POWER AND WATER AUTHORITY
REPORT NO 29/92D

Bore Completion Report
BORE 27345
NEWCASTLE WATERS

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Water Resources Division
Darwin
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Water Resources Bore Data File 1
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LIST OF ABBREVIATIONS

AMG - Australian Map Grid
°C - degree Celsius
ID - internal diameter
km - kilometre
L/s - litre per second
L/c/d - litre per capita per day
m - metre
mm - millimetre
m³/d - cubic metres per day
mg/L - milligram per litre
pH - acidity and alkalinity index
SWL - standing water level
1. INTRODUCTION

An area of land has been excised from Newcastle Waters Station. This land, to be utilised as an Aboriginal Community Living Area, is at the western edge of Newcastle Waters Township. Water Resources Division of the Power and Water Authority was approached by Aboriginal Essential Services (Tennant Creek) to construct a bore to supplement the township water supply. This, in turn, would allow for increased demand on the town water supply due to the Aboriginal living area.

Newcastle Waters Township is on the western side of Newcastle Waters Creek, approximately 3km from the Stuart Highway and 23km north of Elliott. The climate is monsoonal, the wet season lasts normally from December to March, but occasional winter rains occur. The average annual rainfall is about 600mm while mean pan evaporation is about 3400mm. During the wet season, road access to Newcastle Waters is often not available. The region is covered by the 1:250,000 scale Topographic Map Newcastle Waters (AMG Grid Reference 330600 - 8078300).

Newcastle Waters was included in the 1990-91 Production Bore Drilling Programme. An initial desktop study and bore site pegging was undertaken in November 1990. Drilling was undertaken later in the same month and the constructed bore was test pumped in June 1991.
2. HYDROGEOLOGY

The region is part of the Wiso Basin and is covered by the 1:250,000 scale Geological Series Map Newcastle Waters (Sheet SD 53-5).

The area is underlain by 35 to 40 metres of Cretaceous Mullaman Beds consisting of quartz sandstone, siltstone and claystone. These, in turn, overly Middle Cambrian Merrina Beds (up to 180m thick) composed of dolomite, dolomitic limestone, chert, silicified carbonate rocks, siltstone and sandstone.

Sedimentation of the Cretaceous Mullaman Beds began in a lacustrine environment and was followed by marine deposition. These unconformably overly the Merrina Beds, which represent sedimentation in a widespread epeiric sea which covered parts of the Northern Territory in Middle Cambrian times.

The sandstone layers within the Mullaman Beds are generally useful aquifer units. However, the standing water level (about 53m) at Newcastle Waters indicates that these are unsaturated in this area. Fractures and cavities within the carbonate rocks of the Merrina Beds make these a reliable aquifer unit in this area, where they are encountered in excess of 10m below the water table.

The present town bores, RN 1899 and RN 9196, yield 2 L/s and 2.5 L/s respectively, from cavernous and fractured Merrina Beds dolomite. The bores both yield hard water (hardness (as CaCO₃) about 360 mg/L) with moderate TDS values (about 600 mg/L). Water quality has been within potable limits.
3. RESULTS

Bore 27345 was drilled to 86.2m and encountered 3 L/s of potable water in heavily broken rock (probably dolomite or sandstone) between 64.5 and 66.7m. Drilling circulation had been lost at 43.5m and sample return was not regained. The Mullaman Beds were penetrated to 38.4m, below which chert and limestone of the Merrina Beds were apparent until circulation was lost. The bore was constructed with steel casing and inline stainless steel screens adjacent to the aquifer zone (see Attachments).

Water quality results from a sample taken during pump testing are included in Table 1. This bore yielded bicarbonate water within potable limits (AWRC and NHMRC, 1987). The waters are non-corrosive, however, moderately high hardness values indicate that scaling of pumping fixtures and increased soap consumption may occur unless appropriate water softening is undertaken.
4. RECOMMENDATIONS

It is recommended that:

- a pump setting of 64m and a pumping rate not in excess of 3 L/s be adopted at RN 27345;
- absorption trenches and septic tanks should not be constructed within 100m radius of the bore;
- further recommendations for bore equipping are included in the Test Report (see Attachments).
REFERENCES


<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>Pumped sample</th>
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<tbody>
<tr>
<td>Cl- (CaCO3 from Chloride)</td>
<td>0.7152</td>
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<tr>
<td>Fluoride, F-</td>
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<td>Bicarbonate, HCO3-</td>
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<td>Nitrate, NO3</td>
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<tr>
<td>Sulphate, SO4</td>
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<td>Chloride, Cl-</td>
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<td>Silica, SiO2</td>
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<td>Iron (Total), Fe</td>
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<td>CaCO3</td>
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<td>Total Alkalinity</td>
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<tr>
<td>Total Hardness</td>
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<tr>
<td>Magnesium, Mg</td>
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<td>Calcium, Ca</td>
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<td>Potassium, K</td>
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<td>Sodium, Na</td>
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<tr>
<td>pH</td>
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<tr>
<td>Total Dissolved Solids</td>
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<tr>
<td>(REMAKABLE AT 18°C)</td>
<td>1025</td>
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<tr>
<td>Specific Conductance</td>
<td>1025</td>
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<tr>
<td>Date of Sampling</td>
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<td>BOREHOLE REGISTERED NUMBER</td>
<td>07365</td>
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</table>
POWER
WATER
AUTHORITY

DEPTH (m)      BORE CONSTRUCTION LOG        GRAPHIC STRATA DESCRIPTION AQUIFERS
CONSTRUCTION (WATER STRUCK)

Sandy ALLUVIUM
CLAYSTONE : multicoloured
SANDSTONE : medium grained quartz
CLAYSTONE : yellow, sandy
SANDSTONE : yellow, friable
CLAYSTONE : yellow, sandy, with intermittent thin SANDSTONE bands
CHERT/DOLOMITE : broken

LOST CIRCULATION

Highly fractured

S.W.L. 51.95 m

3 L/s

COMPOSITE LOG OF BORE 27345
WATER RESOURCES DIVISION

TEST REPORT — BORE RN. 27345

Bore Location: NEWCASTLE WATERS TOWNSHIP
Client: A.E.S. Tennant Ck.
Map: NEWCASTLE WATERS SHEET SE 53-6 1:250,000.
Grid Reference: 330600 - 8078300

Purpose: Domestic.

RECOMMENDATION

Pumping Rate: 3 L/s. Pump Setting: 64m below Ground Level. General recommendations are given on the reverse side. The aquifer and bore cannot sustain higher pumping rates with deeper pump settings or for short periods in favourable seasons. Further advice can be obtained from Water Directorate (In all correspondence please refer to bores RN number) SASCO House, DARWIN NT

BORO DATA

Finished depth: 80 m Completion Date: 25.10.90 Test Date: 6.7.91.
Standing Water Level: 51.95m on 4.7.91 Test Rates: 3.5 L/s.
Construction details: Test Duration: 8 hrs.

<table>
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<tr>
<th>Interval (m)</th>
<th>Description</th>
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<tbody>
<tr>
<td>0 - 6.0m.</td>
<td>203 mm ID steel casing.</td>
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<td>0 - 64.5m.</td>
<td>152 mm ID steel casing.</td>
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<tr>
<td>64.5m - 66.5m.</td>
<td>152 mm ID s/s, screen, mm aperture.</td>
</tr>
<tr>
<td>66.5m - 80.0m.</td>
<td>152 mm ID steel casing.</td>
</tr>
</tbody>
</table>

Notes: 1. Top of casing as constructed was 0.6m above ground.
2. All depths are measured from natural ground level.
3. Test rates are not indicative of safe long term pumping rates.

WARNING: MINIMUM INTERNAL BORE DIAMETER IS 152 mm. NOMINAL

COMMENTS

1. The above recommendations are based on an 8 hr. constant rate test at 3.5 L/s. and assume hydrological conditions remain constant.

2. Provision to obtain water samples and monitor water levels should be incorporated when equipping this bore.

WATER ANALYSIS See water laboratory report Analysis No. 91/92/0074.

Prepared by: P.REES TO1.
12/8/91.
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention to the following points will ensure a long and safe life for the bore supply and help prevent pollution of the groundwater resource.

1. Construct a concrete apron around the bore head to prevent surface flow, seepage and waste from entering the bore.

2. Seal the space between the casing and pump equipment to prevent entry of vermin, dirt and pollutants.

3. Maintain pumping equipment in good order to prevent pollution. Prevent spillage of fuel and oil on the ground around the bore. Store fertilizer and other chemicals at least 50 m away.

4. Keep stock away from the bore head. Discourage domestic activity at the bore. The first tap on the pipeline should not be less than 5 m from the bore head.

5. Pumping the bore at higher than recommended rates may fork the bore leading to instability of pump maintenance problems. Seek the professional advice of an hydrogeologist or groundwater engineer.

6. If the bore is no longer required, the casing is to be removed or securely capped and the bore backfilled with clayey material. A cement plug may be required in some instances.

IN ADDITION, please ensure that the BORE IDENTIFICATION TAG is retained securely at all times. The registered bore number is Water Resources Division’s only reference to the scientific and engineering data on this bore, and hence important to WRD’s further advice to bore owners.

BORSE LOCATION MAP

Viewed at 15:07:42 on 29/07/2010