

WATER NOTES

WATER RESOURCES DIVISION

BERRY SPRINGS

What is Berry Springs?

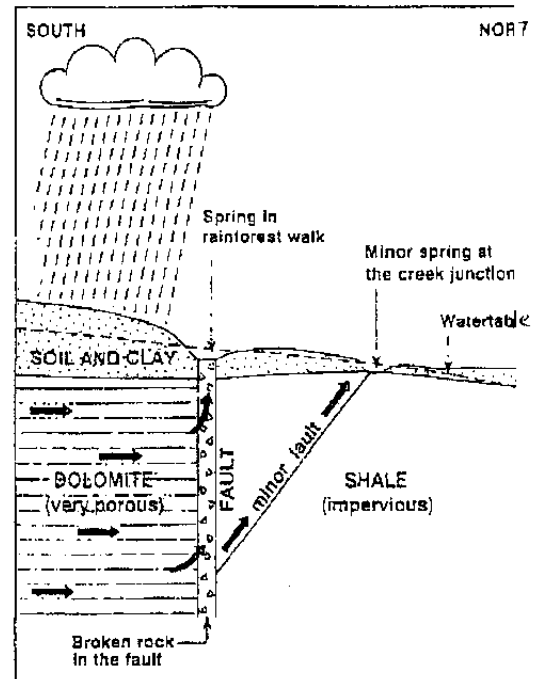
Berry Springs is one of the natural outlets of a small underground water basin. Some 1.8 billion years ago, limey mud was deposited in a shallow sea. It subsequently hardened to form a rock known as dolomite, a type of limestone. The beds were then folded into a basin like shape, forming a natural reservoir for underground water.

The water which seeps into the ground in the Top End is natural acidic and is corrosive to dolomite. Over thousands of years, the dolomite gradually dissolve leaving a sponge like rock capable of holding large amounts of water.

Why are they there?

Water seeps into the ground and flows under the influence of gravity in a south to northerly direction. The springs are located on geological fault lines which brings dolomite into contact with shale, a fairly impervious rock. When the groundwater reaches the fault, shale acts as a barrier and water flows to the surface at Berry Springs, the lowest point along the edge of the basin.

Berry Springs actually consists of numerous individual springs that spread along both the main and smaller faults all of which are interconnected.



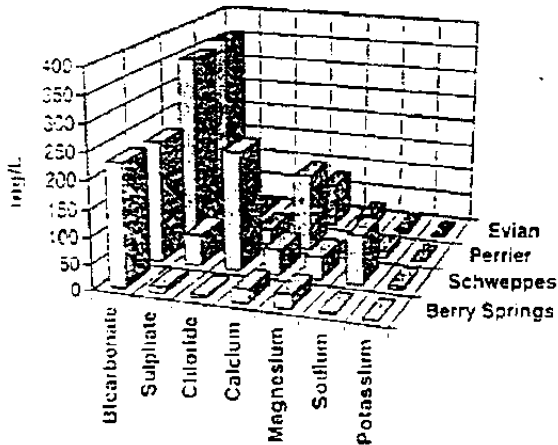
In the Berry Springs Nature Reserve, the main springs is located at the boardwalk in the rainforest walk. The water flowing over the small waterfall where a minor tributary joins the Berry Creek, originates from several springs within the Territory Wildlife Park. Some of these can be seen from the boardwalk in the rainforest walk in the Park.

Where does the water come from?

Rainwater falling onto the dolomite basin is the source of the groundwater and hence the spring water. It seeps through the rock at a rate of about a metre per year.

How is the water used?

Groundwater pumped from a nearby bore hole is bottled and sold as spring water. Compared to mineral waters from other areas, it is notably low in sodium, chloride and total dissolve salts. Berry Springs water is very pure and unpolluted. Groundwater in the basin is also used to irrigate a variety of horticultural crops and for domestic purposes. Over exploitation could result in spring flows being reduced, so monitoring bores have been drilled to ensure that the resource is managed in a sensible way.



Berry Springs water compared to some well known bottled waters

Some interesting facts!

The water flow from Berry Springs and its tributaries combined is about 16 million litres per day; enough to fill about nine Olympic sized swimming pools.

A drop of water falling in the headwaters of the basin and seeping into the ground may take up to 20,000 years to reach the spring.

The rainforest flanking Berry Creek and its tributary in the Wildlife Park owes its existence to the presence of the springs and shallow groundwater. Trees are able to readily tap this source.

Need More Information?

Water Resources Division
4th Floor Goyder Building
Palmerston (GPO Box 1680)
Darwin NT 0801
Steve Tickell, Groundwater
Telephone: 89 993482

Please Note: That until April 1997, Darwin Water Resources will still be located on 1st Floor, Palm Court, Cavenagh Street. For inquires phone 89 247240.

This pamphlet is one of a series on water resource topics in the Northern Territory. For a catalogue of Water Resources publications, phone Bev Pheils on (08) 89 993488 (Darwin) or (08) 89 518603 (Alice Springs)



Simmonds & Bristow

Established 1965 ACN 010 252 418 Pty Ltd

30 Shottery St
PO Box 3160
Yeronga Qld 4104
Australia
Ph: (07) 3848 7699
Fax: (07) 3892 3345

WATER ANALYSIS

Ref. No: 40763
Page No: 1 of 2

Sampled By : Client

Berry Springs Water Aust P/L
P.O. Box 54
Nightcliff
NT 0810
Attn : Winnie Chen

Regd No	Sample Description	Collected	Received	Tested
152764 STD 08 C	Berry Springs Sn 643 NHMRC FOOD STANDARD 08	9/09/98 / /	10/09/98 / /	10/09- 6/10
S&B Method	Physical Analysis	152764	STD 08 C	
WP040.	Conductivity @ 25°C	uS/cm	444.	N/A
WP090.	pH Value @ 25°C		8.1	N/A
*CA110.	Total Dissolved Salts (calc'd)	mg/L	368.	
S&B Method	Chemical Analysis	152764	STD 08 C	
	<u>Major Elements</u>			
WC025.111	Calcium	as Ca mg/L	37.	N/A
WC055.111	Magnesium	as Mg mg/L	29.	N/A
WC090.111	Sodium	as Na mg/L	5.	N/A
WC075.111	Potassium	as K mg/L	<1.	N/A
WC220.4	Chloride	as Cl mg/L	3.	N/A
WC280.4	Sulphate	as SO4 mg/L	2.	N/A
	<u>Minor Elements</u>			
WC045.14	Iron	as Fe mg/L	0.09	
WC060.14	Manganese	as Mn mg/L	0.02	<2.0
WC010.12	Arsenic	as As ug/L	<0.5	<50.
WC015.14	Barium	as Ba mg/L	<0.1	<1.0
*WC020.14	Cadmium	as Cd mg/L	<0.01	<0.005
WC030.14	Chromium	as Cr mg/L	<0.02	<0.05
WC040.14	Copper	as Cu mg/L	<0.01	<1.0
WC050.14	Lead	as Pb mg/L	<0.02	<0.05
WC105.14	Zinc	as Zn mg/L	0.02	<5.0
WC065.12	Mercury	as Hg ug/L	<0.5	<1.
*WC080.12	Selenium	as Se ug/L	<0.5	<10.
WC210.1	Boron	as B mg/L	0.4	<5.
WC225.21	Free Chlorine	as Cl2 mg/L	<0.2	<0.1
WC240.1	Cyanide Total	as CN mg/L	0.01	<0.1
WC245.2	Fluoride	as F mg/L	0.2	<1.7
WC250.24	Nitrate	as N mg/L	<0.1	<10.
WC250.34	Nitrite	as N mg/L	<0.1	<1.
WC265.2	Chemical Oxygen Demand	mg/L	<1.	<3.
WC285.2	Sulphide Total	as S mg/L	<0.1	<0.05

Client Manager

N.W.

Nardia Whisson

SIMMONDS & BRISTOW PTY LTD

PER *J. Whisson*

November 13, 1998



Simmonds & Bristow

Established 1965 ACN 010 252 418 Pty Ltd

30 Shottery St
PO Box 3160
Yeronga Qld 4104
Australia
Ph: (07) 3848 7699
Fax: (07) 3892 3345

WATER ANALYSIS

Sampled By : Client


Ref. No: 40763
Page No: 2 of 2

Berry Springs Water Aust P/L
P.O. Box 54
Nightcliff
NT 0810
Attn : Winnie Chen

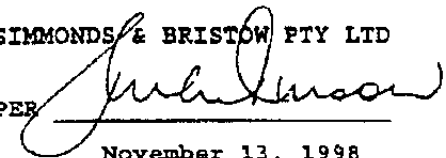
Regd No	Sample Description	Collected	Received	Tested
152764 STD 08 C	Berry Springs Sn 643 NHMRC FOOD STANDARD 08	9/09/98 / /	10/09/98 / /	10/09- 6/10
S&B Method	Chemical Analysis	152764	STD 08 C	
	<u>Carbonate Equilibrium</u>			
WC205.	Total Alkalinity as CaCO3 mg/L	239.	N/A	
S&B Method	External Laboratories	152764	STD 08 C	
*OS110.	Radioactivity Tests	ATTACHED	<1.0	

* NATA Registration does not cover the performance of this service.

Client Manager


Nardia Whisson

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PER 
November 13, 1998



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30 Shottery St
PO Box 3160
Yeronga Qld 4104
Australia

Ph: (07) 3848 7699
Fax: (07) 3892 3345

WATER ANALYSIS REPORT

Sampled By : Client

Ref. No: 40763
Page No: 2 of 2

Territory Groundwater Services
16/6 Poincianna St
Nightcliff
NT 0810
Attn : Ian Matthews

Regd No	Sample Description	Collected	Received	Tested
152764 STD 08 C	Berry Springs Sn 643 NHMRC FOOD STANDARD 08	9/09/98 / /	10/09/98 / /	10/09- 1/10
S&B Method	External Laboratories	152764	STD 08 C	
*OS110.	Radioactivity Tests	ATTACHED	<1.0	

- * NATA Registration does not cover the performance of this service.
- ** Enclosed are external lab results from GCL.
- *** Water samples prepared as per EPA 3010 digest prior to metals' analysis.
- **** Mercury determined as per EPA method 245 and EPA 600/4-79-020.
- ***** Arsenic and/or selenium determined as per EPA method 206.3, EPA method 270.3 and EPA 600/4-79-020.

Client Manager

Julie Ivison BSc MBA

SIMMONDS & BRISTOW PTY LTD

PER

October 5, 1998



QUEENSLAND HEALTH SCIENTIFIC SERVICES

Enquiries to: Ross Kleinschmidt
Telephone: 07 3274 9124
Facsimile: 07 3274 9008
File Number:
Our Reference: 98PQ117
Your reference: 00031021

25 September 1998

Ms J Ivison
Simmonds & Bristow Pty Ltd
30 Shottery Street
YERONGA Q 4104

GROSS ALPHA AND BETA IN WATER RESULTS

Date Received: 16 September 1998

Description: Bore water for bottling - gross alpha and beta activity analysis.

Method: ISO 9696 (1992) Water quality - Measurement of gross alpha activity in non-saline water - Thick source method.
ISO 9697 (1992) Water quality - Measurement of gross beta activity in non-saline water.
Alpha and beta results and minimum detection levels have been calculated at the 95% level.

Traceability: Alpha reference sources (Americium 241) is traceable to NIST (USA) national standards. Beta reference source is natural potassium.

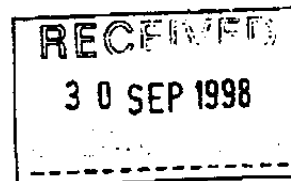
RESULTS

Table with 4 columns: LABORATORY NUMBER, SAMPLE DESCRIPTION, GROSS ALPHA (Bq/l), GROSS BETA (Bq/l). Row 1: 98PQ117, Bore Water 40763 - 152764, 0.01 ± 0.02, < mdl (total) < mdl (**K corrected)

COMMENTS

The gross alpha and beta activity of the sample is lower than the guideline values of 0.1 Bq/l (alpha) and 0.5 Bq/l (beta) recommended by the ARMCANZ & NHMRC Australian Drinking Water Guidelines (1996).

[Signature]
R Kleinschmidt
Senior Health Physicist



This report shall not be reproduced except in full or used in any way for advertising without the written permission of the Laboratory. The results relate to the samples as received. The responsibility for sampling rests with the client.



G.P.O BOX 990 DARWIN N.T. 0801
 HUDSON PYSH AVENUE DARWIN NT 0820
 Telephone: (08) 8224 6413
 Fax: (08) 8224 6410

Bottle No.:
BR 103

Lab Register No.:
1312

RESOURCE PROTECTION DIVISION
 WATER CHEMISTRY LABORATORY

Date Received in Lab:
27/10/98

Time Sampled:
1400

Date Sampled:
26/10/98

VN No.: **31726**

Depth (m): **SH**

Q:

Map:

Sampler:

DEHNING

G.S. No.:

G.H. (m):

Q:

G.R.:

Location: **LOT 643 100 OF CAVENAGH**

Field Temp °C:
32

Field pH:
7.5

Field Cond µS/cm:

RSP:

Project No.:
CHARGE CLIENT

ANALYSIS - PHYSICAL

<input type="checkbox"/> pH	[4500-H*B]	7.9	<input type="checkbox"/> Colour (Hazen units)	[2120B]	
<input type="checkbox"/> Electrical conductivity (microsiemens/cm at 25°C)	[2510B]	394	<input type="checkbox"/> Turbidity (NTU's)	[2130B]	
<input type="checkbox"/> Total dissolved solids (mg L ⁻¹ - dried at 180°C)	[2540C]	219	<input type="checkbox"/> Suspended solids (mg L ⁻¹)	[2540D]	

ANALYSIS - CHEMICAL (mg L⁻¹)

<input type="checkbox"/> Sodium, Na	[3111B]	2	<input type="checkbox"/> Chloride, Cl	[4500-Cl*B]	4
<input type="checkbox"/> Potassium, K	[3111B]	<1	<input type="checkbox"/> Sulphate, SO ₄	[G]	17
<input type="checkbox"/> Calcium, Ca	[3111D]	34	<input type="checkbox"/> Nitrate, NO ₃	[4500-NO ₃ *B]	<1
<input type="checkbox"/> Magnesium, Mg	[3111B]	29	<input type="checkbox"/> Bicarbonate, HCO ₃	[2320B]	263
<input type="checkbox"/> Iron, (total) Fe	[3111B]	0.3	<input type="checkbox"/> Carbonate, CO ₃	[2320B]	0
<input type="checkbox"/> Total Hardness (as CaCO ₃) Calculation	[2340B]	204	<input type="checkbox"/> Hydroxide, OH	[2320B]	0
<input type="checkbox"/> Total Hardness (as CaCO ₃) Titration	[2340C]		<input type="checkbox"/> Fluoride, F	[4500-F*C]	0.1
<input type="checkbox"/> Total Alkalinity (as CaCO ₃)	[2320B]	216	<input type="checkbox"/> NaCl (calc. from chloride)		7
<input type="checkbox"/> Silica, SiO ₂	[4500-Si D]	15	<input type="checkbox"/> Dissolved Oxygen	[4500-O-C]	

ANALYSIS - ADDITIONAL (mg L⁻¹)

<input type="checkbox"/> Copper, Cu	[3111B]		<input type="checkbox"/> Manganese, Mn	[3111B]		<input type="checkbox"/> Zinc, Zn	[3111B]	
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		

U/S DENOTES UNSUITABLE FOR ANALYSIS C1 76179 1291 2/11/98 # 18

I/S DENOTES INSUFFICIENT SAMPLE

F DENOTES FILTRATE ANALYSIS

T DENOTES TOTAL ANALYSIS

This report relates specifically to the "sample tested as received".

The test methods used (denoted within brackets) refer to the 1992 18th edition of Standard Methods for the examination of Water and Wastewater, A.P.H.A. Except [G] which refers to the method of R. Goguel, Anal. Chem. 1969, 41, 1034.

DATE: **5/11/98**

CHECKED: *J. M. Ham*

SIGNATORY: *E. G.*

Boxes marked thus indicate:

Levels are within the limits as quoted in the "Guidelines for Drinking Water Quality in Australia", 1987 N.H. & M.R.C. and the A.W.R.C.

Levels exceed non-health related limits.

Levels exceed health related limits



Department of

Primary Industry and Fisheries
WATER MICROBIOLOGY LABORATORY
Berrimah Veterinary Laboratories

WATER MICROBIOLOGY

G.P.O. Box 300,
Darwin NT 0801
Telephone: 08 8998 2347
08 8998 2249
Facsimile: 08 8992 2024

BACTERIOLOGICAL ANALYSIS OF WATER

Sample Location: BERRY SPRINGS
Sampling Date: 12/11/1998
Job Number: BERRY SPRINGS WATER ADST P/L

SAMPLE SITE	RESULT		TIME SAMPLED	TEMP °C	CHLORINE mg/l		COLIFORM PER 100 ml	FAECAL COLIFORM PER 100 ml	E. COLI PER 100 ml	ENTERO-COCCI PER 100 ml	PSEUDO-MONAS AERUGINOSA PER 100 ml	PLATE COUNT ORGANISMS PER ml °C	PLATE COUNT ORGANISMS PER ml 37°C
	PASS	FAIL			FREE RESIDUE	TOTAL RESIDUE							
BORE RN 31726	1		1110	30			0	0					D

REMARKS:

ASSESSMENT CRITERIA

1. GUIDELINES FOR DRINKING WATER QUALITY IN AUSTRALIA (1987) NH & MRC/AYRC
2. WATER QUALITY GUIDELINES - PUBLIC POOLS (1991) N.T. DEPT. HEALTH AND COMMUNITY SERVICES
3. RESULT HAS NOT BEEN ASSESSED AGAINST ANY CRITERIA

NON-NUMERICAL RESULTS

ND (NONE DETECTED) NT (NOT TESTED)
NR (NO RESULT) LE (NO RESULT - LAB ERROR)

TEST METHODS
APHA Standard Methods
18th Edition 1992

DATE: 15 November, 1998

CHECKED: *Prishadhamy*

O.I.C LAB: *G.P. Berrimah*