

**GEOCHEMICAL ORIENTATION SOIL-LAG  
TRAVERSE AT THE GARLAND GOLD MINE,  
WINNECKE GOLDFIELD,  
NORTHERN TERRITORY**

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This report presents outcomes of research by CRC LEME for Gutnick Resources NL as support for their search for Witwatersrand style Au deposits in the Ngalia and Amadeus basins, Northern Territory. The Project was commenced in April 1999, concluded in 2000 and was led by Dr I.D.M. Robertson. Agreement was reached between Gutnick Resources NL and CRC LEME on 19th December 2001 to release CRC LEME Reports 144R, 148R and 149R into the public domain through the CRC LEME Open File Report series. It is intended that publication of the reports will be an additional factor in transferring technology to aid the Australian mineral industry.

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## **PREFACE AND EXECUTIVE SUMMARY**

This report is part of CRC LEME's final documentation of input to the Rand Project for Gutnick Resources. It was designed to assist Gutnick Resources in their search for Witwatersrand-style gold deposits in the Amadeus and Ngalia basins in the Northern Territory. This could be facilitated if the influence of the regolith was understood, ensuring correct exploration strategies, sample media and data interpretation methods. The project began in February 1998 and was terminated in February 1999. The principal objectives were:-

- To map and characterise the regolith within the Amadeus and Ngalia basins at reconnaissance and local scales and to understand its development.
- To translate this into sampling and exploration strategies.

Part of the latter objective was to complete orientation work at Garland and Edwards Creek to guide future sampling. This report covers the Garland orientation survey.

Basic knowledge of the geochemical behaviour of pathfinder elements is critical to the determination of a relevant element suite, design of sampling programmes and, ultimately, exploration success. The report illustrates the need to conduct meaningful geochemical orientation surveys, particularly in those regions that have not received much 'modern' exploration. At Garland, elements associated with mineralisation partition into two main size fractions, namely Au, Bi and W into the coarse fractions, and Au, Cu, Hg, S and Sb into the fine. Without this simple recognition, collection of the appropriate size fraction(s) and identification of the geochemical signature of the mineralisation are likely to be fortuitous. There is no significant relationship between Au and Ca so it is unlikely that the regolith carbonates are pedogenic and calcrete sampling may be inappropriate in this region.

I.D.M. Robertson  
Project Leader