 3	Magnetite	66.2	0.54
			3 - 6	"	62.6	2.00
			6 - 8	"	63.6	1.80
37	403025	423544	0 - 3	Magnetite	66.4	0.64
			3 - 6	"	64.6	1.10
			6 - 8	L.G. Magnetite	61.2	3.50
38	403018	423534	0 - 3	Magnetite	64.1	1.1
			3 - 4	Fe Skarn	56.6	1.4
39	403015	423521	0 - 3	Fe Skarn	59.7	2.0
			3 - 4	Fe Skarn	56.8	6.3
40	403010	423522	0 - 3	Fe Skarn	58.3	1.4
41	403020	423520	0 - 3	Magnetite Weathered	61.7	2.4
			3 - 5	" "	60.	2.3

1ST PHASE PERCUSSION DRILLING (CONTINUED)

42	403010	423500	0 - 3	Magnetite	63.4	1.6
			3 - 6	"	65.5	1.0
			6 - 7	"	61.8	2.1
43	403024	423590	0 - 3	Skarn	42.7	13.1
			3 - 4	Skarn 41.3	~~8.6~~ 41.3	~~8.6~~
44	403035	423605	0 - 3	Granite	N/A	N/A
45	403045	423605	0 - 3	Magnetite	62.7	2.3
			3 - 6	"	65.1	0.75
			6 - 9	"	62.0	1.7
46	403035	423620	0 - 3	Fe Skarn	60.8	1.5
			3 - 5	Magnetite	64.6	1.4
47	403045	423620	0 - 3	Weathered Skarn	56.2	1.7
			3 - 6	Magnetite	62.4	1.7
			6 - 8	Magnetite	65.7	1.6
48	403040	403635	0 - 3	Fe Skarn	57.5	5.7
			3 - 6	Magnetite	62.4	2.5
			6 - 8	Magnetite	65.7	1.3

TOTAL NO OF HOLES = 20
TOTAL METRES = 123M

KARA NO 2 SOUTH

2ND PHASE PERCUSSION DRILLING

TASMINES 1990

HOLE NO	E	N	DEPTH DRILLED
49	403095	423860	6.0
50	403090	423840	2.5
51	403095	423840	6.0
52	403095	423840	6.0
53	403080	423810	6.0
54	403075	423810	6.0
55	403085	423810	3.0
56	403075	423780	6.0
57	403070	423780	6.0
58	403080	423780	6.0
59	403070	423750	6.0
60	403065	423750	3.0
61	403075	423750	6.0
62	403080	423720	3.0
63	403075	423720	3.0
64	403085	423720	6.0
65	403055	423695	2.0
66	403050	423695	2.0
67	403050	423670	3.0
68	403045	423670	3.0

APPENDIX 6

Results of APPM testing of composite drill sample
from Kara No 2 South

KARA Nº 2 SOUTH - MAGNETITE

LOW SILICA MAGNETITE SAMPLE

APPM DESIGNATION - KARA 2S Nº 25975

Fe_2O_3	-	91.8%
Al_2O_3	-	1.5%
SiO_2	-	0.7%
CaO	-	NIL
MgO	-	0.2%
Na_2O	-	Trace
SO_3	-	Trace
LOI	-	1.3%

MINERALOGY:-

Goethite	-	15-20%
Hematite	-	15-20%
Magnetite	-	60-70%

APPENDIX 7

Results of BHP testing of small surface sample from Kara No 2 South

ATT. D. JAMES

008051 1/2

RAW MATERIALS INVESTIGATION
TECHNOLOGY DEPARTMENT

DATE: 5TH APRIL 1991

TO: SUPT. RAW MATERIALS SUPPLY

SUBJECT: RESULTS FOR SAMPLE OF TAS. MINES KARRA No.2.

Sample of Karra No.2 lump ore(Approx. 3kg) was crushed to 90% minus 6.0mm. Chemical analysis of individual screen fractions was conducted to establish any potential for benificiation by size.

1.0 RESULTS - Head Sample

1.1 SIZING.

(MM)	%Cum
+8.00	3
+4.00	21
+2.00	54
+1.00	72
+0.50	81
+0.25	90
+0.125	94
-0.125	(6)
MS	2.73
SMD	0.47

1.2 CHEMICAL ANALYSIS

T.Fe	65.6
SiO2	0.48
Al2O3	1.27
CaO	.05
Mn	1.28
MgO	.43
P	.017
Zn	.156
K2O	<.001
TiO2	.23
L.O.I	0.57

008052

1.3 Analysis by Size.

Size	% Ret	Fe	SiO2	Al2O3	CaO	Mn	MgO	P	Zn	TiO2
+8.0	3	65.7	.48	1.16	.02	1.27	.43	.011	.157	.25
+4.0	18	66.0	.38	1.15	.01	1.37	.47	.010	.162	.27
+2.0	33	66.0	.37	1.12	.01	1.33	.46	.012	.154	.24
+1.0	18	65.6	.42	1.21	.01	1.30	.43	.013	.149	.24
+0.5	9	66.2	.46	1.26	.01	1.29	.45	.015	.146	.23
+0.25	9	66.2	.34	1.48	.01	1.30	.42	.016	.147	.23
+0.125	4	65.3	.73	1.73	.02	1.26	.40	.022	.145	.23
-0.125	6	63.1	1.30	2.40	.14	1.13	.41	.040	.137	.21

(K2O .001 or less down to +.125. -.125 = .003)

2.0 MINERALOGY (Crushed Product)

Predominate medium/dense magnetite exhibiting pronounced micro fissures. Minor to extensive oxidation to martite along cracks resulting in variable particle mineralogy/morphology. In a majority of cases these cracks are infilled by later stage goethite/limonite. Some discrete geothite/limonite particles are also present.

RAW MATERIALS INVESTIGATION

APPENDIX 8

Results of APPM testing of 100 tonne sample
from Kara No 2 South

Associated Pulp and Paper Mills
A Division of North Broken Hill Ltd
A.C.N. 004 208 904

APPM RESEARCH AND TECHNOLOGY GROUP

Marine Terrace
Burnie 7320
Tasmania, Australia
PO Box 201
Fax: Local (004) 307819
Intnl +61 04 307819
Telephone:
Switchboard (004) 307777
direct 004 307648

FACSIMILE SHEET - No. of pages incl. this page: 1

Date: 28-11-91	Our Ref No: FX 713/91
To: Tasmania Mines	
Attention: C. Whitehead	Fax No: 004 31 6027
From: H. Wernder	
File/Subject:	
Copies:	

Cliff,

Here are the results of the 40 tonne ore (sample obtained 13-11-91) that you crushed for us and put over the magnetic separators.

Material is approx 85% magnetite
7.5% hematite
7.5% goethite

Hematite/goethite has decreased by about 7.5% respectively due to ~~that~~ being passed over magnetic separator.

Chemical analysis. (wt %)

	Fe_2O_3	Al_2O_3	SiO_2	CaO	MgO
	93.8	1.1	0.4	0.1	0.3
previous sample (supplied 1-11-90)	91.8	1.5	0.7	NIL	0.2

Size distribution. (% Retained)

mm	2.36	2.0	1.7	1.0	0.5	0.3	0.15	< 0.15
%	1.0	2.0	1.7	12.6	41.4	25.2	11.7	4.4

Ore still looks good. The last sample that you supplied (26-11-91) is being processed at present

Regards Heiko.

PLEASE RESPOND TO OUR FAX NO: (Local) 004 307819, (International) +61 04 307819

Associated Pulp and Paper Mills
A Division of North Broken Hill Ltd.
A.C.N. 004 208 904

APPM
RESEARCH AND TECHNOLOGY GROUP

Marine Terrace
Burnie 7320
Tasmania, Australia
PO Box 201
Fax: Local (004) 307819
Intnl. +61 04 307819
Telephone:
Switchboard (004) 307777
direct 004 307648

FACSIMILE SHEET - No. of pages incl. this page: 1

Date: 16-12-91	Our Ref No: FX 728/91
To: Tasmania Mines	
Attention: Cliff Whitehead	Fax No: 004 316027
From: Heiko Wunder	
File/Subject:	
Copies:	

Cliff,

The results of the latest lot of Kara ore not put over the magnetic separator are as follows:

Phase assemblage approx.

70% Magnetite
15% Hematite
15% Goedhite

Chemical Analysis (wt%)

Fe_2O_3	Al_2O_3	SiO_2	CaO	MgO
92.18	1.25	0.71	0.09	0.28

Size distribution (% Retained)

mm	2.36	2.0	1.7	1.0	0.5	0.3	0.18	<0.18
%	2.1	3.0	4.0	20.9	33.6	20.5	10.3	5.6

We are in the process of adding 10 tonnes of the ore to the combustion bed sometime today. Chemical analysis and size distribution is quite acceptable for our operation.

Regards
Heiko

PLEASE RESPOND TO OUR FAX NO: (Local) 004 307819, (International) +61 04 307819

APPENDIX 9

Results of TEMCO testing of 20 litre sample from Kara No 2 South

008057

LABORATORY REPORT: Dave Hassell DATE: 4.3.92

WORK NO: .....

MATERIAL: Magnetite (Analysed 26-2-92)

SAMPLE	Fe	SiO_2	Al_2O_3	Mn	P	CaO	MgO	K_2O	TiO_2	Zn	Cr	V	Ni	S
Magnetite	66.7	0.4	1.0	1.5	<0.01	<0.1	0.4	<0.01	0.24	0.18	0.02			
S.R. PELLETS	65.9	2.18	0.39	0.09	.0009	0.15	1.10	0.003	0.96			0.38	0.035	.002
WHYALLA IRON ORE (LAST SHIP)	66.5	2.11	0.61	0.22	0.035	0.02	0.10	0.055	0.03	0.014				0.026

COMMENTS: BULK SAMPLE

K. Dodge
ANALYST.

D. Lyon
CHEMIST.

APPENDIX 10

Results of TEMCO testing of 746 tonne sample from Kara No 2 South

TASMANIAN ELECTRO METALLURGICAL CO. PTY. LTD.

BELL BAY - TASMANIA

LABORATORY REPORT: D. Hassell DATE: 26/5/92

WORK NO:

MATERIAL: N.W. Iron Ore

SAMPLE	Fe	SiO_2	Al_2O_3	Mn	P	CaO	MgO	K_2O	TiO_2	Zn	Cr
Sample 1	66.0	1.3	1.5	1.4	<.01	.1	.1	.02	.23	.15	.01
" 2	66.3	.8	1.3	1.2	<.01	<.1	<.1	.01	.23	.15	.01
" 3	67.2	.9	1.6	1.3	<.01	.1	<.1	.01	.23	.15	.02
" 4	67.7	.7	1.4	1.3	<.01	.1	<.1	.01	.22	.15	.01
" 5	66.6	.9	1.5	1.2	<.01	<.1	<.1	.01	.22	.14	.02
" 6	66.1	1.3	1.8	1.2	<.01	.1	.1	.01	.22	.14	.01
" 7	66.8	.8	1.6	1.2	<.01	<.1	<.1	.01	.23	.14	.01
" 8	67.3	.8	1.4	1.2	<.01	<.1	<.1	.01	.23	.15	.01
" 9	65.3	1.3	1.7	1.4	<.01	.1	.1	.02	.23	.14	.01
" 10	67.0	.8	1.4	1.3	<.01	<.1	<.1	.01	.23	.15	.01

COMMENTS: PROD'N SAMPLES

A. Shierlaw / C. Ferguson

ANALYST.

R. Selston

CHEMIST.

APPENDIX 11

Extract from the Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves - 1992

008061

1992 EDITION

INCORPORATED BY ROYAL CHARTER 1955

AUSTRALASIAN CODE FOR REPORTING OF IDENTIFIED MINERAL RESOURCES AND ORE RESERVES

REPORT OF THE JOINT COMMITTEE OF THE
AUSTRALASIAN INSTITUTE OF MINING AND METALLURGY,
AUSTRALIAN INSTITUTE OF GEOSCIENTISTS
AND
AUSTRALIAN MINING INDUSTRY COUNCIL

(JORC)

SEPTEMBER 1992

Foreword

1. The Joint Ore Reserves Committee was initially set up in 1971 to consider and make recommendations on Australian stock exchange listing requirements appropriate to mining companies reporting Ore Reserves. The first *Report by Joint Committee on Ore Reserves* was published in April 1972 and was re-issued in 1975.

2. A revised *Report* published in 1981 enlarged the section on pre-Ore Reserve terminology to recognise the reporting of indicative, qualitative or quantitative estimates of potentially economic mineralisation. It was reprinted in 1985 as *Reporting of Ore Reserves*.

3. In February 1989, a revised version of the *Report* was issued as a Code which, in July 1989, was adopted in its entirety by the Australian Stock Exchange Limited for incorporation in its Listing Rules. The Code has subsequently been adopted by many other regulatory bodies within the Australasian region.

4. The ***1989 Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves*** was complemented by the *1986 Australian Code for Reporting Identified Coal Resources and Reserves* which was included as Appendix 1 to the former. In 1990, the Committee issued as a companion document a set of ***Guidelines*** to assist is using the Australasian Code.

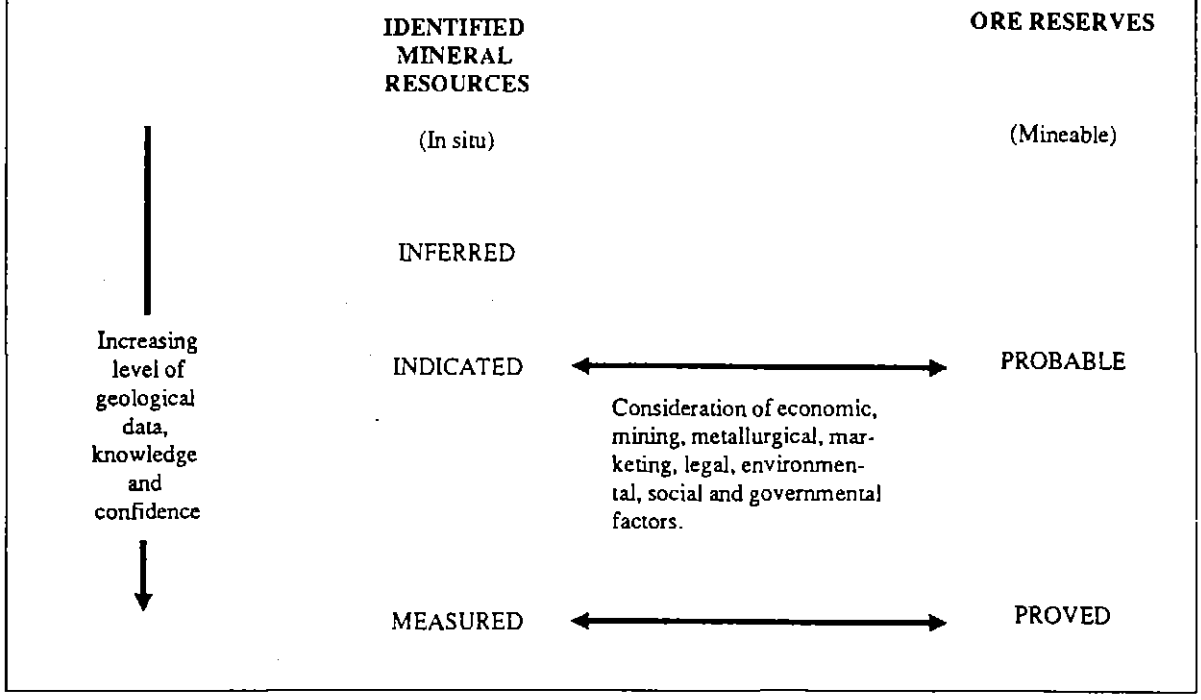
5. The 1992 updated version of the Code makes no fundamental changes with the exception that a definition has been provided for 'Pre-Resource Mineralisation' (paragraph 14). An updated version of the Guidelines has been appended to the revised Code.

6. The Committee recognises that further review of the Code and Guidelines may be required from time to time.

7. The standards outlined in the Code are the minimum to be applied in public reporting. Companies are encouraged to provide as comprehensive information as possible in their reports.

Figure 1 - Reporting Terminology

Relationship between Identified Mineral Resources and Ore Reserves



An 'IDENTIFIED MINERAL RESOURCE', otherwise referred to as a 'MINERAL RESOURCE', is an in-situ (meaning as it occurs on surface or underground) mineral occurrence quantified on the basis of geological data and an assumed cut-off grade only.

The term 'ORE RESERVE' is only to be used if a study of technical and economic criteria and data relating to a 'Mineral Resource' has been carried out to indicate potential feasibility and it is to be stated in terms of mineable tonnes/volume and grade.

Definitions for the terms 'Mineral Resource' and 'Ore Reserves' are provided later in this document.

Competence and Responsibility

8. A Mineral Resource or Ore Reserve report giving technical facts, interpretations or assessments of Mineral Resources or Ore Reserves must be prepared under the direction of, and signed by, a Competent Person or Persons.

9. A 'Competent Person' is defined as a person who is a Corporate Member of The Australasian Institute of Mining and Metallurgy and/or the Australian Institute of Geoscientists with a minimum of five years experience in the estimation, assessment and evaluation of Mineral Resources and Ore Reserves which is relevant to the style of mineralisation under consideration.

10. While the public release of information concerning a company's Mineral Resources and/or Ore Reserves remains the responsibility of the company acting through its Board of Directors, any such release must be based on, and fairly reflect, a Mineral Resource and/or Ore Reserve Report prepared by a Competent Person(s).

11. A public release of information concerning a company's Mineral Resources or Ore Reserves should include a description of the style and nature of mineralisation.

12. A company must disclose relevant information concerning the status and characteristics of a mineral deposit which could materially influence the economic value of that deposit.

13. Companies must review and report on Mineral Resources and Ore Reserves annually.

Reporting of Pre-Resource Mineralisation

14. **'Pre-Resource Mineralisation'** is defined as identified, partially explored mineralisation which is considered to be of significance, but knowledge of which is insufficient to allow classification as a Mineral Resource.

15. A company, when reporting Pre-Resource Mineralisation, must disclose material data sufficient to support statements made.

In reporting such mineralisation which may be isolated, sporadic or discontinuous, full information on the nature of the sampling, sample intervals, assay data and position must be given (refer Table 1).

Reporting of Identified Mineral Resources

16. A **'Mineral Resource'** is defined as an identified in-situ mineral occurrence from which valuable or useful minerals may be recovered. Mineral Resources are subdivided into:

    - Inferred Mineral Resources
    - Indicated Mineral Resources and
    - Measured Mineral Resources

    In defining a Mineral Resource, the Competent Person will only take into consideration geoscientific data. In reporting a Mineral Resource, there is a clear implication that there are reasonable prospects for eventual economic exploitation.

17. Mineral Resource estimates are not precise calculations, being dependent on the interpretation of limited information on the location, shape and continuity of the occurrence and on the available sampling results. Reporting of tonnage/volume and grade figures should reflect the order of accuracy of the estimate by rounding off to appropriately significant figures and, in the case of Inferred Mineral Resources, by qualification with terms such as 'approximately'.

18. The term **'Inferred Mineral Resource'** means a Mineral Resource inferred from geoscientific evidence, drill holes, underground openings or other sampling procedures where the lack of data is such that continuity cannot be predicted with confidence and where geoscientific data may not be known with a reasonable level of reliability.

19. The term **'Indicated Mineral Resource'** means a Mineral Resource sampled by drill holes, underground openings or other sampling procedures at locations too widely spaced to ensure continuity but close enough to give a reasonable indication of continuity and where geoscientific data are known with a reasonable level of reliability. An Indicated Mineral Resource estimate will be based on more data, and therefore will be more reliable, than an Inferred Mineral Resource estimate.

20. The term '**Measured Mineral Resource**' means a Mineral Resource intersected and tested by drill holes, underground openings or other sampling procedures at locations which are spaced closely enough to confirm continuity and where geoscientific data are reliably known. A Measured Mineral Resource estimate will be based on a substantial amount of reliable data, interpretation and evaluation of which allows a clear determination to be made of shapes, sizes, densities and grades.

21. The choice of the appropriate category of Mineral Resource depends upon the quantity and quality of data available and the level of confidence that attaches to those data. The appropriate Mineral Resource category must be determined by the Competent Person(s).

22. Mineral Resource reports must specify one or more of the categories of 'Measured', 'Indicated' and 'Inferred'. Reports should not contain Mineral Resource figures combined for two or more of the categories unless figures for individual categories are also provided.

23. Any public release of information in a report concerning a company's Mineral Resources should state the pertinent data and assumptions on which the report is based and contain a qualification drawing attention to any assessment criteria from Table 1 for which inadequate date are available.

24. The words 'ore' and 'reserves' should not be used in stating Mineral Resource estimates as the terms imply technical feasibility and economic viability and are only appropriate when technical and economic factors have been considered. Reports and statements should continue to refer to the appropriate category or categories of Mineral Resources until technical feasibility and viability have been established. If re-evaluation indicates that the Ore Reserves are no longer viable, the Ore Reserves must revert to the 'Mineral Resource' category.

Table 1

ASSESSMENT CRITERIA	EXPLANATION
Geological interpretation	Whether based on sufficient data or on postulated assumptions; whether constrained by one model or consideration given to possible alternative interpretations.
Data density	Whether sample density is sufficient to establish continuity as well as to provide an adequate data base for the estimation procedure used.
Accuracy of location of sampling points	How well the locations of sampling positions are known and the effect on the Mineral Resource or Ore Reserve estimate.
Drilling technique	Whether core, rotary, percussion or auger and if non-core, whether open hole or reverse circulation.
Sampling technique	If core, whether cut or chisel broken and whether quarter, half or all core taken. If non-core, whether riffled, section cut, tube sampled or whatever and whether sampled dry or wet. If wet, what precautions taken to maximise recovery and minimise fines loss. If underground chip samples, whether channel cut or chipped linearly or randomly taken from a face.
Drill sample recovery	An estimate, expressed in percentage terms, of the quantity of sample recovered as a proportion of the theoretical quantity which should have been recovered.
Tonnage factor (specific gravity)	Whether assumed or determined and, if determined, by what method and how frequently. If assumed, the basis for those assumptions should be stated.
Quality of assay data	Whether reproducible and whether representative: what quality control procedures undertaken.
Quality of data description	Whether core logged in detail: whether all significant, lithologic, structural, mineralogic, alteration or other geological or geotechnical characteristics and properties recorded.
Estimation techniques	A clear description of estimation techniques and key assumptions.
Cut-off grades	Assumptions regarding cut-off grade.

Reporting of Ore Reserves

25. An '**Ore Reserve**' is defined as that part of a Measured or Indicated Mineral Resource which could be mined, inclusive of dilution, and from which valuable or useful minerals could be recovered economically under conditions realistically assumed at the time of reporting. Ore Reserves are subdivided into:

    - Probable Ore Reserves and
    - Proved Ore Reserves

    Ore Reserve estimates are derived from estimates of Mineral Resources modified by economic, mining, metallurgical, marketing, legal, environmental, social and governmental factors.

26. Ore Reserve estimates are not precise calculations and tonnage/volume and grade figures in reports should be expressed so as to convey the order of accuracy of the estimates by rounding off to appropriately significant figures.

27. The term '**Probable Ore Reserve**' means an Ore Reserve stated in terms of mineable tonnes/volume and grades where the corresponding Identified Mineral Resource has been defined by drilling, sampling or excavation (including extensions beyond actual openings and drill holes), and where the geological factors that control the ore body are known with sufficient confidence that the Mineral Resource is categorised as 'Indicated'.

28. The term '**Proved Ore Reserve** means an Ore Reserve stated in terms of mineable tonnes/volume and grade in which the corresponding Identified Mineral Resource has been defined in three dimensions by excavation or drilling (including minor extensions beyond actual openings and drill holes), and where the geological factors that limit the ore body are known with sufficient confidence that the Mineral Resource is categorised as 'Measured'.

29. The choice of the appropriate category of Ore Reserve is determined by the classification of the corresponding Mineral Resource and must be made by the Competent Person(s).

30. Ore Reserve reports must specify one or other of the categories of 'Proved' and 'Probable'. Reports should not contain combined Proved and Probable Ore Reserve figures unless figures for each of the categories are also provided.

31. Any public release concerning a company's Ore Reserve must state the nature of the data on which the report is based and contain a qualification drawing attention to any assessment criteria for which inadequate or uncertain data are available. Economic or political factors alone may be the basis for significant changes in Ore Reserves and should be reported accordingly.

Reporting of Coal Resources and Reserves

32. When public statements on coal Resources and Reserves are made, the recommendations outlined in the ***Australian Code for Reporting Identified Coal Resources and Reserves*** (February 1986) published as Appendix 1 should be followed.

PEARSONS CONSOLIDATED MINERAL LEASE (EXPIRED)
MC 26M/64. 90 acres. 26-4-64. to May 1985.

ANOMALY I.

ANOMALY 2.

ANOMALY 3.

ANOMALY 4.

ANOMALY 5.

ANOMALY 6

DRILL SECTION A

DRILL SECTION B

DRILL SECTION C

DRILL SECTION D

DRILL SECTION E

DRILL SECTION F

D.D.H.1 -50°
D.D.H.2 -50°
D.D.H.3 -50°
D.D.H.4 Vert.
D.D.H.5
D.D.H.6 -50°
D.D.H.7 -50°
D.D.H.8 -50°
D.D.H.9 -50°
D.D.H.10 -50°
D.D.H.14 -50°
D.D.H.16 -50°
D.D.H.17 -50°
D.D.H.18 -50°

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21

To Rogetta Road

To Roadmetal Quarries

To Kara No 2 Sawmill

To Upper Workings Road

QUARRY

LONGITUDINAL SECTION LINE

LEGEND

- Mines Dept. Diamond Drill Hole
- Tasminex Diamond Drill Hole
- Skarn / Granite Contact
- XK2/10 Rock Sample Location
- X 1100 Sn / 300 WO_3 Results in P.P.M.

MAGNETIC BLOCKS

- > 50,000 Gammas
- 40 – 50
- 30 – 40
- 20 – 30
- 10 – 20
- < 10000 Gammas

P12 = Tasmania Mines Ltd. Percussion Drill Holes (1990)

N

5 cm

0 50 100 150 ft.
0 10 20 30 40 50 m.

SCALE: 1:1200

BASE MAP & GROUND MAGNETIC CONTOURS Compiled from Mines Dept Report No 2312 – 36.

008066

93-3444.

TASMANIA MINES LIMITED

KARA N°2 – MAIN SKARN

E.L. 39/89

DRAWN: C.H.W.	SCALE: 1:1200	PLAN 1
TRACED: T.G.D.S.	DATE: Feb. 1991	

401,000mE. 402,000mE. 403,000mE. 404,000mE.

426,000mN. 425,000mN. 424,000mN. 423,000mN.

KARA No.2
MAIN ZONE

KARA No.2
EAST ZONE

KARA No.2
SOUTH ZONE

BLYTHE RIVER

CREEK

HOLLOWAY

PULP ROAD

Old Sawmill

Quarry

Or Dg Tb

CW428 13
CW429 13
CH4.0 13
CH375 328
CW451 806
1000
CM4 1172
CW452 2117
CM5
CW453 945
2700
CW454 2520
CM6 1100
CW448 1638
CM7 1150
CW449 76
CW424 25
CW423 428
CM8 480
(202,25,50) Check Samples
3326
76
25
113
6
25
3
38
3
50
25
265
391
428
504
CW455 517
3
3
3
1638
CW392
76
CW393
13
CW394
CW396 13
76
CW447
CW453 731
CW454 50
CW363 378
CW364 25
CW371 13
CW372 20
CW372 25
CW370R 227
CW371R 50
CW366 25
CW446 76
CW365 25
Old Sawmill
CW495 6
CW493R 101
CW494R 25
CW496R 25
CW497 3
Quarry
160
AD38
AD37
200
CW426 13
CW427 13
76
CW445 76
265
139
6
38
CA377 6

LEGEND

Tb	BASALT	×	SAMPLE LOCATION
Dg	GRANITE	CW350 ×	STREAM SEDIMENT SAMPLE
Or	TRANSITIONAL SERIES	CW351R ×	ROCK SAMPLE
Dm	MAGNETIC SKARN	×50	ASSAY VALUE IN PPM WO_3
	CONTACT METAMORPHIC ZONE		

GN TN MN
GRID CONVERGENCE 0.7°
GRID/MAGNETIC 12.2°

0 100 200 300 400 500
SCALE: 1:5,000

008067

5 cm

93-3444

E.L. 39/89
KARA No.2 REGION
REGIONAL GEOLOGY / SAMPLE LOCATION PLAN

DATE: FEB. 1991 SCALE: 1:5,000

PLAN No. 2

N.W. Coast Computer Aided Drafting Centre. Phone (004 354351)
Fax (004 354495)