ARLPARRA STANDBY BORE
Bore Completion Report
RN 16230

I MATTHEWS
HYDROGEOLOGIST
WATER RESOURCES BRANCH, ALICE SPRINGS

January 1994
SYNOPSIS

A successful standby bore, RN 16230, was constructed at Arlparra (Utopia Store), 220 km north-east of Alice Springs. The bore has a maximum recommended pumping rate of 3 L/s.

The water is drawn from the Dulcie Sandstone and has a TDS of 370 mg/L. Recommendations for the equipping and operation of the bore are included.

KEYWORDS

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>Community water supply</th>
<th>Standby bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLOGY</td>
<td>Dulcie Sandstone</td>
<td>Georgina Basin</td>
</tr>
<tr>
<td>LOCATION</td>
<td>Arlparra</td>
<td>Utopia</td>
</tr>
<tr>
<td></td>
<td>Sandover Highway</td>
<td></td>
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</tbody>
</table>
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ABBREVIATIONS

bg1  below ground level
EC  electrical conductivity
ID  inside diameter
km  kilometres
L/s  litres per second
m  metres
mg/l  milligrams per litre
RN  register number
SWL  standing water level
TDS  total dissolved solids (in mg/L)
µS/cm  microsiemens per centimetre

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AUTHOR  1
1. INTRODUCTION

Arlperra (Utopia Store) is located within the Angarapa Aboriginal Land Trust, approximately 220 km north-east of Alice Springs. (Figure 1).

The community is currently supplied by bore RN 13988 which was drilled in 1984 and has supplied the community since then. Following a request from TSB, a standby bore was constructed at the community.

2. HYDROGEOLOGY

Arlperra is underlain by the Dulcie Sandstone. The formation is named after the Dulcie Range and is largely restricted to the axis of the Dulcie Syncline which trends northwest/southeast (see Figure 2). The formation disconformably overlies the Tomahawk Beds. No overlying unit is exposed, it being the youngest formation of the Georgina Basin.

The Dulcie Sandstone consists of strongly cross bedded, well-sorted, subrounded, fine to medium grained, medium to thick bedded sandstone. Minor tourmaline, muscovite and kaolinite is also present. The formation shows very little lithological variation. Maximum measured thickness is 620 m.

Fresh water fish fossils have been found near the base of the formation which indicates it was deposited under lacustrine conditions. Sedimentary features higher in the formation indicate an aeolian environment.

The Dulcie Sandstone has been correlated with the Lake Surprise Sandstone of the Wiso Basin and the Mereenie Sandstone of the Amadeus Basin. However recent fossil evidence suggests that the base of the Dulcie Sandstone correlates with the lower Pertnjara Group unconformably overlying the Mereenie Sandstone and is thus younger.
The Dulcie Sandstone has excellent aquifer properties and bores drilled into the formation have a very high success rate. With deeper drilling and more efficient construction techniques, bore yields up to 10 L/s may be achievable. The water quality is good with TDS values typically ranging from 200 - 500 mg/L.

3. DRILLING AND TESTING

RN 16230 was drilled to the south of the community and targeted the Dulcie Sandstone. See Figure 3. The bore encountered white, fine to medium grained, quartz sandstone from the surface to 69 m and brown and yellow sandstone from 69 m to the total depth of 74.5 m.

Water was struck at 38 m with the supply increasing to 3 L/s by 69 m. The bore was cased with 153 mm ID steel casing to 74.0 m with perforations from 58.0 m to 70.0 m. The SWL at completion of construction was 29.0 m. The water quality was good.

A 3 x 100 minute step test was carried out at rates of 1, 2 and 3 L/s. The final drawdown was 14.37 m. The available drawdown was 28.11 m.

An 8 hour constant rate test was conducted at 3.0 L/s. The final drawdown was 14.56 m (see Figure 4). The transmissivity was 83 m²/day. Figure 5 is a predicted drawdown versus yield graph for pumping rates from 1 - 4 L/s.

The water quality is good and remained constant throughout testing. Deterioration of water quality is not expected.
4. CONCLUSIONS

A successful community water supply bore (RN 16230) was constructed at Arlparra. The maximum recommended pumping rate is 3.0 L/s.

The water is produced from the Dulcie Sandstone. The water quality is good and is expected to remain so.

5. CONCLUSIONS

1. RN 16230 should be pumped at a maximum continuous rate of 3.0 L/s.

2. Means to monitor water levels and a water meter should be fitted to the bore.

3. The SWL and total depth of the bore should be noted each time pumping equipment is removed from the bore.

4. Both RN 13988 and RN 16230 should be equipped to allow for true standby capacity.

5. A water sample should be submitted from one of the bores on a yearly basis.

6. To minimise risk of aquifer contamination no development should occur any closer to RN 16230 than at present.

7. Simultaneous pumping of the bores should not result in deleterious interference effects.
## Water Quality Data

### Table 1

<table>
<thead>
<tr>
<th>Bore Number</th>
<th>Date of Sampling</th>
<th>Specific Conductance</th>
<th>Total Dissolved Solids</th>
<th>Sodium (Na)</th>
<th>Potassium (K)</th>
<th>Calcium (Ca)</th>
<th>Magnesium (Mg)</th>
<th>Total Hardness</th>
<th>Iron (Fe)</th>
<th>Silica (SiO₂)</th>
<th>Chloride (Cl⁻)</th>
<th>Sulphate (SO₄²⁻)</th>
<th>Nitrate (NO₃⁻)</th>
<th>Sodic Chloride (NaCl)</th>
<th>Comments</th>
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<tbody>
<tr>
<td>RF1</td>
<td>03/06/84</td>
<td>740</td>
<td>440</td>
<td>7.8</td>
<td>86</td>
<td>20</td>
<td>25</td>
<td>178</td>
<td>200</td>
<td>19</td>
<td>65</td>
<td>48</td>
<td>12</td>
<td>244</td>
<td>0.8</td>
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<tr>
<td></td>
<td>17/03/86</td>
<td>700</td>
<td>390</td>
<td>7.3</td>
<td>71</td>
<td>7</td>
<td>23</td>
<td>164</td>
<td>189</td>
<td>6.6</td>
<td>19</td>
<td>20</td>
<td>23</td>
<td>221</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>03/10/86</td>
<td>680</td>
<td>395</td>
<td>7.6</td>
<td>70</td>
<td>19</td>
<td>25</td>
<td>153</td>
<td>171</td>
<td>3.1</td>
<td>62</td>
<td>0.3</td>
<td>12</td>
<td>209</td>
<td>0.9</td>
</tr>
<tr>
<td>16230</td>
<td>08/10/93</td>
<td>672</td>
<td>360</td>
<td>8.0</td>
<td>60</td>
<td>17</td>
<td>22</td>
<td>163</td>
<td>172</td>
<td>3.3</td>
<td>16</td>
<td>75</td>
<td>14</td>
<td>210</td>
<td>0.6</td>
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<td></td>
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<td>657</td>
<td>344</td>
<td>6.8</td>
<td>67</td>
<td>17</td>
<td>29</td>
<td>163</td>
<td>172</td>
<td>0.3</td>
<td>16</td>
<td>71</td>
<td>12</td>
<td>210</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**NHMRC Guidelines**: 1500 mg/L, 6.5-8.5; 500 mg/L, 0.3; 400 mg/L, 45; 1.7; Maximum except pH range
Figures
FIGURE 1

ARLPARRA AND ANKERRAPWE
LOCATION MAP
LOCAL GEOLOGY
(after Shaw and Warren, 1975)

Scale 1:250 000

Qha  Fine and coarse sand
Qa   Alluvium, soil, scree
Qr   Red soil and sand
Qs   Aeolian sand
Qps  Aeolian dunes
Dud  Cross bedded sandstone
-CQt Quartz sandstone and siltstone
Pg   Granite

Cainozoic
Devonian
Ordovician
Proterozoic

ARLPARRA

FIGURE 2
Figure 3

ARLPARRA
BORE LOCATION MAP

Scale 1:4000 approx

RN 16230
- 200 metres south of water tank

Highway

Power House

Water Tank

Basketball Stadium

RN 13988

Figure 3
FIGURE 4

ARLPARRA
STANDBY BORE RN 16230
CONSTANT RATE TEST PUMP GRAPH

Q = 3 L/s
FIGURE 5

ARLPARRA STANDBY BORE
RN 16230
PREDICTED DRAWDOWN GRAPH

SWL before testing - 28.90m
Total available drawdown 28.11m
Appendices
**POWER AND WATER AUTHORITY**

**WATER RESOURCES**

**COMPOSITE LOG OF BORE**

<table>
<thead>
<tr>
<th>DEPTH (m)</th>
<th>BORE GRAPHIC</th>
<th>CONSTRUCTION LOG</th>
<th>STRATA DESCRIPTION</th>
<th>AQUIFERS (Water Struck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>203mm ID blank steel casing</td>
<td>Red brown sandy SOIL.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>154mm ID blank steel casing</td>
<td>Soft, white, fine to medium grained, sub-rounded, well sorted quartz SANDSTONE.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>152mm x 8mm perforated steel casing</td>
<td>As above with chips to 10mm</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>White and red SANDSTONE as above, slightly kaolinitic</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
<td></td>
<td>White and yellow SANDSTONE as above</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td>Red/brown and yellow, fine to medium grained, sub rounded biotite rich SANDSTONE</td>
<td></td>
</tr>
</tbody>
</table>

**ARLPARRA**

**RN 16230**

**APPENDIX A**
WATER RESOURCES DIVISION

TEST REPORT - BORE RN. 16230

Bore Location: Arlparra (Utopia Store)
Client: TSB
Intended Use: Domestic
Map: Alcoota
Grid Reference: 476210 7556922

RECOMMENDATIONS

Pumping Rate: 3.0 L/s Pump Setting: 56 m below Ground Level.

General recommendations are given on the reverse side. The aquifer and bore can sustain higher pumping rates with deeper pump settings or for short periods. Further advice can be obtained from:

Water Resources Branch, Nth Stuart Hwy, ALICE SPRINGS, NT, 0870

(In all correspondence please refer to bore's RN number)

COMPLETION DETAILS

Finished depth: 74.0 m Completion Date: 08-20-93
Standing Water Level: 28.9 m on 08-10-93

BORE CONSTRUCTION

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 5.5</td>
<td>204 mm ID blank steel casing</td>
</tr>
<tr>
<td>0.0 - 58.0</td>
<td>153 mm ID blank steel casing</td>
</tr>
<tr>
<td>58.0 - 70.0</td>
<td>153 mm ID x 8 mm perforated steel casing</td>
</tr>
<tr>
<td>70.0 - 74.0</td>
<td>153 mm ID blank steel casing</td>
</tr>
</tbody>
</table>

WARNING: Minimum internal bore diameter is 153 mm.

Notes:
1. Top of casing as constructed was 0.5 above ground level.
2. All depths are measured from natural ground level.
3. Test rates are not necessarily indicative of sustainable long term pumping rates.

COMMENTS

The above recommendations are based on a constant rate test at 3.0 L/s for 8 hours and assume hydrogeological conditions remain constant.

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

A water meter should be fitted to the bore.

The SWL and TD of the bore should be recorded each time pumping equipment is removed from the bore.

WATER QUALITY

See analysis number 93/94/0619

APPENDIX B
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention 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 fertiliser 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.