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1.0 SUMMARY

In the first year of tenure of Rifle Creek EL 4155, reconnaissance density drainage gravel sampling was completed over the area and samples processed for detection of kimberlitic indicator minerals and microdiamonds. One photocircular feature was loam sampled. All samples reported negative results.

From data review of a 1978 low level, high sensitivity aeromagnetic – radiometric survey flown over since-relinquished EL 1875, one magnetic feature within EL 4155 was selected for follow-up investigation as a possible kimberlitic diatreme. Ground magnetometer traverse profiles and geochemical assay results of an outcrop sample suggest the presence only of variably magnetic Gold Creek Volcanics.

2.0 ASSESSMENT

Reconnaissance exploration within EL 4155 has given only negative results. Positive results in adjacent ELs 4077, 4166, however, are considered to justify an intensified exploration phase including the area of EL 4155.

3.0 INTRODUCTION

In November 1978, a detailed, low level airborne magnetic and radiometric survey was flown over the area of CRAE EL 1875 as part of an exploration programme for uranium and copper-bearing breccia pipes of the Redbank-type (Fraser, 1980).

EL 1875 was subsequently relinquished 14 April 1980.

Rifle Creek EL application 4155 was lodged 17 November 1982 for an area of 90 blocks (295 square km), part of the area previously covered by EL 1875, and was granted 19 May 1983 (Plan NTd 2006).

The area was taken up for exploration for diamondiferous kimberlites by a combination of drainage gravel sampling for indicator mineral observation and data review of the 1978 detailed aeromagnetic survey and EL 1875 exploration results, aimed at recognition of diatreme targets.
Most of the EL area is on the Cainozoic sand and soil blanketed, broad, flat coastal plain of the Gulf of Carpentaria. The inland limit of the coastal plain is marked by a 100m high NNW-trending escarpment, with a plateau of generally flat lying Proterozoic basement Gold Creek Volcanics and Hobblechain Rhyolite occupying the southwest sector of the EL. Low-relief basement inliers are exposed through the coastal plain sediments in places.

Advice was received from the Aboriginal Sacred Sites Authority that there were no registered sacred sites within the area of EL 4155.

4.0 DRAINAGE AND LOAM SAMPLING

Collection of drainage gravel and soil samples was undertaken in two passes. All samples were processed by the CRAE Belmont laboratory for kimberlitic indicator mineral observation and detection of microdiamonds. Sampling data and results are tabulated in Appendix 1 and discussed below. Sample locations are shown on plan NTd 3421.

4.1 First Pass: Orientation sampling

Three samples, 964355 (loam), 964356, 964357 (-4mm drainage gravel), were collected from within the EL 4155 area of as part of a wider random orientation sampling programme. Loam sample 964355 was taken of deflated surficial pisolithic soil over a photocircular soil tone - topographic anomalous feature.

No indicator minerals or microdiamonds were detected in these samples.

4.2 Second Pass: Reconnaissance sampling

Following positive orientation results in EL 4077, a helicopter-supported drainage gravel sampling programme was carried out over the whole area of contiguous EL's 4077, 4155 and 4166. -2mm sieved drainage sediment samples 966432-450, 966534-723 were collected, from trap sites where available, in a pattern aimed at a sampling density of 1 per 20 sq km.
All samples from EL 4155 reported negative for kimberlitic indicators and microdiamonds.

5.0 AIRBORNE GEOPHYSICAL SURVEY

5.1 Survey Specification

A detailed, low level, airborne radiometric and magnetic survey was carried out over the area of EL 1875 in November 1978 by Geoterrax Pty Ltd of Sydney. The logistics report, which contains a detailed description of the survey specifications and descriptions of the equipment used, is contained in Appendix 1 of report CRAE 9923 / NTDME CR 80/32 (Fraser, 1980).

In summary, the survey parameters were:

Line spacing : 250 m
Line direction : N - S
Tie line spacing : 5000 m
Tie line direction : E - W

Terrain clearance : 80 m
Flying speed : 125 knots

Magnetometer interval : 0.8 s
Spectrometer interval : 0.8 s

The recovered flight path was compiled into 1:20 000 plans on an AMG base. Contour plans of residual magnetic intensity and uranium, potassium and total count gamma-ray radioactivity were produced at the same scale to overlie the flight path maps (Fraser, 1980).

5.2 Review of Airborne Survey Data

Data of the 1978 airborne survey were reviewed in detail by Jenke (1983) to select magnetic responses for testing as potential kimberlite targets. Relevant sections of this review are paraphrased below:
Much of the survey area is dominated by the response of the flat-lying Gold Creek Volcanics. This unit produces complex [magnetic] responses over the area of its outcrop, and also in adjacent areas of cover beneath which it obviously continues. The general amplitude variation is of the order of 100 to 200nT, and because of the flat dips and dissected terrain, individual responses tend to be discontinuous.

Responses MAG 1 [within EL 4077 (Colliver and Jenke, 1983)] and MAG 2 [within EL 4155] were chosen as relatively higher amplitude features within an area of disturbance probably related to the Gold Creek Volcanics in the subsurface.

MAG 2 is a pole of about 200nT on the edge of outcropping Gold Creek Volcanics marked by a semi-continuous line of such poles generally trending NW-SE. The response chosen as distinctive is of larger amplitude than others along the same trend.

The airborne radiometric response of the cover to the north is low on all channels, while the Gold Creek Volcanics at the MAG 2 position and to the south are shown by an increase in the potassium channel response level.

"MAG 2" is located on accompanying aeromagnetic contour plan NTd 1164d (reproduced from Fraser, 1980) and sample location plan NTd 3421. Aeromagnetic and radiometric profiles are reproduced in Appendix 2.

6.0 MAGNETIC ANOMALY RECOVERY

Anomaly recovery was helicopter-supported, using for navigation RC-9 aerial photographs marked with the estimated anomaly centres.

The position of MAG 2 as plotted from the aeromagnetic survey data lay on the northern side of a low hill of outcrop of Gold Creek Volcanics.

Ground traverses were run with a Scintrex MP-2 proton precession magnetometer and rocks examined and sampled. The magnetometer traverse lines were run magnetic N-S and E-W with a station spacing of 5 or 10m established by compass and pacing. Sensor height was 1.5m. Diurnal variation was checked by repeat readings at a base station, but not removed as it was insignificant in comparison to the response measured.
The ground magnetometer profiles were extremely erratic which is typical of outcropping or near-outcropping volcanic sequences containing layers of varying magnetisation. The magnetic susceptibility of hand samples varied from 0.02 to 0.05 SI.

Rock sample 641651 produced no unusual assay results.

Ground magnetometer profiles (1:5000) are included in Appendix 3. Rock sample 641651 geochemical assay results are included in Appendix 4.

7.0 REFERENCES


Fraser, W.J. 1980: EL 1875 Camel Creek N.T. Report for year ending 20.10.79, CRAE Report 9923; NDTME CR 80/32

Jenke, G.P. 1983: Investigation of some Aeromagnetic Responses Camel Creek EL 1875, CRAE Report 130165

Johnston, W.H. 1972: PA 3230 and PA 3239, Hobblechain Creek N.T. Photoseological Interpretation, CRAE Report 2584


8.0 KEYWORDS

Diamonds, laterite, volcanics, diamond indicators, airborne, geophys., mas., geophys.-rad, sampling-drainage, sampling-soil sampling-rock
9.0 KEYWORDS

Diamonds, laterite, volcanics, diamond indicators, airborne, geophys.-mag, geophys.-rad, sampling-drainage, sampling-soil sampling-rock

10.0 LOCATION

Robinson River SE 53-4
Selby 6464

11.0 LIST OF PLANS

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Appendix 1

INDICATOR MINERAL SAMPLING DATA
A PROGRAM IN THE MICRO-GAS SYSTEM TO PRINT A LISTING OF A DATA SET

VERSION 3.2    FEB 1980.

DATA TITLE: MCArTHUR BASIN (EAST) MERGED SAMPLE DATA FILES

THE FOLLOWING VARIABLES ARE IN THE DATA SET:
   EASTAMG    NORTHAMG    SAMTYPE    SAMKG    CONGM    MICROKG    MICR0D    IND

LISTING OF ARCHIVAL INFORMATION FOR THE INPUT DATA

ORIENTATION SAMPLING:

SAMPLE NOS. 964351 - 378
           964812 - 830
PERSONNEL: R.J.REBEK, W.H.JOHNSTON, B.E.HARVEY
SAMPLE COLLECTION BY TOYOTA FROM SITES READILY ACCESSED FROM ROAD/TRACK CROSSINGS OF THE MORE IMPORTANT DRAINAGES OF THE MCArTHUR BASIN
GRAVEL SAMPLES SIEVED -4mm

RECONNAISSANCE SAMPLING PROGRAM:

SAMPLE NOS. 966432 - 450
           966534 - 723
PERSONNEL: I.C.COLLIVER, K.R.ALEXANDER
TRAP SITE SELECTION AND SAMPLE COLLECTION HELICOPTER-BORNE SAMPLING PROCEDURE REFERENCE MUGGERIDGE & TEMBY (1979)
GRAVEL SAMPLES SIEVED -2mm
LABELS LEGEND

EAST
NORTH
SAMTYPE 1 = DRAINAGE "GRAVEL", 2 = LOAM, 3 = ROCK
SAMKG SAMPLE WEIGHT (kg)
IND KIMBERLITIC INDICATOR MINERAL GRAINS OBSERVED
     (1.1 = 1 DIAMOND)
MICROD NUMBER OF MICRODIAMONDS RECOVERED

*************************** INFORMATION ADDED BY CRUNCH ***************************

********** COORDINATE TRANSFORMATION **********
THE LOCAL GRID VARIABLES EAST AND NORTH WERE TRANSFORMED TO
AMG COORDINATE VARIABLES EASTAMG AND NORTHAMG IN ZONE 53

**** NO TRANSFORMATIONS OR SELECTIONS WERE MADE DURING CRUNCH ***

THE FOLLOWING SELECTION CRITERIA WILL BE SATISFIED IN THIS RUN

SAMPLES WITH
EASTAMG BETWEEN 802000.000 AND 820000.000
AND
NORTHAMG BETWEEN 8118000.000 AND 8137000.000
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NUMBERS THAT ARE CODED REPRESENT "SPECIAL VALUES". THESE VALUES WILL BE EXCLUDED FROM ALL CALCULATIONS IN THE MICRO-GAS SYSTEM.
Appendix 2

*MAG 2*
AIRBORNE SURVEY ANALOGUE PROFILES
Appendix 3

*MAG 2*
GROUND MAGNETOMETER SURVEY PROFILES
Appendix 4

*MAG 2* ROCK SAMPLE 641651
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* = Below Detection Limit