EXPLORATION LICENCES: EL22252

"CALVERT HILLS PROJECT"

PARTIAL SURRENDER REPORT

FOR THE PERIOD

22 AUGUST 2002 TO 21 AUGUST 2004

BY

C.A. WASHBURN
TENEMENT REPORT INDEX

OPERATOR: Astro Diamond Mines NL
PROJECT: Calvert Hills
TENEMENTS: Exploration Licences: EL22252
JOINT REPORT PERIOD: 22 August 2002 to 8 July 2004
DUE DATE:
AUTHOR: C. A. Washburn
STATE: Northern Territory
LATITUDE: S17° 22’ – S17° 30’
LONGITUDE: E137° 25’ – E137° 36’
MGA mN: 8063000 - 8076000
mE: 759000 - 777000
1 : 250,000 SHEET: SE5308 Calvert Hills
1 : 100,000 SHEET: 6363 Calvert Hills, 6463 Wollogorang
MINERAL FIELD:
COMMODITY: Diamonds
KEYWORDS: Diamonds, aeromagnetic survey, Landsat Interpretation, data review, geology, surface sampling
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1 SUMMARY OF EXPLORATION ACTIVITIES

This report describes exploration work carried out over the partial surrender portions of EL 22252 during the period 22 August 2002 to 21 August 2004. Exploration included acquisition of geological, topographic and geophysical data, GIS compilations and data reviews, compilation of openfile data.

2 TENEMENT STATUS

Fifty percent of EL 22252 was surrendered on 21 August 2004.

3 LOCATION AND ACCESS

The Calvert Hills Project covers approximately 8,347 square kilometers surrounding and east of the Merlin diamond field. Tenements cover the Bauhinia Downs, Robinson River and Calvert Hills 1:250,000 map sheets. Access to the area is via the Carpentaria Highway, east from Daly Waters to Cape Crawford, Borroloola and from the south via Wollogorang.

4 GEOLOGY

All the economic diamond deposits and other significantly diamondiferous occurrences in Australia occur on the North Australian Craton ("NAC"). The NAC underlies the Kimberley region of northern WA, the northern two thirds of the NT and the north western part of Queensland. It is also host to many significant base metal, gold and uranium deposits. The NAC was formed at about 1850 million years (Ma) during the Barramundi Orogeny by the amalgamation of Archaean and early Proterozoic rocks which now form the basement rocks of the NAC. Proterozoic (1820-1600 Ma) platform cover sediments, Palaeozoic volcanics and sediments, and Mesozoic sediments cover these basement rocks. The Palaeozoic volcanics comprise the Lower Cambrian Antrim Plateau Volcanics (about 550 Ma in age) and its equivalents. The only volcanic activity that has occurred on the NAC for the past 500 Ma has been the intrusion of diamondiferous kimberlite at 367 Ma (the Devonian age Merlin kimberlite field), 179 Ma (Jurassic age Timber Creek kimberlite field), and the 25 Ma (Tertiary age) lamproite field in the Ellendale (West Kimberley) area.

The large time span for the intrusion of diamondiferous rocks makes the NAC very prospective for diamond exploration and indicates diamonds have been preserved in the lithosphere below the NAC and that eruption of diamond-bearing volcanic rocks can occur at any time during the last 500 Ma. It is expected that kimberlites would occur in the central parts of the NAC and lamproites would be favored in the marginal areas and in cross cutting Proterozoic mobile zones.

The kimberlites and lamproites of the NAC tend to occur along major north west and north east trending structures. These structures can be seen in the gravity data crossing...
the NAC and have a strike length of many hundreds of kilometers. These structures are interpreted to be fundamental fractures in the NAC and are potential channel ways for diamondiferous intrusives.

4.1 LOCAL GEOLOGY

The Merlin region tenements are centred on the eastern side of the Batten Trough, which comprises Mesoproterozoic rocks of the McArthur Group, which are unconformably overlain in the south east by the Lower Cambrian age Bukalara Sandstone and small outliers of Cretaceous sediments. The McArthur River lead-zinc mine is located near the north western boundary of the Merlin Project area.

The Calvert Hills region tenements are situated in the north east section of the NAC, to the west of the Queensland border. The surface geology comprises mainly Mesoproterozoic sediments and volcanics, which are locally overlain by Cretaceous marine sediments. The Proterozoic and Mesozoic sediments are essentially undeformed and flat-lying. Terrestrial conditions have prevailed since the Cretaceous and deep chemical weathering has produced extensive lateritic soils and some silcrete and calcrete deposits (Pietsch et al 1991).

5 EXPLORATION

5.1 DATA REVIEW

The areas selected for exploration are based on a regional diamond prospectivity review carried out by Astro (Wright 2000), and in areas of moderate to high prospectivity, available open ground was covered by exploration licence applications. Open file exploration data were obtained from the Northern Territory Geological Survey (NTGS), a division of the NT Department of Business, Industry and Resource Development (DBIRD), formerly the NT Department of Mines and Energy (DME).

Available exploration data comprised open file reports of past exploration activity, NTGS and company open file airborne geophysical survey data and Landsat 7 thematic mapper (TM) data. The data was available on CD-ROM by request to the NTGS.

Open file exploration reports were examined and diamond exploration sampling data entered into Excel and a GIS database. Topographic and geological maps at a scale of 1:250 000 were acquired in raster format as a base for the plotting of the data (Figure 3).

The NTGS supplied the available geophysical data as located data files and processed grid images. Astro has acquired approximately 1 million line kilometers of geophysical over the Northern Territory. Stacked magnetic profiles of the first vertical derivative of the residual magnetics were processed from the located data and imported into the GIS. Images of total magnetic intensity and vertical derivatives were supplied by the NTGS. The stacked profiles were used to select pipe-like targets that may represent kimberlite or lamproite intrusives (Figure 4).

Geophysical processing was conducted in-house and a number of anomalies defined. The examination of stacked profiles is considered essential in searching for pipe-like targets as the gridding routines used to prepare images, smooth the data and hence
hide small targets. A pipe response may only occur on one line when using regional data and would be missed if only images are used.

Magnetic targets were numbered using the abbreviated 1:100 000 map sheet name and a sequential number. The line spacing of these regional surveys ranges from 300 to 500 m, and has been used to detect pipe-like responses on one or more lines. The aim is to detect a pipe field by finding at least one pipe with the regional data, and then to acquire more detailed geophysics to identify other pipes in the field.

Landsat TM data was processed in-house using ERMapper and RGB colour images were produced comprising channels 321, 531, 741 and principle components (PC) 123. Thirty-three Landsat scenes have been acquired from the NTGS over the Northern Territory, covering all of the tenement areas.

No targets were generated in the relinquished portion of the tenement.

5.2 PREVIOUS WORK

Ashton and Rio Tinto have carried out exploration to varying extents on various parts of the area. Past conventional indicator mineral sampling has recovered macrodiamonds, microdiamonds and chromite indicator minerals. EL 22252 lies in the central part of the Calvert Hills 1:250 000 map sheet. The EL straddles the NW-SE trending Calvert Fault. Ashton recovered three microdiamonds but follow-up failed to indicate a source.

5.3 GEOPHYSICS

The area is covered by regional aeromagnetic data complied by the NTGS Robinson River and Barkly surveys and open file company survey data.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Direction (degrees)</th>
<th>Line Spacing (m)</th>
<th>Height AGL (m)</th>
<th>Sample Interval (m)</th>
<th>Resolution (nT)</th>
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<td>090</td>
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<tr>
<td>Barkly Area 1</td>
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<td>80</td>
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<td>Wollogorang A</td>
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<td>0.001</td>
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<td>200</td>
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<td>7</td>
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<tr>
<td>Wollogorang C</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Stacked magnetic profiles for the Robinson River and Barkly surveys have been produced and examined for pipe-like targets.

5.4 LANDSAT7 TM

Landsat TM data was processed in-house using ERMapper and RGB colour images were produced comprising channels 321, 531, 741 and principle components (PC) 123. Thirty-three Landsat scenes have been acquired from the NTGS over the Northern Territory, covering all of the tenement areas.
6 BIBLIOGRAPHY

