ANNUAL REPORT E.L. 4373

12th September, 1984
to
11th September, 1985

Volume 1: Text, Plan 1 & Figures

OPEN FILE

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Operator: Ashton Mining Limited
Sheet Reference: Mt. Drummond (SE 53-12) 1:250,000
Submitted to: Department of Mines & Energy

Ashton Mining Limited
444 Queen Street
Brisbane. 4000

NORTHERN TERRITORY GEOLOGICAL SURVEY

October, 1985

CR 85/246A
ABSTRACT

During the period 12th September, 1984 to 11th September, 1985, Ashton Mining Limited as Manager of the A.D.E. Joint Venture carried out an exploration program in E.L. 4373 aimed at the location of kimberlite pipes.

A program of airborne remote sensing using thematic mapper techniques was conducted over the whole of the licence area. Additional work undertaken included airborne and ground magnetics and follow-up loam sampling.

A number of targets remain which will require further testing during the next field program.
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1.00 INTRODUCTION

Exploration Licence 4373 covers an area of 1,562 square kilometres (485 blocks) on the Mount Drummond 1:250,000 sheet (refer to Figure 1).

The licence, which was granted to Aberfoyle Exploration Pty. Limited on 12th September, 1983, is subject to the A.D.E. Joint Venture Agreement between Ashton Mining Limited, A.O.G. Minerals Limited and Aberfoyle Exploration Pty. Limited, concluded on 9th September, 1980. Ashton Mining Limited is the Manager of the Joint Venture.

During the second year of tenure of the licence, two airborne surveys were conducted in the Mount Drummond region and included the entire licence area of E.L. 4373. The surveys were that of thematic mapping and airborne magnetics. Potential target areas defined by the airborne magnetic survey were subject to ground magnetic surveys and follow-up loam sampling.

This report gives a summary of the work carried out in E.L. 4373 during the period 12th September, 1984 to 11th September, 1985.

A statement of expenditure covering this period is included in the report.
TABLE 1

SURVEY SPECIFICATIONS.

Instrument: Daedalus 1268 Scanner (11 channels)

<table>
<thead>
<tr>
<th>Channels available:</th>
<th>Channel</th>
<th>Wave length (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>0.42 - 0.45</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>0.45 - 0.52</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>0.52 - 0.6</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>0.605 - 0.625</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>0.63 - 0.69</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>0.695 - 0.75</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>0.76 - 0.9</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>0.91 - 1.05</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>1.55 - 1.75</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>2.08 - 2.35</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>8.5 - 13</td>
</tr>
</tbody>
</table>

Aircraft: Beech King Air

Flying Altitude: 8000 metres above ground level

Ground Element Size: 20m x 20m

Flight Times: 0930 hours to 1430 hours

Azimuth of Runs: North or South

Overlap between runs: 40%
2.00 AIRBORNE THEMATIC MAPPER SURVEY

An airborne thematic mapper survey, undertaken on behalf of the A.D.E. Joint Venture by the National Safety Council of Australia, Victorian Division ("NSCA"), was flown over the whole of the licence area. Specifications for the survey are given in Table 1.

Thematic mapping was chosen over other remote sensing exploration methods as it had the advantage of using an eleven channel scanner giving a larger number of spectral bands which can be discriminated and because all data collected is digitized allowing for the greatest flexibility in manipulation of the data.

Within Exploration Licence 4373 the exploration method of thematic mapping was aimed primarily to enhance or distinguish between a possible kimberlite body and its surrounding overburden of undifferentiated Cainozoic black clayey soils, sand, sandy soils and lesser Middle Cambrian and Upper Proterozoic (?) sediments in the western sector of the E.L.

The scanner data in the form of 'quick look paper prints' collected from the airborne thematic survey, together with all relevant aerial photography, was forwarded to Hunting Geology and Geophysics (Australia) Pty. Limited for examination.
LISTING OF ANOMALIES

The format used for the listing of anomalies is as follows:

<table>
<thead>
<tr>
<th>Anomaly Number</th>
<th>Grading</th>
<th>Map Ref</th>
<th>Air Photo Num</th>
<th>Scanner Run &amp; Description</th>
<th>Size Channel No.</th>
</tr>
</thead>
</table>

ABREVIATIONS

Grading
- H = high (highest priority)
- M = medium (definitely worth checking)
- L = low (probably worth checking)
- X = lowest (of low interest unless supported by additional data)

Map Ref
- Mbo = Mitchiebo
- Mit = Mittlebah

Air Photo Number
- MD = Mount Drummond

Description
- NSC = No stereo coverage

TABLE 2.

THEMATIC MAPPER ANOMALIES - E.L. 4373

217 X Mbo MD7/1878 R10 ch 6-8 Circular feature in colluvium; picked out by subtle vegetation differences. Not anomalous on air photo. 1.2 km.

218 X Mbo R10 ch 11 Diffuse thermal anomaly in sand over dark soil. 1 km.

220 L Mbo MD8/1857 R10 ch 3-10 Subcircular dark tonal anomaly. 450m.

229 L Mbo MD8/1855 R12 ch 3-11 Pale tonal anomaly in dark soil plain. 400m.
### TABLE 2.

**THEMATIC MAPPER ANOMALIES - E.L. 4373**

<table>
<thead>
<tr>
<th>Code</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>232 L Mbo MD6/1921 R11 ch 4-8</td>
<td>Small circular depression. 400m.</td>
<td></td>
</tr>
<tr>
<td>246 X Mbo MD6/1920 R13 ch 11</td>
<td>Indistinct thermal anomaly on NNW linear. Not anomalous on air photo. 250m.</td>
<td></td>
</tr>
<tr>
<td>258 L Mbo MD8/1853</td>
<td>Subcircular embayment in edge of residual surface; has a slight tonal anomaly. 700 x 800m.</td>
<td></td>
</tr>
<tr>
<td>259 L Mbo MD8/1853 R16 ch 1-10</td>
<td>Indistinct elliptical feature; clearer on scanner data. 350 x 800m.</td>
<td></td>
</tr>
<tr>
<td>260 X Mbo MD8/1853 R15 ch 1-2, 6-11</td>
<td>Elliptical feature in tonal anomaly. Less distinct on scanner data. 200 x 300m.</td>
<td></td>
</tr>
<tr>
<td>291 M Mbo MD8/1853 R16 ch 1-11</td>
<td>Small dark tonal anomaly. Appears slightly larger on thermal channel. On air photo seen as patch of softer material in slight depression in harder residual surface. 250m.</td>
<td></td>
</tr>
<tr>
<td>295 X Mbo MD8/1853 R16 ch 3-10</td>
<td>Dark tonal anomaly on E-W fracture. Not anomalous on air photo. 250m.</td>
<td></td>
</tr>
<tr>
<td>317 X Mit MD8/1851 R17 ch 1-11</td>
<td>Circular feature in dissected residual surface. Appears to be patch of cemented gravel in drainage. 300m.</td>
<td></td>
</tr>
<tr>
<td>318 L Mit MD8/1851</td>
<td>Faint circular on pediment slope. 850m.</td>
<td></td>
</tr>
<tr>
<td>334 X Mbo MD8/1851 R17 ch 3-8</td>
<td>Small topo anomaly on major NNW linear. Not anomalous on air photo. 100m.</td>
<td></td>
</tr>
</tbody>
</table>
The procedure used by Hunting in such an examination is listed below:

1. Monoscopic examination of aerial photography.
2. Identification of anomalies from Step 1 on scanner data.
3. Examination of 11 channels of scanner data.
4. Identification of additional anomalies from Step 3 on aerial photography.
5. Stereoscopic examination of all anomalies on aerial photography where stereoscopic coverage was available.

The targets selected by Hunting were rated on a lowest, low, medium or high priority scale. Grading was established solely on the appearance of the anomalous zones without consideration of their position in regard to regional tectonic structures, or their apparent age in relation to residual surfaces.

Within E.L. 4373 seven lowest, six low and one medium priority thematic target were outlined, details of these being listed in Table 2. Anomaly locations are given in Plan 1.
Top number .... Residual Magnetic Profiles
Centre number .... Flight Path
Lower number .... Residual Magnetic Intensity

FIGURE 2
AIRBORNE MAGNETIC SURVEY
PLAN LOCATION

A.D.E. JOINT VENTURE / ASHTON MINING LIMITED
OCTOBER, 1985
AIRBORNE MAGNETIC SURVEY

3.10 General

A fixed wing airborne magnetic survey was flown by Austirex International Limited over the whole of the licence. Refer to Figure 2 for plan locations.

The work was carried out as part of a larger regional airborne magnetic program by the A.D.E. Joint Venture in the Mount Drummond area. Flight line spacing was 300 metres with lines oriented in a north-south direction. Additional survey specifications are listed in the legend to Plan 2.

Results within E.L. 4373 are presented as residual magnetic profiles, flight path and residual magnetic intensity plans (refer to Plans 2 to 22).

3.20 Interpretation and Follow-up

The data collected from the survey was interpreted by Ashton Mining geologists and a number of potential target areas were selected for further investigation. Anomalies were chosen from the stacked magnetic profiles and priority was attached to those discrete anomalies which could not be readily accounted for by the available geology. The position of the anomaly in relation to major structural features was also noted.

Selected targets were subject to field inspection and, where appropriate, ground magnetic surveys. Results of such
surveys within E.L. 4373 are presented as magnetic profiles and contoured plans (refer to Figures 3 to 5). Follow-up loam sampling programs were conducted over two of these potential target areas. Loam samples, which are surface scrape samples usually weighed 15 to 20 kg. In addition one gravel sample was collected to help test the anomalous area.

All sample locations are given on Plan 1.

3.30 Laboratory Phase

All samples collected during such follow-up sampling stages were forwarded to Ashton Mining's laboratory in Perth where they were concentrated by Wilfley Table and heavy liquid separation techniques.

The heavy liquid used was tetrabromoethane with a specific gravity of 2.96. The concentrates were then screened into various size fractions, further concentrated, where required, by magnetic and electrostatic separation techniques and a comprehensive grain by grain examination carried out on the minus 1.0mm plus 0.4mm fractions.

Of the 21 samples collected within the licence, 18 contained no detectable kimberlite indicator minerals. The remaining three samples were each found to contain a single microdiamond. In addition one garnet was identified
through laboratory examination but was considered to be of non-kimberlitic origin.

A complete listing of the laboratory results of all samples is given in Appendix 1.
4.00 FUTURE PROGRAMS

Potential target areas outlined by the thematic mapper survey will be subject to field inspection and, where appropriate, ground magnetic surveys and/or loam sampling.

Further interpretation of airborne magnetic data together with additional ground follow-up in the form of detailed gravel and/or loam sampling and possibly additional ground magnetic surveys may also be undertaken.

Depending on the outcome of such a work program, the thematic mapper data, initially acquired on high density tape may be converted into computer compatible tapes for further image processing.
APPENDIX 1.
RESULTS OF LABORATORY EXAMINATIONS

FOLLOW-UP GRAVEL AND LOAM SAMPLES EL 4373

The following fractions of each sample were studied:

-1.0 mm +0.8 mm; denoted by +0.8
-0.8 mm +0.5 mm; denoted by +0.5
-0.5 mm +0.425 mm; denoted by +0.4

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Results</th>
<th>Comments</th>
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<tbody>
<tr>
<td>MDR 810</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 811</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 812</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 813</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 814</td>
<td>1 -0.4 DIAMOND</td>
<td>1 +0.12 x 0.12 x 0.12 STONE well formed dodecahedron. Weak pink colour.</td>
</tr>
<tr>
<td>MDR 815</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 816</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 817</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 818</td>
<td>1 -0.4 DIAMOND</td>
<td>1 +0.20 x 0.20 x 0.18 STONE very irregular, turbid, pink. Aggregate of cubes.</td>
</tr>
<tr>
<td>MDR 819</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 851</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>Sample No</td>
<td>Results</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------</td>
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<tr>
<td>MDR 881</td>
<td>Nil</td>
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<td>MDR 882</td>
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<td></td>
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<tr>
<td>MDR 883</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 884</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 885</td>
<td>1 -0.4 DIAMOND</td>
<td>1 +0.16 x 0.16 x 0.16 STONE brown, opaque cube. Resorbed corners and one part bevelled off by resorption. One brown radiation damage spot. 1 +0.5 GARNET orange, anhedral with chemically etched surfaces. Not of interest.</td>
</tr>
<tr>
<td>MDR 886</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 887</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 888</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 889</td>
<td>Nil</td>
<td></td>
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<tr>
<td>MDR 890</td>
<td>Nil</td>
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A.D.E. JOINT VENTURE

EXPLORATION LICENCE NO. 4373

EXPENDITURE FOR THE YEAR ENDED 11.9.85

<table>
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<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Salaries</td>
<td>6,418</td>
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<tr>
<td>Field &amp; Laboratory Expenses</td>
<td>54,492</td>
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<tr>
<td>Miscellaneous</td>
<td>5,200</td>
</tr>
</tbody>
</table>

Expenditure for year: $66,110

Date Licence Granted: 12.9.83
ANOMALY MC6/3 MITCHIEBO

Figure 4

October, 1985

NORTHERN TERRITORY GEOLOGICAL SURVEY
CR85/246A
ANOMALY MC6/5 MITCHIEBO

(Note profiles half scale of contour plot.)

FIGURE 5

SAMPLE LOCATIONS MDR 810-819
OCTOBER, 1985

ANOMALY MC6/5 MITCHIEBO
LINE 9200.0 SCALE 1: 10000.0

ANOMALY MC6/5 MITCHIEBO
LINE 9000.0 SCALE 1: 10000.0

ANOMALY MC6/5 MITCHIEBO
LINE 9100.0 SCALE 1: 10000.0

NORTHERN TERRITORY
GEOLOGICAL SURVEY
CR85/246 A