Appendix 1: 2011 Geophysical Review

1.0 Introduction

Assessment of historic geophysical maps, profiles, sections and supplied data from 1987 are analysed in this section. The results of the 1966 Swedish AEM survey cannot be located but the rest of the data from 1967 to present is analysed in the subsequent sections. As noted previously the best assessment material was around EPM18244.

2.0 Aeromagnetic Targets

The magnetic anomalies are under sediments and around the intrusive complex as previously discussed. Breaks within these magnetic anomalies are potential haematite alteration zones and are also targets. Magnetic sulphides along the intrusive contact under sediments will be more magnetic at depth, and show the peak of metamorphism temperature by being under the highest sediment peaks.

During the historic data review it became apparent the largest isolated magnetic anomaly in the complex, is under Mt Orange and it has never been drilled. This anomaly is not due to cultural interference as the anomaly has been measured in every single magnetic survey.

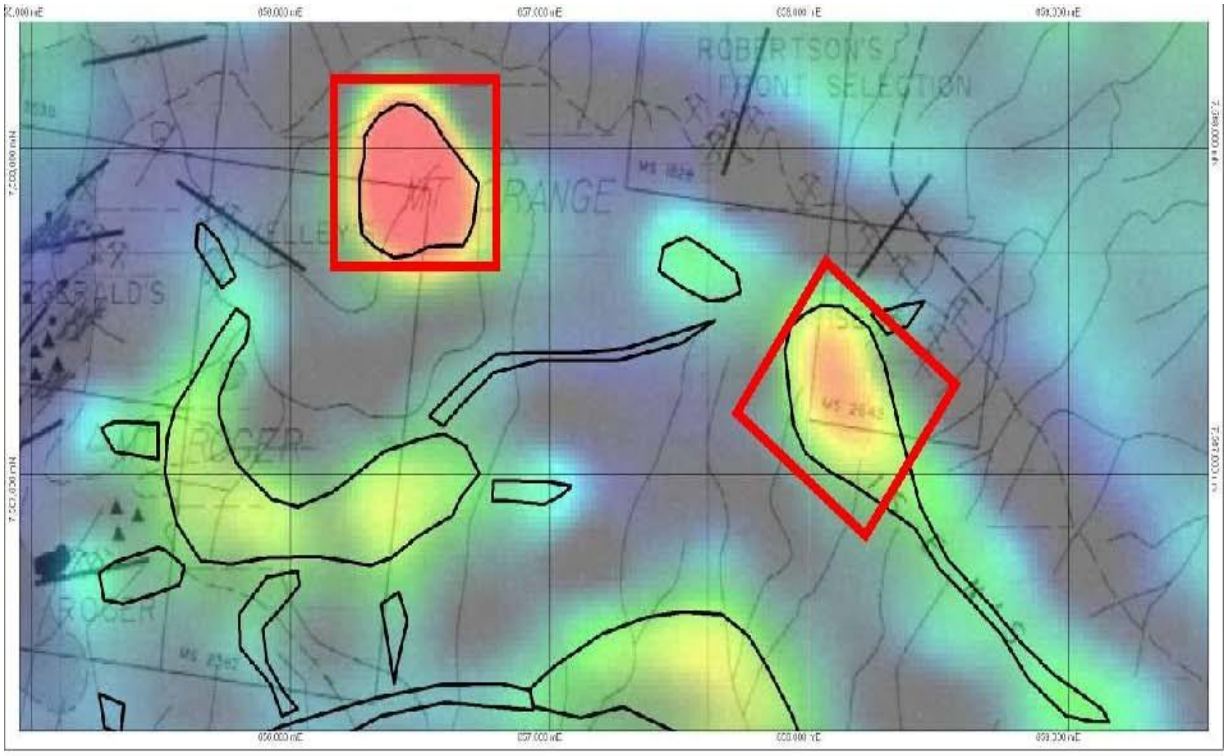

Figure 1. Primary magnetic anomaly under Mt Orange and secondary at Mt Isens

The Mt Orange magnetic anomaly adjoins a linear magnetic anomaly under the Isens range. This has never been drilled from the southern side of the ridge due to the +300m depth required to intersect the granodiorite / slate contact through metamorphosed sediments of the ridge. The Isens magnetic anomaly shown in Figure 1 is also directly down dip from the Isens and True Blue mines, on the north side of the Isens range.

The Isens and True Blue mines are predominately in oxidised material and will not be magnetic near to the surface, but should be magnetic down dip especially if magnetite to hematite alteration has occurred, as hematite is non magnetic.

A less intense folded linear magnetic anomaly is present to the north of the Mt Flora mines (MacFadzen's, Eastern, Douchange, Essie Green Crops mines), and is directly under Mt Flora which means this magnetic target has never been drilled. The effect of the sediment sitting above a basement magnetic anomaly should "dull" the signal amplitudes of any magnetic anomalism, not be the area of the most intense magnetic anomalies in the district.

In 1967 and 1987 magnetic targets defined clearly as under the peaks were never drill tested. This could be that the raw field data was not Reduced to Pole (RTP) so the resultant TMI interpretation would not be precise. In this report all images have been RTP filtered prior to further filtering and individually stretched for anomalously magnetic areas. The following magnetic images have been RTP filtered first, then a 3 x 3 hanning filter (low pass) applied to minimise the FFT ringing issues around the sharp edges of the 200m line spaced survey boundaries, after re-gridding at 50m cell size. Re-locating from AGD66 to GDA94 has also been done, but GPS accuracy is unknown and requires re-acquisition.

A second vertical derivative filter has been applied to the RTP magnetic data to:

a) Locate magnetic centres correctly in space for worm map interpretation

b) Define sharply inflexion points on the magnetic units to define boundaries

Reduction to the pole in this latitude and longitude moves the near surface TMI anomalies +100m to the south, and +200m south for deeper targets such as the targets to the north and south of the pluton under sediment cover. This means previous drill holes drilled to test these targets were not successful, and drilling into the targets along Mt Isens was never performed, only around the margin.

The most magnetic area is at 700nT, with the source circular in shape, and under Mt Orange. As previously discussed, Mt Orange may be part of a linear magnetic unit tightly folded, ie may be the same magnetic stratigraphy as Mt Isens. A simple interpretation of the magnetic areas is shown below, showing the western orange targets as Mt Orange and Mt Isens aeromagnetic targets (Figure 2).

Under Mt Rogers to the south west of Mt Orange is a third magnetic target, a 300nt kidney bean shape between Keeley's mine and Rogers mine and is represented in Figure 2 as the western yellow target. At Roger's mine, it has the only magnetite mentioned in the area within the mineralised envelope, and also has a late stage Lamprophyre dyke intruded along the same structure.

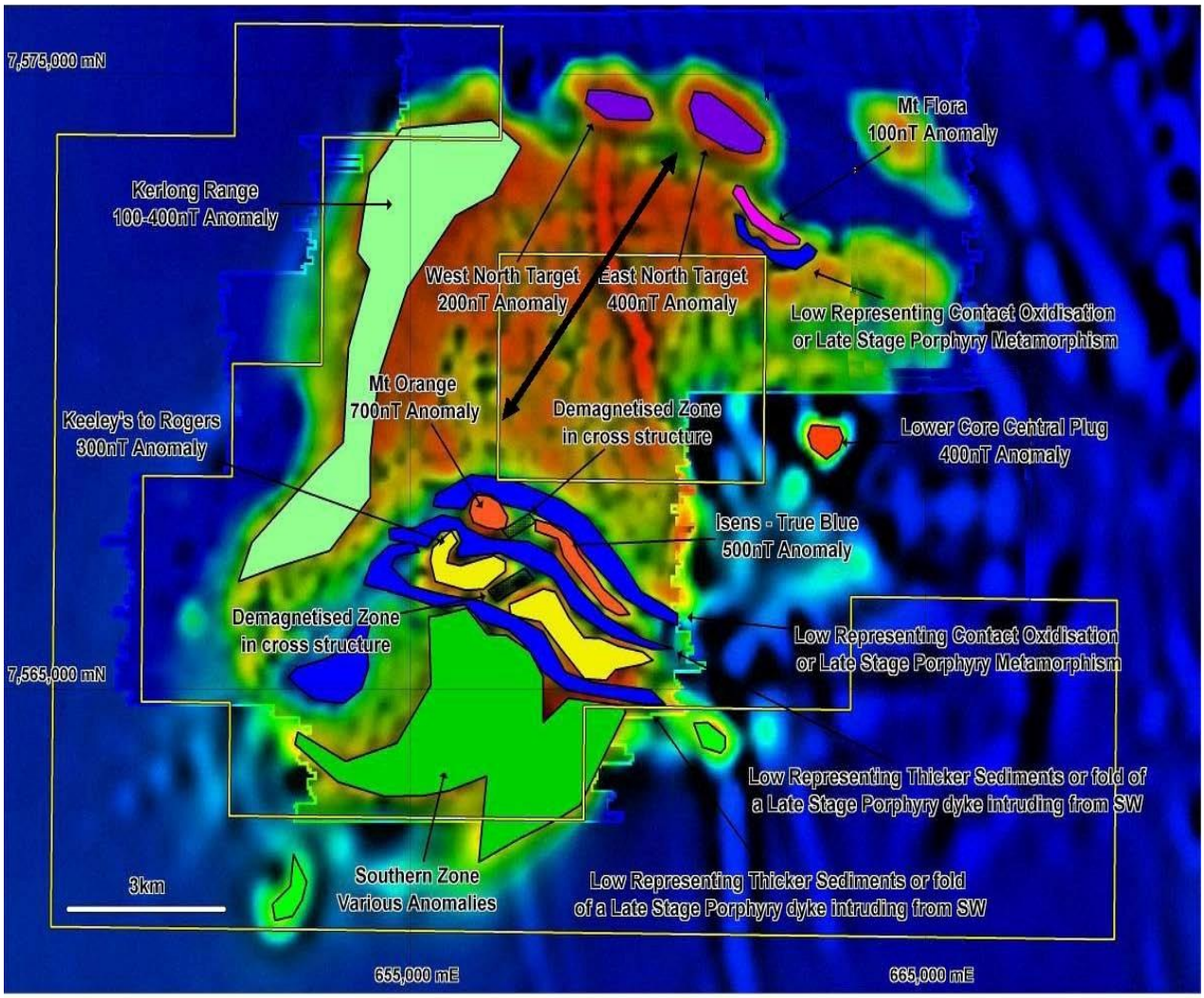

Figure 2. Anomalies are shown as the orange area - Mt Orange-Mt Isens, yellow area - Mt Rogers, pink area - Mt Flora and the purple areas - McFadzens. Blue colours correlate to remanent or negative linear magnetic anomalies at Mt Flora and Mt Orange, linking the two magnetic targets by the lows, not the highs as they are not seen elsewhere in the area. The dark orange anomaly lying eastwards has been referred to as the lower core central plug anomaly. The Lower Core Central Plug aeromagnetic anomaly was picked up in the regional 400m line spaced data, but has been missed historically by the 200m line.

At Mt flora a 1km long, 100nt magnetic anomaly has been defined using the 200m line spaced magnetic data. This magnetic data is still coarse (50m cell size), however the magnetic units appear “blocky” because the survey has been flown along the magnetic strike of East to West (Figure 3).

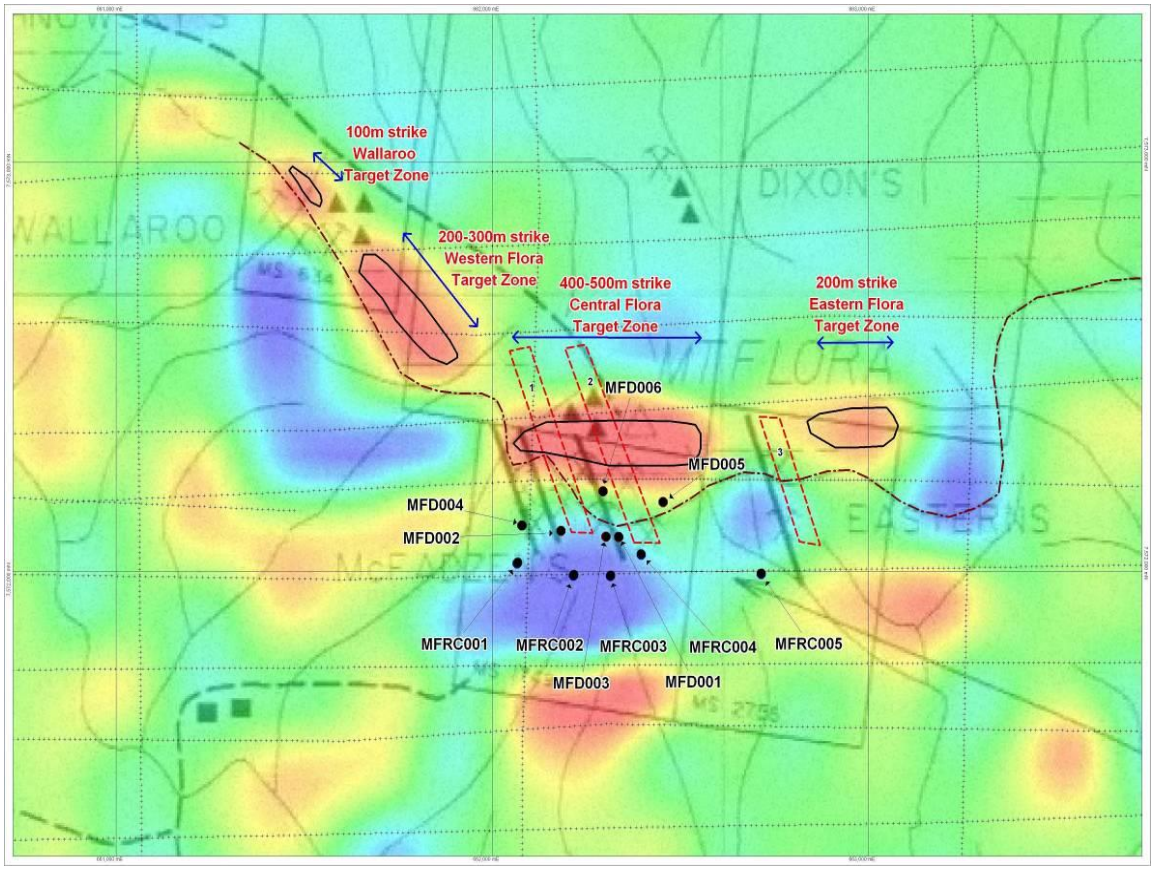

Figure 3: Mt Flora has a subtle 100nt magnetic high / low adjoining to the south.

The magnetic remnant low around the southern margin of Mt Flora is similar in response to the up-dip northern margin low of Mt Isens. This low may have been caused by the original sediment contacting with the granodiorite roof or by the mineralising fluids themselves.

The main exploration question is what is causing the (high and low) magnetic anomalies at Mt Flora and Mt Isens and why do only these deposit areas have magnetic lows adjoining magnetic highs? No rocks have been intersected in the drilling such as magnetite alteration zones near the deposits, but there is potential for sulphides themselves around the margins causing the magnetic anomalies. When the sulphides are fresh and unaltered, they may contain substantial amounts of iron sulphates, which could cause the signal.

The surface exposures around the contact are oxidised, which could indicate hematite mineralisation after magnetite. If this is so only down dip areas (+100m depth) will be the only magnetic zones

3.0 Aeromagnetic Reconstruction

The mineralised contact dips spherically around the granodiorite intrusive with the potential for the magnetic roof of the intrusive being under dipping sediments of 300m-1km thickness in the south and in the north. Mineralised zones in the district were mined to 20 to 50m vertical depth on average, which is entirely within the oxide zone and predominantly around the contact margin.

The ridges above the sediments are directly over the most magnetic units and are potentially down-dip along the contact margin with the granodiorite. 3D magnetic modelling is required once the aeromagnetic data has been acquired as the mineralisation may be located in tight isoclinal folds within the sediments.

As discussed previously, the mineralised unit will not be magnetic until it is deep within the fresh zone. Low magnetism will start to develop in the transition zone from 50 to 100m depth, The magnetic anomalies will therefore be down-dip away from surface oxidisation and groundwater processes.

4.0 Aeromagnetic Worm Interpretation

An aeromagnetic worm interpretation (Figure 4), shows the high magnetic targets. A convoluted, folded sequence to the south of Mt Orange has the Mt Rogers magnetic anomaly appearing to have remnants of magnetic shoots radiating out. The older / detailed aeromagnetic data is sometimes not realistic as it covers only part of the pluton. Figure 23 shows the northern magnetic targets enhanced and fused with the MIM geology map, showing dashed outlines of magnetic anomalies are not plotted in the correct location (TMI). The AEM will determine depth to crystalline basement on these. The dashed line is showing the sheared contact of the core with the roof pennant.

Although this 400m aeromagnetic data is coarse, a merge of both the 200m and 400m surveys is shown. The small targets could be related to height issues and / or line processing busts. A detailed aeromagnetic survey is recommended to fly the entire pluton at 50m line spacing, and this interpretation will be revised then. There is potential the small ore shoots are either magnetic or will appear as small offsets (no magnetic zones) in the magnetic basement.

5.0 Radiometrics Targets

The airborne radiometric data shows anomalous areas around the sediment contact with the granodiorite. These targets will be revised when new detailed radiometric data is collected, at the same time as the new detailed aeromagnetic data is collected prior to final drilling planning.

The radiometric data is old, but focuses attention to Mt Isens – True Blue uranium anomaly, the Mt Isens Thorium anomaly (on the south side of the Isens range), and potassium anomalies at Keeley's, Kerlong, Flora and Quorn (Figure 5).

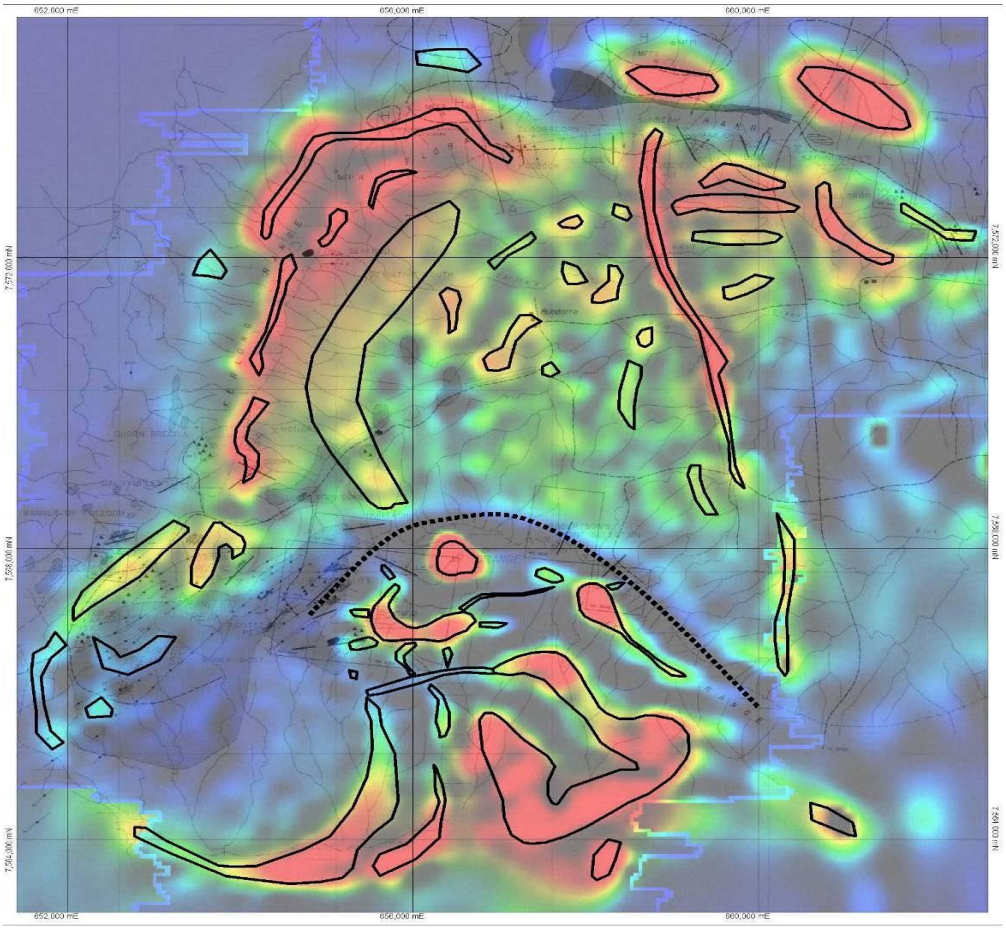

Figure 4 Aeromagnetic worm interpretation

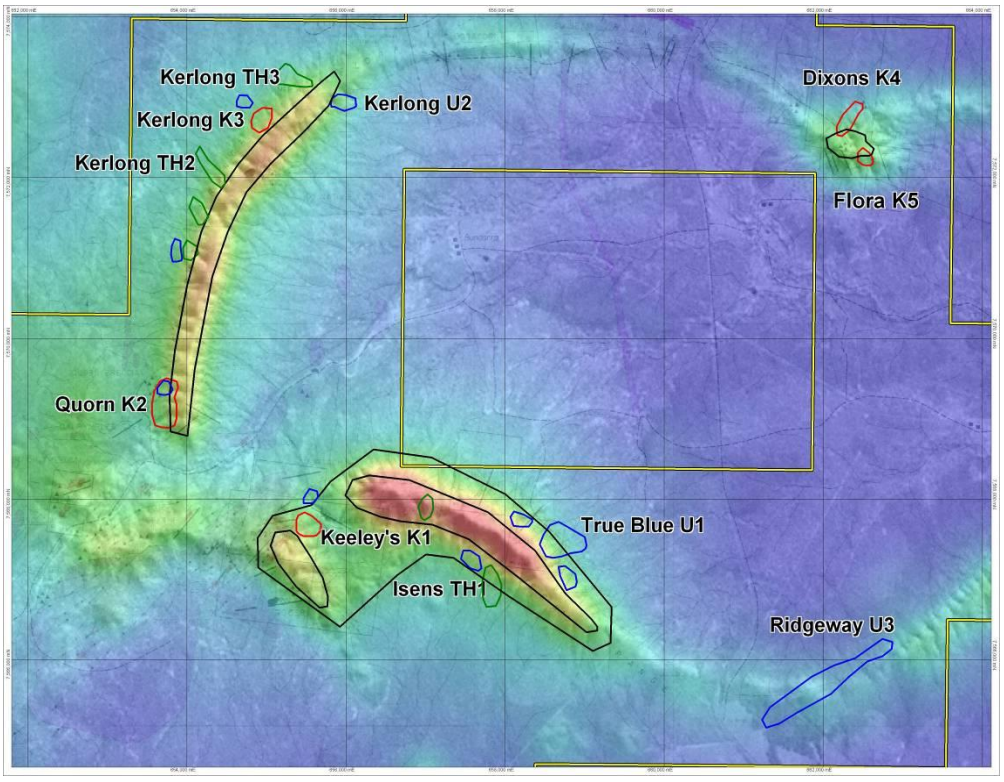

Figure 5: Summary map showing radiometric targets of interest

Potassium anomalies suggesting alteration zones along the contact, have been identified at Dixions, Keeley's, Quorn (especially between the Quorn breccia pipe and underground workings) and Kerlong (Figure 6).
The Potassium channel also highlights an anomaly to the SW of Keeley's mine and is coincident with the Keeley's Rogers kidney bean shaped magnetic target (Figure 7).

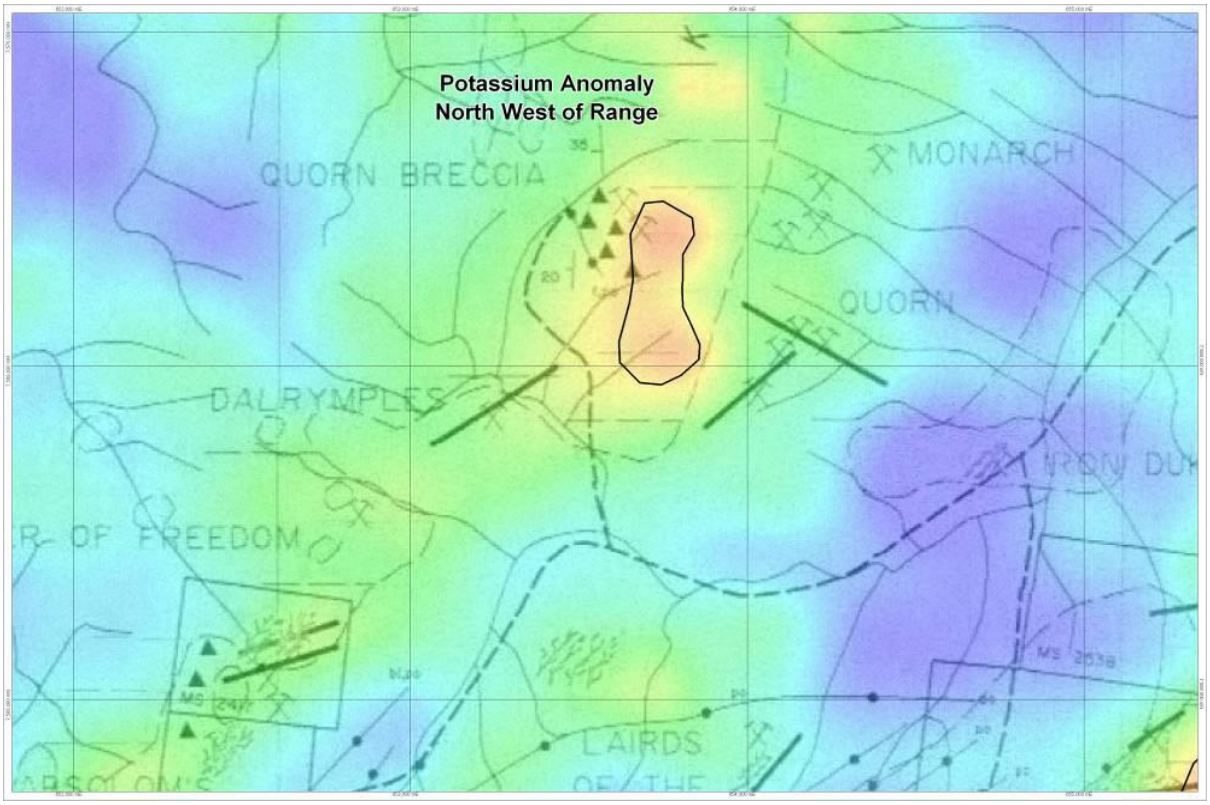

Figure 6: Potassium anomaly uphill from Quorn Breccia require field check

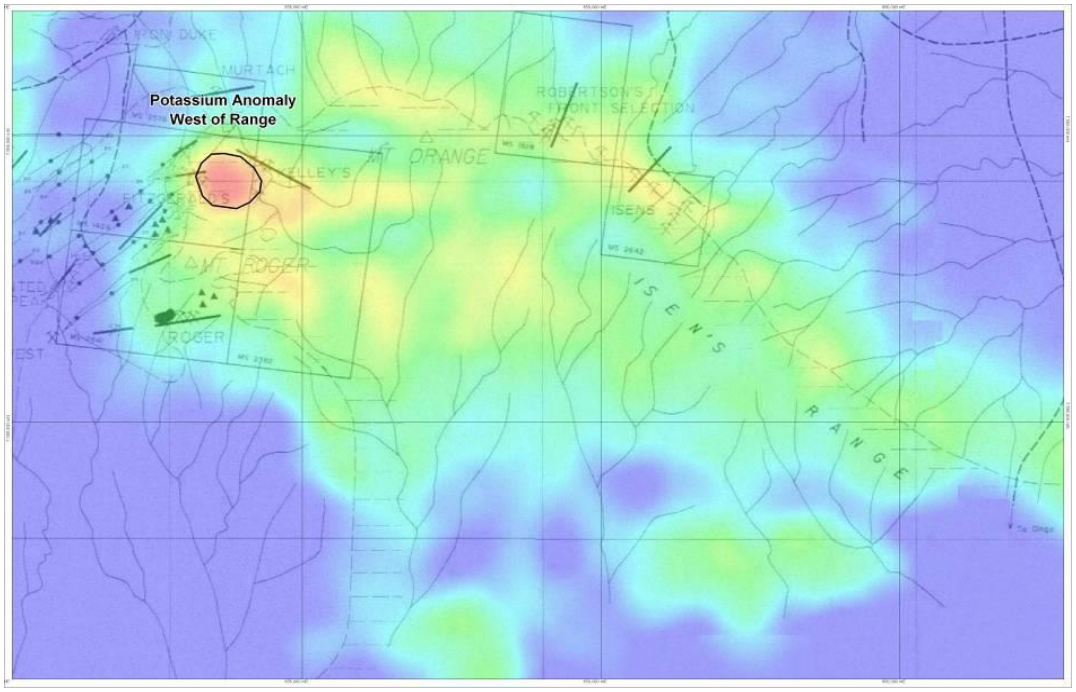

Figure 7: Potassium anomaly SW of Keeley's adjoining magnetic anomaly

Assessing the shape of the pluton, connection may exist between Keeley's and Quorn using the potassium response and location on the ridge, potentially having been pushed apart by the intruding quartz porphyry devoid of radiometric rocks (Figure 8).

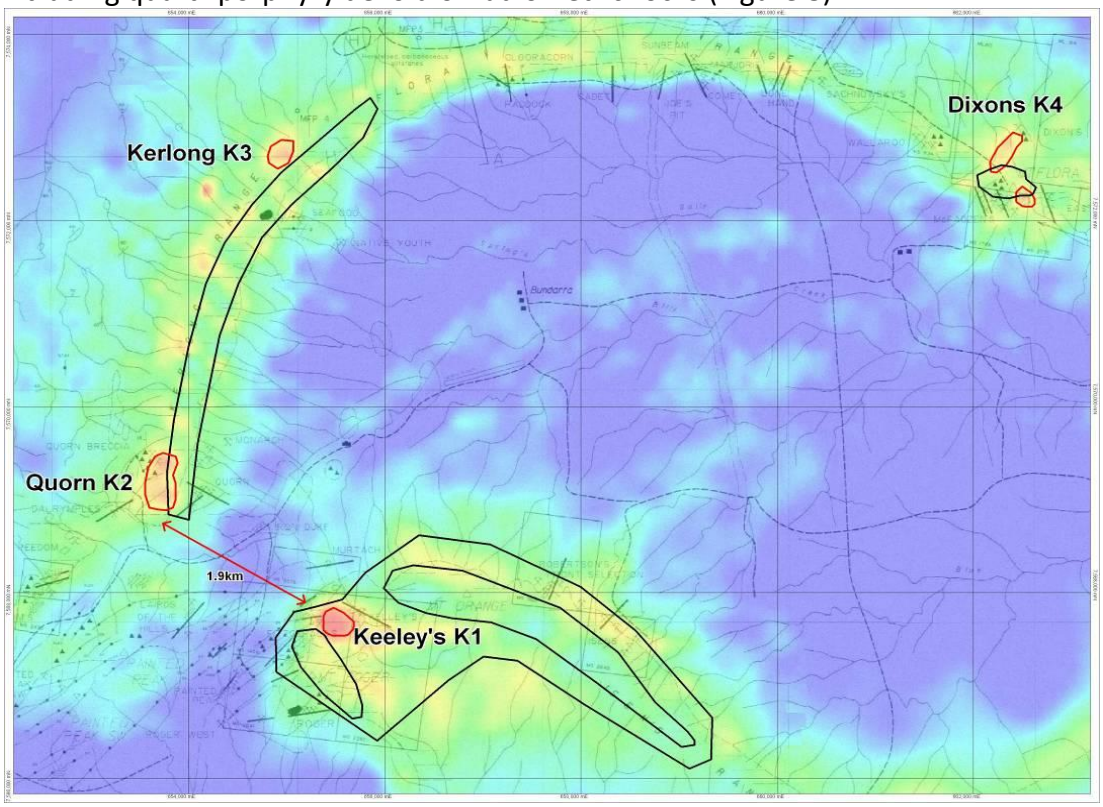

Figure 8: Two potassium anomalies may link Keeley's and Quorn sediments

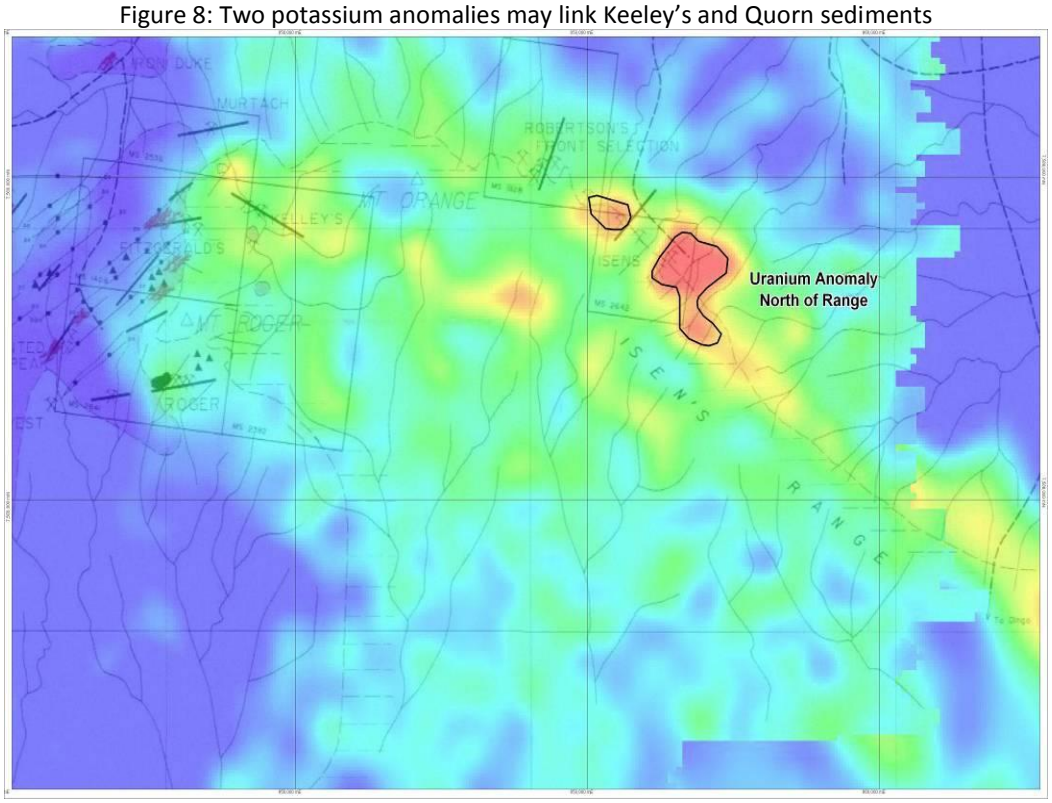

Figure 9: Uranium Anomaly east of True Blue along a weak linear trend

The uranium anomaly is interesting as it is within an area to the south east of True Blue which does not have any workings mapped. There are two broad weakly mineralised trends in the same WNW direction as the magnetic units, and this anomaly is off the other side of the range.

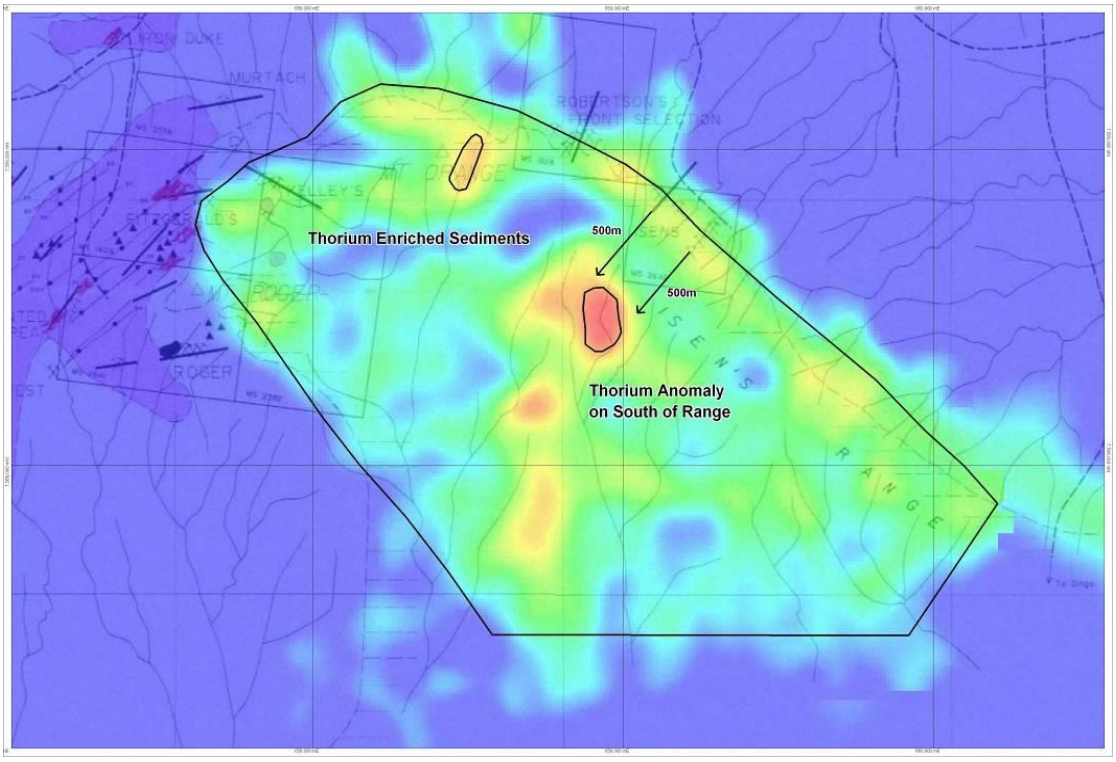

Figure 10: Thorium anomaly south west of Isens on the other side of the range