UR1976-67

1976/67. Groundwater investigations near Railton.

W.C. Cromer

The Department of Mines received a request from Mr R.H. King to investigate the groundwater potential of his 40 ha property [DQ501280] 6 km north of Railton.

The land lies between the Railton main road and the Western Railway Line and slopes westward, extending from the western flanks of Dulverton Hill to Caroline Creek. Mr King requires water for gardening and general domestic uses.

GEOLOGY

The basement rock of the area is Ordovician Moina Sandstone, consisting mainly of white-orange brown slightly clayey sandstone. The sediments underlie Dulverton Hill, and most of Mr King's property, and dip west at angles between 20 and 30° (Jennings *et al.*, 1959).

A narrow elongate zone of Tertiary basalt crops out diagonally across the northern part of the property, occupying a north-east trending inferred fault zone. The basalt is rarely exposed (except in a small quarry on the lower parts of the block), but its orange red soils contrast strongly with the paler, sandy clay of the weathered Moina Sandstone.

HYDROLOGY

Moina Sandstone

It is difficult to assess the groundwater potential of the Moina. Groundwater recommendations are usually based on previous drilling experience in a particular area, or rock type, or both. The Department of Mines has no records of drilling for water in Moina Sandstone, mainly because until recently the rock was considered too hard to drill with the rigs then available. Although this is no longer true, no water drilling has yet been undertaken in Moina Sandstone.

Nevertheless, two conclusions can be made of the area.

(*a*) Topographically, Mr King's property is favourably situated. It occupies the lower, gentler slopes of Dulverton Hill, and a large catchment area exists above it.

(*b*) The moderate westerly dip of the Moina Sandstone is conducive to a downslope westerly movement of groundwater. A successful bore in this situation may be subartesian or artesian.

Groundwater movement in the Moina Sandstone is confined to secondary openings (joints and other fractures) in the rock. Unfortunately, nothing is known of their subsurface frequency, extent and orientation. Accordingly, predictions of bore yield cannot be made, since the success of a bore in such fractured rock depends largely on the number and size of secondary openings intersected during drilling.

Tertiary basalt

Experience elsewhere in Tasmania has shown that basalt is often a reliable supplier of good quality groundwater, and on this basis the Tertiary basalt on Mr King's property is considered to be a favourable aquifer.

Basalt stores and transmits water mainly through primary (vesicular) openings, but vesicularity is a property which varies greatly both vertically and horizontally in the rock, and it cannot be accurately estimated from surface outcrop. (The basalt in the quarry on the property was non-vesicular, fine grained and moderately fractured).

RECOMMENDATIONS

A bore sunk in basalt on the lower parts of the property (between the quarry and a small intermittent spring 150 m to the north) is expected to yield groundwater suitable for general domestic and gardening purposes. The water should be chemically and biologically analysed to determine its suitability for drinking.

The fact that the basalt occupies a suspected fault zone may enhance or reduce the yield of the bore. The fault may act as a conduit for groundwater, but conversely, it may have promoted subsurface weathering of the basalt, reducing its permeability and potential yield.

Depending on the shape of the basalt (which is unknown), the bore may be drilled entirely in basalt, or it may intersect the underlying Moina Sandstone. The latter possibility may increase the yield (see (a) and (b) above). If sandstone is encountered, the total depth of the bore should not exceed 30-40 m, as overburden pressure tends to close secondary openings and reduce yield. Drilling in basalt may proceed to a greater depth. Experience has shown that yield often increases progressively as successive vesicular zones are intersected.

REFERENCE

JENNINGS, I.B.; BURNS, K.L.; MAYNE, S.J.; ROBINSON, R.G. 1959. Geological atlas 1 mile series. Zone 7 Sheet 37 (8115S). Sheffield. *Department of Mines, Tasmania.*

[17 November 1976]