ANNUAL REPORT E.L. 4372
12th September, 1984
to
11th September, 1985
Volume 1: Text, Plan 1 & Figures

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

NORTHERN TERRITORY GEOLOGICAL SURVEY

Ashton Mining Limited
444 Queen Street
Brisbane. 4000

CR 85/269 A
October, 1985
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. 4372 aimed at the location of kimberlite pipes.

Work undertaken included an airborne thematic mapper survey, 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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5. Residual Magnetic Profiles
6. Residual Magnetic Profiles
7. Residual Magnetic Profiles
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1.00 INTRODUCTION

Exploration Licence 4372 covers an area of 1,610 square kilometres (500 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. 4372. 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. 4372 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>0.42</td>
<td>0.45</td>
</tr>
<tr>
<td>2</td>
<td>0.45</td>
<td>0.52</td>
</tr>
<tr>
<td>3</td>
<td>0.52</td>
<td>0.6</td>
</tr>
<tr>
<td>4</td>
<td>0.605</td>
<td>0.625</td>
</tr>
<tr>
<td>5</td>
<td>0.63</td>
<td>0.69</td>
</tr>
<tr>
<td>6</td>
<td>0.695</td>
<td>0.75</td>
</tr>
<tr>
<td>7</td>
<td>0.76</td>
<td>0.9</td>
</tr>
<tr>
<td>8</td>
<td>0.91</td>
<td>1.05</td>
</tr>
<tr>
<td>9</td>
<td>1.55</td>
<td>1.75</td>
</tr>
<tr>
<td>10</td>
<td>2.08</td>
<td>2.35</td>
</tr>
<tr>
<td>11</td>
<td>8.5</td>
<td>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 4372 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 sands and black soil, Middle Cambrian sediments and volcanics of the Burton Beds and Peaker Piker Volcanics and lesser Upper(?) Proterozoic sediments of the South Nicholson Group.

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.
**TABLE 2.**

**THEMATIC MAPPER ANOMALIES — E.L. 4372**

<table>
<thead>
<tr>
<th>Code</th>
<th>Date</th>
<th>Channel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>237</td>
<td>MD6/1920</td>
<td>R14 ch 4-10</td>
<td>Tonal anomaly close to strike ridge. Appears dark on scanner data. 300 x 500m.</td>
</tr>
<tr>
<td>238</td>
<td>MD5/1952</td>
<td>R13 ch 1-11</td>
<td>Subcircular feature. Shows up prominently on scanner data as dark tonal anomaly. Possibly a closed fold - common in this area. 1 x 1.3km.</td>
</tr>
<tr>
<td>245</td>
<td>MD5/1952</td>
<td>R13 ch 11</td>
<td>Two small topo highs on NNW linear. Not anomalous on air photo. 100m and 200m.</td>
</tr>
<tr>
<td>253</td>
<td>MD4/1974</td>
<td>R16 ch 1-6,9-11</td>
<td>Circular feature in drainage. 400m.</td>
</tr>
<tr>
<td>254</td>
<td>MD4/1974</td>
<td>R16 ch 1-5,11</td>
<td>Radial drainage around ?pinnacle. 100m.</td>
</tr>
<tr>
<td>256</td>
<td>MD6/1918</td>
<td>R15 ch 1-2,6-11</td>
<td>Oval structure - partly an erosional feature in drainage. 500 x 800m.</td>
</tr>
<tr>
<td>257</td>
<td>MD6/1918</td>
<td>R15 ch 1-2,6-11</td>
<td>Subcircular feature on minor N-S fault in Proterozoic sandstone. 350m.</td>
</tr>
<tr>
<td>267</td>
<td>MD7/1880</td>
<td>R14 ch 1-11</td>
<td>Elliptical feature in dissected residual surface. Not anomalous on air photo. 400 x 700m.</td>
</tr>
<tr>
<td>268</td>
<td>MD7/1880</td>
<td>R14 ch 11</td>
<td>Distinct thermal anomaly. Not anomalous in stereo. 400m.</td>
</tr>
<tr>
<td>269</td>
<td>MD4/1976</td>
<td>R14 ch 1-5,9-11</td>
<td>Small tonal and thermal anomaly, masked by vegetation on channels 6-8. Not anomalous on air photo. 200m.</td>
</tr>
</tbody>
</table>
### TABLE 2.

<table>
<thead>
<tr>
<th>Code</th>
<th>Survey Area</th>
<th>Survey Year</th>
<th>Channel</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>293 L Mbo MD5/1954 R16 ch 1-6,11</td>
<td>Concentric structure on nose of tight fold. 100m to 300m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>319 X Mit MD7/1884 R17 ch 1-11</td>
<td>Broadening of drainage along NW-trending linear. Shows as 'island' in creek bed on scanner data. 300 x 400m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>320 M Mit MD6/1916</td>
<td>Small topo anomaly on fault displacing Proterozoic strata. Two short ridges (?dykes) radiate from south-east side. 150m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>322 M Mit MD5/1956 R18 ch 1-10</td>
<td>Dark tonal anomaly on NW-trending linear. 550m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>324 X Box MD4/1972 R17 ch 1-11</td>
<td>Circular topo anomaly - possibly outlier of residual surface. More anomalous on thermal channel. 250m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>344 X Mit MD5/1956 R18 ch 7-8,11</td>
<td>Subcircular anomaly seen on thermal channel as smaller topo high. Not anomalous on air photo. 100 x 200m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>348 X Mit MD5/1956 R18 ch 11</td>
<td>Circular structure on fold axis culmination. Not anomalous on air photo. 950m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>536 L Mbo MD7/1882 R16 ch 1-10</td>
<td>Depression on axis of minor syncline in Proterozoic. Less obvious on scanner data. 400 x 600m.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 Number</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

- Ben = Benmara
- Box = Boxer
- Mbo = Mitchiebo
- Mit = Mittiebah

Air Photo Number

- MD = Mount Drummond

Description

- NSC = No stereo coverage

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**TABLE 2.**

**THEMATIC MAPPER ANOMALIES - E.L. 4372**

230 L Mbo MD7/1880 R12 ch 1–10 Circular feature in sand over colluvium. On diffuse NW linear. 700m.

231 L Mbo MD6/1921 Textural anomaly at intersection of NNW and NNW trending linears. 600m.
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. 4372 eleven lowest, nine low and three medium priority thematic targets were outlined, details of these being listed in Table 2. Anomaly locations are given in Plan 1.
### Figure 2

**AIRBORNE MAGNETIC SURVEY PLAN LOCATION**

<table>
<thead>
<tr>
<th>Top number</th>
<th>Centre number</th>
<th>Lower number</th>
</tr>
</thead>
<tbody>
<tr>
<td>..... Residual Magnetic Profiles</td>
<td>..... Flight Path</td>
<td>..... Residual Magnetic Intensity</td>
</tr>
</tbody>
</table>

---

*A.D.E. JOINT VENTURE / ASHTON MINING LIMITED*  
OCTOBER, 1985
3.00 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. 4372 are presented as residual magnetic profiles, flight path and residual magnetic intensity plans (refer to Plans 2 to 28).

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. 4372 are presented as magnetic profiles and contoured plans (refer to Figures 3 to 11). Follow-up loam sampling programs were conducted over three of these potential target areas. Loam samples, which are surface scrape samples usually weighed 15 to 20 kg.

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 30 samples collected within the licence, none were found to contain detectable kimberlite indicator minerals.

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.

At this stage two magnetic targets are proposed for testing by diamond drilling during the next field season.
RESULTS OF LABORATORY EXAMINATIONS

FOLLOW-UP LOAM SAMPLES EL 4372

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 780</td>
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<tr>
<td>MDR 781</td>
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<td></td>
</tr>
<tr>
<td>MDR 782</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>MDR 783</td>
<td>Nil</td>
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<td>Comments</td>
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<td>MDR 896</td>
<td>Nil</td>
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<tr>
<td>MDR 897</td>
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<td>MDR 898</td>
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</tr>
<tr>
<td>MDR 899</td>
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<td></td>
</tr>
<tr>
<td>MDR 900</td>
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</tr>
</tbody>
</table>
APPENDIX 2.
A.D.E. JOINT VENTURE

EXPLORATION LICENCE NO. 4372

EXPENDITURE FOR THE YEAR ENDED 11.9.85

$ 72,061

Salaries 6,418
Field & Laboratory Expenses 60,443
Miscellaneous 5,200

Expenditure for year:

Date Licence Granted: 12.9.83
ANOMALY BE7/1 BENMARA

FIGURE 3
OCTOBER, 1995

ANOMALY BE7/1 BENMARA
LINE 1400.0 SCALE 1: 5000.0 ANOMAL KAL.

ANOMALY BE7/1 BENMARA
LINE 1200.0 SCALE 1: 5000.0 ANOMAL KAL.

ANOMALY BE7/1 BENMARA
LINE 1000.0 SCALE 1: 5000.0 ANOMAL KAL.
ANOMALY BE7/4 BENMARA

FIGURE 6

OCTOBER, 1986

[Graph and diagrams showing geological anomalies]
ANOMALY BE7/4 BENMARA

FIGURE 6
OCTOBER, 1985

ANOMALY BE7/4 BENMARA
LINE 3100.0 SCALE 1: 5000.0

ANOMALY BE7/4 BENMARA
LINE 2900.0 SCALE 1: 5000.0

ANOMALY BE7/4 BENMARA
LINE 3000.0 SCALE 1: 5000.0
ANOMALY MB3/3 MITTIEBAH

FIGURE 8

OCTOBER, 1985
ANOMALY MC1/2 MITCHIEBO

FIGURE 10

OCTOBER, 1985
ANOMALY MC4/1 MITCHIEBO

FIGURE 11

OCTOBER, 1985