Bore Completion Report (RN 14692 and RN 14693) for Ngalikirrlangu Outstation Water Supply
POWER AND WATER AUTHORITY
WATER DIRECTORATE

BORE COMPLETION REPORT
(RN 14692 AND RN 14693)
for
NGALIKIRLANGU OUTSTATION
WATER SUPPLY

Prepared by:
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Hydrogeology Section
Water Resources Group
ALICE SPRINGS

Job No: RWT 372
File No: 144.3
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ABBREVIATIONS

L/s    LITRES/SECOND
L/c/d  LITRES/CAPITA/DAY
mm     MILLIMETRE
m      METRE
m³/d   CUBIC METRES/DAY
mg/L   MILLIGRAMMES/LITRE
1.0 INTRODUCTION

Ngalikirlangu is located about 15 km north of Yuendumu on the Yuendumu Aboriginal Reserve on which the Ngalikirlangu Pastoral Company runs a cattle raising enterprise. The community of about 18 people, lead by Sandy Tilmouth, lives in five pre-fabricated shelters and previously relied on water transported from Yuendumu.

The search for potable groundwater started in February 1985 with the unsuccessful drilling of bore RN 14303 at Limestone Ridge and RN 14304 at Emu Dreaming. Both bores encountered water in schist at less than 30 m but supplies were inadequate and had fluoride levels in excess of current recommendations.

Further exploration took place in February 1986 and resulted in the construction of the bores which are the subject of this report. Other drill sites were pegged at Nunalbin, Paradi and Puru-Puru but these were not pursued following the success of RN 14692/3.

All sites were selected on the basis of geological and community requirements and full co-operation was given by Sandy Tilmouth and Max Heggen from the Office of Local Government in Alice Springs. Phase 1 drilling was performed by Gorey and Cole Drillers of Alice Springs and Phase 2 by F J Leonhardt from Darwin. Site preparation, Phase 1 only, was completed using a bulldozer from the Yuendumu Mining Company. All work was supervised by a technical officer from the Water Authority which also undertook the test pumping of the bores. Funds were supplied by the Office of Local Government.

2.0 WATER DEMAND

The current design standard calls for a water supply of 300 L/c/d to meet the need for adequate domestic and hygiene purposes. Based on a semi permanent population of 18 adults the total daily demand is 5400 l (5.4 m³). Supplies are also required to comply with quality standards set by the NT Department of Health.

3.0 HYDROGEOLOGY

Bore RN 14693 was sited on a small ephemeral drainage channel which was named Bean Tree Creek to distinguish it from other similar channels draining an extensive outcrop of Pre-Cambrian schist. Schist was encountered to the full depth of 62 m in this borehole. Recharge of the aquifer, which was struck at 40 m, will be mainly via fractures extending below the sandy alluvium in the creek bed.

Bore RN 14692 was drilled adjacent to a shallow un-named water course. The site was selected due to the presence
of a calcrete surface layer which, on drilling, was found to extend to a depth of 9 m. Recharge will be by direct percolation through the calcrete and from the creek during flow periods. Bedrock is granitic rather than the schists and gneiss mentioned in the drillers log.

4.0 DRILLING AND TESTING RESULTS

No special access preparation was needed for these holes. Drilling and testing took place without problems.

RN 14962 has a tested yield of 2 L/s. Some dewatering of the aquifer occurred. Results of chemical analysis of a water sample taken at the end of testing show that the Fluoride level is 2.6 mg/L which is in excess of the recommended limit of 1.5 mg/L. The Iron level of 2.9 mg/L is also excessive but this can be remedied by aeration and settlement.

Bore RN 14693, which will support the new settlement at Bean Tree Creek, has a tested yield of 1 L/s. It will thus supply the anticipated demand of 5400 L/d by about 1 1/2 hours pumping. Again both Fluoride and Iron levels are in excess of current limits.

6.0 RECOMMENDATIONS

(a) Approval should be obtained from the NT Department of Health before making either of these supplies available for human consumption.

(b) Bores should be equipped with pumps rated and set in accordance with recommendations set out in the attached test reports. Until the pumps are fitted the bores should remain securely capped.

(c) Because stock bore RN 12985 is located about 90 m from RN 14692 extended pumping of either bore will cause interference with the adjacent bore. Pumping times and frequency should therefore be carefully arranged to minimise this interference.

(d) Any pit latrines or septic systems in these areas should be constructed in accordance with Department of Health regulations.
3.

7.0 REFERENCES

(1) 1:250 000 Geological map and Explanatory Notes, Mt Doreen SF 52-12
     Bureau of Mineral Resources Canberra 1968.

# Final Statement of Bore

**Name of Bore:** Ngalikurlungu No 2

**Name of Property:** Yuendumu

**Description of Property:** Aboriginal Land

**Name of Owner:**

**Name of Contractor:** F. J. Le Cronard

**Name of Driller:**

**Date of Commencement:**

**Date of Completion:**

**Total Depth:** 20 metres

**Particulars of Casing:** 20.3 x 168.3 steel

**Particulars of Perforations or Screens:** 6 mm x 51042 - 14 - 20 m

## Water

<table>
<thead>
<tr>
<th></th>
<th>1st Supply only</th>
<th>2nd Supply only</th>
<th>3rd Supply only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struck at</td>
<td>7</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Standing Water Level</td>
<td>Seepage</td>
<td>Seepage</td>
<td>Seepage</td>
</tr>
<tr>
<td>Pumping Supply Litres/sec</td>
<td>Seepage</td>
<td>Seepage</td>
<td>0.9</td>
</tr>
<tr>
<td>Duration of Pump Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Level During Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality: Good, Fair or Bad</td>
<td>Good</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Samples of Strata and Water Supplies** have been left at the following place -

<table>
<thead>
<tr>
<th>Grid Reference</th>
<th>Map Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>487-239</td>
<td>SF 52-12</td>
</tr>
</tbody>
</table>

**Location of Bore (or supply sketch on the back hereof):**

4.3 m South of Old equipped RN 12935 bore.

Circle appropriate direction.

Use known point such as existing bore, homestead, outstation, etc.

**Location of Bore in the Northern Territory of Australia:**

[Insert location details]

**Control of Water Act:**

WR4/3

---

**Date of Office Use:**

[Signature]

D. L. Duffield, Government Printer of the Northern Territory
From | To | Description of Strata (including colour and hardness) |
--- | --- | --- |
0 - 3 |  | Fine Medium Brown Sand |
3 - 45 |  | Grey sandstone shist |
45 - 62 |  | Grey Gneiss with bits of Granite |

Name of Bore — **Bean Tree Creek 1/86**
Name of Property — **Yuendemu**
Description of Property — **Aboriginal Land**

Name of Owner —

Name of Contractor — **T J. Leonardt**

Name of Driller —

Date of Commencement — 21.2.86
Date of Completion — 24.2.86

Total Depth — 62.0

Particulars of Casing — 62.27 x 6" Steel
Particulars of Perforations or Screens — 5.88m x 6 holes 56.35 - 62.00

Water

<table>
<thead>
<tr>
<th>Water</th>
<th>1st Supply only</th>
<th>2nd Supply only</th>
<th>3rd Supply only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struck at</td>
<td>40</td>
<td>54°</td>
<td>57°</td>
</tr>
<tr>
<td>Standing Water Level</td>
<td>23.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumping Supply Litres/sec</td>
<td>dewater</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Duration of Pump Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Level During Test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Quality:
- Good
- Fair
- Bad

For Office use only —

G L. Coffield, Government Printer of the Northern Territory
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Analysed By: [Signature]

LOCATION AND DETAILS

QUENDUMU R/N 14692 DEPTH 14m DISCH 3.5LPS TEMP 30°C
COND 1400 MAP SF 52-12 G.R. 487-239 RWT 372 RSP134

Proposed water use:- Domestic, Stock, Irrigation, other (specify)

ANALYSIS — PHYSICAL

- pH
- Specific conductance (microsiemens/cm at 25°C)
- Total dissolved solids (mg/L - by evaporation at 180°C)

ANALYSIS — CHEMICAL (mg/L)

- Sodium, Na
- Potassium, K
- Calcium, Ca
- Magnesium, Mg
- Total Hardness (as CaCO₃)
- Total Alkalinity (as CaCO₃)
- Iron, (total) Fe
- Silica, SiO₂

ANALYSIS — ADDITIONAL (mg/L)

- Copper, Cu
- Lead, Pb
- Arsenic, As
- Manganese, Mn
- Zinc, Zn
- Cadmium, Cd

THE SAMPLE AS ANALYSED DOES NOT COMPLY WITH NORTHERN TERRITORY DRINKING WATER STANDARDS AS RECOMMENDED BY THE NORTHERN TERRITORY DEPARTMENT OF HEALTH.
** ANALYSIS **

Date 11/4/86

Laboratory Register No. 85/86/1786

Date received in Laboratory 24/3/86

Date of sampling 8/3/86

WR 4/IA

Bottle No. PP86

Time of sampling 1500

Proposed water use: Domestic, Stock, Irrigation, other (specify) RSP 124

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**LOCATION AND DETAILS**

Yuendumu R/N 14693 Depth 59.69m D/SCH 1-2 LPS TEMP 30°C

Cond 1660 MAP SF 5.2-12 G.R. 494-246 RWT 372

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**ANALYSIS — PHYSICAL**

- pH
- Specific conductance (microsiemens/cm at 25°C)
- Total dissolved solids (mg/L - by evaporation at 180°C)

**ANALYSIS — CHEMICAL (mg/L)**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium, Na</td>
<td>222</td>
</tr>
<tr>
<td>Potassium, K</td>
<td>17</td>
</tr>
<tr>
<td>Calcium, Ca</td>
<td>43</td>
</tr>
<tr>
<td>Magnesium, Mg</td>
<td>56</td>
</tr>
<tr>
<td>Total Hardness (as CaCO₃)</td>
<td>338</td>
</tr>
<tr>
<td>Total Alkalinity (as CaCO₃)</td>
<td>476</td>
</tr>
<tr>
<td>Iron, (total) Fe</td>
<td>*</td>
</tr>
<tr>
<td>Chloride, Cl</td>
<td>200</td>
</tr>
<tr>
<td>Sulphate, SO₄</td>
<td>93</td>
</tr>
<tr>
<td>Nitrate, NO₃</td>
<td>18</td>
</tr>
<tr>
<td>Bicarbonate, HCO₃</td>
<td>580</td>
</tr>
<tr>
<td>Carbonate, CO₃</td>
<td></td>
</tr>
<tr>
<td>Fluoride, F</td>
<td>0.7</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>326</td>
</tr>
<tr>
<td>Orthophosphate, PO₄</td>
<td></td>
</tr>
<tr>
<td>Silica, SiO₂</td>
<td>43</td>
</tr>
<tr>
<td>NaCl (calc. from chloride)</td>
<td></td>
</tr>
</tbody>
</table>

**ANALYSIS — ADDITIONAL (mg/L)**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper, Cu</td>
<td></td>
</tr>
<tr>
<td>Lead, Pb</td>
<td></td>
</tr>
<tr>
<td>Arsenic, As</td>
<td></td>
</tr>
<tr>
<td>Manganese, Mn</td>
<td></td>
</tr>
<tr>
<td>Zinc, Zn</td>
<td></td>
</tr>
<tr>
<td>Cadmium, Cd</td>
<td></td>
</tr>
</tbody>
</table>

---

THE SAMPLE AS ANALYSED *DOES NOT COMPLY WITH NORTHERN TERRITORY DRINKING WATER STANDARDS AS RECOMMENDED BY THE NORTHERN TERRITORY DEPARTMENT OF HEALTH.*

With suitable treatment the Iron concentration may be lowered to an acceptable level.

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Boxes marked thus * indicate levels considered undesirable for drinking water by the Northern Territory Department of Health.

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Analysed By: [Signature] Date 7/4/86

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4278.54
Bore location: NGALIKURLONGU (YUENDUMU OUTSTATION)

Map: SP 52-12
Grid reference: 487-239

Client/owner: ABORIGINAL OUTSTATION
Purpose of supply: ABORIGINAL OUTSTATION

RECOMMENDATIONS

Pumping rate: 2 L/s. Pump setting: 13 m below ground level

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 RESOURCES DIVISION (In all correspondence refer to the bore’s RN number).

BORE DATA

Finished depth: 20 m
Completion date: 21/2/86
Test date: 4/3/86
Standing water level 7.70 m on 2/3/86
Test rates: 3.5 L/s
Test duration 8 hrs

Construction details:

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 14.00</td>
<td>150mm ID blank steel casing</td>
</tr>
<tr>
<td>14.00 to 20.00</td>
<td>150mm ID oxy slotted steel casing</td>
</tr>
</tbody>
</table>

Notes: 1. Top of casing as constructed was 0.3 m 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 150 mm

COMMENTS

TEST RESULTS SUGGEST THAT DEWATERING OF THE AQUIFER OCCURRED DURING TESTING. CONSEQUENTLY IT IS RECOMMENDED THAT THE PUMPING RATE DOES NOT EXCEED 2 L/s.

Provisions to obtain water samples at the bore head should be incorporated when the pump is being fitted.

WATER QUALITY

See water laboratory report (Analysis No.)
**WATER RESOURCES DIVISION**

**TEST REPORT — BORE RN. 14693**

<table>
<thead>
<tr>
<th>Bore location:</th>
<th>YUENDUMU OUTSTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BEAN TREE CREEK</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client/owner:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client's reference:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Purpose of supply:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSTATION WATER SUPPLY</td>
</tr>
</tbody>
</table>

Map: SF52-12

Grid reference: 94-246

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**RECOMMENDATIONS**

Pumping rate: 1 L/s. Pump setting: 58.00 m below ground level

General recommendations are given on the reverse side.

The aquifer and bore can/cannot sustain higher pumping rates with deeper pump settings or for short periods in favourable seasons. Further advice can be obtained from: WATER RESOURCES, ALICE SPRINGS (In all correspondence refer to the bore's RN number).

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**BORE DATA**

Finished depth: 62.06 m  
Standing water level: 23.70 m on 6/3/86  
Completion date:  
Construction details:

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0m to 58.77m</td>
<td>150mm ID BLANK STEEL CASING</td>
</tr>
<tr>
<td>58.77m to 62.00m</td>
<td>150mm ID DAY SLOTTED STEEL CASING</td>
</tr>
</tbody>
</table>

---

**AQUIFER TEST**

Test date: 8/3/86  
Test rates: 1.3 L/s  
Test duration: 8 hrs

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**COMMENTS**

Notes: 1. Top of casing as constructed was 0.65 m 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 150 mm

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**WATER QUALITY**

See water laboratory report (Analysis No. WRD4020)
WATER RESOURCES DIVISION

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

LIMESTONE CALCETE: fine grained, grey

GNEISS: with bands of SCHIST, grey

TERMINAL DEPTH 20.0

SEEPAGE

SWL 2/3/86

0.9 L/s

0.9 L/s

WELDED STEEL CASING

152mm Ø

OXY SLOTTED CASING

152mm Ø

TERMINAL DEPTH 20.0

COMPOSITE LOG OF BORE

RN 14692
PUMPING PERFORMANCE CURVE

This diagram shows the expected decline of groundwater level at various pumping rates. It provides a guide to selection of pump setting.

Standing Water Level: 7.70m

Test results suggest that de-watering of aquifer occurs at higher pumping rates.

Available Drawdown:

PUMPING PERFORMANCE - BORE RN 14692
WATER DIVISION

PUMPING PERFORMANCE CURVE
This diagram shows the expected decline of groundwater level at various pumping rates (Q). It provides a guide to selection of pump setting.

STANDING WATER LEVEL
23.35m
24/2/86

TIME
1 DAY
1 MONTH
3 MONTHS
6 MONTHS
1 YEAR

AVAILABLE DRAWDOWN

1.0 L/s

10
20
30
40

-10
-20
-30

DRAWDOWN BELOW STANDING WATER LEVEL (m)