

# Final report for relinquished proportion of EL50/2011



View of Mt Cleveland from Whyte River Lookout

**John McDougall BSc.(hons)**

**Ph: 0400 192 570**

**PO Box 90, Sandy Bay, Tas 7006**

## Introduction:

Aus Tin Mining Limited (formerly AusNiCo) is relinquishing part of licence EL50/2011 and retaining part of the area primarily for Nickel exploration.

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## Exploration Philosophy:

The target within EL50/2011 is Avebury style mineralisation (and to a lesser extent tin deposits like Renison or Mt Bischoff). The Avebury style of deposit is remobilised nickel sulfide deposits formed when Carboniferous granites intrude ultramafic formations, thereby producing quantities of magnetite, pyrrhotite and pentlandite which accumulate in trap sites towards the top of altered ultramafic piles.

Avebury style deposits are essentially nickel sulfide skarn deposits formed as the result of extensive serpentinisation of ultramafic formations by major hydrothermal events capable of providing the chemical and physical environment necessary to remobilise, transport and deposit nickel sulfides and iron oxides. The mineralising system always contains magnetite which is variably accompanied by sulfide, and sometimes this sulfide includes the nickel sulfide - pentlandite. The magnetite is formed as a result of serpentinisation of olivine rich ultramafic rocks e.g. dunite, and olivine-pyroxene varieties e.g. harzburgite.

It was thought that to be a source rock for the formation of an Avebury style deposit, the dunite/pyroxenite must also contain nickel, possibly at low levels within the lattices of the principal components of the ultramafics, so that it is released upon serpentinisation. If nickel is not present in the source rocks, then only magnetite and pyrrhotite would form as a result of the hydrothermal alteration. It is now recognised (Keays and Jowitt, 2012) that Nickel is also remobilised from a probable primary magmatic source at depth at Avebury.

Development of Avebury style deposits requires that the ultramafic source rock is extensively altered i.e. serpentinised by a major hydrothermal event which contributes heat, hydrothermal fluids and sulfur to the alteration process. Serpentinisation of a dunite (and to a lesser extent a pyroxenite) will result in the formation of serpentine minerals accompanied by variable amounts of talc and carbonate.

The sulfur source is still possibly the hydrothermal fluids i.e. from the Meredith Granite, however enough sulfur may be scavenged from the ultramafic pile and associated primary mineralisation. If sulfur is not present in the hydrothermal system, then pyrrhotite and pentlandite cannot form, in which case the nickel would probably be deposited in various nickel silicates and the iron will concentrate as magnetite.

For major mineral deposits to form the metals must be transported by the hydrothermal fluids and concentrated in "trap sites" prior to deposition. If the hydrothermal system is essentially a large convection cell, then deposition will be focused near the top of the cell.

Fluid movement paths within the cell will be influenced by structures (faults) and country rock geometry. Trap sites, or mineralisation repositories, may be formed by a combination of structural settings and essentially non-permeable country rocks eg: hornfelsed sediments or volcanics.

If the nickel bearing fluids are not focused, they will continue to circulate within the slowly cooling hydrothermal cell, eventually forming large low grade disseminated deposits within the altered ultramafics or in fracture systems in the enclosing rock formations.

If the nickel sulfides are accumulated in repositories near the top of hydrothermal cells, it is necessary that these sites be largely preserved from subsequent erosion i.e. the best deposits will probably be concealed deposits.

In summary the Avebury model requires the following:

- Granite < 5 kms of current surface
- extensive alteration of ultramafics with resultant production of magnetite
- evidence of extensive hydrothermal processes, including addition of sulfur to the system
- development of substantial structures within the hydrothermal environment to facilitate movement and focusing of hydrothermal fluids
- presence of trap sites for mineralised fluids and subsequent preservation of these sites

## Surrendered Area:

The area to be relinquished is shown on the large scale map below:

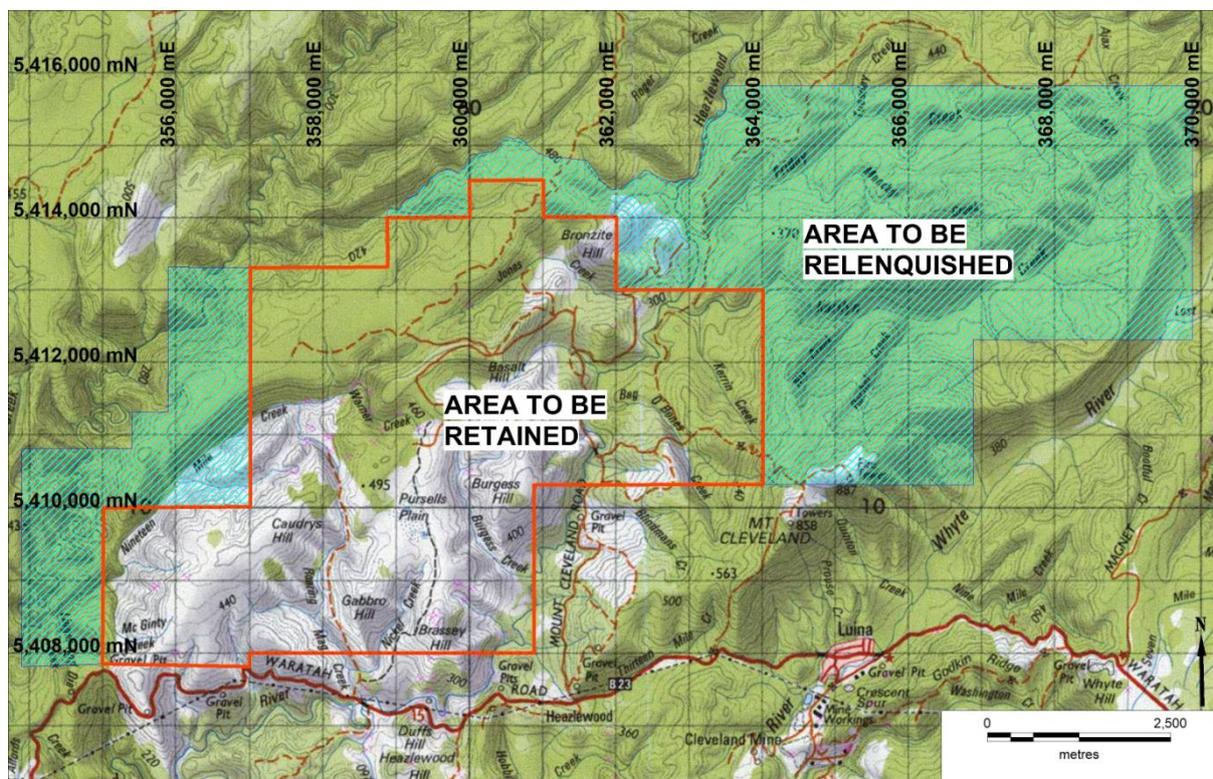


Figure 1 - Area to be relinquished in light blue diagonal stripe

## Exploration Undertaken:

No on ground exploration was undertaken in the areas to be relinquished.

## Details of work undertaken:

The region was assessed for Nickel and Tin potential on the basis of the magnetic character and the proximity of the Meredith Granite, the eastern and Western extremities of the licence did not have the preferred host rocks, magnetic character or proximity to the Meredith Granite for targets to be reliably identified. In addition access to the North of the licence is poor and would likely require an airborne EM survey or similar to help assess any mineralisation potential. This has proven to be beyond the scope of the focussed targeting of Nickel and Tin deposits by Aus Tin Mining.

## Conclusions:

No conclusion can be reliably drawn as to the mineral potential within the relinquished area as on ground works or further surveys were not conducted in these zones. The historic data including stream sediments and geophysical surveys tend to suggest that potential is limited for the target style Aus Tin Mining is seeking.

## Rehabilitation Considerations:

No tracks or other ground disturbing works have been completed.

## Digital Data:

No new digital data was acquired for the relinquished areas.

## Bibliography:

The reports below were used in assessing the area to be retained and the area to be relinquished -

Bates, 2011, Heazlewood Project (Savage River Group) Tasmania, EL31/2003 Partial Relinquishment Report, 22nd March 2011 – 15th June 2011 (TCR 11-6262)

Carthew, 1989, Annual Heazlewood Prospect EL21/85 Annual Report for the period ending 1.12.89 (TCR 89-3054)

Kalla, 2006, Exploration Licence EL31/2003 – Heazlewood, Tasmania, Annual Report for the period ended 26<sup>th</sup> March 2006, Bass Metals Limited. (TCR 06-5320)

Keays and Jowitt, 2012, The Avebury Ni deposit, Tasmania: A case study of an unconventional nickel deposit. *Ore Geology Reviews* 52, 2013 (pp 4-17)

Maher S., 1994 EL 36/1992 Heazlewood, Final and third Annual Report for the Period Ending 5 March 1996. (TCR 95-3777)

Metals X, 1986, Heazlewood Prospect EL21/85 Annual Report for the period ending 1.12.86 (TCR 87-2644)

Newnham, 2003, EL14/2001 Heazlewood, Annual Report year ending 14 September 2002 (TCR 02-4765)

Piggott, 1981, Report accompanying licence renewal application for EL 1/68, Tasmania, Comstaff Pty Ltd 21.5.1981 (TCR 81-1605)

Peck and Keays, 1990, Insights into the behaviour of precious metals in primitive, S-undersaturated magmas: Evidence from the Heazlewood River Complex, Tasmania, *Canadian Mineralogist* Vol 28, 1990 (pp553-557)

Seymour et al. 2006, The Geology and Mineral Deposits of Tasmania: a summary, *Bulletin 72 MRT*

Weber and Murphy, 1997, Heazlewood EL23/1996, Annual and final report for the period ending October 1997 (TCR 97-4807)