

COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

REPORT ON WATER SUPPLY AT NUTWOOD DOWNS STATION
NORTHERN TERRITORY.

by

N. J. MacKay.

Records 1957/61.



REPORT ON WATER SUPPLY AT NUTWOOD DOWNS STATION

NORTHERN TERRITORY.

by

N.J. MacKay.

Records 1957/61

C O N T E N T S.

	<u>Page.</u>
Introduction	1
Geology and Hydrology	1
Previous Bores	2
New Bore Sites Selected	3
References	3

L I S T O F P L A T E S

Plate 1. - Geological Map, Nutwood Downs Station, N.T.
Scale: 1 inch = 4 miles.

REPORT ON WATER SUPPLY AT NUTWOOD DOWNS STATION

NORTHERN TERRITORY.

by

N.J. MacKay.

Introduction:

An examination of the underground water supply at Nutwood Downs Station was made during the period 17th to 22nd May, 1957 at the request of Australian Investment Agency Pty. Ltd. Six bore sites were selected in areas where water supplies are required by the Company.

In 1955, N.O. Jones carried out a water supply survey of portion of the station. He selected several bore sites and also suggested areas where supplies of underground water should be obtainable. Five bores (Nos. 7, 8, 9, 10 and 11) were drilled in 1956, resulting in two successful bores and three dry bores, all the latter being abandoned at shallow depths due to hard drilling conditions.

The general geology of the area is shown on Plate 1 and is the result of ground traverses and photo-interpretation. The positions of the selected bore sites and all bores drilled on the station are also plotted on Plate 1.

Geology and Hydrology:

Rocks of four ages are present at Nutwood Downs Station and these are summarized in the table below (youngest rocks at the top):

<u>Age.</u>	<u>Rock Types.</u>	
Cretaceous.	Sandstone, siltstone and conglomerate with laterite capping.)Mullaman Group.
? Middle Cambrian.	Limestone, sandstone and chert.	
Lower Cambrian.	Sandstone and volcanic rocks)Antrim Plateau) Volcanics.
Upper Proterozoic.	Quartzite, sandstone and siltstone.	

The distribution of the rocks is shown on Plate 1. The Cretaceous rocks are flat-lying sediments which form a broad tableland. This tableland surrounds on three sides the valley formed by the head-waters of the Hodgson River. Water supplies are only required within the valley and not in the country covered by the Cretaceous sediments.

Rocks of Upper Proterozoic age crop out in the north-western part of the station and they are also exposed as small inliers within the valley of the Hodgson River. The inliers consist of pink quartzite which is strongly jointed.

Good supplies of water are obtainable at shallow depths from these fractures but generally hard drilling conditions would be encountered.

Overlying the Upper Proterozoic rocks with an erosional unconformity is a series of volcanic rocks with

interbedded bands of sandstone. The volcanic rocks consist of massive basalt, amygdaloidal basalt, andesite, agglomerate and tuff. This sequence is considered to be Lower Cambrian in age and is tentatively correlated with the Antrim Plateau Volcanics of the Ord-Victoria Region (Traves, 1955). Boring for water in the north-eastern part of the Hodgson River valley, where the volcanic sequence crops out, should be avoided. Supplies of water may be obtained from fractures zones in the basalt, from vesicular layers in the basalt, or from the sandstone beds within the volcanic rocks. As very little information can be obtained about the sub-surface geology in the north-eastern section, no boring should be done here unless specific targets are available. Hard drilling conditions in the massive basalt also make it desirable to avoid this area.

A sedimentary sequence, consisting of limestone, sandstone and chert, overlies the volcanic rocks in the south-western part of the Hodgson River Valley. The sequence is possibly Middle Cambrian in age and is apparently conformable with the underlying volcanic sequence. The general dip of the sediments is to the south-west at a low angle. Very few exposures were seen but near Dalglesse Creek, fragments of fossil shells were found in limestone which dips at 20° to the southwest. Good supplies of water have been obtained from the sedimentary beds in bores 5, 6 and 9. Adequate supplies should be available within the sedimentary sequence but caution should be exercised when selecting bore sites near the boundary of the sediments and the volcanic sequence. To avoid the possibility of striking the volcanic sequence above the water table, bores should be sited at least two miles down-dip from this boundary.

In general, good supplies of underground water are obtainable from the sedimentary rocks in the south-western part of the Hodgson River valley, but drilling should be avoided in the volcanic country to the north-east.

Previous Bores:

Available records of bores drilled on Nutwood Downs Station are as follows:

<u>Bore No.</u>	<u>Total Depth.</u> (feet)	<u>Yield.</u> (gals/hour).	<u>Strata.</u>	<u>Remarks.</u>
1.	127	-	Sandstone, overlying volcanics.	Dud.
2.	75	Good	Sandstone	
3.	87	-	Sandstone overlying volcanics.	Dud.
4.	?	-	Sandstone overlying volcanics.	Dud.
5.	222	1100	Limestone and Sandstone.	
6.	110	1440	Limestone and Sandstone.	
7.	41	-	Quartzite.	Abandoned due to hard drilling.
8.	68	500	Quartzite.	
9.	181	2000	Limestone and Sandstone.	

<u>Bore No.</u>	<u>Total Depth.</u> (feet)	<u>Yield.</u> (gals/hour).	<u>Strata.</u>	<u>Remarks.</u>
10.	113	-	0-111' Clay & Limestone 111'-113' Volcanics.	Abandoned due to hard drilling.
11.	52	-	?Volcanics.	"

The sites of the bores are shown on Plate 1.

New Bore Sites Selected.

Site NA was selected at the south-western end of the Hodgson River valley, $6\frac{1}{2}$ miles south of No. 5 bore. The site is on the northern side of Limestone Creek. In the bed of the creek pink, micaceous sandstone dips to the west at 10° . SITE NB, is on the western side of Horse Creek, seven miles south of No. 6 bore. Flat-lying, ferruginous sandstone crops out on low hills in this area. At both NA and NB good supplies of water should be obtained from sandstone-limestone beds within 250 feet of the ground surface. Drilling conditions should be easy at both sites.

Site NC is situated on the western bank of Kovwell Creek, just upstream from a small gorge. Felspathic sandstone and vesicular basalt are exposed in the creek bed. These rocks appear to be deeply weathered. Drilling at this site should not be abandoned until hard, massive basalt is struck.

In the Dalgles Creek area two alternative sites have been chosen. At both Site ND and Site NE the underlying rocks consist of limestone and sandstone with small bands of siltstone. It is suggested that site ND should be drilled first. If the bore reaches the underlying basalt without encountering water, the bore should be abandoned. At site NE the thickness of sediments overlying the basalt should be greater than at site ND and this site should be utilised if site ND is abandoned.

Site NF was selected on Watch Creek, 9 miles south-east of the homestead. Felspathic sandstone crops out on the northern side of the creek. A bore should pass through alluvium into the sandstone and intersect the underflow of water through fractures in the sandstone below the creek. Any water supply available should be struck within a depth of 150 feet. Drilling conditions below the alluvium may be hard at this site.

All six bore sites were selected in the company of Mr. P. Morris of Australian Investment Agency Pty. Ltd. and Mr. R. Loudon, Manager, of Nutwood Downs Station.

References:

Jones, N.O.	1955	-	Water supply at Nutwood Downs Station, N.T. Resident Geologists' Office, Alice Springs.(unpub.).
Traves, D.M.	1955	-	The geology of the Ord-Victoria region, Northern Australia. Bur. Mineral Resources, Aust., Bull. 27.

Resident Geologists' Office,
Darwin.....N.T.

31st July, 1957.

GEOLOGICAL MAP NUTWOOD DOWNS STATION NORTHERN TERRITORY



REFERENCE

CRETACEOUS		Sandstone, siltstone & conglomerate
MIDDLE CAMBRIAN (?)		Limestone, sandstone & chert
LOWER CAMBRIAN		Sandstone & volcanic rocks
UPPER PROTEROZOIC		Quartzite, sandstone & siltstone.
		Geological boundary - position approximate
		Strike & dip of strata.
		Fault
		Stream channel
		Track
		Existing bore
		Dud bore
		Proposed bore

LOCALITY MAP

