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1987/44. Progress report on the Sub-basalt Drilling Project

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**Abstract**

The history, and results of the first season's drilling, of the Mt Read Volcanics Project Sub-basalt Drilling Project are presented.

**INTRODUCTION**

This report is a summary of the current state of progress of the Sub-basalt Drilling Project (SBDP) following completion of the first season's (1986-87) drilling.

The project commenced during the latter part of 1986, and to date seven holes (SBDP 1, 2, 4, 5, 6, 9, 10) have been completed, and a further four have been sited (SBDP 7, 14, 15, 16) for drilling in late 1987 and 1988.

**HISTORY**

The possibility of pattern drilling the basalt-covered terrain north of the Que River had been considered for some time, but a formal proposal was first put forward in December 1984 for inclusion in the Mt Read Volcanics Project (at an estimated cost of \$1.8 million).

Initially, the basalt drilling project was not included in the MRV Project, but was re-submitted for funding by the West Coast Advisory Development Committee. In January 1986 the drilling project was included in the Liberal Party's "Policy statement - mining, mineral processing industry, and hydrocarbon development".

During 1986, most of the area covered by Tertiary basalt was relinquished by exploration companies and, as the area did not attract any tenders for exploration licences, all available land was gazetted by Statutory Rule 1986 No. 70 as exempt from the Mining Act (fig. 1).

Following gazettal of the Guildford Exempt Area, a hole was drilled at the Fingerpost, near Waratah, to test an interpreted basement geophysical anomaly as part of the Mt Read Volcanics Project.

In mid-1986, the Department decided to proceed with the drilling programme and undertake those investigations that could be done in-house. The first four holes were pre-collared in August-September 1986 and diamond drilling commenced in October 1986.

The basalt drilling project was re-submitted as part of an extension of the MRV Project, but this time only seeking funding for specific 'outside' services and essential equipment. This was approved in December 1986.

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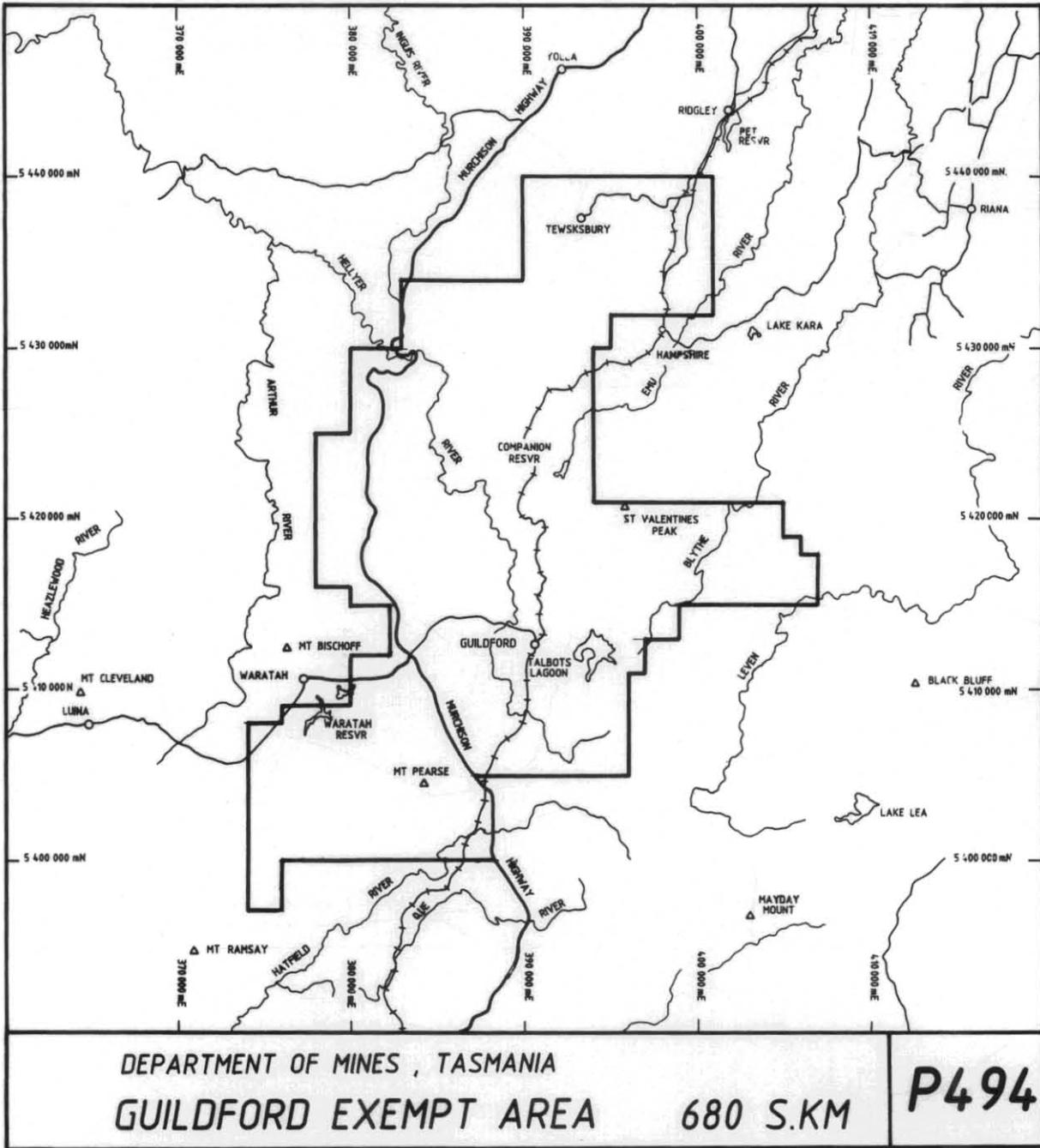


Figure 1. Guildford Exempt Area.

## PROJECT AIMS

**AIM: To stimulate mineral exploration in basalt-covered terrains and enhance the prospects for discovery of ore bodies.**

This will be achieved through a programme of pattern drilling of the basalt 'blanket' (originally based on a 4 km grid), followed by infill drilling of selected areas / targets / anomalies, in association with geological, geochemical and geophysical investigations, all undertaken over a three year period.

The project will provide the mining and exploration industry with:-

- information on the basalt thickness and the pre-Tertiary topography.
- the geophysical characteristics of the Tertiary basalt.
- information on and better definition of the basement (pre-Tertiary) geology.
- the geophysical characteristics of the basement rocks.
- information on which geophysical techniques are best suited to 'see through' the basalt.
- geochemical data on basement rocks with particular emphasis on detecting alteration haloes to ore bodies.

## PROGRESS TO DATE

Figure 2 shows the location of holes drilled to date, and the following is a summary of the location, and a brief summary of lithologies encountered:-

Hole - 1 (Goderich)	Easting 387 980.2 m Northing 5 417 973 m	
	0 - 282 m	Tertiary basalt and sediments;
	282 - 394 m	Gordon Group (limestone).
Hole - 2 (Race Course Plain)	Easting 391 808.5 m Northing 5 406 007.5 m	
	0 - 320 m	Tertiary basalt and sediments;
	320 - 377 m	Gordon Group;
	377 - 383 m	Denison Group correlate.
Hole - 4 (Talbot)	Easting 391 893.7 m Northing 5 410 206.5 m	
	0 - 375 m	Tertiary basalt and sediments;
	375 - 412 m	Florence Quartzite correlate (Devonian).
Hole - 5 (Guildford)	Easting 388 008 m Northing 5 413 892 m	
	0 - 298 m	Tertiary basalt and sediments;
	298 - 410 m	Dundas Group correlate (Cambrian).

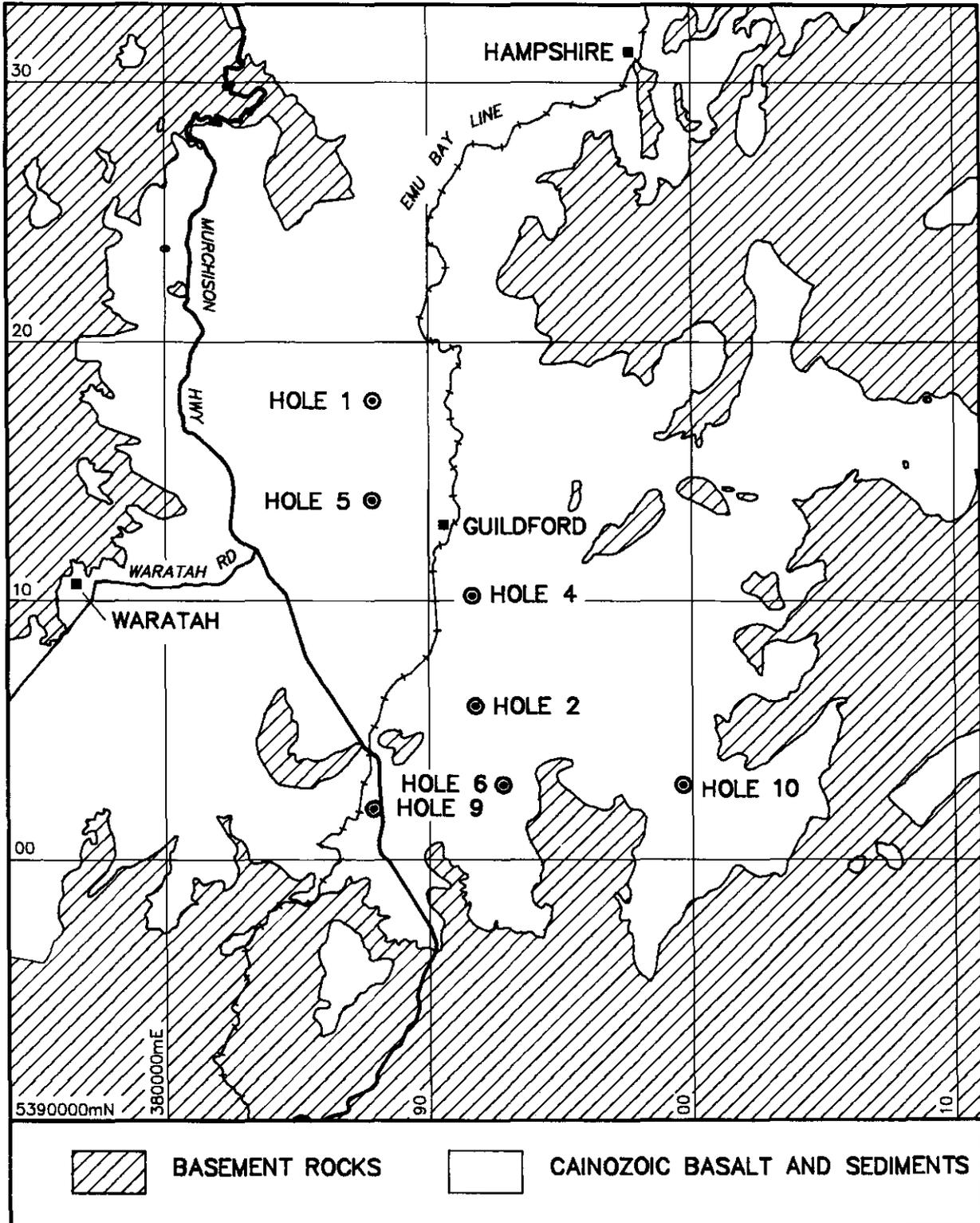


Figure 2. Locations of holes drilled to date.

Hole - 6            Easting 392 643.8 m  
(Pearse)           Northing 5 402 733.0 m

0 - 226 m    Tertiary basalt and sediments;  
226 - 316 m    Bell Shale correlate (Devonian).

Hole - 9            Easting 387 912.7 m  
(Hatfield)        Northing 5 401 906.3 m

0 - 269 m    Tertiary basalt;  
269 - 346 m    Florence Quartzite correlate (Devonian).

Hole - 10          Easting 399 627.1 m  
(Leven)           Northing 5 403 019.6 m

0 - 239 m    Tertiary basalt and sediments;  
239 - 321 m    Mt Read Volcanics, dominantly coarse-grained  
                 felsic epiclastic rocks.

Standard work performed on each hole includes lithological and geophysical logging, XRD analyses of vesicle infillings of the basalt, chemical analyses of basalt and basement rocks, palynology of intra-basalt sedimentary horizons, and petrological studies.

Completion reports will be issued for each of the holes in which all analytical results will be presented. To date, reports have been completed for Holes 1 and 2.

RESULTS

*"If a man will begin with certainties, he shall end in doubts;  
but if he will be content to begin with doubts, he shall end in certainties."*

**Francis Bacon**

The results of the drilling to date have indicated a greater degree of faulting in basement sequences than was previously suspected. The drilling further indicates that the Tertiary valley system into which the basalts were extruded was the site of a Palaeozoic(?) structural depression, an area comprised largely of Gordon Group limestone and Eldon Group correlate sedimentary sequences.

For example, prior to drilling, the fault-bounded basin composed of Siluro-Devonian sedimentary rocks situated between the generally northerly-dipping Cambrian sequences in the Hatfield/Que River areas and the Ordovician(?) clastic sequences of the Mt Pearse Syncline was not suspected. The presence of the basin has been conclusively proven by Holes 6 and 9.

The Cambrian Dundas Group correlates encountered in Hole 5 were not predicted, and their presence requires further faulting to explain the now known rock distribution.

Drilling has confirmed that the Denison Group correlates of the Mt Pearse Syncline are connected with equivalent rocks of The Hummocks Anticline (Hole 2), although some relatively minor cross-faulting is also present.

Small areas of Florence Quartzite correlate mapped near Talbots Lagoon (Baillie *et al.*, 1986) are part of a wider distribution of the formation (Hole 4) and probably connected to the fault-bounded area of Bell Shale correlate cropping out in the vicinity of Old Park Road.

The programme to date has also indicated that a significant portion of the Tertiary volcanic pile was erupted into water (freshwater lakes), and that the formation of the pile occurred within a relatively narrow time range. Palynological studies of intrabasalt sediments have indicated that all microfloras belong to the Lower *Proteacidites tuberculatus* and Upper *Nothofagidites asperus* palynological zones, i.e. latest Eocene and earliest Oligocene or approximately 30-40 Ma.

Extensive groundwater movements through the pile produced, in the vesicles of the basalts, a secondary mineral assemblage of montmorillonite, carbonate minerals (dominantly calcite, but some aragonite) and zeolites. The most common zeolite is chabazite, but phillipsite, natrolite (gonnardite and thompsonite), analcite and heulandite have also been recorded.

FUTURE WORK

Given the results so far, it has been decided that future drilling will be concentrated in the area south and east of The Hummocks, where Mt Read Volcanics are known to occur (Baillie *et al.*, 1986). It is also hoped that drilling in this area will help define the northerly extension of the Henty Fault System (Komysam, 1986).

REFERENCES

BAILLIE, P. W.; WILLIAMS, P. R.; SEYMOUR, D. B. *et al.* 1986. Geological Atlas 1:50 000 series. Sheet 36 [8015N]. St Valentines. *Department of Mines, Tasmania.*  
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