4.3 Rylstone Project Summary

Location: Rylstone, New South Wales, Australia

The Rylstone Project is located near Rylstone in New South Wales (NSW). The project area contains a number of intrusions that are considered prospective for rare earths mineralisation. The Bald Mountain phonolite has the largest exposure of these, measuring 1.9 x 1.6 km and is a distinct outcrop in the southern part of the project area (see Figure 6).

Rare Earths Potential

The Rylstone project area has potential for rare earth mineralisation. A circular fault has been reported from aerial photographs of the area as well as a large gravity anomaly. These features may indicate the presence in the subsurface of an alkaline ring complex, which may have fed sub-volcanic intrusions and volcanic lava flows. All of the above features are strong hints that alkaline magmas emplaced in the area are associated with alkaline-peralkaline and carbonatite complexes

About 130 km west of the Rylstone area and about 20 km south of the town of Dubbo, is the Toongi rare earths world-class deposit (Dubbo Zirconia Project, Alkane Resources Ltd). The deposit is estimated to contain a measured resource of 35.7 million tonnes, grading 0.56% niobium and 1.96% zirconium, 0.14 yttrium and 0.745% other rare earths to a depth of 55m, and an inferred resource of 37.5 million tonnes grading 0.46% niobium between 55m and 100m. This deposit is hosted in a sub-volcanic trachyte pipe-like body (allegedly of Jurassic age). Similar intrusions may be present in the Rylstone project area.

It is a point of note that igneous rocks such as phonolites can be associated with carbonatites in sub-volcanic intrusions. Based on the work of Langley and Lishmund (1983), the igneous rocks in the Rylstone project area are mostly phonolites, which are typically peralkaline and silica undersaturated. In the Singleton geological map (1:250,000), basanite and nephelinite have also been recorded; and they too fall in the peralkaline and silica undersaturated field. Some of the project area is located in the western part of this map. The mineral potential for rare earths and the possibility of carbonatite occurrences has not been fully assessed.

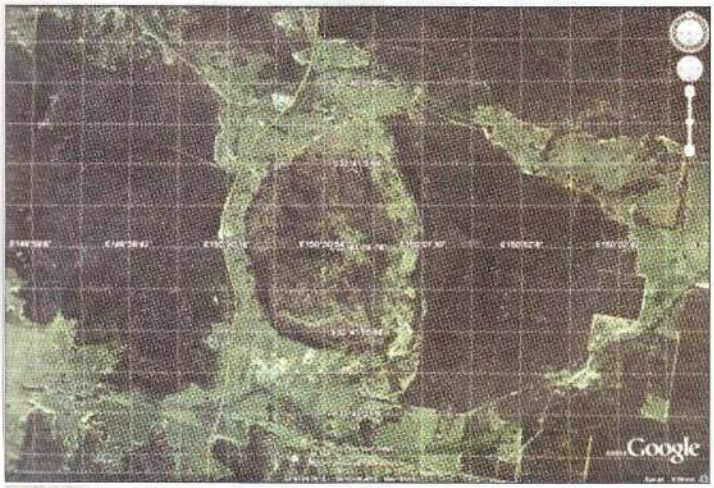

Figure 6 Bald Mountain (Singleton 1:250,000 map sheet) at centre of the image, as shown in a Google Earth image; Bald Mountain is a dome-like phonolitic intrusion (Langley and Lishmund, 1983)

Additional phonolites of Tertiary age that have been identified may include: The Pinnacles, Round Mountain, Bald Hill, Mt. Stormy, Burrembelong Creek. Davids Mountain, Ginghi Creek, Porcupine, Barigan Creek and Horse Gully, Derowen, Narigan Hole, Big Oakeys, Murrumbo Sill and Wollar Sill (Langley and Lishmund, 1983).

Early petrographic analyses of these igneous bodies indicate that they are mostly composed of various combinations of aegirine-augite, olivine, riebeckite (sodic amphibole), sanidine and nepheline as well as alkali feldspar. These igneous rocks are litte known, and detailed field, petrographic and geochronological work is necessary to better define their nature.

Geophysics

Southern Geoscience Consultants (2010) reported on geophysical data (magnetic and radiometric) for the Rylstone project area.

Short wavelength circular to elliptical magnetic anomalies in the area, coincide with the outcrops of phonolites, but some of these anomalies may be due to cultural features. Southern Geoscience also reported that many of these anomalies do not have a radiometric response, suggesting that they are mostly of mafic and/or sodic composition.

The radiometric data shows a number of circular to elliptical features, which are considered more prospective for rare earth mineralisation. These radiometric anomalies appear to relate to outcrops of Meszoic alkaline intrusions and volcanic and are characterised by strong potassium and thorium anomalies, but with less distinct uranium anomalism.

Rylstone Geophysical Interpretation

The Rylstone project (Figure 1) covers a section of the western edge of the Sydney Basin. In this area, the basement geology consists of strongly deformed Palaeozoic (Carboniferous and older) sediments, volcanics and intrusives, overlain by shallow dipping Permo-Triassic sediments and volcanics, including substantial coal measures. These are in turn overlain by flat lying Mesozoic sediments. Scattered outcrops of Mesozoic and Tertiary alkaline volcanics and intrusive suites are present throughout the area. These include alkaline syenites and diorites and their extrusive equivalents. These are considered prospective for rare earth mineralization (Figure 1a). The published Government geological mapping does not distinguish between the Mesozoic and Tertiary volcanic-intrusive suite in the eastern part of the project area (Singleton 1:250,000 sheet).

The magnetic data for the project area includes responses from the Palaeozoic (mostly pre-Permain basement) volcanics and intrusives and the Mesozoic to Tertiary alkaline volcanic suites. The Palaeozoic basement geology is mostly reflected as a series of elongate, northerly trending magnetic units (presumed metavolcanic horizons) and ovoid features that indicate possible syn- to post deformational intrusives. These basement rocks may be prospective for gold and copper-gold mineralization associated with felsic intrusives and along major structures (Figure 1b, Table 1). However, the Palaeozoic basement is obscured by the Sydney Basin and younger sediments and volcanics within the Rylstone project area. This adds to the cost, difficulty and risk of effectively assessing the potential in the older Palaeozoic rocks.

A series of relatively short wavelength (shallow), circular to elliptical magnetic features within and near the Rylstone tenement commonly coincide with outcropping Tertiary volcanics. A mixture of normally and reversely magnetized anomalies is present. Considering the rural and mining activities in the area, some of the smaller, discrete magnetic anomalies are likely to be cultural in origin.

Few of these magnetic anomalies have associated radiometric responses, suggesting that they are either mafic or sodic in composition. The absence of elevated uranium and thorium associated with these magnetic features reduces their prospectivity for rare earth mineralization.

A suite of circular to elliptical features is also evident in the radiometric data. These features are characterized by strong potassium and thorium anomalism, with less distinct and consistent uranium anomalism. These radiometric anomalies generally do not coincide with the magnetic bullseye anomalies. The majority of these distinct potassium-thorium anomalies coincide with outcropping intrusives ± volcanics of the Mesozoic alkaline igneous suite (Googoodery Trachyte?). These potassic volcanics and high-level intrusives are considered prospective for rare earth mineralization. The variable, often minor uranium content may reduce the prospectivity somewhat.

There are indications that the distribution of both Tertiary and Mesozoic intrusive-volcanic lithologies are partially controlled by relatively late stage faults and fractures, mostly oriented northeast and northwest. The resolution of the geophysical data and the published mapping is not high enough to confirm this observation.

Table 1. Summary of the Cu-Au Target Zones shown in Figure 2

Target Area	Description
Zone 1	Largish, zoned Mesozoic–Tertiary phonolite intrusion
Zone 2	Largish, zoned Mesozoic–Tertiary phonolite intrusion
Zone 3	Contact zone between Carboniferous granite, Palaeozoic volcanics ± sediments & strange, possible reversely magnetized intrusive
Zone 4	Possibly dilational, NW trending fault intersecting major regional faults
Zone 5	Possibly dilational, NE trending 'link' fault between major regional faults

Several elongate, often discontinuous uranium channel radiometric anomalies within the data set follow current drainages. This may indicate some potential for remobilized uranium mineralization in the Permian and Mesozoic sediments.

Southern Geoscience Consultants

Rylstone Project – Airborne Magnetic Interpretation

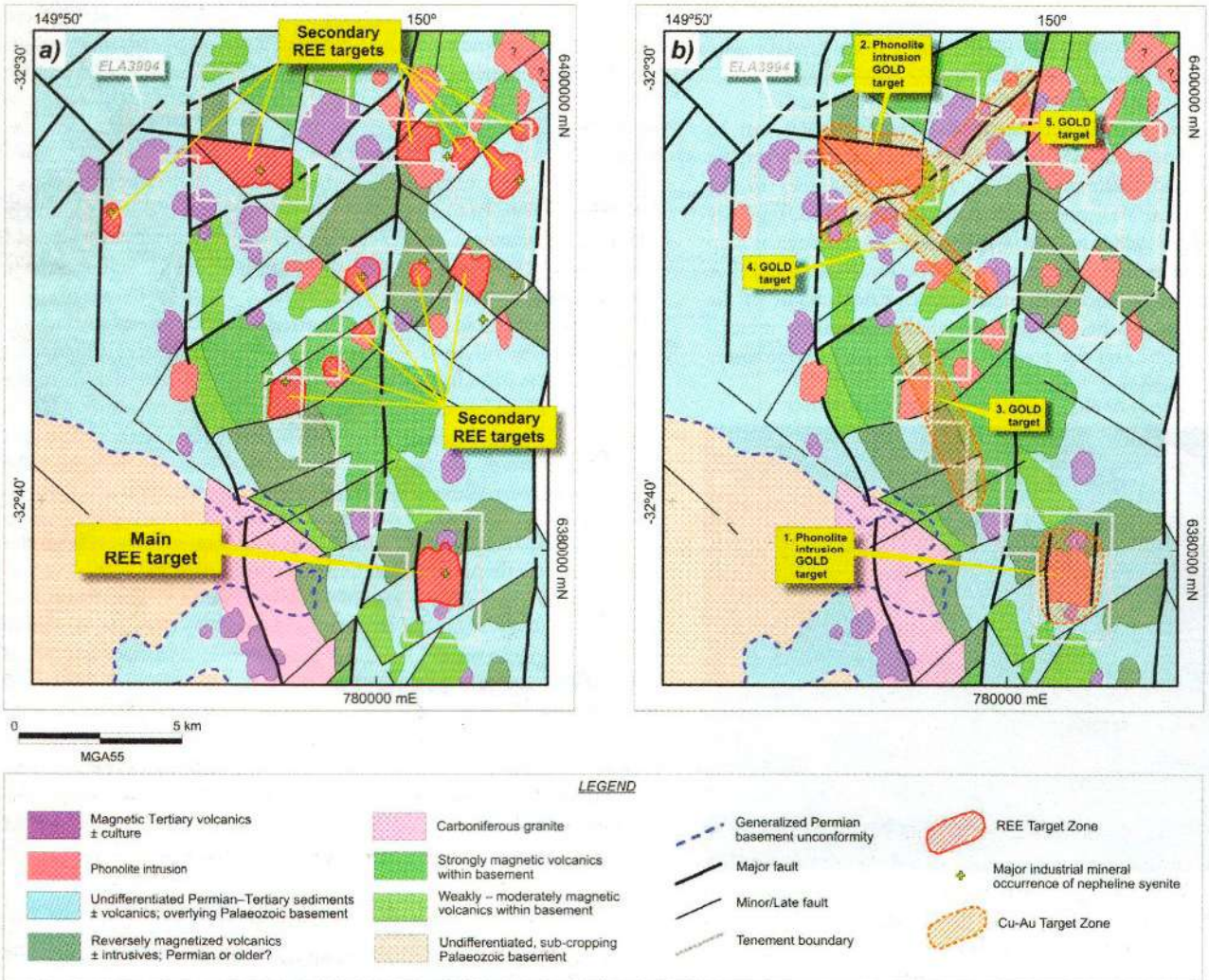

Figure 1. Lithostructural interpretation of the geophysical data over Rylstone, showing a) the potential rare earth target zones and b) the potential copper-gold target zones. See Table 1 for a description of each copper-gold target zone.