POWER AND WATER AUTHORITY

Groundwater Investigations
BECKS WATERHOLE
OUTSTATION

R Sanders
Hydrogeologist
Water Resources Division
Darwin
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AMG</td>
<td>Australian Map Grid</td>
</tr>
<tr>
<td>°C</td>
<td>degree Celsius</td>
</tr>
<tr>
<td>ID</td>
<td>Internal Diameter</td>
</tr>
<tr>
<td>km</td>
<td>Kilometre</td>
</tr>
<tr>
<td>L/s</td>
<td>Litre per second</td>
</tr>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>m³/d</td>
<td>cubic metres per day</td>
</tr>
<tr>
<td>mg/L</td>
<td>milligram per litre</td>
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<tr>
<td>pH</td>
<td>acidity and alkalinity index</td>
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<td>SWL</td>
<td>Standing Water Level</td>
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1. INTRODUCTION

This report details the results of groundwater investigations at the proposed Becks Waterhole Outstation. This project was undertaken by the Water Resources Division of the Power and Water Authority with the aim of constructing a water-supply bore for up to 20 people.

The outstation is situated on aboriginal land 33 km northeast of Mittiebah homestead. Access is from the homestead on a graded track or from Benmarra homestead to the northwest. The area is covered by the 1:100 000 scale Topographic Map Mitchiebo, Sheet 6360 (AMG Grid Reference 729550 - 7946620).

The outstation site stands on the crest of a gentle laterite ridge at an elevation of 300 m AHD. This ridge descends toward the headwaters of Buddycurrawa Creek which is one of the principal tributaries of the Nicholson River and flows into the Gulf of Carpentaria.

The area has a humid monsoonal climate with a dry season between April and October and a rainy season from November to March. Mean annual rainfall is 500 mm while annual pan evaporation is about 3000 mm.

Initial hydrogeological study was undertaken in early 1989 with a preliminary field reconnaissance following in May. Bore sites were pegged and access checked in September 1989. Four holes were drilled in May 1990, each of which was unsuccessful.

2. HYDROGEOLOGY

Regional geology is covered by the 1:250 000 Geological Series Map Mt Drummond (Smith and Roberts, 1963).

The area lies at the southwestern edge of the South Nicholson Basin and is underlain by Upper Proterozoic Mullera Formation. This unit consists of siltstone, shale, quartz sandstone, feldspathic sandstone, glauconitic sandstone, ferruginous sandstone, and ironstone. The Mullera Formation is shallow dipping (between 0° and 30°) and has a maximum thickness of 2400 m. The regional Mitchiebo Fault cuts the Mullera Formation to the north of the camp, but does not improve the permeability of the sediments. Local bores drilled in Mullera Formation have penetrated only siltstone and blue shale to a maximum of 180 metres. These bores have been generally dry.

The unit mapped to the north of the Mitchiebo Fault as anticlinally folded Constance Sandstone is probably basal quartz sandstone of the Mittiebah Sandstone which immediately overlies the Mullera Formation. Consequently the
same shales are penetrated at shallow depth below the sandstone. Similarly, the ridge on which the proposed camp is sited is mapped as being underlain by Peaker Piker Volcanics, but is also shales.

3. WATER DEMAND

A population of 20 people would require a water supply of 0.25 L/s pumped for 24 hours a day to provide 1000 L/c/d.

4. RESULTS

TABLE 1 - RESULTS OF DRILLING AT BECKS WATERHOLE

<table>
<thead>
<tr>
<th>BORE REGISTERED NUMBER</th>
<th>GRID REFERENCE</th>
<th>TOTAL DEPTH</th>
<th>LITHOLOGIES DRILLED</th>
<th>YIELD</th>
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<td>26508</td>
<td>729750 7947370</td>
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<td>0-64.6 m Mullera Formation</td>
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<td>26466</td>
<td>729830 7946600</td>
<td>28.1 m</td>
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<td>Nil</td>
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<td>26467</td>
<td>730350 7948100</td>
<td>100 m</td>
<td>0-12 m Mittiebah Sandstone</td>
<td>Nil</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>12-100 m Mullera Formation shale</td>
<td></td>
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</table>

Four bores sited to intercept fracturing associated with the Mitchiebo Fault, or associated with geological lineations or folding, have been unsuccessful in yielding a groundwater supply. This is because of the presence of the impermeable shales of the Mullera Formation which are more extensive than originally thought. Fracturing of these shales is poorly developed, and primary porosity is very low.
5. CONCLUSIONS

It is considered that further drilling in the area of the proposed outstation is not warranted. Two possible options are apparent:

i) if the outstation is to be used on a temporary basis rainwater tanks may provide short-term supply;

ii) the outstation site may be moved to an area where more favourable hydrogeological conditions exist.
REFERENCE
