CORONATION HILL
GEOPHYSICAL DOWNHOLE LOGGING
APRIL-MAY 1988

C.R. 5841 JUNE 1988

DDH 053 EXT
100-
101
102
103
104
105
CORONATION HILL

GEOPHYSICAL DOWNHOLE LOGGING

APRIL-MAY 1988

R.F. BRESCIANINI
A.G. ROSSBACK
Brisbane

JUNE 1988

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Appendix 1  Graphical downhole geophysical logs
As part of a continuing programme of downhole logging at Coronation Hill, six holes were geophysically logged. A further hole that had been deepened was relogged to its new total depth.

In addition DDH029 was relogged to check repeatability of the data.
1. **INTRODUCTION**

Previous drill holes at Coronation Hill have, where possible, been geophysically logged. The aim of the logging is to identify intersections of radioactive rocks. Downhole gamma logging is very sensitive and will respond to low background levels.

In April-May 1988, a programme was undertaken to log diamond drill holes DDH100 to DDH105 inclusive. The addition of a further two holes that required relogging brought the total number of holes surveyed to 8.

The logging system employed was a Geosource T500 Digital Data Unit in conjunction with a Toshiba T2100 computer, allowing direct acquisition and storage of data onto hard disc. Such a system minimizes data handling and permits on-site processing.

Processing at night involved transferring data onto 3½" micro discs and, where necessary, hard copy plots were printed. Conversion of files from binary to ASCII format was performed to allow compatibility of data. The data were then transferred to a Hewlett-Packard 9845B computer for final manipulation and display.

Although gamma logs were the aim of the programme, self potential and resistance logs were also collected as their acquisition involved no extra cost. Previous experience at Coronation Hill has shown that these electric logs contribute very few interesting features; however they do serve to locate the water table, and in some cases, delineate rock boundaries.

2. **WORK DONE**

The logging equipment was temporarily mounted to the interior of a hire 4WD vehicle. With the exception of the winch, all logging equipment used was the property of BHP-UTAH Minerals. A 2000 m winch was hired from Geosource (at a cost of $1900) to enable logging at depths greater than 500 m.
- **DH** indicates holes geophysically logged in 1988
- **DH** indicates holes geophysically logged in 1987
- **DN** Diamond drill hole
- **PM** Percussion drill hole
- **SC** Reverse circulation drill hole

Coordinates for DH005 are 40000E, 9084DN

**SHP Minerals Exploration**

**LOCATION OF HOLES GEOPHYSICALLY LOGGED, CORONATION HILL J.V.**

Prepared: Date: December 1987
Drew by: W. Mead Project No.: 02/0086CA
Centre: Brisbane Drawing No.: A3-581

FIGURE 2
Table 1 lists the holes logged and details the depth reached in each hole. The 45-55° inclination of all the holes caused repeated problems with the probe sticking on the sides of the hole. When this occurs, the Geosphere depth monitor is prone to inaccuracies. The errors encountered on this survey were generally greater than those recorded previously. They are tabulated below:

<table>
<thead>
<tr>
<th>Hole</th>
<th>Average Error (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDH053</td>
<td>0.1</td>
</tr>
<tr>
<td>DDH100</td>
<td>2.4</td>
</tr>
<tr>
<td>DDH101</td>
<td>1.1</td>
</tr>
<tr>
<td>DDH102</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>DDH103</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>DDH104</td>
<td>0.1</td>
</tr>
<tr>
<td>DDH105</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>

An appropriate correction has been applied in each case to compensate for these mis-closures.

Consistent with previous surveys, hole DDH029 was selected as an appropriate test/comparison hole and was relogged at the commencement of the programme. Hole DDH053 was completely relogged as it had been deepened subsequent to its initial logging.

Satisfactory geophysical logs were obtained for 6 of the 8 holes requiring logging. The high success rate of 75% compares favourably with that obtained in previous programmes. The frequency of hole collapse can be attributed in the main to the increase in intensity of earthworks and bench reclaiming within the area.

The gamma probe was not calibrated in the AMDEL test pits following the completion of the logging programme. However, a comparison against the probe used last November was made by relogging hole DDH029. The probe used in the recent survey was found to suffer severe clipping problems above 16000 cps. However, this had no effect on the logging whatsoever, as such levels of radioactivity were not experienced throughout the entire survey.
### Table 1: Details of Logging

<table>
<thead>
<tr>
<th>Hole</th>
<th>Gamma Log</th>
<th>Electric Log</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDH029 (test)</td>
<td>213.1</td>
<td>212.9</td>
<td>Drilled depth is 257.5 m. Hole collapse.</td>
</tr>
<tr>
<td>DDH053 (extn)</td>
<td>342.2</td>
<td>342.3</td>
<td>Drilled depth is 415.5 m. Hole collapse.</td>
</tr>
<tr>
<td>DDH100</td>
<td>489.7</td>
<td>498.8</td>
<td>Drilled depth is 698.3 m. Hole collapse.</td>
</tr>
<tr>
<td>DDH101</td>
<td>664.0</td>
<td>664.8</td>
<td>Drilled depth is 698.6 m. Hole collapse.</td>
</tr>
<tr>
<td>DDH102</td>
<td>19.8</td>
<td>19.5</td>
<td>Drilled depth is 700.4 m. Hole blocked.</td>
</tr>
<tr>
<td>DDH103</td>
<td>Complete</td>
<td>Complete</td>
<td>Drilled depth is 281.0 m.</td>
</tr>
<tr>
<td>DDH104</td>
<td>279.8</td>
<td>280.0</td>
<td>Drilled depth is 680.4 m. Hole collapse.</td>
</tr>
<tr>
<td>DDH105</td>
<td>39.9</td>
<td>40.1</td>
<td>Drilled depth is 281.0 m. Hole blocked.</td>
</tr>
</tbody>
</table>
Below the 1600 cps level, the count rates were approximately 20% higher than those recorded in November. This order of variation is common between different probes and indicates the necessity to recalculate probes after each logging survey.

3. RESULTS

All the graphical logs are presented in the Appendix. The gamma logs have been plotted at a scale of 0 to 5000 cps, this range chosen to highlight only the high radiation zones. Where the log has gone substantially off scale the logs are also presented at 0 to 50,000 cps.

With the equipment used, no discrimination of the various radioactive sources is possible. However, from previous surface spectrometer work, both uranium and thorium are present.

Zones of elevated radioactivity (greater than 1000 cps which loosenly approximates 0.05% e U$_3$O$_8$) are listed below in Table 2:

Table 2: Radioactive Intervals

<table>
<thead>
<tr>
<th>Hole</th>
<th>Radioactive Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDH053 (relog)</td>
<td>51-55</td>
</tr>
<tr>
<td></td>
<td>74-76</td>
</tr>
<tr>
<td></td>
<td>83-95</td>
</tr>
<tr>
<td></td>
<td>101-135</td>
</tr>
<tr>
<td></td>
<td>172-174</td>
</tr>
<tr>
<td>DDH100</td>
<td>286-403</td>
</tr>
<tr>
<td>DDH101</td>
<td>204-206</td>
</tr>
<tr>
<td></td>
<td>254-262</td>
</tr>
<tr>
<td></td>
<td>357-380</td>
</tr>
<tr>
<td>DDH103</td>
<td>198-257</td>
</tr>
<tr>
<td>DDH104</td>
<td>66-75</td>
</tr>
<tr>
<td></td>
<td>132-152</td>
</tr>
<tr>
<td></td>
<td>174-239</td>
</tr>
</tbody>
</table>

None of the holes logged in this survey produced the extremely high responses encountered in DDH029.
4. CONCLUSIONS

1. High levels of radiation were encountered in five holes. This includes one interval of almost 120 m in hole DDH100.

2. This technique does not indicate which element is responsible for the radioactivity. Most likely it is a combination of uranium and thorium, with a lesser contribution from potassium.
APPENDIX 1

GRAPHICAL DOWNHOLE GEOPHYSICAL LOGS
SUMMARY: BOREHOLE CH102

RES  SP  GAMMA

ohm  mV  cps

200  275  350  50  150  250  0  2500  5k
LOG SUMMARY: BOREHOLE CH105

RES
ohm
250 350 450

SP
mV
275 300 325

GAMMA
cps
0 2500 5k

-