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EL 3647

MOUNT JOSEPHINE

ANNUAL AND FINAL REPORTS TO LICENCE EXPIRY/SURRENDER FOR THE PERIOD 6/11/2006 TO 5/11/2010

Submitted by
Copper Range Ltd
2011

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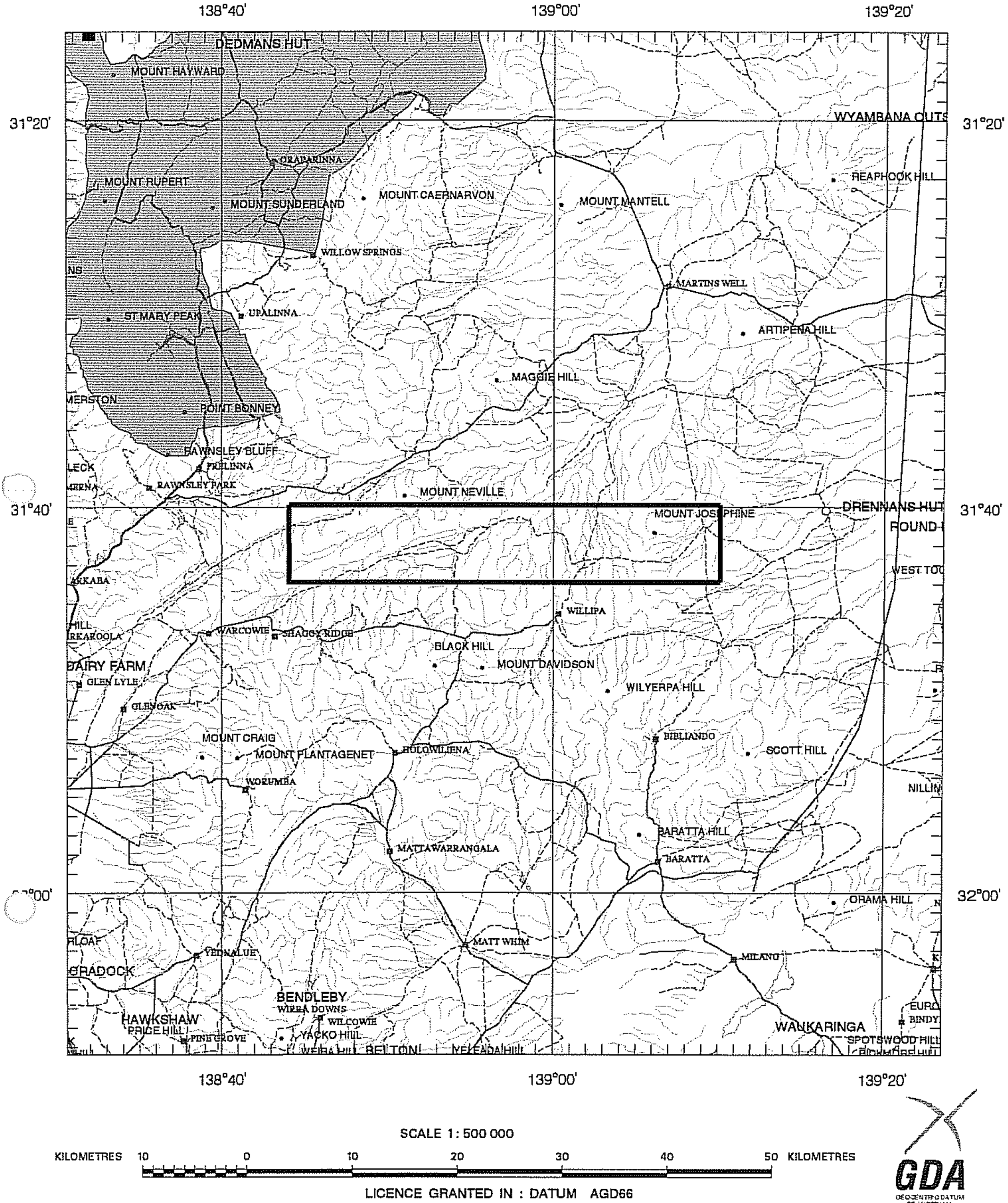
Government of South Australia
Primary Industries and Resources SA

SCHEDULE A



GDA

APPLICANT : **COPPER RANGE (SA) PTY LTD**

FILE REF : **93/06** TYPE : **MINERAL ONLY** AREA : **304** km² (approx.)

1:250000 MAPSHEETS : **PARACHILNA**

LOCALITY : **MOUNT JOSEPHINE AREA - Approximately 140 km northeast of Port Augusta**

DATE GRANTED : **06-Nov-2006** DATE EXPIRED : **05-Nov-2007** EL NO : **3647**

COPPER RANGE (SA) PTY LTD

ANNUAL TECHNICAL REPORT
6th November 2006 to 5TH November 2007

EL 3647 – Mt Josephine

TITLE:	ANNUAL TECHNICAL REPORT FOR EL 3647 – Mt Josephine for the Period Ending 05/11/2007
HOLDER:	COPPER RANGE (SA) Pty Ltd
OPERATOR:	COPPER RANGE (SA) Pty Ltd
1:250,000 SHEET:	Parachilna SH54-13
1:100,000 SHEET:	Wilpena 6634
AUTHOR:	Charlie Seabrook
SUBMITTED BY:	Ian Garsed
DATE:	31/12/2007
KEYWORDS:	Copper, zinc, Mt Neville, ASTER satellite imagery, Cambrian, Hawker Group, Proterozoic, Rawnsley Quartzite, Parachilna Formation
DISTRIBUTION:	1. Copper Range (SA) Pty Ltd, Adelaide Office 2. Copper Range (SA) Pty Ltd, Sydney Office 3. Department of Primary Industries and Resources, South Australia

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SUMMARY

EL 3647 – Mt Josephine lies 40km NW of Hawker in the southern Flinders Ranges (figure 1). The EL was granted to Copper Range (SA) Pty Ltd on 06/11/2006.

Copper Range is targeting large alteration zones within porous sandstone units for sediment-hosted copper sulphide mineralisation. Alteration zones have been identified using ASTER satellite imagery. These zones are interpreted to be the result of basin-wide fluid flow and subsequent alteration of suitable host rocks. Copper-bearing fluids that penetrated along favourable structures that cross cut stratigraphy would have precipitated copper at reducing horizons, onto available organic material or disseminated pyrite.

Initially, four targets were identified along the same horizon, associated with a spectral anomaly that indicated stratabound alteration at the base of the Etina Formation, which is stratigraphically equivalent to the mineralised horizon at Kapunda to the south. These targets are known as Stardrift, Stardrift West, Nantabra and Artelevena (figure 2). An additional target area was identified west of Mt Neville (figure 2) associated with the transition from the oxidised coarse sandstones of the Proterozoic Rawnsley Quartzite (Pound Subgroup) to the reducing carbonates of the Hawker Group limestones. This favourable stratigraphy (the old mine at Kanyaka is also at this location) forms a syncline and is associated with a significant fault that truncates the northern limb of the syncline. A notable ASTER anomaly is also present in this area.

Exploration activities in the Mt Josephine project were initially focussed on the Stardrift, Stardrift West, Nantabra and Artelevena prospects, with more recent exploration focussed on the Mt Neville prospect area.

During the last year (ending 5/11/2007) exploration has included a review of past exploration, reconnaissance visits to prospective sites, interpretation of airborne radiometric and Aster satellite imagery, limited soil geochemical programmes at Stardrift, Stardrift West, Nantabra and Artelevena and a more substantial soil sampling programme at Mt Neville prospect area. Table 1 summarises exploration activities of the past year in the Mt Josephine tenement.

Initial soil and rock chip sampling over the reducing boundary has not shown any anomalous results at Stardrift, Stardrift West, Nantabra and Artelevena. However, at Mt Neville initial samples of float in creeks and outcrop of ironstone yielded anomalous copper and zinc values. This ironstone is probably related to dissolution at the base of the Wirrapowie Limestone. Soil sampling at Mt Neville also showed anomalous results across the siltstone/limestone boundary.

Follow-up soil sampling and mapping was undertaken in the Mt Neville area, with five sample lines extending across the syncline. Results from this sampling are still being reviewed, but some enrichment in copper and zinc is apparent at the base of the Wirrapowie Limestone, which is probably associated with the ironstone. Zinc also shows anomalous values in the Rawnsley Quartzite and in the centre of the syncline over the Mernmerna Limestone.

For the next reporting year follow-up exploration is recommended with further soil sampling in the Mt Neville prospect area to define the extent of anomalous copper and zinc, with possible drilling of any subsequent targets.

Prospect	Aerial, Satellite imagery	Review past exploration	Rock Chip sampling			Soil geochemical sampling	
			no. of samples	elements analysed	petrology analysis	no. of samples	elements analysed
Stardrift	Radiometric, Aster	√	3	All major elements, base metals + Au	-	11	All major elements, base metals + Au
Stardrift West	Radiometric, Aster	√	4	All major elements, base metals + Au	-	6	All major elements, base metals + Au
Artelevena	Radiometric, Aster	√	1	All major elements, base metals + Au	-	9	All major elements, base metals + Au
Nantabra	Radiometric, Aster	√	4	All major elements, base metals + Au	-	10	All major elements, base metals + Au
Mt Neville	Radiometric, Aster	√	10	All major elements, base metals + Au	-	149	Ag, As, Au, Co, Cu, Fe, Mn, Pb, U, Zn

Table 1. Summary of work undertaken in EL 364 during the period 06/11/06 to 05/11/07

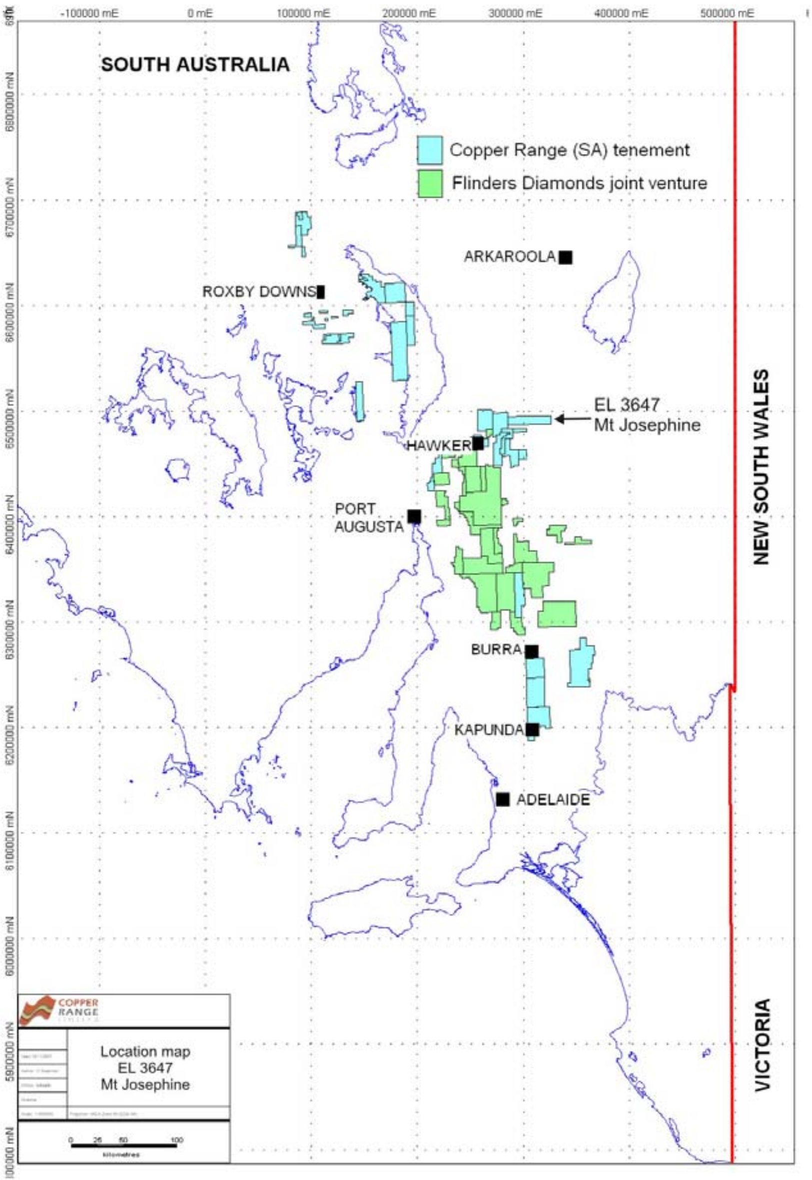

Figure 1. Location of EL 3643 within the current Copper Range (SA) Pty Ltd project areas

1. INTRODUCTION

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement. The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges. Between the ridges (Chace and Druid Ranges) the Parachilna Siltstone and the Wirrapowie and Wilkawilena Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure.

Copper Range took out the tenement to explore for sediment-hosted copper mineralisation associated with basin-scale fluid flow, identified as anomalous alteration zones on ASTER satellite imagery. Copper Range identified several zones of alteration associated with favourable stratigraphy within the Mt Josephine tenement.

The aim of this report is to describe the exploration carried out from the 6th of November 2006 to the 5th of November 2007 and to report the Department of Primary Industries and Resources of South Australia (PIRSA).

2. LOCATION AND ACCESS

The Mt Josephine tenement (EL 3647) is situated in the Southern Flinders Ranges. The tenement lies some 360km north of Adelaide, approximately 40km northeast of the town of Hawker and 20km southeast of Wilpena Pound National Park. The majority of the tenement falls within the property boundaries of WIllipa and Arkepena Stations. Access to the tenement in the east is via the road to Martin’s Well, off the main road to Wilpena Pound and in the west from the Warcowie Road and Willipa Homestead.

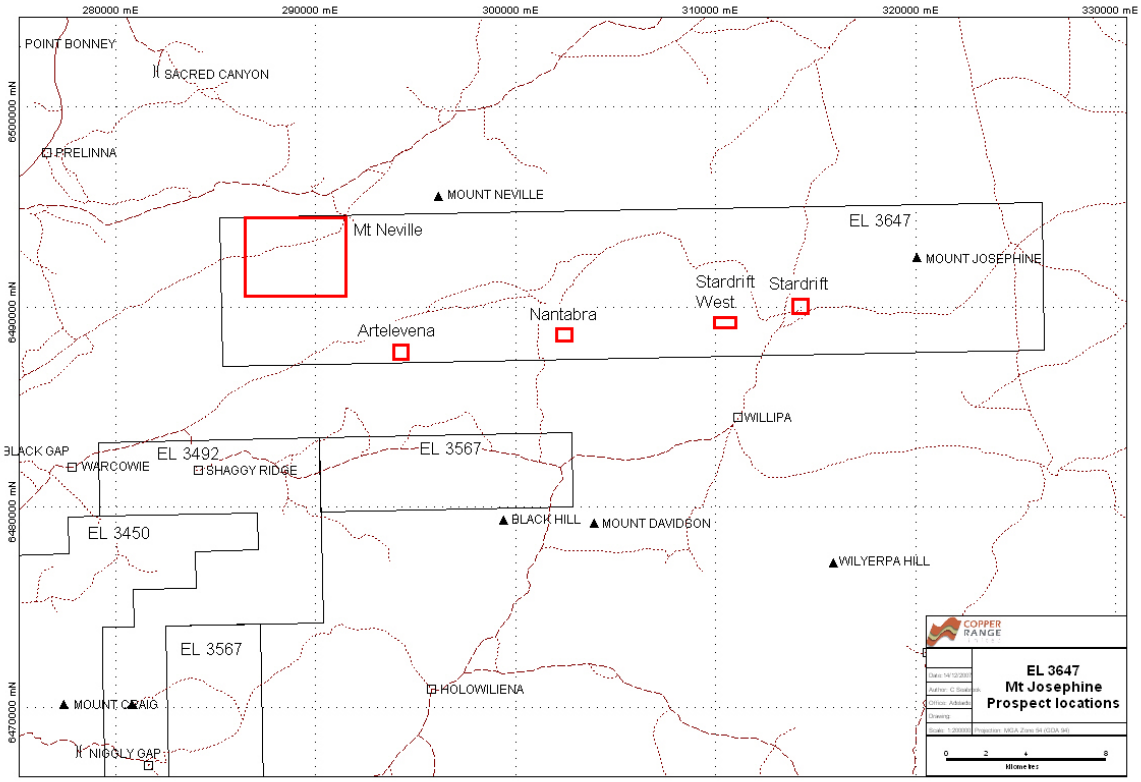

Figure 2. Map showing location of and prospect areas within EL 3643

3. TENURE DETAILS

The Josephine tenement EL 3647 was taken out by Copper Range (SA) Pty Ltd, a wholly-owned South Australian subsidiary of International Base Metals Ltd that was floated on the ASX as an independent company in December 2006. Tenement details are summarised in table 2.

Tenement number	Date granted	Expiry date	Renewal date	Project name	Licensee and operator	Locality	Area km²
EL 3647	06/11/06	05/11/07	05/10/07	Mt Josephine	Copper Range (SA) Pty Ltd	Approximately 40km NW of Hawker	304

Table 2. Summary of tenement details

4. MINING HISTORY AND PREVIOUS EXPLORATION

4.1 Mining

No old mines or working exist within the tenement area. Just outside the eastern boundary of the tenement are some old workings that are marked on maps as an unnamed copper occurrence. However, a visit to this site, where a shaft and some pits have been sunk into ironstone, showed no evidence that copper was mined here. The old shaft at this location is thought to have been dug during the depression years when prospectors were paid by the foot of shaft sunk.

4.2 Past Exploration

Previous exploration in the area has been undertaken for several different commodities, including base metals, gold and diamonds. Table 3 shows a summary of previous Exploration Licences (EL) and Special Mining Leases (SML) that have infringed in some part on the current EL 3643.

Lease	Holder	Start date	End date	Activities
SML 276	SA Barytes Ltd	Mar 1969	Mar 1970	No info available
SML 582	Electrolytic Zinc Co. of Australasia	Nov 1970	Aug1971	Stream sediment sampling
EL 1195	Electrolytic Zinc Co. of Australasia	Dec 1983	Dec 1985	Stream sediment and rock chip sampling for base metal mineralisation in Proterozoic limestone and calcareous rocks
EL 1455	Lynch Mining Ltd	Dec 1987	Aug 1988	BCL stream sediments, channel chip and rock chip sampling for hydrothermal gold in Martin's Well area
EL 1625	CRA Exploration Pty Ltd	Dec 1989	May 1991	Stream sediment, gravel and rock chip sampling for diamonds, copper and gold associated with diapiric structures
EL 2273	Perylia Ltd	Nov 2000	Nov 2001	Regional soil, stream sediment and rock chip sampling
EL 3065	AngloGold Australia	Mar 2003	Mar 2004	No info available

Table 3. Summary of previous work carried out in the Mt Josephine tenement area

1970 – 1971 Electrolytic Zinc Co.

EZ held a Special Mining Lease (SML) over the area and completed a reconnaissance geochemical sampling programme in the region, including the area between the Chace and Druid Ranges and the Arkaba Diapir (not within EL 3647). They sampled the intersections of all creeks draining the Lower Cambrian Limestone units (-20 +80 mesh) and assayed fro Cu, Pb and Zn. They found anomalies associated with copper mineralisation with the Arkaba Diapir, Ochreous clays developed on the Parara Limestone, anomalously high metal values in the Parachilna Formation and sparse galena mineralisation within the Parara Limestone to the south of the Arkaba Diapir. They considered that none of these anomalies constituted substantial mineralisation.

1983 – 1985 Electrolytic Zinc Co.

EZ later took out an exploration licence over the area in search of base metal mineralisation using the Beltana and Ediacara-type models. The took over 1000 stream sediment and over 200 rock chip samples from the Etina Formation, Enorama Shale, Elatina, Nucaleena, Brachina, Trezona and Tapley Hill Formations. These samples were compared to standard samples collected from the Eukaby Mines area. They used multiple linear regression to statistically filter out effects of base metal scavenging by iron and manganese. Follow up sampling showed that anomalous values were mainly due to scavenging or unworthy of further follow up.

1987 – 1988 Lynch Mining Ltd

Lynch Mining explored for fine-grained hydrothermal gold associated with ironstone/siderite veins within NE-trending fault zones northeast of Hawker, in the Martin's Well area. A review of historical gold exploration was undertaken and accompanied by bulk cyanide leach (BCL) stream sediment sampling, channel chip and rock chip sampling as well as geological prospecting.

1989 – 1991 CRA Exploration Pty Ltd

CRA were searching for diamonds and copper, plus gold, rare earth elements, niobium and phosphates associated with diapiric structures in the Arkaba-Worumba area. Stream sediment, gravel and rock chip sampling was undertaken with inspection of historic copper workings located within the diapirs. The results from sampling did not give any encouragement for further testing.

2000 – 2001 Perylia Ltd

As part of Perylia's regional exploration in the Flinders Ranges, they undertook semi-regional soil, stream sediment and rock chip sampling in the Chace/Druid Range area in search of economic base metal deposits. Stream sediment sampling gave a peak result of 1215 ppm Zn, while follow up rock chip sampling gave peak values of 0.78% Zn and 310 ppm Cu. They determined that the style and tenor of observed mineralisation was not appropriate for follow up work.

5. EXPLORATION RATIONALE

Copper Range's initial targets in the Adelaide Fold and Thrust Belt are secondary near-surface oxide copper deposits that are structurally controlled, related to hydrothermal events focused along faults late in the deformational history of the region.

Copper Range is also exploring for epigenetic primary copper sulphides hosted by suitably porous or reactive strata and in dilatant sites adjacent to significant structures that cross cut stratigraphy. With this model in mind multispectral satellite imagery and airborne radiometric data have been used to identify zones of alteration that indicate appropriate stratigraphic horizons and substantial fluid movement. This method has generated targets that are not related to known mineralisation and have thus not generally been explored in the past.

A report was prepared on the tenement area by Copper Range consultant Martin I'Ons and is included here (Appendix 1). This report outlines the specific reasons for tenement application which is based on the occurrence of a spectral anomaly in conjunction with favourable lithology and structures that would have allowed substantial fluid flow.

6. REGIONAL GEOLOGY

Regionally, the area lies within the Adelaide Fold and Thrust Belt, which contains Neoproterozoic to late Cambrian sequences. Rock types recognised within this Precambrian, fault-bounded intracratonic trough are Neoproterozoic in age (1400 to 570 Ma) with terrestrial and marine clastic, chemical and glaciogenic sediments (Preiss 1987). These formations have been deformed and metamorphosed (generally to greenschist facies) by at least two major orogenic episodes: the Proterozoic Adelaide Fold Belt orogenic event and a later Early Palaeozoic Delamerian Orogeny (Preiss 1987). Following uplift caused by these deformations, erosion of the exposed older formations has taken place and younger Palaeozoic and Cainozoic sediments unconformably overly the Adelaidean sequences in places.

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana, Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement (figure 3). The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges (the Chace and Druid Ranges). Talus and scree from the quartzite covers large areas of adjacent sub-cropping Cambrian limestones, which impedes the effectiveness of sampling. Between the ridges, the poorly outcropping Parachilna Formation and the Wirrapowie and Wilkawilena Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure. The published Parachilna 1:250,000 geological map also shows Callana Group rocks outcropping in the core of the syncline.

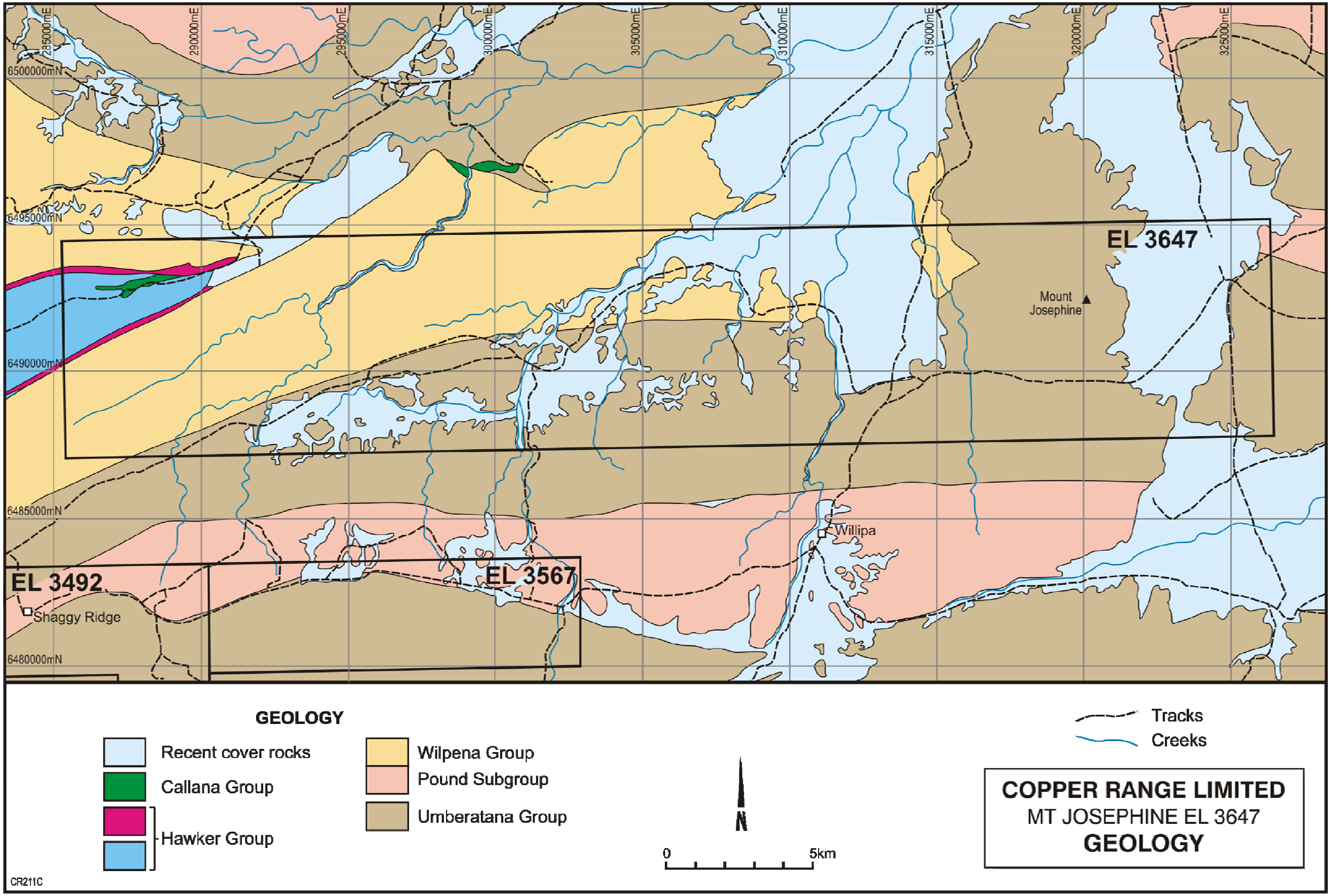

Figure 3. Geology of EL 3647, based on published PIRSA mapping

7. WORK COMPLETED BY COPPER RANGE (SA) PTY LTD

7.1 ACCESS NEGOTIATIONS

The majority of the tenement occurs within the boundaries of Arkapena and Willipa Stations, owned by Stephen Gregory and Dennis Hilder respectively. The landholders have been consulted during each phase of exploration and have been agreeable to all activities.

7.2 GEOLOGY

7.2.1 Stardrift, Stardrift West, Artelevena and Nantabra prospects

The target the Stardrift, Stardrift West, Artelevena and Nantabra prospects was an ASTER spectral anomaly that occurs at the boundary between Sunderland Formation siltstones and Etina Formation Limestone. The base of the Etina Formation in this area is marked by the presence of permeable sandstone horizon and there is abundant gypsum in the soil that appears to be derived from this unit. The initial thought was that the sulphate in the gypsum could have been produced by the weathering of sulphides, but it is probably more likely that it is derived from anhydrite in the sediments. There are also numerous distinctive outcrops of heavily leached, manganiferous sandstones as well as massive ironstone.

The stratigraphy is cut by a very distinctive ENE trending fracture zone, which extends from the Wyacca Mine area to the SW, where copper sulphide mineralisation is present in ENE trending quartz/siderite veins. It is possible that this fracture system could have acted as conduits for mineralisation within the Mt Josephine tenement.

7.2.2 Mt Neville prospect area

The Mt Neville prospect area occurs within a syncline formed by the Late Proterozoic Wilpena Group quartzites, sandstone and shales and the Early Cambrian Hawker Group siltstones and limestones (figure 3), with the Pound Quartzite forming steep ridges on the flanks and limestone the valley floor. Extensive scree and talus derived from the quartzites conceal much of the underlying rocks. The northern limb of the syncline is truncated towards it's fold closure in the NE by a NE trending fault, while the southern limb is thinned by another NE trending fault that appears to have taken advantage of the competency contrast between the quartzite and siltstone. The Parachilna Siltstone (basal Cambrian unit) outcrops poorly at the base of the slope on both sides of the syncline. This unit hosts copper mineralisation at the Kanyaka Mine, along strike to the south west and is thus a target horizon. Field mapping (figure 4) has also shown a zone of ironstone at the base of the Cambrian Limestone that appears to be the result of dissolution at this contact, where is iron, weathered from country rocks, was precipitated in oxidising zones of water flow. This feature is also observed to the southeast in the Kanyaka Syncline area.

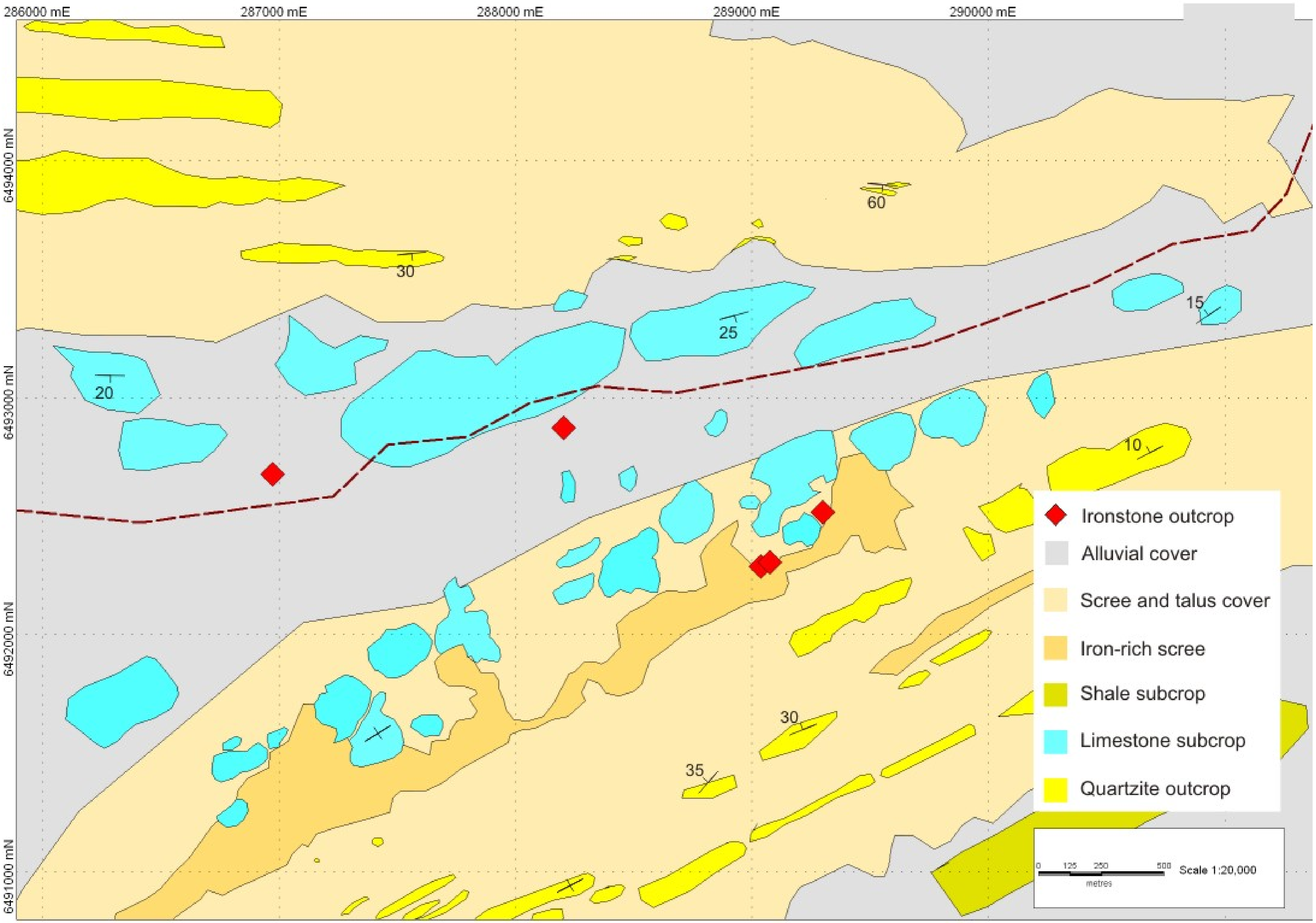

Figure 4. Geological and outcrop map of Mt Neville prospect area

7.3 GEOPHYSICS

7.3.1 Airborne radiometric and Aster satellite image analysis

Copper Range consultant Martin I'Ons used state-wide airborne radiometric data obtained from PIRSA and Aster satellite imagery covering the tenement to target alteration features in the region. His report is included in appendix 1.

The ASTER and modified LSFIT Crippen's Ratio are images, based on digital spectral data collected by the ASTER and Landsat TM satellites, which enhance infrared absorption spectra of clay minerals that are known to be produced by hydrothermal alteration associated with mineral deposits. The techniques were developed by CSIRO and are marketed by Geoimage Pty Ltd of Brisbane.

The ASTER image interpretation has identified alteration associated with a sandstone unit at the base of the Etina Formation which shows up as a yellow zone on the imagery (figure 5).

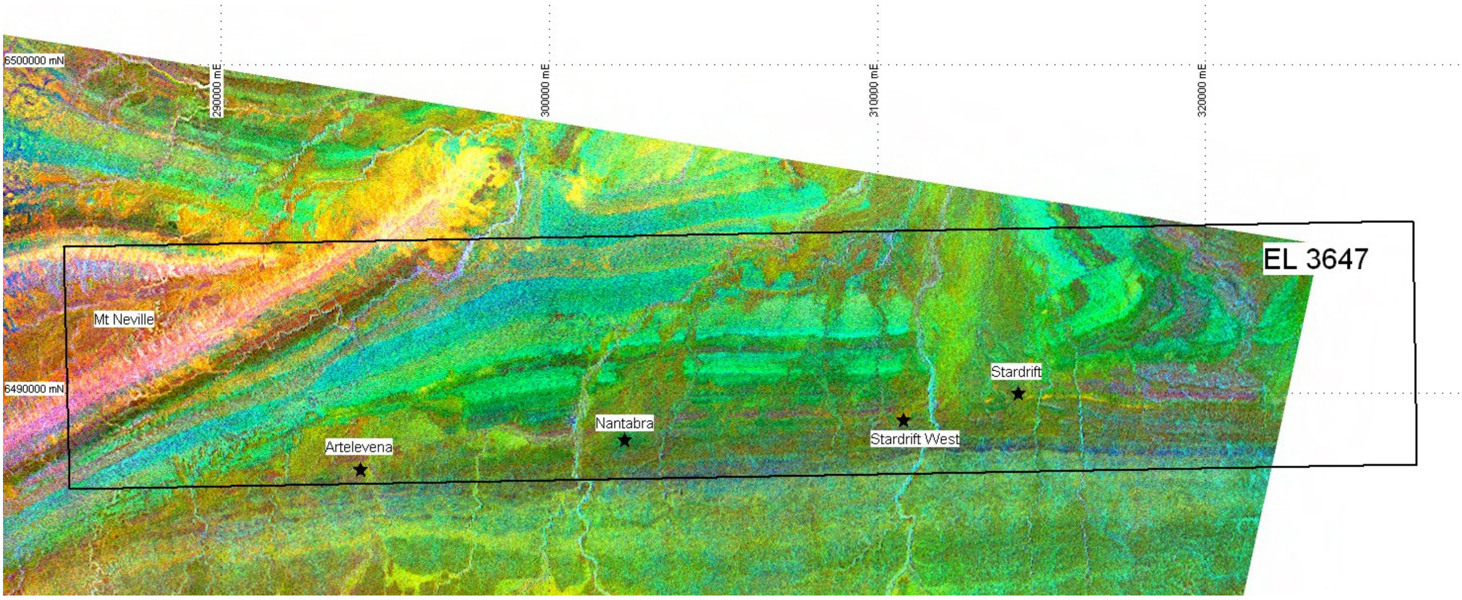

Figure 5. Composite image of ASTER satellite RDB channels

7.4 GEOCHEMISTRY

7.4.1 Rock chip sampling

A total of 22 rock chip samples were collected. All rock chip samples were submitted to ALS (Brisbane) for their ME-MS61 technique, a four acid near-total digestion technique that gives 47 elements (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Ga, Ge, Hf, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, Re, S, Sb, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn, Zr) by HF-HNO3-HClO4 acid digestion, HCl leach and combination of ICPMS and ICPAES. Six of these samples were also submitted for PGM-MS23, which analyses for Au, Pt and Pd. All rock chip sample descriptions, locations and analyses are given in Appendix 2. Figure 6 shows rock chip locations for each prospect area. Figures 7, 8 and 9 show more precise locations and sample numbers for Stardrift and Stardrift West prospects (figure 7), Nantabra and Artelevena prospects (figure 8) and Mt Neville prospect (figure 9).

Rock chip samples at Stardrift, Stardrift West, Nantabra and Artelevena did not yield any anomalous values. At Mt Neville, two anomalous samples were collected. A sample from an altered, iron oxide-bearing outcrop contained 1170 ppm Cu and 3060 ppm Zn. The ironstone at the base of the Cambrian limestone contained 164 ppm Cu and 2,860 ppm Zn.

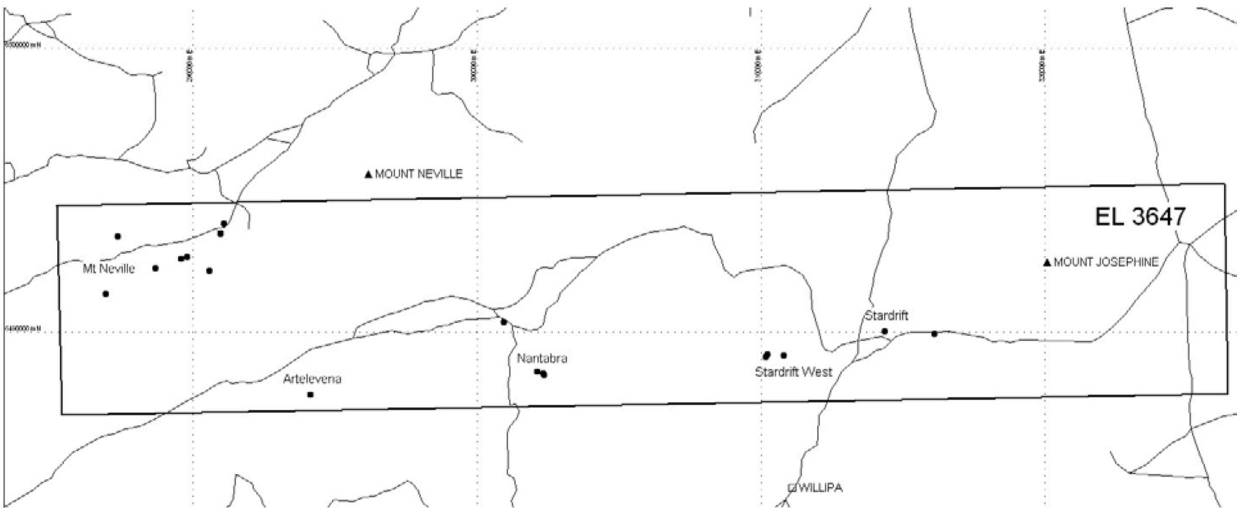

Figure 6. Rock chip sampling locations within EL 3647

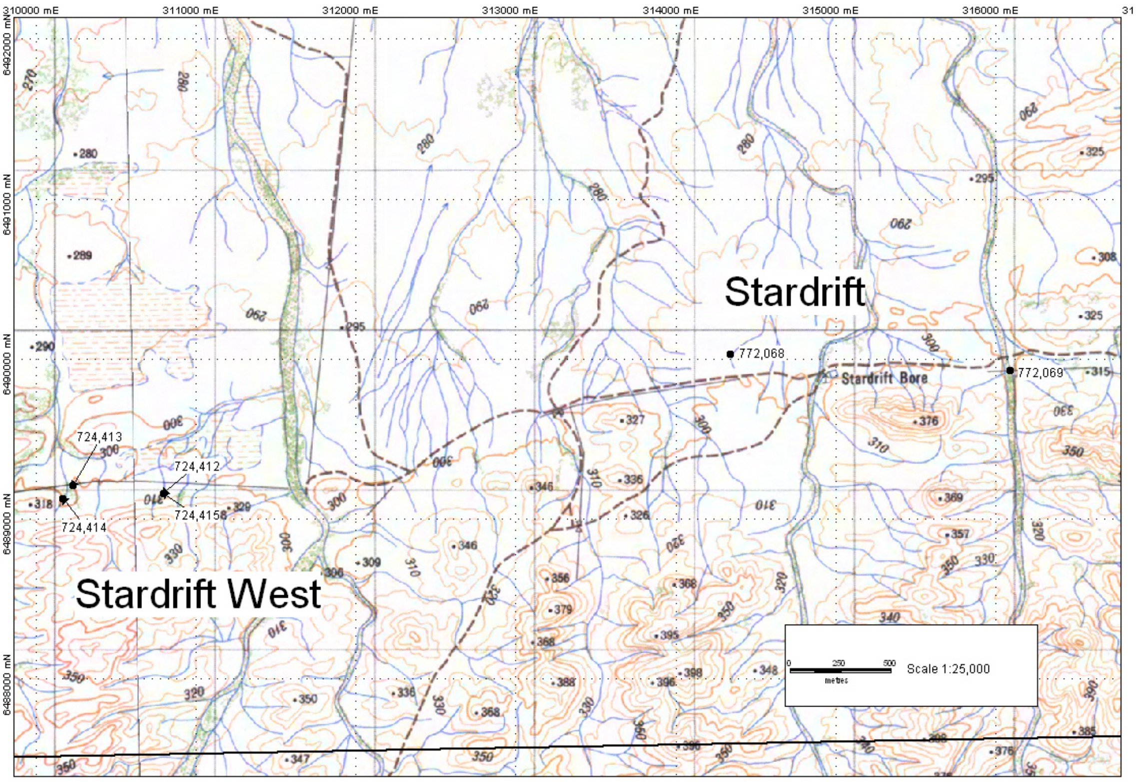

Figure 7. Rock chip sampling locations at Stardrift and Stardrift West prospects

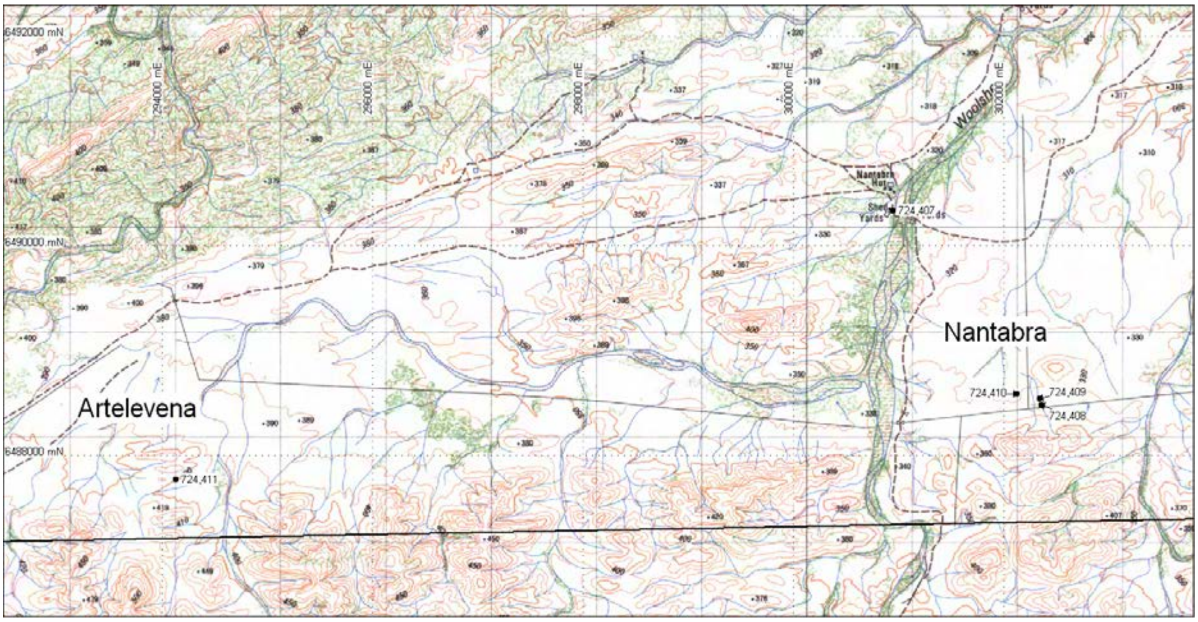

Figure 8. Rock chip sampling locations at Nantabra and Artelevena prospects

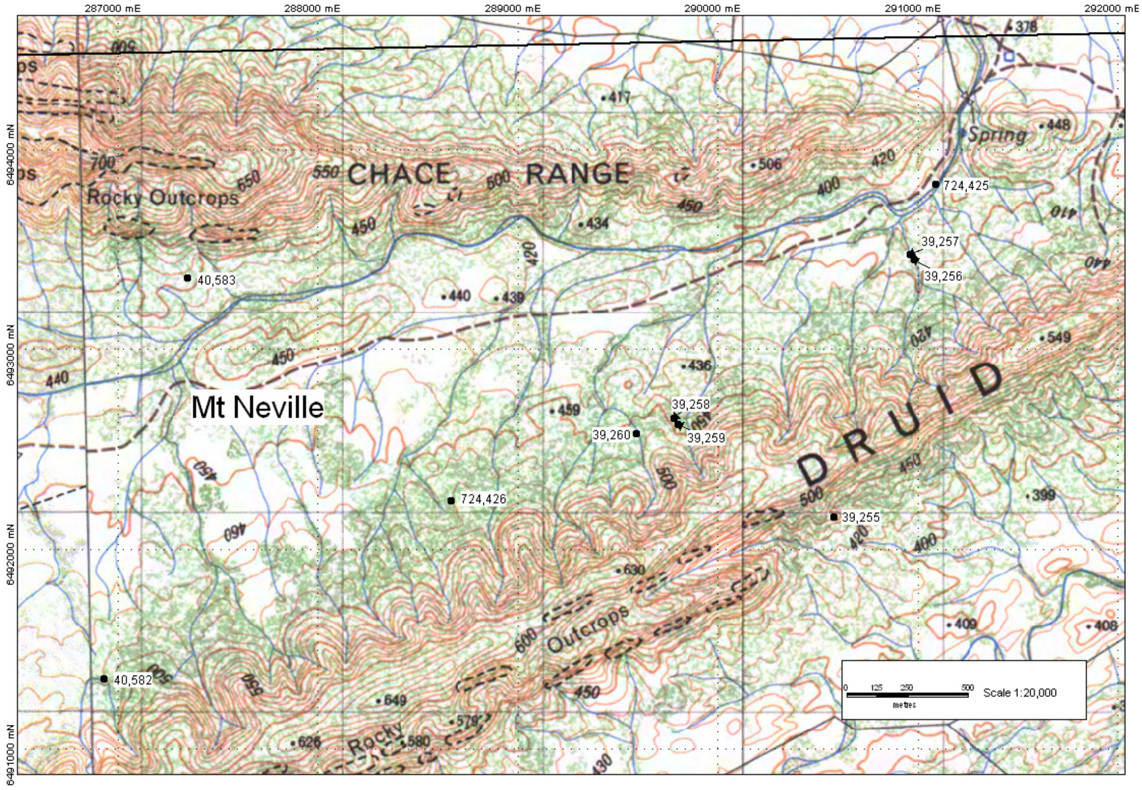

Figure 9. Rock chip sampling locations at Mt Neville prospect

7.4.2 Soil sampling

Limited soil sampling was undertaken in early 2007 at Stardrift, Stardrift West, Nantabra, Artelevena (figures 10, 11 and 12 respectively) and Mt Neville prospects. Sampling at Mt Neville was followed up in late 2007 with a more extensive sampling programme comprising 5 lines of samples at 100 – 200m spacing, several kilometres long (figure 13).

42 soil samples (<6 mm fraction, at 20cm depth where applicable) were submitted to ALS (Brisbane) for their Regoleach technique (ME-MS08), which is a unique weak leach technique that selectively solubilises gold as well as base metals and pathfinder elements, (Ag, As, Au, Ba, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, Hg, K, La, Mg, Mn, Mo, Na, Nb, Ni, Pb, Pt, S, Sb, Se, Sr, Te, Tl, U, W, Zn), followed by ICPMS. Soil samples from the Mt Neville prospect (142 in total) were analysed by ALS for the mobile metal ions (MMI) technique, which analysed for Ag, As, Au, Co, Cu, Fe, Mn, Pb, U and Zn. All soil samples, locations and analyses are given in Appendix 3. Detection limits for each analytical technique are given in Appendix 4.

The soil sampling at Stardrift, Stardrift West, Nantabra and Artelevena was not encouraging. No samples contained anomalous metals. These prospects were not considered to have any more potential.

At Mt Neville, the initial Regoleach soil sampling results were a little more encouraging (figure 13). Three of these samples contained elevated zinc of 761, 210 and 275 ppm. These samples were followed up with MMI sample lines across the syncline in an attempt to locate zinc mineralisation within the limestones and possible copper mineralisation within the quartzites and sandstones, as per the sediment-hosted copper model. This follow up sampling did not show up any significant anomalies. Where anomalous copper and zinc values do occur they are generally associated with enriched ironstone or altered zones within the limestone. There is no real encouragement for copper within the sandstones or quartzites and there does not seem to be any consistency of zinc within the limestones that might have suggested a more substantial mineralised zone.

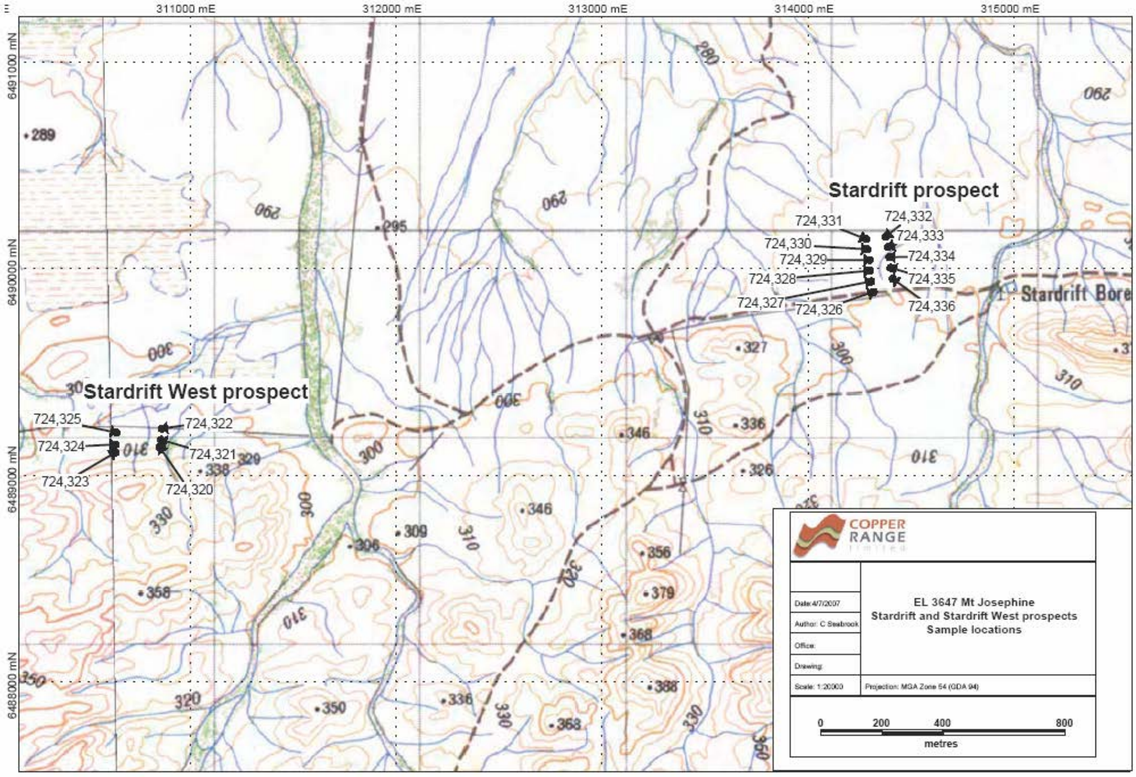

Figure 10. Soil sample locations at Stardrift and Stardrift West prospects (Regoleach technique)

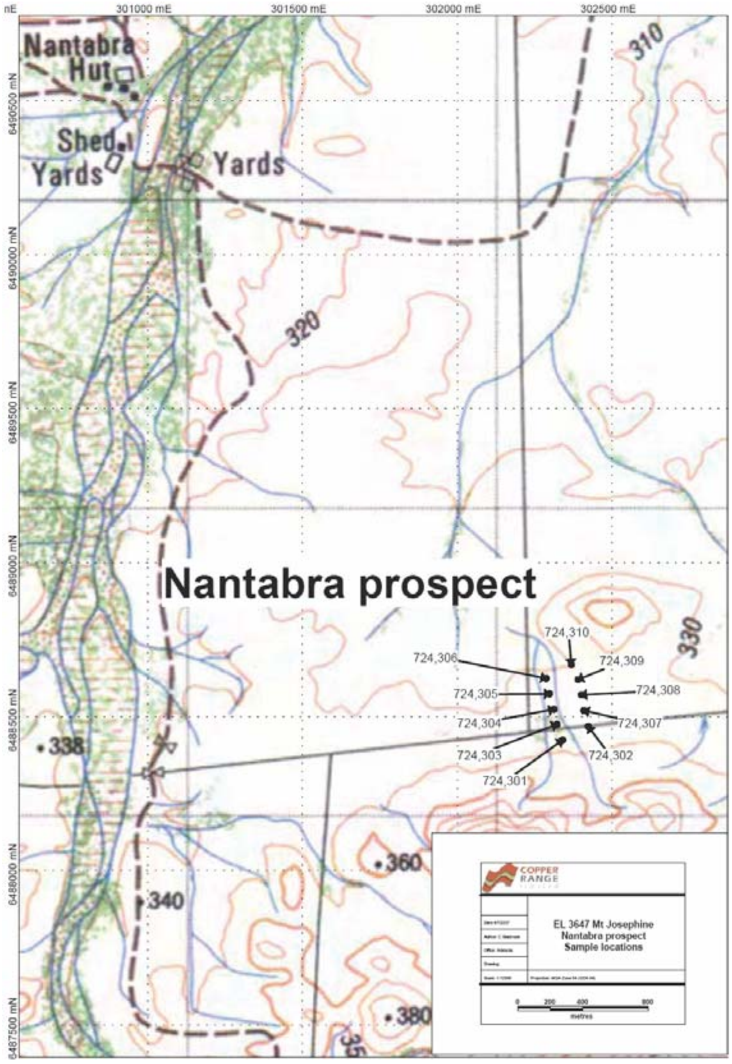

Figure 11. Soil sample locations at Nantabra prospect (Regoleach technique)

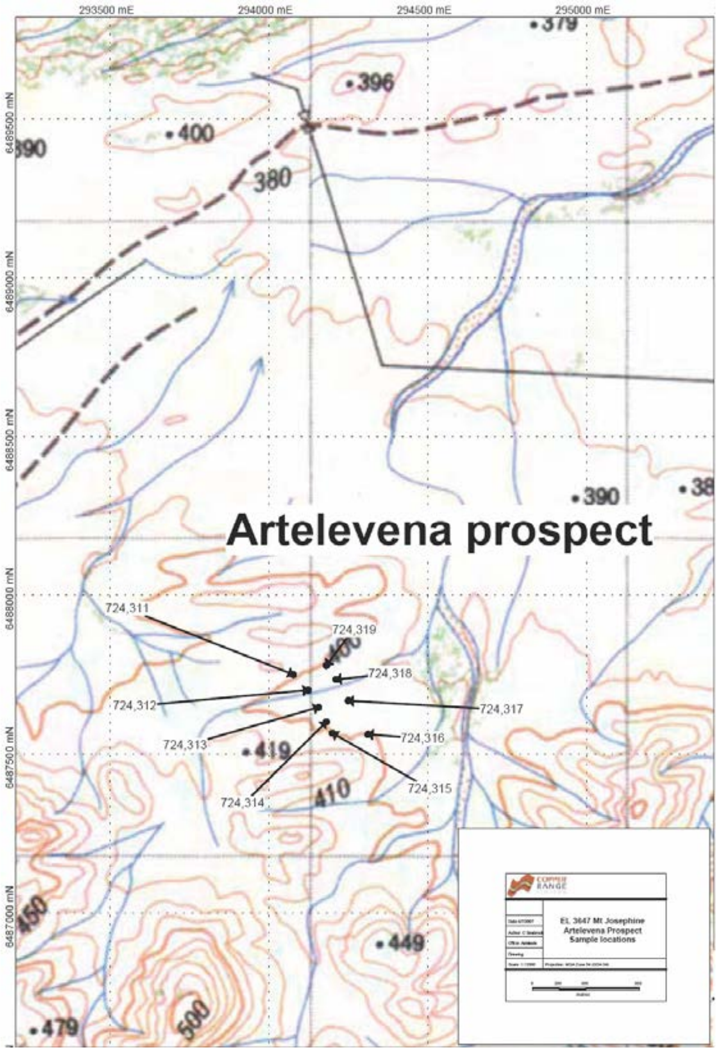

Figure 12. Soil sample locations at Artelevena prospect (Regoleach technique)

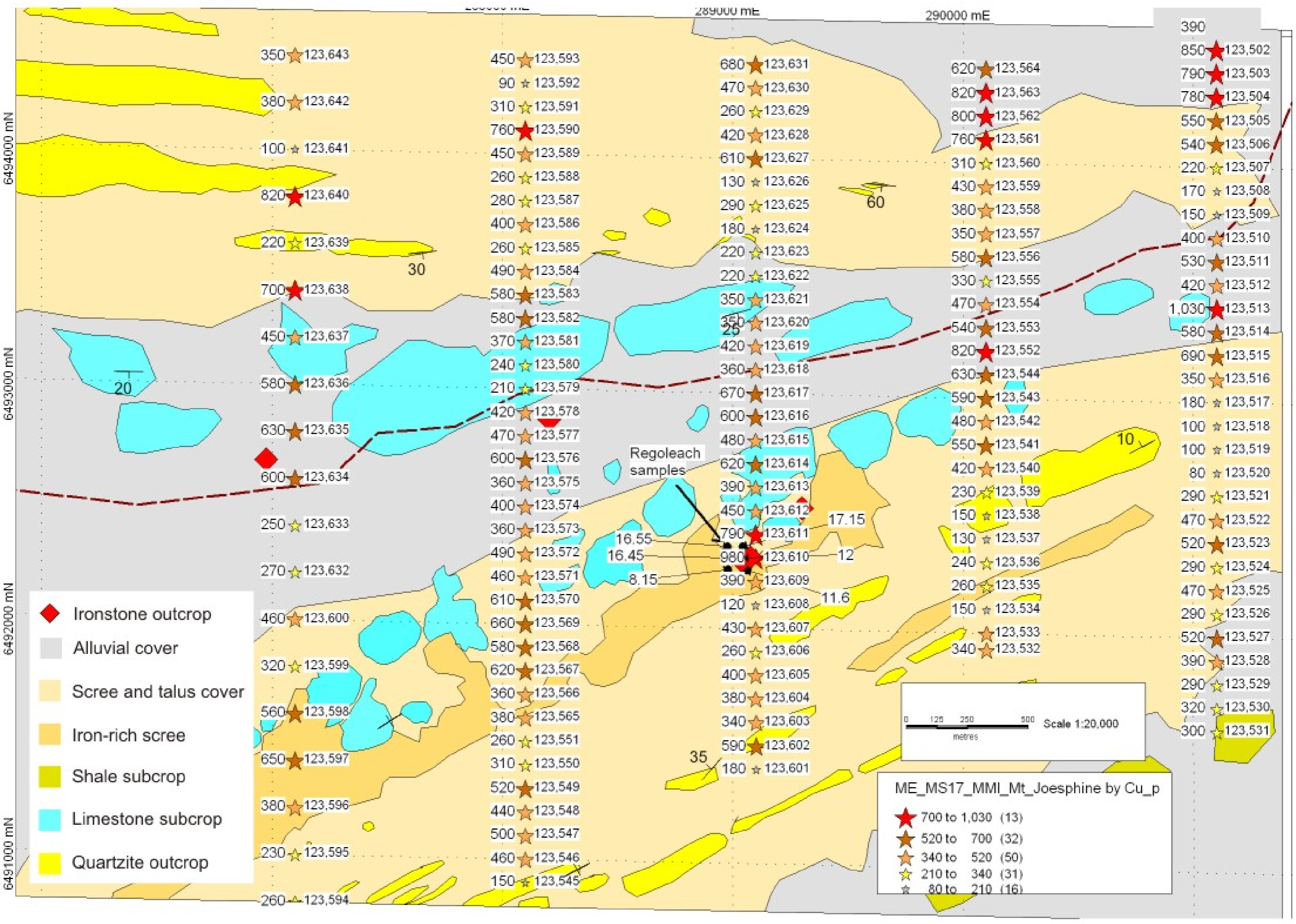

Figure 13. MMI (stars) and Regoleach (dots) soil sample locations at Mt Neville prospect showing ranged copper values in soils, labelled with sample number (right), Cu ppm (left),and geological outcrop map

8. CONCLUSIONS

Several prospects identified in EL 3647 have been tested with rock chip and soil sampling.

At Stardrift, Stardrift West, Nantabra and Artelevena prospects soil sampling failed to identify any anomalous base metals associated with the alteration zone shown on the ASTER imagery. No further work is required at these prospects.

At the Mt Neville prospect area, initial rock chip and limited soil sampling results showed anomalous zinc values. This was followed up by extensive soil sampling lines across stratigraphy and mapping. This sampling did not identify any significant anomalies. Where anomalies do occur, these are thought to be the result of scavenging by iron in alteration zones within the limestone.

It is recommended that no further work is necessary and this tenement should be relinquished.

9. EXPENDITURE STATEMENT

Copper Range (SA) Pty Ltd
Level 4, 72 Pitt Street
Sydney
Mt Josephine 5011
EL 3647

Expenditure Statement

06/11/2006 To 05/11/2007

Job Name	Debit
Wages/Salaries/Consultants/Contractors	$16,441.43
T'mnt - Gov Fees, Rates, Rent	$79.50
T'mnt - Landholder searches	$901.29
T'mnt - Native Title	$265.19
Freight, office supplies, printing,plans/maps	$620.01
Publications	$40.00
Motor Vehicles - Fuel, Hire, Maintenance	$3,637.67
Travel - Accommodation, Meals, Airfares	$5,657.66
Assaying	$2,583.58
Field Supplies, Equipment, Site Office rental/maintenance	$2,123.24
Management Fee - HO Overheads (10%)	$3,234.96
Grand Total:	**$35,584.53**

10. REFERENCES

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APPENDIX 1
Report by Copper Range consultant Martin I'Ons

REPORT ON THE FIELD VISIT TO THE MT JOSEPHINE TENEMENT NORTH EAST OF HAWKER IN 2006

The MT Josephine tenement was initially chosen because of a spectral anomaly on the Astra imagery that indicated a zone of stratabound alteration at the base of the Etina Formation which is stratigraphically equivalent to the mineralised horizon at Kapunda to the south. This alteration zone occurs close to the boundary between two different tectonic regimes where syntectonic fluid fluxes through permeable strata would have been high. An examination of recently available high resolution Google Earth imagery over the area indicated that the spectral anomaly coincided with a strongly leached horizon from which a lot of iron and manganese had been mobilised and precipitated when it encountered more alkaline conditions downstream. The field inspection in the vicinity of Stardrift Bore found that base of the Etina Formation is marked by a permeable sandstone horizon and there is abundant gypsum in the soil derived from this unit. The sulphate in this gypsum could either have been derived from anhydrite in the sediment or the weathering of sulphides. The fact that large amounts of iron have been leached from this unit by acidic groundwater implies that the oxidation of sulphides is the most likely source of the sulphate material. Leached outcrops of manganiferous sandstones as well as some of the massive ironstone precipitate were sampled. Twelve and a half kilometers to the east of Stardrift Bore but within this same unit, a Cu Fe occurrence has been noted on the Parachilna 1:250,000 geological map. This site was investigated in the field but no evidence of copper mineralisation could be found although there were abundant sulphates in the soil at this location too. The old shaft at this location is thought to have been dug during the depression years when prospectors were paid by the foot of shaft sunk. Samples were collected from the shaft to analyse for copper and other base metals, particularly zinc.

The particularly leached zone within the target horizon immediately west of Stardrift Bore also coincides with ENE trending fractures intersecting this horizon. Similar fractures appear to be the conduits for syntectonic copper mineralising fluids at Wyacca and this could be the situation here too. No secondary copper minerals were observed in this area so the geochemical analytical results will determine the prospectivity of the area.

The assay results received do not indicate any copper mineralisation but four samples were anomalous in zinc with values of 184, 112, 1125 and 308 ppm. One sample had higher silver at 1.6 ppm, one was high in arsenic at 178 ppm, one in barium at 1410 ppm, two in cobalt at 90 and 101 ppm, one in nickel at 339 ppm, and one in platinum at 11 ppb. This horizon has given rise to a lot of sulphate in the soils which may be sulphide derived. Zinc sulphate is very soluble and therefore is likely to be leached.

M.E. I'Ons, 2006.

APPENDIX 2
Rock chip sample locations and geochemistry

APPENDIX 2 - ROCK CHIP SAMPLE LOCATIONS AND GEOCHEMISTRY

Sample No.	Prospect	Zone	WGS84 E	WGS84 N	Elevation	Sample type	Field description
772068	Star Drift	54 J	314342	6490031	295	Outcrop	Surface iron boulders - gossanous?
772069	Star Drift	54 J	316092	6489927	302	Outcrop	Manganese veins in sandstone from creek bed
772073	Star Drift	54 J	314342	6490031	295	Outcrop	Gossanous? sandstone
724407	Nantabra	54J	300944	6490338	318	Outcrop	m-c grained porous sandstone associated with gypsur
724408	Nantabra	54J	302357	6488486	343	Outcrop	Coarse crystalline anhydrite
724409	Nantabra	54J	302340	6488543	343	Outcrop	Manganiferous oolitic limestone with silica alteratior
724410	Nantabra	54J	302123	6488592	336	Outcrop	Oolitic limestone with crosscutting sideritic veins
724411	Artelevena	54J	294127	6487780	403	Outcrop	Grey siltstone
724412	Stardrift West	54J	310800	6489161	312	Outcrop	Salty, m-grained yellow sandstone Brown/red spots of sulphide? accretior
724413	Stardrift West	54J	310229	6489214	303	Outcrop	Leached sandstone
724414	Stardrift West	54J	310169	6489129	304	Outcrop	Dolomite with oxidised sulphides?
724415	Stardrift West	54J	310797	6489163	306	Outcrop	Fe -rich vein material + unknown white secondary minera
724425	Mt Neville	54J	291088	6493827	393	Float	Possible gossan, brecciated
724426	Mt Neville	54J	288667	6492245	475	Outcrop	Iron oxide - possible gossan
40582	Mt Neville	54J	286931	6491351	-	Outcrop	White sandstone within red sandstone (reduction along fracture planes)
40583	Mt Neville	54J	287346	6493357	-	Outcrop	Silicified rounded boulder? Outcrop? Of Fe-stained quartzite
39255	Mt Neville	54J	290581	6492163	461	Outcrop	Siltstone, Fe-stained along bedding planes etc
39256	Mt Neville	54J	290984	6493450	401	Float	Ironstone float
39257	Mt Neville	54J	290961	6493476	402	Outcrop	Fe-enriched limestone breccia with hematite along fracture planes
39258	Mt Neville	54J	289779	6492653	446	Outcrop	Ironstone at base of limestone
39259	Mt Neville	54J	289802	6492626	455	Outcrop	Fine-grained white sandstone with silicified, brecciated grey sandstone
39260	Mt Neville	54J	289590	6492577	454	Outcrop	White sandy siltstone

Sample No.	Prospect	Ag ppm	Al %	As ppm	Au ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Fe %	Ga ppm
772068	Star Drift	0.5	1.25	178	-	280	6.08	0.13	0.23	0.12	42.6	90.8	43	0.34	23.5	>50	4.63
772069	Star Drift	0.11	3.21	14.4	-	1410	1.45	0.06	6.72	0.19	42	122	29	0.94	31.6	2.54	9.27
772073	Star Drift	0.46	3.09	17.4	-	120	8.67	0.19	0.74	1.25	93.1	51.9	61	1.34	33.9	39.5	6.96
724407	Nantabra	0.14	4.5	14.3	-	250	0.88	0.13	0.42	0.03	38.2	6.3	79	1.61	25.7	2.29	10.7
724408	Nantabra	0.04	2.02	<5	-	80	0.37	0.07	18.95	<0.02	18.65	1.7	23	0.85	8.9	1.17	4.32
724409	Nantabra	0.04	0.53	6	-	50	0.1	0.07	33.3	0.03	15.1	4.9	8	0.18	4.8	0.38	0.95
724410	Nantabra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724411	Artelevena	0.2	5.3	2.5	-	440	1.9	0.14	8.29	0.06	42.8	3.4	42	2.44	20.3	1.89	10.85
724412	Stardrift West	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724413	Stardrift West	0.1	0.99	<5	-	130	0.46	0.02	32.5	0.18	8.36	1.6	7	0.52	5	0.35	2.07
724414	Stardrift West	0.15	4.63	8	-	440	1.45	0.1	13.15	0.2	58.1	13.2	35	2.17	24.8	2.56	11
724415	Stardrift West	0.19	1.99	30	-	310	8.48	0.06	10.45	0.2	24.3	163	34	0.98	173	33	5.78
724425	Mt Neville	0.2	0.96	425	-	5390	17.3	0.09	16.1	0.06	11.1	19.9	5	3.04	22.7	23.4	5.99
724426	Mt Neville	0.33	0.77	236	-	50	8.24	0.13	4.5	0.53	23.5	320	29	0.77	1170	46.5	4.37
40582	Mt Neville	0.22	1.53	4.8	-	40	0.21	0.28	0.25	<0.02	21	2.1	12	0.51	19.6	0.74	4.74
40583	Mt Neville	0.18	0.17	4.5	-	130	0.81	0.11	0.05	<0.02	5.08	2.9	10	0.07	23.7	1.58	0.91
39255	Mt Neville	0.15	-	19.3	<0.01	-	-	0.27	-	-	-	9.6	36	-	17.1	4.89	-
39256	Mt Neville	0.07	-	184	<0.01	-	-	0.12	-	-	-	17.4	9	-	34.4	9.31	-
39257	Mt Neville	0.09	-	15	<0.01	-	-	0.09	-	-	-	13.9	16	-	19.9	1.24	-
39258	Mt Neville	0.41	-	71.3	<0.01	-	-	0.12	-	-	-	35.1	23	-	164	45.2	-
39259	Mt Neville	0.64	-	8	<0.01	-	-	0.13	-	-	-	1.7	9	-	10.5	1.26	-
39260	Mt Neville	0.22	-	3.5	<0.01	-	-	0.92	-	-	-	2.4	12	-	11.5	0.5	-

APPENDIX 2 - ROCK CHIP SAMPLE LOCATIONS AND GEOCHEMISTRY

Sample No.	Prospect	Ge ppm	Hf ppm	In ppm	K ppm	La ppm	Li ppm	Mg %	Mn ppm	Mo ppm	Na ppm	Nb ppm	Ni ppm	P ppm	Pb ppm	Rb ppm	Re ppm	S %	Sb ppm
772068	Star Drift	1.87	1.1	0.08	0.05	19.8	4.3	0.07	1365	3.78	0.07	2.4	24.4	1220	47.3	3.1	0.002	0.11	0.97
772069	Star Drift	0.12	8.1	0.065	0.43	16.4	21.8	0.25	6410	0.81	0.03	10.6	22.4	260	29.7	22.6	0.002	0.02	0.66
772073	Star Drift	0.96	3.5	0.042	0.49	34.1	10.4	0.22	1960	0.6	0.38	4	48.2	940	23.2	20.8	0.002	0.08	0.82
724407	Nantabra	0.11	6.5	0.03	0.5	18.3	10.6	0.23	104	1.07	0.22	9	12.1	210	5.8	31.8	<0.002	0.03	3.94
724408	Nantabra	0.08	1.5	0.014	0.29	10.1	6.3	0.1	43	1.37	0.04	3.2	7	140	7.9	16.4	<0.002	>10.0	1.12
724409	Nantabra	0.05	0.6	0.027	0.11	6.7	1.3	0.56	319	0.24	0.23	0.9	6.7	140	3.3	5.1	<0.002	0.06	0.6
724410	Nantabra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724411	Artelevena	0.1	5.1	0.033	0.75	20.1	22	0.47	41	0.99	0.5	9.1	27.6	2520	17	40.6	<0.002	0.14	0.69
724412	Stardrift West	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724413	Stardrift West	0.05	0.8	0.006	0.18	3.9	4.6	0.22	44	0.21	0.08	1.7	11.8	730	5	9	<0.002	0.03	0.3
724414	Stardrift West	0.13	4.4	0.04	0.79	28.7	15.4	1.72	247	0.39	0.06	9.1	22.2	490	11.5	45.6	<0.002	0.06	0.61
724415	Stardrift West	0.7	1.8	0.035	0.29	12.5	6.8	0.63	4380	5.26	0.08	2.6	126	5920	9.6	13.9	<0.002	0.05	2.84
724425	Mt Neville	0.28	0.8	0.009	0.49	5.8	4.6	0.38	26300	22.5	0.04	2.4	27.2	2350	26.3	18.1	0.005	0.04	5.21
724426	Mt Neville	0.62	0.8	0.047	0.19	12.1	2.1	0.5	2680	2.95	0.02	3.2	696	1140	22.8	9.1	<0.002	0.07	4.63
40582	Mt Neville	<0.05	4.2	0.017	0.11	13.4	17.3	0.22	93	0.73	0.01	8.3	4	60	19.1	7	<0.002	<0.01	0.32
40583	Mt Neville	<0.05	0.2	0.009	0.02	2.4	4.6	0.02	285	1.11	0.01	2	3	750	4.6	1.2	<0.002	<0.01	0.84
39255	Mt Neville	-	-	-	-	-	-	-	158	1.06	-	-	-	-	22.2	-	-	0.05	-
39256	Mt Neville	-	-	-	-	-	-	-	47300	24.8	-	-	-	-	95.8	-	-	0.03	-
39257	Mt Neville	-	-	-	-	-	-	-	1800	0.78	-	-	-	-	7.8	-	-	0.02	-
39258	Mt Neville	-	-	-	-	-	-	-	783	1.2	-	-	-	-	68.2	-	-	0.04	-
39259	Mt Neville	-	-	-	-	-	-	-	2020	1.69	-	-	-	-	76.4	-	-	0.03	-
39260	Mt Neville	-	-	-	-	-	-	-	188	0.41	-	-	-	-	51.7	-	-	0.01	-

Sample No.	Prospect	Sc ppm	Se ppm	Sn ppm	Sr ppm	Ta ppm	Te ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
772068	Star Drift	-	2	0.5	92.6	0.17	0.14	3.6	0.077	0.04	8.5	114	0.3	18.2	184	38.8
772069	Star Drift	-	<1	1.9	91.3	0.76	<0.05	11.4	0.586	3.52	2.6	80	0.8	19.4	36	290
772073	Star Drift	-	3	1.2	58.6	0.33	0.07	8.5	0.155	0.39	7.1	108	0.6	82.2	308	134
724407	Nantabra	-	<1	1.7	73.6	0.69	<0.05	8.4	0.521	0.17	3.2	113	1.1	25.5	29	225
724408	Nantabra	-	<1	0.7	4900	0.23	<0.05	3.1	0.134	0.07	2	31	0.5	6.8	13	55
724409	Nantabra	-	1	0.2	1080	0.05	<0.05	1.1	0.044	<0.02	0.7	9	0.2	7.2	6	22.3
724410	Nantabra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724411	Artelevena	-	1	1.7	731	0.74	<0.05	8.6	0.473	0.17	3.6	62	0.9	51.7	61	171.5
724412	Stardrift West	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
724413	Stardrift West	-	1	0.4	1195	0.11	<0.05	1.6	0.077	0.02	1.4	13	0.3	19	24	27.8
724414	Stardrift West	-	<1	2.2	586	0.72	<0.05	9.9	0.407	0.22	2.7	81	1.1	20.6	68	151.5
724415	Stardrift West	-	2	0.6	711	0.26	<0.05	2.9	0.096	0.41	29.2	160	0.5	98.9	390	84.6
724425	Mt Neville	-	<1	0.5	209	0.22	<0.05	2.6	0.04	14.05	2	117	4.9	8.1	101	34.2
724426	Mt Neville	-	3	0.4	141.5	0.55	<0.05	8.7	0.039	1.51	14.2	86	0.2	38.9	3060	31.9
40582	Mt Neville	5.6	<1	1.2	24.1	0.63	<0.05	6.5	0.31	0.28	1.5	13	5.3	6.3	13	137.5
40583	Mt Neville	1.2	<1	0.6	12.2	0.05	<0.05	1	0.099	0.13	0.5	5	1.2	2.7	6	11.8
39255	Mt Neville	-	-	-	-	-	-	-	-	-	-	59	-	-	81	-
39256	Mt Neville	-	-	-	-	-	-	-	-	-	-	153	-	-	167	-
39257	Mt Neville	-	-	-	-	-	-	-	-	-	-	40	-	-	56	-
39258	Mt Neville	-	-	-	-	-	-	-	-	-	-	40	-	-	2860	-
39259	Mt Neville	-	-	-	-	-	-	-	-	-	-	32	-	-	23	-
39260	Mt Neville	-	-	-	-	-	-	-	-	-	-	51	-	-	7	-

APPENDIX 2 - ROCK CHIP SAMPLE LOCATIONS AND GEOCHEMISTRY

Sample No.	Prospect	PGM-MS23 Au	PGM-MS23 Pt	PGM-MS23 Pd
772068	Star Drift	0.001	0.0039	0.002
772069	Star Drift	0.001	0.0114	0.002
772073	Star Drift	0.001	0.0014	0.001
724407	Nantabra	-	-	-
724408	Nantabra	-	-	-
724409	Nantabra	-	-	-
724410	Nantabra	-	-	-
724411	Artelevena	-	-	-
724412	Stardrift West	-	-	-
724413	Stardrift West	-	-	-
724414	Stardrift West	-	-	-
724415	Stardrift West	-	-	-
724425	Mt Neville	-	-	-
724426	Mt Neville	-	-	-
40582	Mt Neville	-	-	-
40583	Mt Neville	-	-	-
39255	Mt Neville	-	-	-
39256	Mt Neville	-	-	-
39257	Mt Neville	-	-	-
39258	Mt Neville	-	-	-
39259	Mt Neville	-	-	-
39260	Mt Neville	-	-	-

APPENDIX 3
Soil sample locations and geochemistry

APPENDIX 3 - SOIL SAMPLE LOCATIONS AND GEOCHEMISTRY

REGOLEACH

Sample No.	Prospect	WGS84 E	WGS84 N	Ag ppm	As ppm	Au ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Hg ppm	K ppm	La ppm
724301	Nantabra	302340	6488424	0.02	1.7	<0.001	90	0.084	>50000	0.075	16.9	6.98	6.42	12.95	5560	0.018	978	6.4
724302	Nantabra	302423	6488468	0.031	0.749	0.001	102	0.127	>50000	0.1	20.8	7.02	10.25	12.7	10000	0.025	1700	8.4
724303	Nantabra	302322	6488475	0.036	0.655	0.001	84	0.119	>50000	0.097	17.6	6.76	10.55	11	9970	0.018	1140	6.8
724304	Nantabra	302312	6488524	0.055	0.66	0.001	89	0.139	32500	0.087	20.5	7.05	12.6	12.55	11850	0.019	1390	8.1
724305	Nantabra	302298	6488574	0.034	0.753	0.001	106	0.139	>50000	0.101	22.7	7.98	11.95	14.7	11100	0.02	2030	8.8
724306	Nantabra	302287	6488624	0.029	0.976	0.001	101	0.155	>50000	0.079	22.3	7.51	13.75	17.6	12700	0.025	2090	9.2
724307	Nantabra	302409	6488520	0.03	0.75	0.001	121	0.129	>50000	0.128	22.2	9.2	11.3	12.2	10750	0.019	2010	8.8
724308	Nantabra	302401	6488571	0.026	0.547	0.001	116	0.103	>50000	0.085	18.6	7.51	9.34	13.5	8090	0.026	1540	7.3
724309	Nantabra	302390	6488620	0.029	1.14	0.001	130	0.093	>50000	0.074	18.8	7.04	8.96	14.05	7250	0.02	1250	7.7
724310	Nantabra	302368	6488670	0.034	0.569	0.001	183	0.12	>50000	0.12	21.7	10.7	11.1	15.6	10050	0.022	2200	8.7
724311	Artelevena	294076	6487750	0.022	1.2	0.001	119	0.055	>50000	0.105	18.6	5.94	4.75	11.9	3610	0.028	1610	7.2
724312	Artelevena	294123	6487701	0.031	0.929	0.001	97	0.134	47400	0.063	23.8	7.73	12.6	14.8	11650	0.025	2230	8.3
724313	Artelevena	294156	6487647	0.048	0.652	0.001	80	0.176	5850	0.036	28.6	9.61	21.4	13.95	19150	0.024	2110	11.3
724314	Artelevena	294180	6487601	0.047	0.772	0.001	131	0.192	5480	0.036	26.5	8.36	22	14.45	20600	0.039	1920	11
724315	Artelevena	294199	6487566	0.043	0.493	<0.001	77	0.146	33500	0.041	25.2	7.31	12.85	13.85	11950	0.032	1510	9.4
724316	Artelevena	294311	6487562	0.045	0.575	0.001	101	0.119	>50000	0.061	21.7	8.23	11.4	13.1	10300	0.021	1270	8.1
724317	Artelevena	294249	6487668	0.055	0.774	<0.001	70	0.197	8470	0.031	30.5	10.2	22.2	15.25	19250	0.032	2680	12.6
724318	Artelevena	294210	6487734	0.023	1.085	<0.001	146	0.208	9190	0.038	25.1	8.74	17.5	15.85	16300	0.028	1850	10.9
724319	Artelevena	294180	6487778	0.022	2.9	0.001	85	0.059	>50000	0.067	17.4	5.94	4.81	13.55	3600	0.031	1090	6
724320	Stardrift West	310852	6489137	0.015	0.493	0.001	273	0.046	>50000	0.03	7.8	6.47	7.9	10.45	5530	0.03	659	3.2
724321	Stardrift West	310860	6489172	0.097	0.251	0.001	33	0.075	34200	0.095	7.8	79.1	2.98	33.6	14600	0.027	302	0.9
724322	Stardrift West	310864	6489226	0.04	<0.005	<0.001	274	0.066	36400	0.067	9.9	44	5.29	8.64	6250	0.014	610	3
724323	Stardrift West	310640	6489111	0.03	<0.005	<0.001	118	0.078	>50000	0.088	18.8	6.47	7.41	11.4	6420	0.029	951	7.6
724324	Stardrift West	310639	6489149	0.05	0.028	<0.001	119	0.107	>50000	0.117	20.2	8.55	8.94	10.6	8830	0.022	1610	8.2
724325	Stardrift West	310643	6489206	0.021	<0.005	<0.001	222	0.087	>50000	0.115	17	21.5	6.78	7.99	7270	0.012	855	6.4
724326	Stardrift	314318	6489888	0.028	1.14	0.002	193	0.083	>50000	0.063	15.7	8.73	7.56	13.05	6190	0.022	1030	6.6
724327	Stardrift	314305	6489938	0.022	2.7	0.002	169	0.052	>50000	0.072	13	4.93	5.55	12.2	3600	0.013	914	5.3
724328	Stardrift	314298	6489990	0.018	0.465	0.001	127	0.088	>50000	0.084	16.7	5.97	7.93	12.6	6600	0.027	998	6.9
724329	Stardrift	314298	6490042	0.013	0.492	0.001	110	0.097	>50000	0.08	15.8	6.03	8.31	13	7160	0.015	940	6.2
724330	Stardrift	314286	6490094	0.03	0.557	0.001	118	0.1	>50000	0.091	16.3	5.43	9.19	15.1	7960	0.027	1220	7
724331	Stardrift	314280	6490143	0.019	1.5	0.001	144	0.042	>50000	0.108	13.4	4.85	3.35	11.8	2030	0.046	912	5.2
724332	Stardrift	314376	6490155	0.009	4.3	0.003	259	0.056	>50000	0.069	15.7	5.51	5.09	11.2	3860	0.028	708	6.1
724333	Stardrift	314388	6490104	0.041	0.359	<0.001	353	0.105	26000	0.096	45.9	34.4	7.96	11.75	8700	0.018	1030	6.8
724334	Stardrift	314394	6490055	0.016	0.375	0.001	95	0.089	40100	0.031	12.9	5.09	8.83	7.65	8360	0.006	624	4.8
724335	Stardrift	314400	6490004	0.035	0.822	0.001	112	0.112	15550	0.036	17.1	7.55	11.55	10.3	10400	0.019	1320	6.5
724336	Stardrift	314411	6489951	0.05	1.625	0.001	84	0.099	42900	0.052	10.9	4.17	10.15	9.09	7110	0.013	706	4.1
724355	Mt Neville	289044	6492349	0.039	0.453	0.001	433	0.092	3140	2.74	22.7	23.8	8.52	17.15	11650	0.029	950	8.5
724356	Mt Neville	289048	6492300	0.056	0.379	0.001	141	0.091	9670	0.691	20	11.4	8.86	12	10200	0.033	1040	7.7
724357	Mt Neville	289061	6492249	0.037	0.094	0.001	134	0.056	>50000	0.057	12.3	2.79	5.62	11.6	4210	0.039	914	5.2
724358	Mt Neville	288979	6492250	0.027	0.437	<0.001	75	0.087	23600	0.056	16.2	3.6	8.18	8.15	7210	0.034	1110	6.9
724359	Mt Neville	288977	6492299	0.046	0.377	0.001	78	0.107	38800	0.557	22.8	5.01	9.57	16.45	8230	0.044	1490	8.9
724360	Mt Neville	288976	6492346	0.067	0.481	<0.001	316	0.099	2810	1.835	26.9	25.6	10.65	16.55	12250	0.041	673	9.2

REGOLEACH

Sample No.	Prospect	Mg %	Mn ppm	Mo ppm	Na ppm	Nb ppm	Ni ppm	Pb ppm	Pt ppm	S %	Sb ppm	Se ppm	Sr ppm	Te ppm	Tl ppm	U ppm	W ppm	Zn ppm
724301	Nantabra	4370	263	0.01	1520	0.08	7.24	7.84	0.002	342	0.005	0.951	238	0.017	0.022	0.15	<0.005	13.85
724302	Nantabra	4910	464	0.02	1780	0.06	9.13	10.5	0.002	210	0.005	0.887	128	0.02	0.032	0.28	<0.005	27.6
724303	Nantabra	5480	477	0.02	76	0.04	8.26	10.45	0.001	141	0.005	0.72	118	0.017	0.026	0.17	<0.005	28.1
724304	Nantabra	6110	507	0.02	3940	0.06	9.8	10.3	0.001	457	<0.005	0.826	80	0.02	0.032	0.18	0.005	29.9
724305	Nantabra	7050	424	0.01	5710	0.06	11.1	10.65	0.001	615	<0.005	0.938	131	0.024	0.035	0.46	0.005	28.7
724306	Nantabra	7710	386	0.01	6430	0.05	11.05	10.55	0.001	801	<0.005	0.968	114	0.023	0.041	0.23	0.005	29.5
724307	Nantabra	5910	555	0.02	583	0.07	11.15	11.3	0.002	284	0.005	1.235	135	0.018	0.039	0.52	0.025	32.7
724308	Nantabra	6430	278	0.01	4970	0.07	9.51	8	0.001	855	<0.005	1.03	207	0.02	0.03	0.4	0.011	21.3
724309	Nantabra	6520	268	0.01	4420	0.07	8.48	8.26	0.002	1100	<0.005	1.035	195	0.02	0.03	0.42	0.01	19.3
724310	Nantabra	6020	563	0.01	2010	0.06	13	9.53	0.001	262	<0.005	0.925	152	0.02	0.056	0.26	0.01	31.7
724311	Artelevena	2510	353	<0.01	149	0.1	6.69	5.22	0.001	473	0.005	1.06	256	0.018	0.032	0.16	0.009	13.35
724312	Artelevena	4620	401	0.01	130	0.04	11.5	9.44	0.001	152	<0.005	0.689	100	0.025	0.04	0.11	0.005	23.4
724313	Artelevena	5390	429	0.01	2410	0.02	13.2	10.8	0.001	111	<0.005	0.698	66	0.032	0.045	0.19	<0.005	24.4
724314	Artelevena	5350	383	0.01	317	0.02	13.2	11.65	0.001	56	<0.005	0.594	38	0.032	0.048	0.19	<0.005	22.7
724315	Artelevena	5300	351	0.01	454	0.03	10.25	9.98	0.001	115	<0.005	0.692	65	0.023	0.03	0.09	<0.005	21.6
724316	Artelevena	5400	379	0.01	166	0.06	9.43	15.75	0.002	177	<0.005	0.775	125	0.021	0.027	0.15	0.006	22.3
724317	Artelevena	6450	442	0.01	3740	0.02	15.4	12.3	0.001	142	<0.005	0.722	80	0.036	0.051	0.13	<0.005	27.1
724318	Artelevena	5800	404	0.01	253	0.01	15.8	11.65	0.001	59	<0.005	0.623	43	0.031	0.045	0.11	<0.005	23.9
724319	Artelevena	2260	240	<0.01	117	0.09	5.9	5.18	0.001	386	<0.005	0.982	122	0.019	0.023	0.18	0.005	11.45
724320	Stardrift West	6990	153	0.03	1940	0.06	6.36	3.61	0.001	578	0.005	1.16	455	0.012	0.028	0.51	<0.005	12.9
724321	Stardrift West	3380	2770	0.29	6430	0.02	64.7	12.1	0.003	4290	0.022	0.869	244	0.026	0.701	2.68	0.01	140
724322	Stardrift West	4100	1450	0.04	1680	0.03	16.25	11.45	0.001	484	<0.005	0.621	145	0.012	0.529	0.61	0.005	21.2
724323	Stardrift West	4060	294	<0.01	212	0.08	8.03	6.31	0.001	260	<0.005	0.975	372	0.016	0.103	0.33	0.007	18.25
724324	Stardrift West	4930	600	0.01	324	0.05	8.96	8.62	0.001	245	<0.005	0.816	224	0.017	0.088	0.2	0.007	25.5
724325	Stardrift West	5000	1600	0.02	2080	0.05	12.75	11.85	0.001	615	0.005	0.72	263	0.016	0.246	0.92	0.005	22.6
724326	Stardrift	5010	234	0.01	2710	0.09	8.1	8.16	0.001	486	0.006	0.907	260	0.021	0.038	0.22	0.007	16.75
724327	Stardrift	5220	147	<0.01	2650	0.09	5.68	6.7	0.002	567	0.005	1.085	346	0.016	0.027	0.29	0.005	12.8
724328	Stardrift	5610	257	<0.01	6050	0.07	8.44	8.63	0.001	384	<0.005	0.864	189	0.019	0.027	0.18	<0.005	17.5
724329	Stardrift	5670	251	0.01	2970	0.07	9.6	8.24	0.001	641	<0.005	0.794	151	0.019	0.025	0.2	<0.005	18.6
724330	Stardrift	6200	236	0.01	3710	0.08	8.99	7.82	0.001	730	<0.005	0.986	210	0.022	0.024	0.18	0.005	20.7
724331	Stardrift	3130	236	<0.01	241	0.1	5.91	5.04	0.001	475	0.005	0.995	344	0.017	0.019	0.19	0.006	9.72
724332	Stardrift	3160	196	<0.01	174	0.09	6.77	6.82	0.001	331	0.006	0.896	262	0.018	0.017	0.3	<0.005	10.45
724333	Stardrift	4490	1750	0.03	1230	0.04	28.2	15.15	0.002	179	0.006	0.666	101	0.018	0.552	0.28	0.005	32.9
724334	Stardrift	5950	266	0.02	5910	0.04	6.41	8.4	0.001	621	0.007	0.561	168	0.02	0.091	1.14	<0.005	14.2
724335	Stardrift	8410	387	0.05	5120	0.02	8.96	9.04	0.001	639	0.005	0.808	96	0.024	0.079	0.47	<0.005	22
724336	Stardrift	4590	183	0.02	676	0.06	7.41	8.71	0.002	320	0.008	0.659	120	0.018	0.032	0.35	<0.005	15.75
724355	Mt Neville	1200	>10000	0.04	151	0.02	18.7	21.7	0.001	35	0.005	0.285	108	0.02	0.29	0.91	<0.005	761
724356	Mt Neville	1520	3940	0.03	157	0.04	9.18	13.5	0.001	115	0.006	0.424	62	0.02	0.178	0.45	0.009	210
724357	Mt Neville	2790	104	<0.01	158	0.09	5.18	6.2	0.001	256	0.012	0.88	228	0.016	0.051	0.36	0.01	8.11
724358	Mt Neville	2830	136	0.01	421	0.07	5.57	7.41	0.001	217	0.005	0.497	88	0.019	0.032	0.18	0.005	10.05
724359	Mt Neville	4590	593	0.01	684	0.06	8.84	12.1	0.001	183	0.005	0.69	124	0.024	0.046	0.42	0.011	59.8
724360	Mt Neville	1770	7840	0.06	325	0.01	15.75	15.6	0.001	56	<0.005	0.323	77	0.023	0.218	0.54	0.007	275

APPENDIX 3 - SOIL SAMPLE LOCATIONS AND GEOCHEMISTRY

MMI

Sample number	WGS84E	WGS84N	Comments	Ag ppb	As ppb	Au ppb	Co ppb	Cu ppb
123501	291,100	6,494,600		2.8	1	0.3	142	390
123502	291,100	6,494,500		4.8	2	0.4	543	850
123503	291,100	6,494,400		5.8	2	0.8	317	790
123504	291,100	6,494,300		11.5	6	0.2	437	780
123505	291,100	6,494,200	Outcrop	4.7	2	0.3	308	550
123506	291,100	6,494,100	Rocky outcrop	5.2	3	0.4	768	540
123507	291,100	6,494,000		2.6	<1	0.7	41.1	220
123508	291,100	6,493,900	Disturbed ground	2.4	<1	0.4	16	170
123509	291,100	6,493,800	Creek bed	2.1	1	0.1	63.2	150
123510	291,100	6,493,700		11.8	8	0.5	60	400
123511	291,100	6,493,600		5.1	1	0.2	163.5	530
123512	291,100	6,493,500		5.8	1	0.1	63.6	420
123513	291,100	6,493,400		19.7	5	0.2	281	1030
123514	291,100	6,493,300		4.7	2	0.1	144	580
123515	291,100	6,493,200		6.7	10	0.8	96.2	690
123516	291,100	6,493,100		2.7	3	0.5	413	350
123517	291,100	6,493,000	Mountain side	1.9	<1	0.7	126	180
123518	291,100	6,492,900	Mountain side	1	1	0.2	209	100
123519	291,100	6,492,800	Mountain side	2.2	<1	0.1	164	100
123520	291,100	6,492,700	Mountain peak	1.8	2	0.2	157	80
123521	291,100	6,492,600	Mountain side	4.6	2	0.1	160.5	290
123522	291,100	6,492,500	Mountain side	6.4	<1	0.2	207	470
123523	291,100	6,492,400	Mountain side	5.4	3	0.2	186	520
123524	291,100	6,492,300		3	<1	0.2	281	290
123525	291,100	6,492,200		3.9	1	0.6	365	470
123526	291,100	6,492,100		2.4	1	0.3	211	290
123527	291,100	6,492,000		4	<1	0.1	166.5	520
123528	291,100	6,491,900		4.1	<1	0.3	113.5	390
123529	291,100	6,491,800		5.9	5	0.2	176	290
123530	291,100	6,491,700		6.9	3	0.1	141	320
123531	291,100	6,491,600		5.3	4	0.1	191.5	300
123532	290,100	6,491,930	Cliff face	4.2	3	0.1	272	340
123533	290,100	6,492,000	Mountain side	3.3	5	0.4	150	410
123534	290,100	6,492,100	Mountain side	1.9	5	<0.1	41.8	150
123535	290,100	6,492,200	Mountain side	2	<1	0.2	214	260
123536	290,100	6,492,300	Mountain side	3.2	1	0.1	214	240
123537	290,100	6,492,400	Mountain side	1.1	11	0.4	28.9	130
123538	290,100	6,492,500	Mountain side	2.3	1	0.3	78.9	150
123539	290,100	6,492,600	Mountain side	4.3	4	0.8	176.5	230
123540	290,100	6,492,700	Mountain side	6.8	2	0.2	393	420
123541	290,100	6,492,800		4.7	5	0.1	310	550
123542	290,100	6,492,900		8.2	<1	0.1	304	480
123543	290,100	6,493,000		7.9	1	0.1	141	590
123544	290,100	6,493,100		9.8	6	0.2	194.5	630
123545	288,100	6,490,900	Mountain side	2.7	<1	<0.1	52.1	150
123546	288,100	6,491,000	Mountain side	3.3	2	0.1	109	460
123547	288,100	6,491,100	Mountain side	2.4	1	0.1	289	500
123548	288,100	6,491,200	Mountain side	3.5	1	0.1	282	440
123549	288,100	6,491,300	Mountain side	3.7	1	0.3	400	520
123550	288,100	6,491,400	Mountain side	2.5	2	0.2	263	310
123551	288,100	6,491,500	Mountain side	3.9	1	0.4	213	260
123552	290,100	6,493,200		13.9	4	0.3	285	820
123553	290,100	6,493,300		14.8	3	0.6	284	540
123554	290,100	6,493,400		5.2	3	0.3	128	470
123555	290,100	6,493,500	Creek bed	2.8	3	<0.1	170	330
123556	290,100	6,493,600		49.9	18	0.2	106.5	580
123557	290,100	6,493,700	Mountain side	2.1	1	0.1	114	350
123558	290,100	6,493,800	Mountain side	2.2	2	0.2	214	380
123559	290,100	6,493,900	Mountain side	3.6	3	0.5	429	430
123560	290,100	6,494,000	Mountain side	2.7	3	0.2	243	310
123561	290,100	6,494,100	Mountain side	5.1	3	0.1	267	760
123562	290,100	6,494,200		4.3	1	0.1	208	800
123563	290,100	6,494,300		3.4	4	0.3	369	820
123564	290,100	6,494,400		3.8	4	0.5	278	620
123565	288,100	6,491,600	Mountain side	4.3	1	0.9	313	380
123566	288,100	6,491,700	Creek bed	3	1	0.1	317	360
123567	288,100	6,491,800		8.9	3	0.3	218	620
123568	288,100	6,491,900		7	2	0.2	207	580
123569	288,100	6,492,000		7	4	0.7	307	660
123570	288,100	6,492,100		5.1	7	0.4	202	610
123571	288,100	6,492,200		7.9	1	0.1	142	460
123572	288,100	6,492,300		2.5	20	0.5	101	490
123573	288,100	6,492,400		4.6	1	0.6	209	360
123574	288,100	6,492,500		6.3	14	0.4	244	400
123575	288,100	6,492,600		3.6	1	0.3	249	360
123576	288,100	6,492,700		5.6	7	0.4	129	600

APPENDIX 3 - SOIL SAMPLE LOCATIONS AND GEOCHEMISTRY

MMI

Sample number	WGS84E	WGS84N	Comments	Ag ppb	As ppb	Au ppb	Co ppb	Cu ppb
123577	288,100	6,492,800		9.7	6	1.1	72.5	470
123578	288,100	6,492,900		8.2	2	0.5	78.9	420
123579	288,100	6,493,000		3	2	0.2	183	210
123580	288,100	6,493,100		4.3	1	0.1	147.5	240
123581	288,100	6,493,200		6.9	1	0.1	129	370
123582	288,100	6,493,300	Edge river bank	8.1	2	0.2	162	580
123583	288,100	6,493,400		10.1	<1	0.1	37.4	580
123584	288,100	6,493,500		4.2	4	0.1	274	490
123585	288,100	6,493,600		5	4	0.2	133	260
123586	288,100	6,493,700	Mountain side	4.5	1	0.1	152	400
123587	288,100	6,493,800	Mountain side outcrop	3.8	<1	0.1	150.5	280
123588	288,100	6,493,900	Mountain peak rocky outcrop	2.7	4	0.1	35	260
123589	288,100	6,494,000	Mountain side rocky outcrop	4.8	4	0.6	132	450
123590	288,100	6,494,100	Mountain side	4.6	4	0.3	270	760
123591	288,100	6,494,200		1.1	1	0.2	186.5	310
123592	288,100	6,494,300		0.8	2	0.1	55.3	90
123593	288,100	6,494,400		2.6	2	0.2	213	450
123594	287,100	6,490,800		1.3	3	0.1	386	260
123595	287,100	6,491,000		1.5	5	0.1	45.9	230
123596	287,100	6,491,200		2.7	3	0.2	248	380
123597	287,100	6,491,400		4.2	13	0.3	158.5	650
123598	287,100	6,491,600		5.3	4	0.2	251	560
123599	287,100	6,491,800		2.1	4	0.4	230	320
123600	287,100	6,492,000		3.1	3	0.6	102.5	460
123601	289,100	6,491,400	Outcrop	0.8	3	0.1	17.2	180
123602	289,100	6,491,500	Mountain side	2.6	2	0.1	222	590
123603	289,100	6,491,600	Mountain side	3.1	6	0.1	294	340
123604	289,100	6,491,700	Mountain side	2.9	1	0.3	225	380
123605	289,100	6,491,800	Mountain side	1.5	2	0.2	204	400
123606	289,100	6,491,900	Mountain side	1.2	3	0.1	136	260
123607	289,100	6,492,000	Mountain side	2.3	1	0.4	215	430
123608	289,100	6,492,100	Mountain side	1.6	2	0.2	59.9	120
123609	289,100	6,492,200	Mountain side	2.5	1	0.6	162	390
123610	289,100	6,492,300		7.1	2	0.1	124.5	980
123611	289,100	6,492,400		10.7	4	0.2	136	790
123612	289,100	6,492,500		6.2	3	0.2	121.5	450
123613	289,100	6,492,600		4.5	2	0.3	101.5	390
123614	289,100	6,492,700		3.6	3	0.2	186	620
123615	289,100	6,492,800		3.4	2	0.1	51.5	480
123616	289,100	6,492,900		4.4	1	0.1	78.2	600
123617	289,100	6,493,000		4.3	2	0.3	111.5	670
123618	289,100	6,493,100	Creek bed	5.5	<1	0.1	90.1	360
123619	289,100	6,493,200		3.3	2	0.1	52.7	420
123620	289,100	6,493,300		7.4	2	0.3	81.3	350
123621	289,100	6,493,400		5.2	<1	<0.1	80.2	350
123622	289,100	6,493,500		3.8	2	0.1	74.6	220
123623	289,100	6,493,600	Creek bed	1.8	5	0.1	81.3	220
123624	289,100	6,493,700	Mountain side outcrop	1.1	2	<0.1	59.1	180
123625	289,100	6,493,800	Mountain side outcrop calitris forest	2.1	1	<0.1	169	290
123626	289,100	6,493,900	Mountain peak	0.6	3	<0.1	62.4	130
123627	289,100	6,494,000	Mountain side	3.1	2	0.1	257	610
123628	289,100	6,494,100		2	<1	0.3	208	420
123629	289,100	6,494,200		1.2	2	0.2	117.5	260
123630	289,100	6,494,300		2.9	3	0.2	295	470
123631	289,100	6,494,400		6.7	2	0.2	82.5	680
123632	287,100	6,492,200		3.3	3	0.2	31.9	270
123633	287,100	6,492,400		4.2	1	0.5	64.4	250
123634	287,100	6,492,600		9.7	10	0.7	123.5	600
123635	287,100	6,492,800		24.5	95	0.5	21.8	630
123636	287,100	6,493,000		5.6	3	0.3	148.5	580
123637	287,100	6,493,200		6.7	<1	<0.1	89.9	450
123638	287,100	6,493,400		5.7	5	0.3	338	700
123639	287,100	6,493,600	Mountain base	2.2	1	<0.1	26.1	220
123640	287,100	6,493,800	Mountain side goat track	3.1	2	<0.1	153.5	820
123641	287,100	6,494,000		1.5	7	<0.1	27.8	100
123642	287,100	6,494,200		2.9	1	<0.1	280	380
123643	287,100	6,494,400	Mountain side outcrop	3.2	1	<0.1	279	350

APPENDIX 3 - SOIL SAMPLE LOCATIONS AND GEOCHEMISTRY

MMI

Sample number	WGS84E	WGS84N	Fe ppm	Mn ppm	Pb ppb	U ppb	Zn ppb
123501	291,100	6,494,600	4.8	2.81	40	3	20
123502	291,100	6,494,500	5.3	6.66	50	2	20
123503	291,100	6,494,400	5.6	3.61	50	1	20
123504	291,100	6,494,300	3.5	10.3	30	23	130
123505	291,100	6,494,200	5.3	3.3	90	54	30
123506	291,100	6,494,100	5.4	13.15	60	76	120
123507	291,100	6,494,000	7	0.45	60	124	20
123508	291,100	6,493,900	2.3	0.84	20	45	20
123509	291,100	6,493,800	2.2	1.82	20	6	100
123510	291,100	6,493,700	1.6	1.73	10	4	20
123511	291,100	6,493,600	2.5	3.69	20	2	50
123512	291,100	6,493,500	2.5	1.59	40	4	360
123513	291,100	6,493,400	4.2	4.68	230	9	5420
123514	291,100	6,493,300	2.5	1.96	10	5	230
123515	291,100	6,493,200	2.2	0.54	10	4	30
123516	291,100	6,493,100	3.5	2.69	20	10	40
123517	291,100	6,493,000	3.3	1.19	110	16	30
123518	291,100	6,492,900	5.6	2.38	60	16	80
123519	291,100	6,492,800	3.9	2.4	90	15	60
123520	291,100	6,492,700	3.9	2.97	120	11	130
123521	291,100	6,492,600	3.2	3.39	50	12	90
123522	291,100	6,492,500	2.7	2.32	20	27	80
123523	291,100	6,492,400	3.6	1.72	10	35	30
123524	291,100	6,492,300	3.3	1.27	10	40	20
123525	291,100	6,492,200	4	0.96	10	6	20
123526	291,100	6,492,100	3.8	0.74	20	14	20
123527	291,100	6,492,000	3.5	1.98	10	52	20
123528	291,100	6,491,900	3.7	0.67	10	3	20
123529	291,100	6,491,800	3.9	1.92	20	4	40
123530	291,100	6,491,700	3.5	3.62	20	4	50
123531	291,100	6,491,600	3.2	5.06	20	4	20
123532	290,100	6,491,930	5	3.63	50	30	210
123533	290,100	6,492,000	3.4	0.69	10	21	30
123534	290,100	6,492,100	20.8	2.11	390	13	100
123535	290,100	6,492,200	4.2	2.27	40	11	20
123536	290,100	6,492,300	5	2.08	40	15	50
123537	290,100	6,492,400	49	0.36	400	13	60
123538	290,100	6,492,500	3.3	1	160	17	20
123539	290,100	6,492,600	4.9	1.46	220	27	30
123540	290,100	6,492,700	4.9	4.35	30	27	90
123541	290,100	6,492,800	4.7	4.57	30	24	230
123542	290,100	6,492,900	4.6	4.06	40	33	90
123543	290,100	6,493,000	4	3	20	12	70
123544	290,100	6,493,100	4.1	3.23	20	13	80
123545	288,100	6,490,900	9.6	1.42	110	21	110
123546	288,100	6,491,000	1	1.94	30	36	20
123547	288,100	6,491,100	1.7	1.96	80	36	20
123548	288,100	6,491,200	2.8	2.89	50	20	70
123549	288,100	6,491,300	1.5	2.43	20	16	20
123550	288,100	6,491,400	1.8	2.03	30	12	20
123551	288,100	6,491,500	2.3	2.11	70	14	40
123552	290,100	6,493,200	0.3	2.76	20	4	40
123553	290,100	6,493,300	<0.1	3.11	30	3	30
123554	290,100	6,493,400	0.1	2.84	20	2	20
123555	290,100	6,493,500	4.1	8.6	30	4	310
123556	290,100	6,493,600	0.4	4.07	10	1	50
123557	290,100	6,493,700	5.1	1.52	120	19	30
123558	290,100	6,493,800	1.4	1.82	60	35	30
123559	290,100	6,493,900	0.9	2.25	80	13	30
123560	290,100	6,494,000	2.1	2.96	130	15	70
123561	290,100	6,494,100	0.4	2.75	20	13	40
123562	290,100	6,494,200	0.9	2.38	20	29	20
123563	290,100	6,494,300	0.5	3.32	30	4	20
123564	290,100	6,494,400	0.5	2.61	30	5	20
123565	288,100	6,491,600	2.2	1.66	110	24	30
123566	288,100	6,491,700	8.4	4.26	90	15	280
123567	288,100	6,491,800	<0.1	3.29	40	2	20
123568	288,100	6,491,900	0.1	2.83	40	3	50
123569	288,100	6,492,000	0.4	4.47	50	3	30
123570	288,100	6,492,100	0.3	4.61	30	4	20
123571	288,100	6,492,200	0.3	6.04	30	1	110
123572	288,100	6,492,300	0.6	6.94	10	21	220
123573	288,100	6,492,400	0.4	4.95	30	6	40
123574	288,100	6,492,500	1.4	6.74	30	18	180
123575	288,100	6,492,600	0.8	4.91	20	30	110
123576	288,100	6,492,700	0.6	6.97	10	37	70

APPENDIX 3 - SOIL SAMPLE LOCATIONS AND GEOCHEMISTRY

MMI

Sample number	WGS84E	WGS84N	Fe ppm	Mn ppm	Pb ppb	U ppb	Zn ppb
123577	288,100	6,492,800	0.6	5.64	10	20	50
123578	288,100	6,492,900	0.4	6.79	10	4	40
123579	288,100	6,493,000	0.7	6.29	50	2	50
123580	288,100	6,493,100	0.6	3.97	50	1	80
123581	288,100	6,493,200	0.5	5.89	40	1	60
123582	288,100	6,493,300	0.7	5.38	20	1	70
123583	288,100	6,493,400	2.7	2.4	30	17	30
123584	288,100	6,493,500	0.1	5.49	30	2	20
123585	288,100	6,493,600	18.2	1.33	150	15	100
123586	288,100	6,493,700	1	2.01	20	17	20
123587	288,100	6,493,800	7.5	2.8	150	27	60
123588	288,100	6,493,900	12.8	0.75	320	21	70
123589	288,100	6,494,000	<0.1	3.2	30	2	20
123590	288,100	6,494,100	0.1	3.97	20	7	60
123591	288,100	6,494,200	4.1	1.83	60	11	50
123592	288,100	6,494,300	16.4	1.88	90	21	70
123593	288,100	6,494,400	2.6	0.89	30	25	30
123594	287,100	6,490,800	1.4	9.74	70	8	120
123595	287,100	6,491,000	19.7	3.13	460	22	60
123596	287,100	6,491,200	2.2	5.83	50	17	80
123597	287,100	6,491,400	<0.1	3.08	30	3	40
123598	287,100	6,491,600	0.9	3.52	30	5	20
123599	287,100	6,491,800	<0.1	13.65	50	2	140
123600	287,100	6,492,000	<0.1	8.22	20	3	20
123601	289,100	6,491,400	26.8	1.8	510	9	160
123602	289,100	6,491,500	2.3	3.48	20	32	30
123603	289,100	6,491,600	0.8	6.56	20	27	20
123604	289,100	6,491,700	0.9	2.33	60	23	40
123605	289,100	6,491,800	2.2	1.85	60	24	<20
123606	289,100	6,491,900	9.8	4.82	70	15	70
123607	289,100	6,492,000	2	2.46	110	12	50
123608	289,100	6,492,100	5.9	0.65	40	15	30
123609	289,100	6,492,200	4	1.97	20	15	20
123610	289,100	6,492,300	0.7	4.64	30	60	510
123611	289,100	6,492,400	0.1	12.4	30	11	700
123612	289,100	6,492,500	0.2	10.1	60	4	100
123613	289,100	6,492,600	0.2	6.68	40	2	40
123614	289,100	6,492,700	0.2	6.81	30	3	30
123615	289,100	6,492,800	1.3	9.49	10	6	20
123616	289,100	6,492,900	<0.1	2.3	10	6	20
123617	289,100	6,493,000	0.1	2.47	20	15	20
123618	289,100	6,493,100	<0.1	3.1	10	4	70
123619	289,100	6,493,200	0.1	1.83	10	4	40
123620	289,100	6,493,300	<0.1	4.86	30	1	30
123621	289,100	6,493,400	0.1	5.71	20	1	60
123622	289,100	6,493,500	<0.1	4.66	20	1	20
123623	289,100	6,493,600	2	10.85	10	6	90
123624	289,100	6,493,700	20.4	4.08	120	9	260
123625	289,100	6,493,800	1	9.53	30	15	60
123626	289,100	6,493,900	33.1	4.92	490	10	470
123627	289,100	6,494,000	1.9	2.85	20	25	30
123628	289,100	6,494,100	<0.1	1.49	20	18	20
123629	289,100	6,494,200	1	1.35	10	32	20
123630	289,100	6,494,300	0.4	2.59	10	19	20
123631	289,100	6,494,400	0.2	1.4	10	17	20
123632	287,100	6,492,200	<0.1	4.61	10	3	30
123633	287,100	6,492,400	2.1	3.1	20	20	20
123634	287,100	6,492,600	2	8.86	20	3	60
123635	287,100	6,492,800	4.4	0.57	20	4	30
123636	287,100	6,493,000	2.9	2.55	10	7	30
123637	287,100	6,493,200	2.4	3.6	30	1	60
123638	287,100	6,493,400	2.9	3.02	20	5	40
123639	287,100	6,493,600	5	1.1	50	17	150
123640	287,100	6,493,800	3.3	6.31	60	42	40
123641	287,100	6,494,000	25.2	0.84	460	20	70
123642	287,100	6,494,200	3.2	2.28	120	25	20
123643	287,100	6,494,400	7.8	3.97	260	26	170

APPENDIX 4
Analytical detection limits

APPENDIX 4 - Analytical detection limits

Technique	Ag	Al	As	Au	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe
	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%
ME-ICP41	0.2000	0.0100	2.0000		10.0000	0.5000	2.0000	0.0100	0.5000		1.0000	1.0000		1.0000	0.0100
ME-MS61	0.1000	0.0100	0.2000		10.0000	0.0500	0.0100	0.0100	0.0200		0.1000	1.0000	0.0500	0.2000	0.0100
ME-MS08 (Regoleach)	0.0050		0.0050	0.0010	1.0000		0.0050	1.0000	0.0050	0.1000	0.0010	0.0010		0.0100	5.0000
ME-MS17 (mmi)	0.0001		0.0010	0.0001	0.0100		0.0030	0.2000	0.0010	0.0001	0.0003	0.0010		0.0100	0.0100
ME-ICP61	0.5000	0.0100	5.0000		10.0000	0.5000	2.0000	0.0100	0.5000		1.0000	1.0000		1.0000	0.0100
PGM-MS23				0.0010											

Technique	Ga	Hf	Hg	In	K	La	Mg	Mn	Mo	Na	Nb	Ni	P	Pb	Pd
	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
ME-ICP41	10.0000		1.0000		0.1000	10.0000	0.0100	5.0000	1.0000	0.0100		1.0000	10.0000	2.0000	
ME-MS61	0.0500	0.0100		0.0050	0.0100	0.5000	0.0100	5.0000	0.0500	0.0100		0.0200	10.0000	0.0500	
ME-MS08 (Regoleach)			0.0050		1.0000	0.1000	1.0000	1.0000	0.0100	1.0000	0.0100	0.0100		0.0100	
ME-MS17 (mmi)						0.0001	0.0100	0.0100	0.0050		0.0001	0.0030		0.0100	0.0001
ME-ICP61	10.0000				0.0100	10.0000	0.0100	5.0000	1.0000	0.0100		1.0000	10.0000	2.0000	
PGM-MS23														0.0010	0.0005

Technique	Pt	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W
	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
ME-ICP41		0.0100	2.0000	1.0000			1.0000				0.0100	10.0000	10.0000	1.0000	10.0000
ME-MS61		0.0100	0.0500			0.2000	0.2000	0.0500	0.0500	0.2000	0.0050	0.0200	0.1000	1.0000	0.1000
ME-MS08 (Regoleach)	0.0010	1.0000	0.0050		0.0050		1.0000		0.0050			0.0050	0.0100		0.0050
ME-MS17 (mmi)			0.0010	0.0030		0.0002	0.0100		0.0010	0.0010	0.0100	0.0100	0.0010		0.0002
ME-ICP61		0.0100	5.0000	1.0000			1.0000			20.0000	0.0100	10.0000	10.0000	1.0000	10.0000
PGM-MS23															

Technique	Y	Zn	Zr
	ppm	ppm	ppm
ME-ICP41		2.0000	
ME-MS61	0.1000	2.0000	0.5000
ME-MS08 (Regoleach)		0.0050	
ME-MS17 (mmi)	0.0001	0.0200	0.0010
ME-ICP61			2.0000
PGM-MS23			

COPPER RANGE (SA) PTY LTD

ANNUAL TECHNICAL REPORT
6th November 2007 to 5TH November 2008

EL 3647 – Mt Josephine

TITLE:	ANNUAL TECHNICAL REPORT FOR EL 3647 – Mt Josephine for the Period Ending 05/11/2008
HOLDER:	COPPER RANGE (SA) Pty Ltd
OPERATOR:	COPPER RANGE (SA) Pty Ltd
1:250,000 SHEET:	Parachilna SH54-13
1:100,000 SHEET:	Wilpena 6634
AUTHOR:	Charlie Seabrook
SUBMITTED BY:	Mike Ware
DATE:	09/01/2009
KEYWORDS:	Copper, zinc, Mt Neville, ASTER satellite imagery, Cambrian, Hawker Group, Proterozoic, Rawnsley Quartzite, Parachilna Formation
DISTRIBUTION:	1. Copper Range (SA) Pty Ltd, Adelaide Office 2. Department of Primary Industries and Resources, South Australia

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SUMMARY

EL 3647 – Mt Josephine lies 40km NW of Hawker in the southern Flinders Ranges (figure 1). It forms part of the Hawker Project area which includes 7 other tenements in the Hawker region.

Soil sampling programmes undertaken during the previous reporting year (Nov 2006 – Nov 2007) were unsuccessful in locating sediment-hosted copper mineralisation associated with porous sandstone units and alteration zones identified by ASTER satellite imagery. The exploration focus in this tenement was therefore shifted to the Cambrian carbonate rocks in the core of the syncline that previous explorers (as well as Copper Range sampling programmes) have shown to be anomalous in zinc. The target is structurally controlled Beltana-style zinc silicate (willemite) mineralisation associated with replacement of carbonate rocks. At Beltana, intense ferrugenisation of the dolomite rocks is observed associated with mineralisation (Groves et al. 2003) which is common within the carbonates of the Mt Josephine tenement. These features, along with significantly elevated zinc values have highlighted the potential for this style of mineralisation within EL 3547.

During the reporting period Nov 2007 – Nov 2008 Copper Range has undertaken a review of previous exploration data, focussing on zinc, including digitising previous stream sediment samples. In addition, a structural review of the region (including other Copper Range tenements in the area) was undertaken to identify suitable structural settings for Beltana-style zinc silicate mineralisation.

The reviews show that the Cambrian Limestone has been thoroughly explored by previous explorers using stream sediment sampling and that all anomalous zinc values were traced back to ironstone development at the Parachilna Formation/Wirrapowie Limestone contact. However, Beltana was discovered from anomalous stream sediment samples of up to 760ppm Zn and higher values than this, of up to 1215ppm Zn have been recorded in the Chace/Druid Range syncline (EL 3647). Nevertheless, previous explorers did not get any encouragement from field investigations following up anomalous stream sediment samples. And due to other exploration commitments Copper Range has not field checked any of the previous explorer's anomalies.

Due to the nature of zinc silicate mineralisation, a broad scale EM and gravity survey would be best to identify potential targets within EL 3647 and other adjoining tenements.

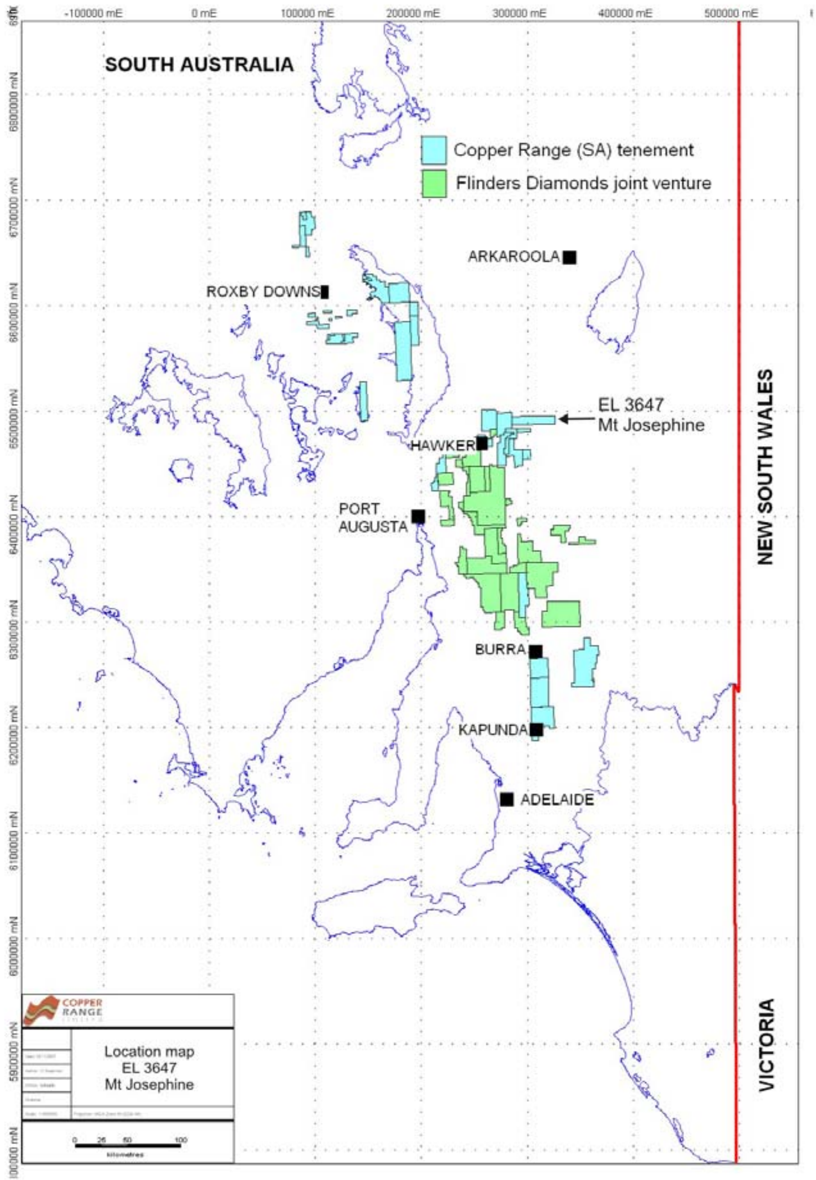

Figure 1. Location of EL 3643 within the current Copper Range (SA) Pty Ltd project areas

1. INTRODUCTION

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement. The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges. Between the ridges (Chace and Druid Ranges) the Parachilna Siltstone and the Wirrapowie and Wilkawilena Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure.

Copper Range took out the tenement to explore for sediment-hosted copper mineralisation associated with basin-scale fluid flow, identified as anomalous alteration zones on ASTER satellite imagery. Copper Range identified several zones of alteration associated with favourable stratigraphy within the Mt Josephine tenement, but follow-up soil and rock chip sampling was not encouraging.

Subsequently, Copper Range changed it's exploration focus to Beltana-style zinc silicate mineralisation with the Cambrian carbonates, compiling and reviewing previous exploration data and undertaking a regional structural review to target favourable structural settings.

2. LOCATION AND ACCESS

The Mt Josephine tenement (EL 3647) is situated in the Southern Flinders Ranges. The tenement lies some 360km north of Adelaide, approximately 40km northeast of the town of Hawker and 20km southeast of Wilpena Pound National Park. The majority of the tenement falls within the property boundaries of WIllipa and Arkepena Stations. Access to the tenement in the east is via the road to Martin's Well, off the main road to Wilpena Pound and in the west from the Warcowie Road and Willipa Homestead.

3. TENURE DETAILS

The Josephine tenement EL 3647 was taken out by Copper Range (SA) Pty Ltd, a wholly-owned South Australian subsidiary of International Base Metals Ltd that was floated on the ASX as an independent company in December 2006. Tenement details are summarised in table 1.

Tenement number	Date granted	Expiry date	Project name	Licensee and operator	Locality	Area km²
EL 3647	06/11/06	05/11/08	Mt Josephine	Copper Range (SA) Pty Ltd	Approximately 40km NW of Hawker	304

Table 1. Summary of tenement details

4. MINING HISTORY AND PREVIOUS EXPLORATION

4.1 Mining

No old mines or working exist within the tenement area. Just outside the eastern boundary of the tenement are some old workings that are marked on maps as an unnamed copper occurrence. However, a visit to this site, where a shaft and some pits have been sunk into ironstone, showed no evidence that copper was mined here. The old shaft at this location is thought to have been dug during the depression years when prospectors were paid by the foot of shaft sunk.

4.2 Past Exploration

Previous exploration in the area has been undertaken for several different commodities, including base metals, gold and diamonds. Table 3 shows a summary of previous Exploration Licences (EL) and Special Mining Leases (SML) that have infringed in some part on the current EL 3643.

Lease	Holder	Start date	End date	Activities
SML 276	SA Barytes Ltd	Mar 1969	Mar 1970	No info available
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EL 2273	Perylia Ltd	Nov 2000	Nov 2001	Regional soil, stream sediment and rock chip sampling
EL 3065	AngloGold Australia	Mar 2003	Mar 2004	No info available

Table 2. Summary of previous work carried out in the Mt Josephine tenement area

1970 – 1971 Electrolytic Zinc Co.

EZ held a Special Mining Lease (SML) over the area and completed a reconnaissance geochemical sampling programme in the region, including the area between the Chace and Druid Ranges and the Arkaba Diapir (not within EL 3647). They sampled the intersections of all creeks draining the Lower Cambrian Limestone units (-20 +80 mesh) and assayed fro Cu, Pb and Zn. They found anomalies associated with copper mineralisation with the Arkaba Diapir, Ochreous clays developed on the Parara Limestone, anomalously high metal values in the Parachilna Formation and sparse galena mineralisation within the Parara Limestone to the south of the Arkaba Diapir. They considered that none of these anomalies constituted substantial mineralisation.

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EZ later took out an exploration licence over the area in search of base metal mineralisation using the Beltana and Ediacara-type models. The took over 1000 stream sediment and over 200 rock chip samples from the Etina Formation, Enorama Shale, Elatina, Nucaleena, Brachina, Trezona and Tapley Hill Formations. These samples were compared to standard samples collected from the Eukaby Mines area. They used multiple linear regression to statistically filter out effects of base metal scavenging by iron and manganese. Follow up sampling showed that anomalous values were mainly due to scavenging or unworthy of further follow up.

1987 – 1988 Lynch Mining Ltd

Lynch Mining explored for fine-grained hydrothermal gold associated with ironstone/siderite veins within NE-trending fault zones northeast of Hawker, in the Martin's Well area. A review of historical gold exploration was undertaken and accompanied by bulk cyanide leach (BCL) stream sediment sampling, channel chip and rock chip sampling as well as geological prospecting.

1989 – 1991 CRA Exploration Pty Ltd

CRA were searching for diamonds and copper, plus gold, rare earth elements, niobium and phosphates associated with diapiric structures in the Arkaba-Worumba area. Stream sediment, gravel and rock chip sampling was undertaken with inspection of historic copper workings located within the diapirs. The results from sampling did not give any encouragement for further testing.

2000 – 2001 Perylia Ltd

As part of Perylia's regional exploration in the Flinders Ranges, they undertook semi-regional soil, stream sediment and rock chip sampling in the Chace/Druid Range area in search of economic base metal deposits. Stream sediment sampling gave a peak result of 1215 ppm Zn, while follow up rock chip sampling gave peak values of 0.78% Zn and 310 ppm Cu. They determined that the style and tenor of observed mineralisation was not appropriate for follow up work.

5. EXPLORATION RATIONALE

Copper Range's initial targets in the Adelaide Fold and Thrust Belt are secondary near-surface oxide copper deposits that are structurally controlled, related to hydrothermal events focused along faults late in the deformational history of the region.

However, soil sampling programmes carried out by Copper Range over favourable lithological units did not identify encouraging copper anomalism. The occurrence of some zinc anomalism lead to the investigation of zinc silicate mineralisation associated with the Cambrian carbonates in the core of the Chace Range / Druid Range syncline in the western end of the tenement.

The exploration model for zinc silicate mineralisation is based on the willemite occurrences at Beltana, to the north of Hawker. These deposits consist of structurally controlled epigenetic willemite mineralisation deposited during the Delamerian Orogeny in a palaeo-high setting. Precipitation of zinc silicate and surrounding haematite-zinc-dolomite alteration resulted from deep-seating saline oxidising acid ore solutions permeating structures forming karsts and subsequent brecciation. Mineralisation was precipitated in open spaces formed by the karstic collapse breccias (Groves et al. 2003).

Copper Range is therefore targeting areas of brecciation and iron enrichment within the dolomite units within structurally complex settings.

6. REGIONAL GEOLOGY

Regionally, the area lies within the Adelaide Fold and Thrust Belt, which contains Neoproterozoic to late Cambrian sequences. Rock types recognised within this Precambrian, fault-bounded intracratonic trough are Neoproterozoic in age (1400 to 570 Ma) with terrestrial and marine clastic, chemical and glaciogenic sediments (Preiss 1987). These formations have been deformed and metamorphosed (generally to greenschist facies) by at least two major orogenic episodes: the Proterozoic Adelaide Fold Belt orogenic event and a later Early Palaeozoic Delamerian Orogeny (Preiss 1987). Following uplift caused by these deformations, erosion of the exposed older formations has taken place and younger Palaeozoic and Cainozoic sediments unconformably overly the Adelaidean sequences in places.

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana, Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement (figure 2). The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges (the Chace and Druid Ranges). Talus and scree from the quartzite covers large areas of adjacent sub-cropping Cambrian limestones, which impedes the effectiveness of sampling. Between the ridges, the poorly outcropping Parachilna Formation and the Wirrapowie and Wilkawilena Limestones form the core of the syncline (figure 3). The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure. The published Parachilna 1:250,000 geological map also shows Callana Group rocks outcropping in the core of the syncline (figure 3).

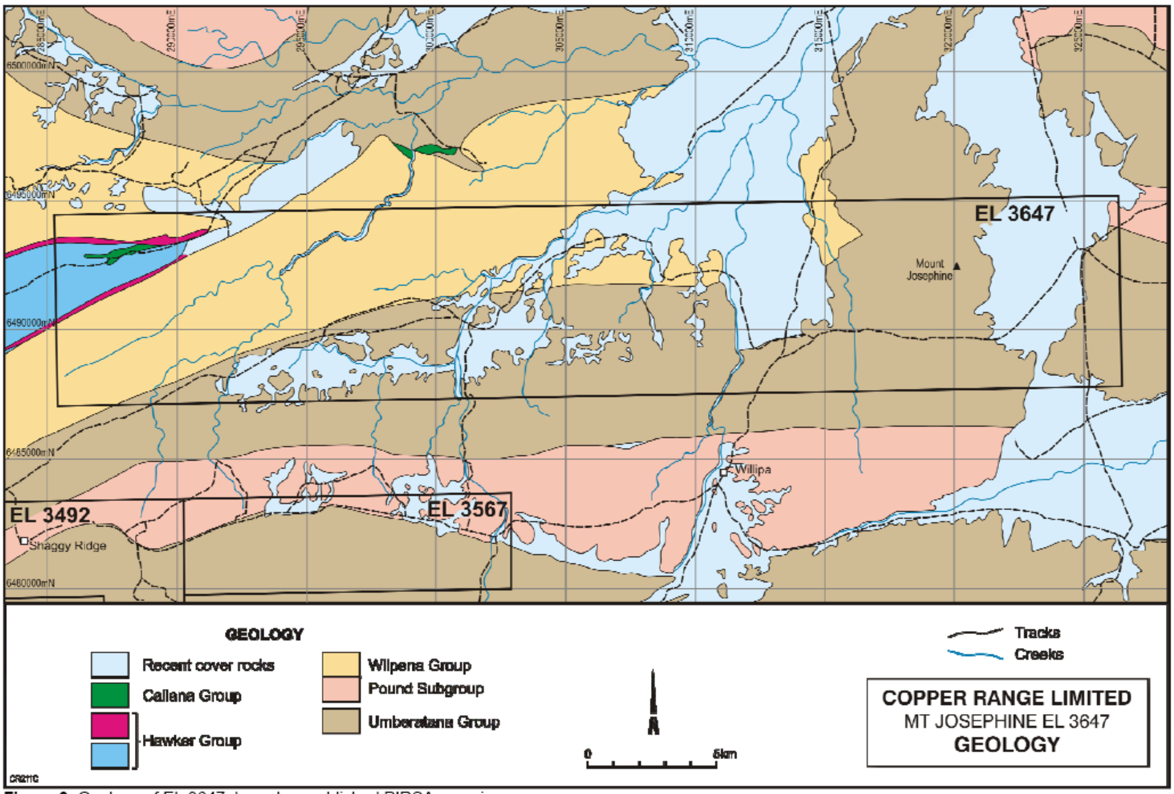

Figure 3. Geology of EL 3647, based on published PIRSA mapping

Figure 2. Geology of EL 3647, based on published PIRSA mapping

7. WORK COMPLETED BY COPPER RANGE (SA) PTY LTD

7.1 ACCESS NEGOTIATIONS

The majority of the tenement occurs within the boundaries of Arkapena and Willipa Stations, owned by Stephen Gregory and Dennis Hilder respectively. The landholders have been consulted during each phase of exploration and have been agreeable to all activities.

7.2 REVIEW OF PREVIOUS EXPLORATION DATA

Previous exploration data of EL 3647 was compiled, digitised and reviewed (figure 3). This showed numerous zinc anomalies but reports and Copper Range sampling indicate that these anomalies are all related to ironstone development at the Parachilna Formation (Pound Subgroup) / Cambrian Limestone boundary.

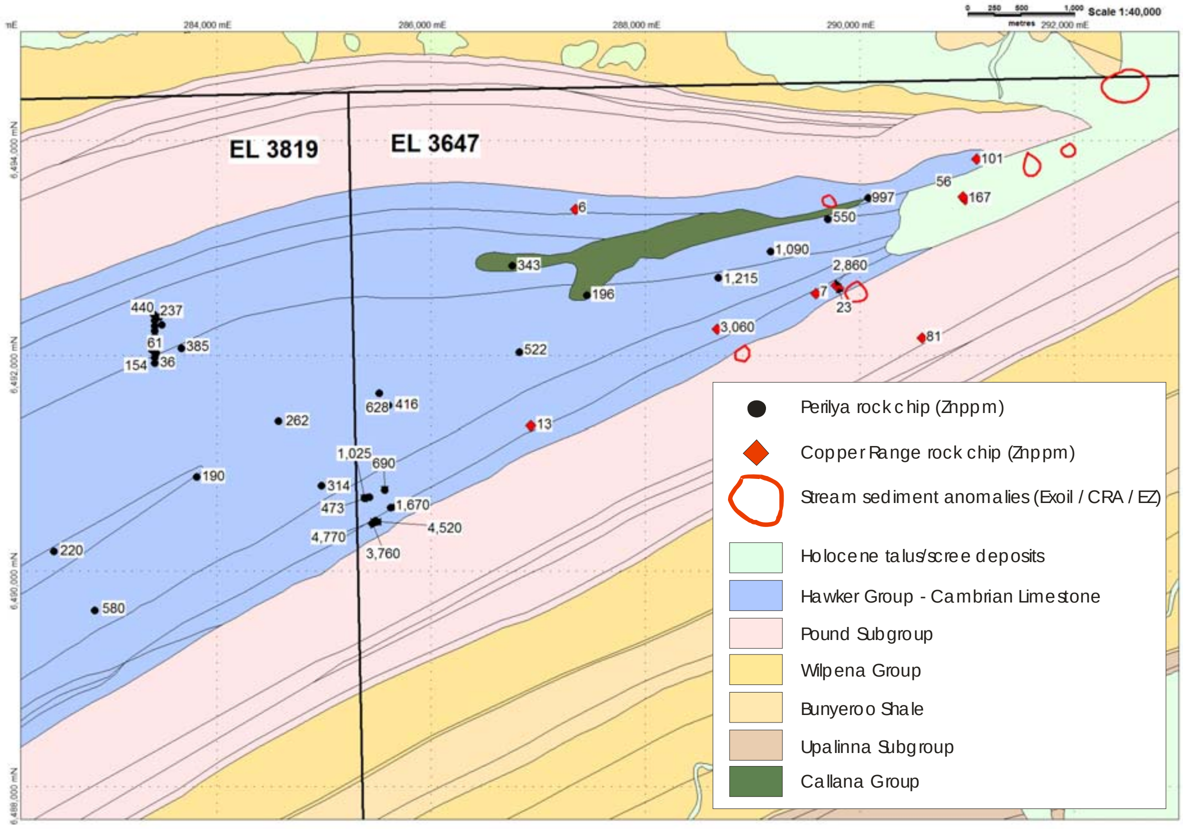

Figure 3. Location of previous and Copper Range rock chip and stream sediment sampling, with regional geology based on published PIRSA maps

7.3 REGIONAL STRUCTURAL REVIEW

The following memo was written by in-house structural geologist Adriaan van Herk. It diuscusses the potential and geological setting for zinc silicate mineralisation in the Adelaide Fold Belt and focuses on the Hawker project area, namely EL 3819 Chace Range and EL 3647 Mt Josephine.

Memo

To: *Mike Ware*

From: *Adriaan van Herk*

CC: *Joseph Ogierman*

Date: *08/07/08*

Re: *Review of zinc mineralisation in Cambrian shelf carbonates*

MINERALSATION

A few observations and interpretations which may be important when targeting willemite mineralisation in the Chace Ranges:

NW trending faults

The Chace Range covers a stratigraphic sequence of Cambrian shelf-carbonates which are prospective for willemite (Zn_2SiO_4) mineralisation. At the Beltana these carbonates were deposited proximal to the shelf margin. Dominant NW trending faults seem to have controlled mineralisation which indicates a syn-sedimentary and reactivated fault system which would have enhanced convection of mineralising fluids.

Quartzite, host or seal?

John Thorson has suggested the Pound Quartzite as a susceptible host rock for copper mineralisation at stratigraphic contacts considered to be favourable reducing horizons. Copper in solution to may have precipitated onto pyrite within the Quartzite which was then still sandstone. Known mineralisation occurs at several locations at this stratigraphic boundary e.g. at Kanyaka.

However, structural relationships (e.g. absence of joint deflection on grain size transitions) in the quartzite at Kanyaka and Redford Creek suggest that the Quartzite was already silicified prior to NW faulting, which is related to mineralisation. This suggests that the Quartzite may not be a susceptible host rock at all, but a good seal or channelling horizon for mineralising fluids.

Ironstones

Charlie has pointed out the development of ironstone at the base of the limestone / top of the Parachilna Formation is a common feature of the Cambrian boundary in this region. These ironstones occur as massive, haematite and manganese pods that frequently display anomalous geochemistry. Surficial ironstones may appear to be the product of surficial supergene processes only.

Yet one of the earlier mineralisation models of the Beltana deposits involves supergene enrichment of a sphalerite-galena MVT massive sulphide ore body (Muller 1972).

The current model invokes structurally controlled epigenetic willemite mineralisation deposited during the Delamerian Orogeny in a palaeo-hiqh. Precipitation of willemite and the surrounding haematite-Zn-dolomite alteration resulted from deep-seated saline oxidising acid ore solution permeating structures. Mineralisation occurred in open spaces formed via hydrothermal corrosion and hydrothermal brecciation possibly aided *by tectonic brecciation of the host limestone. Coronadite ($Pb(Mn^{4+},Mn^{2+})_8O_{16}$) was deposited late in the genesis along the controlling structures. (Iain Groves, Perilya, October 2001)*

The Perilya report suggests that elevated levels of Fe and Mn around the deposits are the result of alteration of the dolomite by acid fluids. This implies that surficial supergene processes have further modified the Fe and Mn enriched dolomite, possibly into ironstone

Conclusion: anomalous geochemistry in ironstones may mask earlier haematite-Zn-dolomite alteration.

Tectonic and collapse breccia

The Beltana deposit is centred on a hydrothermal karstic collapse breccia. This karst is interpreted to have formed during mineralisation as a result of dissolution by an acid ore fluid; the resulting collapse breccias were cemented by late-stage lead mineralisation.

Discussions with John Thorson and Wolfgang Preiss at the Burra Mine hint at multi-phase tectonic and collapse brecciation of the Burra Deposit well sealed by a major clay-rich fault, a setting similar to Beltana (see figure.1) and possibly Princess Royal.

Figure.1 *Clay-rich fault separates the willemite ore (left) from the manganese mega-breccia (right), Beltana Mine pit. (from www.datametallogenica.com)*

Absence of sulphides

A feature which has not previously been stressed is the total absence of sulphides in the Beltana Deposits. Willemite is the only zinc ore mineral, and the arsenate hedyphane ($Ca_2Pb_3[AsO_4]_3Cl$) is the main lead mineral (Brugger et al 2003). Brugger et al 2003 propose a mineralisation model in which the presence of arsenate in hydrothermal fluids inhibits the reduction of sulfate to sulfide, resulting in the precipitation of willemite, not sphalerite.

KEY FEATURES OF THE BELTANA DEPOSITS

- *High grade willemite deposit, absent of sulphides*
- *Host rock: dolomite of the Cambrian Ajax Limestone*
- *Structural setting:*
  - *anticlinal basement high*
  - *proximity to the shelf (tectonically active during deposition)*
  - *deep seated NS trending faults*
  - *NW trending syn-sedimentary and reactivated faults*
- *Tectonic contact with halite-bearing clastic sediments of the Callanna Group*
- *Hydrothermal acidic brines, possibly arsenate rich*

This small, high grade deposit (850,000 t at 36% Zn) is hosted in dolomite of the Cambrian Ajax Limestone, next to a tectonic contact with the diapiric, halite-bearing clastic sediments of the Callanna Group. The orebody is associated with hematite alteration and is characterized by the total absence of sulfides; willemite is the only zinc ore mineral, and the arsenate hedyphane ($Ca_2Pb_3[AsO_4]_3Cl$) is the main lead mineral.

The model results show that willemite will precipitate in response to water-rock interaction and fluid mixing processes at temperatures above 120°C.

The presence of arsenate in the hydrothermal fluid is likely to have been important at Beltana; in arsenate-absent models sulfate is reduced to sulfide by the precipitation of ferrous iron as hematite, resulting in the precipitation of sphalerite and galena. In contrast, in models including arsenate the reduction of sulfate to sulfide is inhibited and willemite is predicted to precipitate.

There are three areas in Copper Range tenements with key features similar to the Beltana Deposits:

The Chace Range tenement falls within the Parachilna 1:250,000 map sheet. The tenement is spit into two parts, a NE section and a SW section. This tenement was taken out in order to cover the extent of the Proterozoic/Cambrian boundary in the Hawker area as it is this level in stratigraphy that hosts the copper mineralisation at Kanyaka, Radford Creek and also the zinc mineralisation at Beltana.

Regionally, the tenements occur on a syncline formed by ridges of resistant Pound Quartzite with a core of Parachilna Formation (outcrops poorly) Mernmerna Formation Limestone, Woodendinna Dolomite and Orarparina Shale. This is flanked by Wonoka and Bunyeroo Formation shales, with the Arkaba Diapir occurring to the NW and the

Worumba Diapir occurring to the SE. The syncline trends NE between these features. The syncline appears to be overturned and the sequence is much thinner on the Druid Range limb (southern limb) and shearing has probably reduced the thickness of the sequence.

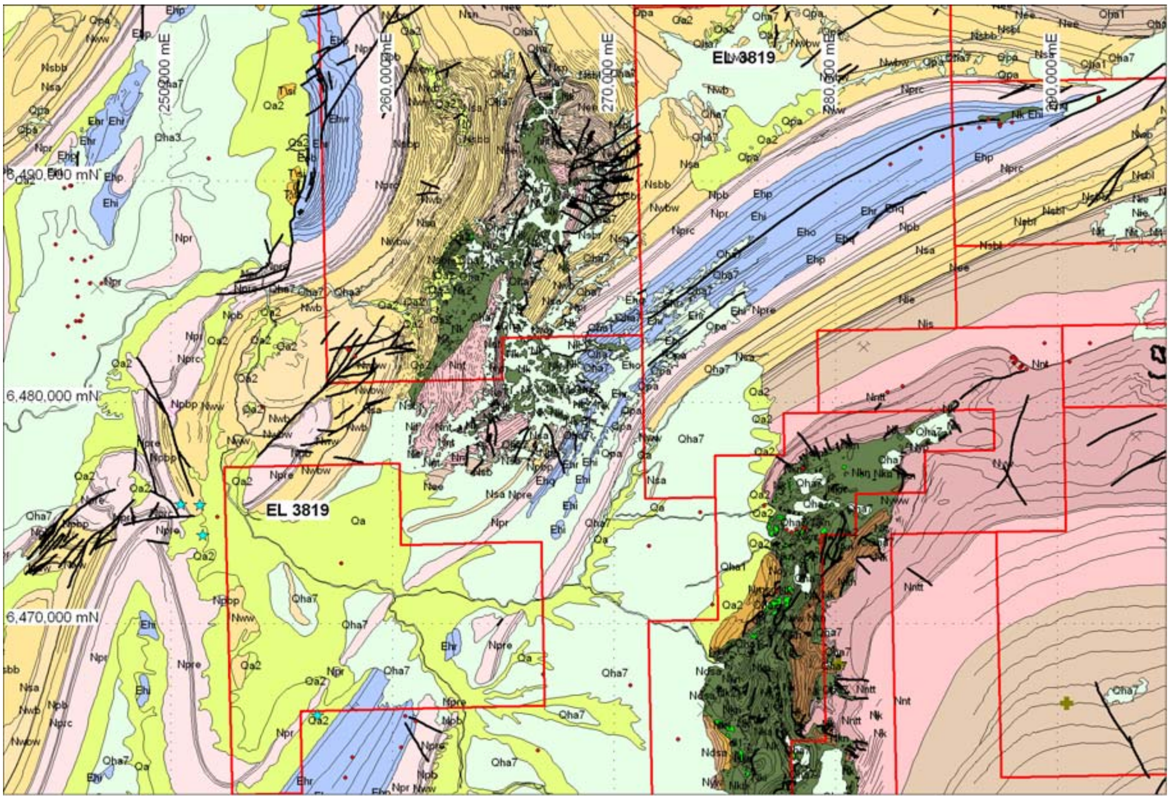

***Figure 2**. General geology of EL 3819 – Chace Range (Hawker)*

*No old workings or known mineralisation occur within the Chace Range (Hawker) tenement area, except the **Rawnsley Bluff copper occurrence** at the very north edge of the NE tenement, and the **Hawker Manganese Mine** at the southernmost edge of the SW tenement.*

Mineralisation is more common in the adjoining Mt Aleck tenement (EL 3646) where it is associated with the Arkaba Diapir, and the nearby Wyacca Mines, associated with the Worumba Diapir.

PREVIOUS EXPLORATION

Exoil and Transoil Drill testing (11 percussion holes) of a manganiferous horizon in the NE of the tenement defined no significant mineralisation in thinly laminated, near-vertically dipping unweathered shales.

EZ established, investigated all anomalies in one of the following categories: Trace copper mineralisation in the diapir, copper derived from basic intrusives in the diapir, and Zn-Pb and Cu anomalies resulting from the scavenging of metal ions by iron and clay-rich weathering products of the Parara Limestone and Parachilna Formations. The ironstone formed by weathering at the base of the Cambrian Limestone is a common occurrence within the syncline and is also observed all along strike e.g. with the Mt Josephine tenement and within the Kanyaka tenement.

EZ also identified malachite, galena and crocidolite at the contact between the Arkaba Diapir and the Parara Limestone.

CONCLUSIONS AND RECOMMENDATIONS

- *The Cambrian limestone has been thoroughly explored by previous explorers using stream sediment sampling*
- *All anomalous results seem to have been traced to ironstone development at the Parachilna Fm / limestone contact or anomalous copper within the Parachilna Fm*
- *However, initial stream sediment sampling at Beltana gave a maximum of 760ppm Zn and in the Chace-Druid Ranges Perylia recorded a maximum of 1,215ppm Zn, with several other samples >1,000ppm Zn.*
- *Nevertheless it seems that the stream sediment sampling has not identified any significant mineralisation or other anomalies that CRJ could follow up.*
- *It is possible that stream sediment sampling is not an effective method for exploration.*
- *In order to continue exploration in this area, a previously unused technique should be implemented.*
- *It is recommended that EM be used to identify sulphide bodies and gravity to identify zinc silicate (oxide) bodies such as at Beltana.*
- *A broad scale survey would be most effective to cover all the prospective ground i.e. an aerial EM and gravity survey.*

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Adriaan van Herk - November 2008

8. CONCLUSIONS

- Reviews of the potential for zinc silicate mineralisation within the Cambrian Limestones of EL 3647 suggest that it is a highly prospective area.
- Extensive stream sediment surveys and rock chip sampling programmes by previous explorers have identified numerous zinc anomalies
- On follow-up these have been traced back to ironstone outcrops at the Parachilna Formation / limestone boundary
- Further exploration for zinc silicate mineralisation should utilise more broad search tools, namely airborne EM and gravity

9. EXPENDITURE STATEMENT

Copper Range (SA) Pty Ltd
34 Stepney Street, Stepney, SA 5069

Mt Josephine EL 3647 (5011)

Expenditure Statement

6/11/2007 To 5/11/2008

Job Name	Debit
Consultant - Geology	$4,985.00
Consultant - Drafting	$420.00
Wages/Salaries-Geo/Technical	$10,220.70
T'mnt - Gov Fees, Rates, Rent	$1,881.80
T'mnt - Landholder	$390.00
Phone - Fax	$44.07
MV - Fuel & Maint/Parking/Toll	$672.68
MV - Hire	$1,826.00
Travel - Accommodation, Meals	$121.93
Travel - Airfares	$189.88
Assaying - Rocks/Soil	$4,126.37
Field Consumables	$69.37
House - Supplies/Equipment	$337.13
Computer - Software	$622.92
Consultant - Geophysics	$4,500.00
Phone - Fax	$93.07
Field - Supplies Food	$3.81
Over Heads at 10%	$3,050.47
Grand Total	$33,555.20

10. REFERENCES

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COPPER RANGE (SA) PTY LTD

ANNUAL TECHNICAL REPORT
6th November 2008 to 5TH November 2009

EL 3647 – Mt Josephine

TITLE:	ANNUAL TECHNICAL REPORT FOR EL 3647 – Mt Josephine for the Period Ending 05/11/2009
HOLDER:	COPPER RANGE (SA) Pty Ltd
OPERATOR:	COPPER RANGE (SA) Pty Ltd
1:250,000 SHEET:	Parachilna SH54-13
1:100,000 SHEET:	Wilpena 6634
AUTHOR:	Adrian Brewer
SUBMITTED BY:	Mark Arundell
DATE:	23/02/2010
KEYWORDS:	Copper, zinc, Iron, Mt Neville, Cambrian, Hawker Group, Proterozoic, Rawnsley Quartzite, Parachilna Formation
DISTRIBUTION:	1. Copper Range (SA) Pty Ltd, Perth Office 2. Department of Primary Industries and Resources, South Australia

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SUMMARY

EL 3647 Mt Josephine lies 40km NW of Hawker in the southern Flinders Ranges (Figure 1). It forms part of the Hawker Project area which includes 7 other tenements in the Hawker region.

During the reporting period Nov 2007 – Nov 2008 Copper Range undertook a review of previous exploration data, focussing on zinc, including digitising previous stream sediment samples. In addition, a structural review of the region (including other Copper Range tenements in the area) was undertaken to identify suitable structural settings for Beltana-style zinc silicate mineralisation. The reviews show that the Cambrian Limestone has been thoroughly explored by previous explorers using stream sediment sampling and that all anomalous zinc values were traced back to ironstone development at the Parachilna Formation/Wirrapowie Limestone contact. However, Beltana was discovered from anomalous stream sediment samples of up to 760ppm Zn and higher values than this, of up to 1215ppm Zn have been recorded in the Chace/Druid Range syncline (EL 3647). Nevertheless, previous explorers did not get any encouragement from field investigations following up anomalous stream sediment samples. Due to the nature of zinc silicate mineralisation, a broad scale EM and gravity survey would be best to identify potential targets within EL 3647 and other adjoining tenements.

Exploration during the current period has involved a brief reconnaissance field visit and further review of earlier exploration data

Expenditure during the period totalled $3,177.

1. INTRODUCTION

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement. The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges. Between the ridges (Chace and Druid Ranges) the Parachilna Siltstone and the Wirrapowie and Wilkawillina Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure.

Copper Range took out the tenement to explore for sediment-hosted copper mineralisation associated with basin-scale fluid flow, identified as anomalous alteration zones on ASTER satellite imagery. Copper Range identified several zones of alteration associated with favourable stratigraphy within the Mt Josephine tenement, but follow-up soil and rock chip sampling was not encouraging.

Subsequently, Copper Range changed its exploration focus to Beltana-style zinc silicate mineralisation with the Cambrian carbonates, compiling and reviewing previous exploration data and undertaking a regional structural review to target favourable structural settings. The potential for iron ore development within the tenement is also currently being investigated.

2. LOCATION AND ACCESS

The Mt Josephine tenement (EL 3647) is situated in the Southern Flinders Ranges. The tenement lies some 360km north of Adelaide, approximately 40km northeast of the town of Hawker and 20km southeast of Wilpena Pound National Park. The majority of the tenement falls within the property boundaries of WIllipa and Arkepena Stations. Access to the tenement in the east is via the road to Martin’s Well, off the main road to Wilpena Pound and in the west from the Warcowie Road and Willipa Homestead.

3. TENURE DETAILS

The Josephine tenement EL 3647 was taken out by Copper Range (SA) Pty Ltd, a wholly-owned South Australian subsidiary of International Base Metals Ltd that was floated on the ASX as an independent company in December 2006. Tenement details are summarised in Table 1.

Tenement number	Date granted	Expiry date	Project name	Licensee and operator	Locality	Area km²
EL 3647	06/11/06	05/11/09	Mt Josephine	Copper Range (SA) Pty Ltd	Approximately 40km NW of Hawker	222

Table 1. Summary of tenement details

4. MINING HISTORY AND PREVIOUS EXPLORATION

4.1 Mining

No old mines or working exist within the tenement area. Just outside the eastern boundary of the tenement are some old workings that are marked on maps as an unnamed copper occurrence. However, a visit to this site, where a shaft and some pits have been sunk into ironstone, showed no evidence that copper was mined here. The old shaft at this location is thought to have been dug during the depression years when prospectors were paid by the foot of shaft sunk.

4.2 Past Exploration

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CRA were searching for diamonds and copper, plus gold, rare earth elements, niobium and phosphates associated with diapiric structures in the Arkaba-Worumba area. Stream sediment, gravel and rock chip sampling was undertaken with inspection of historic copper workings located within the diapirs. The results from sampling did not give any encouragement for further testing.

2000 – 2001 Perilya Ltd

As part of Perilya's regional exploration in the Flinders Ranges, they undertook semi-regional soil, stream sediment and rock chip sampling in the Chace/Druid Range area in search of economic base metal deposits. Stream sediment sampling gave a peak result of 1215 ppm Zn, while follow up rock chip sampling gave peak values of 0.78% Zn and 310 ppm Cu. They determined that the style and tenor of observed mineralisation was not appropriate for follow up work.

5. EXPLORATION RATIONALE

Copper Range's initial targets in the Adelaide Fold and Thrust Belt are secondary near-surface oxide copper deposits that are structurally controlled, related to hydrothermal events focused along faults late in the deformational history of the region, and iron ore deposits formed within the Holowilena Ironstone units.

Soil sampling programmes carried out by Copper Range over favourable lithological units have not identified encouraging copper anomalism. The occurrence of some zinc anomalism led to the investigation of zinc silicate mineralisation associated with the Cambrian carbonates in the core of the Chace Range / Druid Range syncline in the western end of the tenement.

The exploration model for zinc silicate mineralisation is based on the willemite occurrences at Beltana, to the north of Hawker. These deposits consist of structurally controlled epigenetic willemite mineralisation deposited during the Delamerian Orogeny in a palaeo-high setting. Precipitation of zinc silicate and surrounding haematite-zinc-dolomite alteration resulted from deep-seating saline oxidising acid ore solutions permeating structures forming karsts and subsequent brecciation. Mineralisation was precipitated in open spaces formed by the karstic collapse breccias (Groves et al. 2003).

Copper Range is therefore targeting areas of brecciation and iron enrichment within the dolomite units within structurally complex settings, together with potential iron ore development within specific stratigraphic horizons.

6. REGIONAL GEOLOGY

Regionally, the area lies within the Adelaide Fold and Thrust Belt, which contains Neoproterozoic to late Cambrian sequences. Rock types recognised within this Precambrian, fault-bounded intracratonic trough are Neoproterozoic in age (1400 to 570 Ma) with terrestrial and marine clastic, chemical and glaciogenic sediments (Preiss 1987). These formations have been deformed and metamorphosed (generally to green schist facies) by at least two major orogenic episodes: the Proterozoic Adelaide Fold Belt orogenic event and a later Early Palaeozoic Delamerian Orogeny (Preiss 1987). Following uplift caused by these deformations, erosion of the exposed older formations has taken place and younger Palaeozoic and Cainozoic sediments unconformably overly the Adelaidean sequences in places.

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana, Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement. The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges (the Chace and Druid Ranges). Talus and scree from the quartzite covers large areas of adjacent sub-cropping Cambrian limestones, which impedes the effectiveness of sampling. Between the ridges, the poorly outcropping Parachilna Formation and the Wirrapowie and Wilkawillina Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure. The published Parachilna 1:250,000 geological map also shows Callana Group rocks outcropping in the core of the syncline.

7. WORK COMPLETED BY COPPER RANGE (SA) PTY LTD

7.1 ACCESS NEGOTIATIONS

The majority of the tenement occurs within the boundaries of Arkapena and Willipa Stations, owned by Stephen Gregory and Dennis Hilder respectively. The landholders have been consulted during each phase of exploration and have been agreeable to all activities.

7.2 REVIEW OF PREVIOUS EXPLORATION DATA

Previous exploration data of EL 3647 was compiled, digitised and reviewed. This showed numerous zinc anomalies but reports and Copper Range sampling indicate that these anomalies are all related to ironstone development at the Parachilna Formation (Pound Subgroup) / Cambrian Limestone boundary. These ironstones are presently being investigated for the potential to host iron ore deposits.

8. CONCLUSIONS AND RECOMMENDATIONS

- Reviews of the potential for zinc silicate mineralisation within the Cambrian Limestones of EL 3647 suggest that it is a highly prospective area for zinc mineralisation.

- Extensive stream sediment surveys and rock chip sampling programmes by previous explorers have identified numerous zinc anomalies

- On follow-up these have been traced back to ironstone outcrops at the Parachilna Formation / limestone boundary

- Further exploration for zinc silicate mineralisation should utilise more broad search tools, namely airborne EM and gravity

- The potential for Iron ore development within the tenement in areas of known ironstone development requires additional investigation.

9. EXPENDITURE STATEMENT

Copper Range (SA) Pty Ltd
Level 1, 33 Richardson Street, West Perth, WA, 6005

EL 3647

Job Activity [Detail]

6/11/2008 To 5/11/2009

Job #	Job Name	Debit
5-1092	Wages/Salaries- Geo/Technical	$2,670.20
5-4030	MV - Fuel & Maint/Parking/Toll	$198.85
5-4048	Travel - Accommodation, Meals	$19.05
	Sub Total	$2,888.10
	Overheads @ 10%	$288.81
	TOTAL	**$3,176.91**

10. REFERENCES

Cook, I; Schmidt, B.L. 1985. Mount Josephine. Progress and final reports for the period 05/12/1983 to 05/12/1985. *Electrolytic Zinc Co. of Australasia Ltd.* Open File Envelope 05472.

Donnelly, M. J; Sugden, S. P. 1991. Arkaba. Progress and final reports to licence surrender for the period 22/12/1989 to 24/05/1991. *CRA Exploration Pty Ltd.* Open File Envelope 08263.

Groves, I. 2001. Chace and Druid Ranges (part of Flinders Ranges Project). First annual/surrender report for the period 16/11/2000 to 15/11/2001. *Perilya Ltd.* Open File Envelope 09799.

Groves, I.M., Carman, C.E., Dunlap, W.J. 2003. Geology of the Beltana Willemite Deposit, Flinders Ranges, South Australia. *Economic Geology*, v. 98, pp. 797-818.

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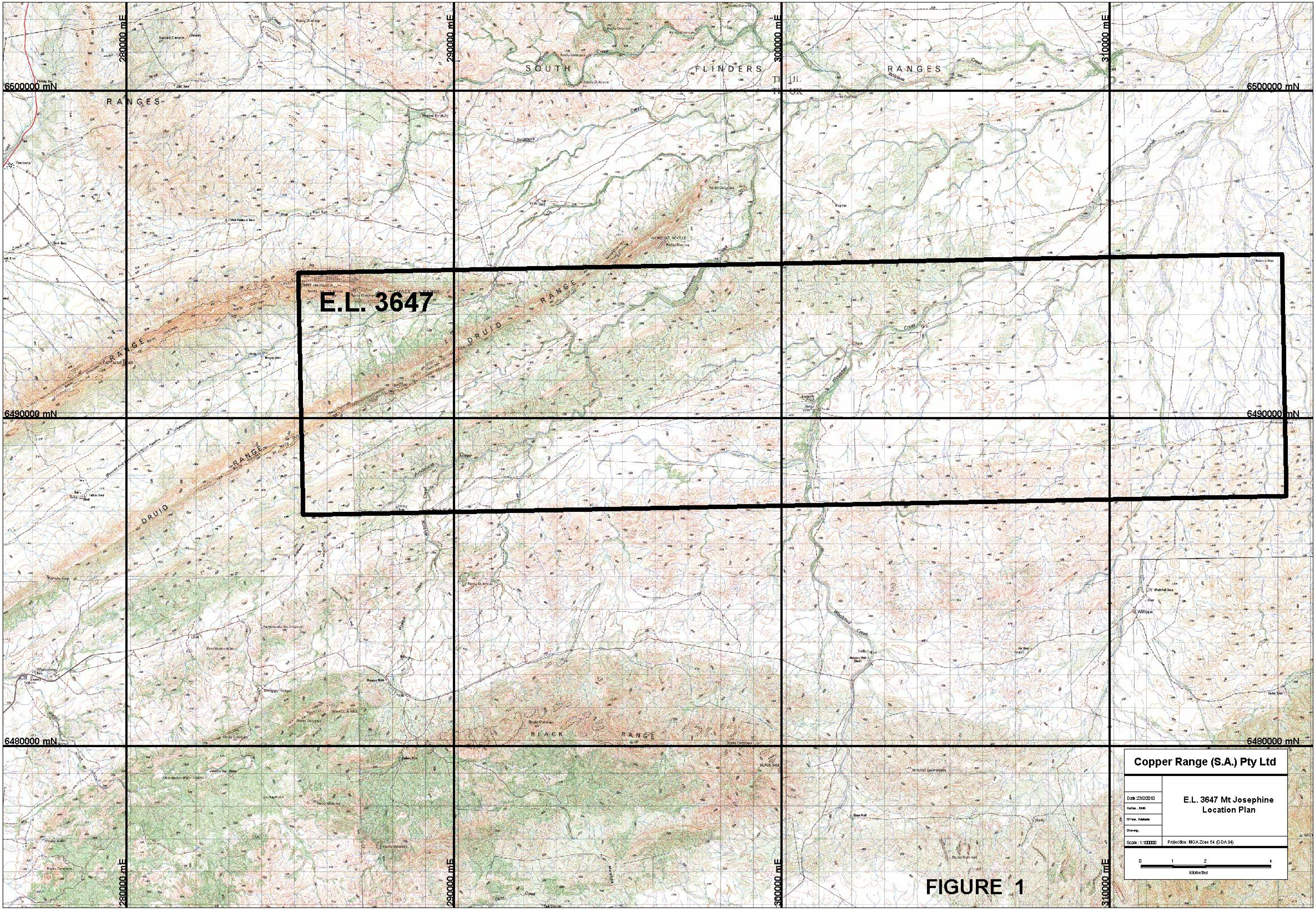
E.L. 3647
280000 mE
290000 mE
300000 mE
310000 mE
6500000 mN
6490000 mN
6480000 mN
SOUTH
FLINDERS
RANGES
DRUID
RANGE
BLACK
RANGE
Copper Range (S.A.) Pty Ltd
E.L. 3647 Mt Josephine
Location Plan
kilometres

FIGURE 1

COPPER RANGE (SA) PTY LTD

FINAL ANNUAL TECHNICAL REPORT
6th November 2009 to 5TH November 2010

EL 3647 – Mt Josephine

TITLE:	FINAL ANNUAL TECHNICAL REPORT FOR EL 3647 – Mt Josephine for the Period Ending 05/11/2010
HOLDER:	COPPER RANGE (SA) Pty Ltd
OPERATOR:	COPPER RANGE (SA) Pty Ltd
1:250,000 SHEET:	Parachilna SH54-13
1:100,000 SHEET:	Wilpena 6634
AUTHOR:	Mark Arundell
SUBMITTED BY:	Mark Arundell
DATE:	6th April, 2011
KEYWORDS:	Copper, zinc, Iron, Mt Neville, Cambrian, Hawker Group, Proterozoic, Rawnsley Quartzite, Parachilna Formation
DISTRIBUTION:	1. Copper Range (SA) Pty Ltd, Perth Office 2. Department of Primary Industries and Resources, South Australia

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SUMMARY

EL 3647 Mt Josephine lies 40km NW of Hawker in the southern Flinders Ranges (Figure 1). It forms part of the Hawker Project area which includes 7 other tenements in the Hawker region.

During the reporting period Nov 2007 – Nov 2008 Copper Range undertook a review of previous exploration data, focussing on zinc, including digitising previous stream sediment samples. In addition, a structural review of the region (including other Copper Range tenements in the area) was undertaken to identify suitable structural settings for Beltana-style zinc silicate mineralisation. The reviews show that the Cambrian Limestone has been thoroughly explored by previous explorers using stream sediment sampling and that all anomalous zinc values were traced back to ironstone development at the Parachilna Formation/Wirrapowie Limestone contact. However, Beltana was discovered from anomalous stream sediment samples of up to 760ppm Zn and higher values than this, of up to 1215ppm Zn have been recorded in the Chace/Druid Range syncline (EL 3647). Nevertheless, previous explorers did not get any encouragement from field investigations following up anomalous stream sediment samples. Due to the nature of zinc silicate mineralisation, a broad scale EM and gravity survey would be best to identify potential targets within EL 3647 and other adjoining tenements.

Exploration during the current period has involved a further review of earlier exploration data.

No compelling targets were identified and the tenement was allowed to expire.

Expenditure during the period totalled $1,131. Total expenditure over the four year period of the tenement was $48,745.

1. INTRODUCTION

The Mt Josephine tenement covers Adelaidean sediments of the Umberatana Wilpena and Hawker Groups that generally strike northwest in the west of the tenement, rotating to E-W trending stratigraphy in the majority of the rest of the tenement. The outcropping Umberatana Group rocks are predominantly siltstones, shales and limestones of the Upalinna Subgroup (Sunderland and Etina Formations, Enorama Shale, Trezona and Elatina Formations). The Wilpena rocks are predominantly siltstones of the Brachina and Bunyeroo Formations, quartzites (ABC Quartzite) and Wonoka Formation shale. In the western part of the tenement (Mt Neville prospect area) the Rawnsley Quartzite (Pound Subgroup) forms a syncline and outcrops as steep, high ridges. Between the ridges (Chace and Druid Ranges) the Parachilna Siltstone and the Wirrapowie and Wilkawillina Limestones form the core of the syncline. The northern limb of the syncline is truncated by a NW trending fault as it folds in towards the syncline closure.

Copper Range took out the tenement to explore for sediment-hosted copper mineralisation associated with basin-scale fluid flow, identified as anomalous alteration zones on ASTER satellite imagery. Copper Range identified several zones of alteration associated with favourable stratigraphy within the Mt Josephine tenement, but follow-up soil and rock chip sampling was not encouraging.

Subsequently, Copper Range changed its exploration focus to Beltana-style zinc silicate mineralisation with the Cambrian carbonates, compiling and reviewing previous exploration data and undertaking a regional structural review to target favourable structural settings. The potential for iron ore development within the tenement is also currently being investigated.

2. LOCATION AND ACCESS

The Mt Josephine tenement (EL 3647) is situated in the Southern Flinders Ranges. The tenement lies some 360km north of Adelaide, approximately 40km northeast of the town of Hawker and 20km southeast of Wilpena Pound National Park. The majority of the tenement falls within the property boundaries of WIllipa and Arkepena Stations. Access to the tenement in the east is via the road to Martin’s Well, off the main road to Wilpena Pound and in the west from the Warcowie Road and Willipa Homestead.

3. TENURE DETAILS

The Josephine tenement EL 3647 was taken out by Copper Range (SA) Pty Ltd, a wholly-owned South Australian subsidiary of International Base Metals Ltd that was floated on the ASX as an independent company in December 2006. Tenement details are summarised in Table 1.

Tenement number	Date granted	Expiry date	Project name	Licensee and operator	Locality	Area km²
EL 3647	06/11/06	05/11/09	Mt Josephine	Copper Range (SA) Pty Ltd	Approximately 40km NW of Hawker	222

Table 1. Summary of tenement details

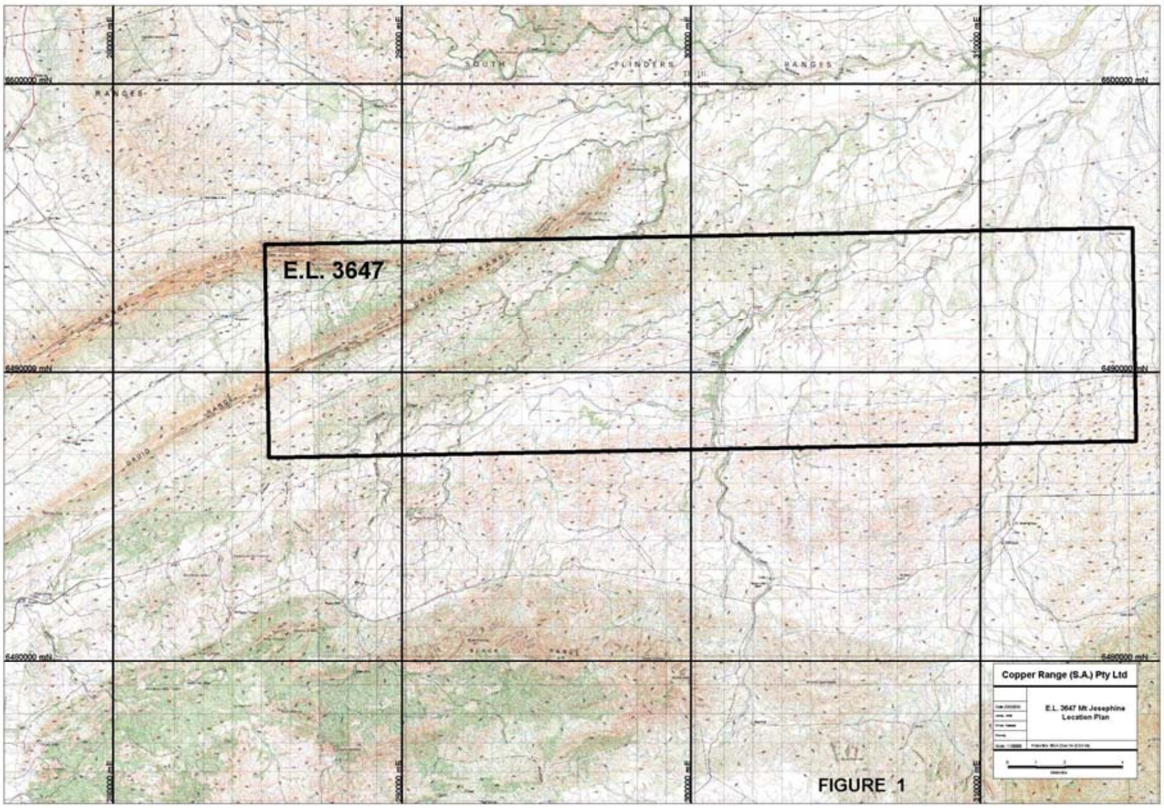

FIGURE 1: Project Location.

4. EXPLORATION RATIONALE

Copper Range's initial targets in the Adelaide Fold and Thrust Belt are secondary near-surface oxide copper deposits that are structurally controlled, related to hydrothermal events focused along faults late in the deformational history of the region, and iron ore deposits formed within the Holowilena Ironstone units.

Soil sampling programmes carried out by Copper Range over favourable lithological units have not identified encouraging copper anomalism. The occurrence of some zinc anomalism led to the investigation of zinc silicate mineralisation associated with the Cambrian carbonates in the core of the Chace Range / Druid Range syncline in the western end of the tenement.

The exploration model for zinc silicate mineralisation is based on the willemite occurrences at Beltana, to the north of Hawker. These deposits consist of structurally controlled epigenetic willemite mineralisation deposited during the Delamerian Orogeny in a palaeo-high setting. Precipitation of zinc silicate and surrounding haematite-zinc-dolomite alteration resulted from deep-seating saline oxidising acid ore solutions permeating structures forming karsts and subsequent brecciation. Mineralisation was precipitated in open spaces formed by the karstic collapse breccias (Groves et al. 2003).

Copper Range is therefore targeting areas of brecciation and iron enrichment within the dolomite units within structurally complex settings, together with potential iron ore development within specific stratigraphic horizons.

5. WORK COMPLETED BY COPPER RANGE (SA) PTY LTD

5.1 Year 1

Copper Range is targeting large alteration zones within porous sandstone units for sediment-hosted copper sulphide mineralisation. Alteration zones have been identified using ASTER satellite imagery. These zones are interpreted to be the result of basin-wide fluid flow and subsequent alteration of suitable host rocks. Copper-bearing fluids that penetrated along favourable structures that cross cut stratigraphy would have precipitated copper at reducing horizons, onto available organic material or disseminated pyrite.

Initially, four targets were identified along the same horizon, associated with a spectral anomaly that indicated stratabound alteration at the base of the Etina Formation, which is stratigraphically equivalent to the mineralised horizon at Kapunda to the south. These targets are known as Stardrift, Stardrift West, Nantabra and Artelevena. An additional target area was identified west of Mt Neville associated with the transition from the oxidised coarse sandstones of the Proterozoic Rawnsley Quartzite (Pound Subgroup) to the reducing carbonates of the Hawker Group limestones. This favourable stratigraphy (the old mine at Kanyaka is also at this location) forms a syncline and is associated with a significant fault that truncates the northern limb of the syncline. A notable ASTER anomaly is also present in this area.

Exploration activities in the Mt Josephine project were initially focussed on the Stardrift, Stardrift West, Nantabra and Artelevena prospects, with more recent exploration focussed on the Mt Neville prospect area.

During the last year (ending 5/11/2007) exploration has included a review of past exploration, reconnaissance visits to prospective sites, interpretation of airborne radiometric and Aster satellite imagery, limited soil geochemical programmes at Stardrift, Stardrift West, Nantabra and Artelevena and a more substantial soil sampling programme at Mt Neville prospect area.

Initial soil and rock chip sampling over the reducing boundary has not shown any anomalous results at Stardrift, Stardrift West, Nantabra and Artelevena. However, at Mt Neville initial samples of float in creeks and outcrop of ironstone yielded anomalous copper and zinc values. This ironstone is probably related to dissolution at the base of the Wirrapowie Limestone. Soil sampling at Mt Neville also showed anomalous results across the siltstone/limestone boundary.

Follow-up soil sampling and mapping was undertaken in the Mt Neville area, with five sample lines extending across the syncline. Results from this sampling are still being reviewed, but some enrichment in copper and zinc is apparent at the base of the Wirrapowie Limestone, which is probably associated with the ironstone. Zinc also shows anomalous values in the Rawnsley Quartzite and in the centre of the syncline over the Mernmerna Limestone.

5.2 Year 2

Soil sampling programmes undertaken during the previous reporting year (Nov 2006 – Nov 2007) were unsuccessful in locating sediment-hosted copper mineralisation associated with porous sandstone units and alteration zones identified by ASTER satellite imagery. The exploration focus in this tenement was therefore shifted to the Cambrian carbonate rocks in the core of the syncline that previous explorers (as well as Copper Range sampling programmes) have shown to be anomalous in zinc. The target is structurally controlled Beltana-style zinc silicate (willemite) mineralisation associated with replacement of carbonate rocks. At Beltana, intense ferrugenisation of the dolomite rocks is observed associated with mineralisation (Groves et al. 2003) which is common within the carbonates of the Mt Josephine tenement. These features, along with significantly elevated zinc values have highlighted the potential for this style of mineralisation within EL 3547.

During the reporting period Nov 2007 – Nov 2008 Copper Range has undertaken a review of previous exploration data, focussing on zinc, including digitising previous stream sediment samples. In addition, a structural review of the region (including other Copper Range tenements in the area) was undertaken to identify suitable structural settings for Beltana-style zinc silicate mineralisation.

The reviews show that the Cambrian Limestone has been thoroughly explored by previous explorers using stream sediment sampling and that all anomalous zinc values were traced back to ironstone development at the Parachilna Formation/Wirrapowie Limestone contact. However, Beltana was discovered from anomalous stream sediment samples of up to 760ppm Zn and higher values than this, of up to 1215ppm Zn have been recorded in the Chace/Druid Range syncline (EL 3647). Nevertheless, previous explorers did not get any encouragement from field investigations following up anomalous stream sediment samples. And due to other exploration commitments Copper Range has not field checked any of the previous explorer's anomalies.

Due to the nature of zinc silicate mineralisation, a broad scale EM and gravity survey would be best to identify potential targets within EL 3647 and other adjoining tenements.

5.3 Year 3

Previous exploration data of EL 3647 was compiled, digitised and reviewed. This showed numerous zinc anomalies but reports and Copper Range sampling indicate that these anomalies are all related to ironstone development at the Parachilna Formation (Pound Subgroup) / Cambrian Limestone boundary. These ironstones are presently being investigated for the potential to host iron ore deposits.

5.4 Year 4 – Work completed in the current reporting period.

The review of the ironstones concluded that so significant potential existed.

6. CONCLUSIONS AND RECOMMENDATIONS

- Reviews of the potential for zinc silicate mineralisation within the Cambrian Limestones of EL 3647 suggest that it is a highly prospective area for zinc mineralisation.

- Extensive stream sediment surveys and rock chip sampling programmes by previous explorers have identified numerous zinc anomalies which have been traced back to ironstone outcrops at the Parachilna Formation / limestone boundary
- The potential for Iron ore development within the tenement in areas of known ironstone development was reviewed with negative results.

7. EXPENDITURE STATEMENT

Copper Range (SA) Pty Ltd
Level 1, 33 Richardson Street, West Perth, WA, 6005

EL 3647

Job Activity [Detail]

6/11/2008 To 5/11/2009

Job #	Job Name	Debit
5-5011	Purchase; Primary Industry and Resources SA	$104.00
	Purchase; Primary Industry and Resources SA	$924.30
	5-2228 T'mnt - Gov Fees, Rates, Rent Net:	$1,028.30
	Sub Total	$1,028.30
	Overheads @ 10%	$102.83
	TOTAL	**$1,131.13**

10. REFERENCES

Cook, I; Schmidt, B.L. 1985. Mount Josephine. Progress and final reports for the period 05/12/1983 to 05/12/1985. *Electrolytic Zinc Co. of Australasia Ltd.* Open File Envelope 05472.

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