

Challenges in Mineral Geophysics – Exploration for Unconformity Uranium in Arnhem Land (NT)

Geoff Beckitt*

*Cameco Australia Pty Ltd
Geoff_Beckitt@cameco.com.au*

Andrew Bisset

*Cogema Australia Pty Ltd
Andrew.Bisset@mineraus.com.au*

SUMMARY

Since the late nineties Cameco Australia Pty Ltd and Cogema Australia Pty Ltd have been involved in exploration for unconformity related uranium deposits in Arnhem Land Australia. During this time the exploration model has evolved from the initial Canadian-Athabasca based model. Physical property measurements and field tests have led to the current integrated exploration strategy that incorporates the disciplines of geology, geochemistry and geophysics.

Airborne radiometrics continues to be the primary tool for identifying surface uranium anomalies. However, other geophysical techniques are utilised in order to map basement lithologies, alteration and the depth of sandstone cover, which are also key exploration objectives. With these aims in mind airborne hyperspectral, magnetic and electromagnetic geophysical techniques have been extensively utilised as efficient methods for quickly evaluating large areas where rugged topography prevents effective use of ground techniques. The usefulness of these techniques is discussed utilising examples from Cameco's King River project, located in northern Arnhem Land.

It is shown that .5 s sampling is viable for detailed airborne radiometrics, TEMPEST can be used to estimate the unconformity depth and Hyperspectral airborne surveys can be used instead of ground PIMA measurements for detecting alteration within sandstone.

In both Arnhem Land and the Athabasca, exploration is now focusing on identifying uranium below thick sandstone cover sequences. The Australian challenge is to undertake this exploration without the strong graphitic conductors, which are closely related to the Athabasca unconformity uranium deposits.

Key words: Uranium, Arnhem Land (NT), Radiometrics, Hyperspectral, TEMPEST.