DEPARTMENT OF MINES
SOUTH AUSTRALIA

WATER SUPPLY - ANDAMOOKA OPALFIELD

REPORT ON RECENT DRILLING

by

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Plan No.	Title	Scale
63-872A	Geological plan, vicinity of Andamooka Opalfield	1 mile= 1 inch.

Rept. Bk. No. 60/116
G.S. No. 3163
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8th June, 1965.

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INTRODUCTION

The drilling of four bores was undertaken during April 1965 in an attempt to augment the limited supplies of potable water for the residents of Andamooka Opalfield.

Present supplies of water are drawn from low-capacity shallow wells and bores which have been constructed in the bed of Opal Creek and from a bore located at North Swamp, some 6 miles NNW of the Opalfield. These are supplemented at times of peak demand by water from the Woomera pipeline, 70 miles distant.

This report summarises the occurrence of groundwater in the region and the recent drilling activity.

GEOLOGICAL SETTING OF OPALFIELD

Andamooka Opalfield is located on the Arcoona Plateau west of Lake Torrens. Precious opal occurs sporadically in clay and boulder beds which with siltstones and sandstones comprise a Cretaceous sequence over 60 ft. in thickness. These rocks are exposed in the numerous opal diggings which are spread over an area of several square miles; natural outcrops are restricted as the surface is largely mantled by duricrust gibbers, sand dunes or claypans. The Mesozoic strata are flatlying and are little disturbed by faulting.

Basement rocks include the gently inclined Andamooka Limestone of Cambrian age and the underlying purple and red-brown quartzites, siltstones and shales of the Tent Hill Formation.

UNDERGROUND WATER SUPPLIES

General

The low irregular rainfall (annual average 5½ inches), high evaporation rate and concentration of cyclic salts in a region of internal drainage of waters of local origin are factors which are not conducive to the occurrence of large supplies of potable groundwaters.

Drilling undertaken in the region by the Government (unpublished reports by T.A. Barnes, E.P. O'Driscoll and C. Bleys) and by pastoral interests has shown that small supplies of saline water are available from the Mesozoic rocks. Their storage capacity is low and over extensive tracts there is no surface drainage of storm waters, hence there is little opportunity for recharge of potential aquifers. The basal sands (?Jurassic) together with alluvium and sandstones of the underlying Tent Hill Formation in the bed of Opal Creek provide aquifers adequate for the supply of up to 1,000 gallons per day of drinking water.

In Andamooka Limestone solution channels and occasional caves are developed but except in areas of favourable recharge of a generally thin aquifer (e.g. Phillips Ridge) salinities have proved to be high.

The underlying shaley and silty rocks provide notoriously poor aquifers because they are dense and impermeable and clays derived from weathering of micas seal inherent fractures. These rocks have undergone little structural disturbance and bedding planes offer the principal openings for the storage of water. Small supplies of drinking water are derived from the Arcoona Quartzite member where topographic situations are favourable; elsewhere the stored waters are brackish or saline.

Existing Supplies

The provision of potable water for residents at the Andamooka Opalfield has presented problems as the steadily expanding community makes further demands on what appears to be a limited supply of underground water. A number of shallow wells and bores, 30 ft. - 75 ft. deep, have been constructed along the course of Opal Creek. Several of these provide small supplies of water, the remainder have proved too saline for use.

A bore at North Swamp, 270 ft. in depth and penetrating quartzite under limestone, is also being utilised but excessive pumping results in a yield of somewhat brackish water.

The location of these and other bores and wells is indicated on the accompanying plan (no. 63-8724); unless otherwise indicated these proved to be too saline even for stock and their potential capacity undetermined.

Recent drilling

Four sites were drilled by the Department in April, 1965, utilizing the Failing 1500 (with the down hole hammer); relevant details follow.

Bore 1, located at the western extremity of North Swamp

log - feet		
0	- 15	Brown clayey fine sand
	- 70	Grey gypseous shale and grey limestone
	- 80	Blue-grey limestone
	- 120	Blue, purple and grey siltstone.

Water cut 97 ft. (S.W.L. 91 ft.), salinity 6,930 p.p.m.

Bore 2, located on the channel of Teatree Creek

log - feet		
0	- 5	Brown sand
	- 10	Grey green shale
	- 90	Purple brown flaggy quartzite with micaceous shale bands.

Water cut 80 ft. (S.W.L. 50 ft.), salinity 17,100+ p.p.m.

Bore 3, located downstream from Chimney rockhole on Trig Creek adjacent to a fault intersected purple-green flaggy quartzite with micaceous shale bands to the limit of boring (15 ft.).
Water cut 5 ft. and 12 ft. (S.W.L. 4 ft.), salinity 17,100+ ppm

Bore 4, located on Trig Creek where strongly developed rectangular jointing in quartzite was expected to facilitate downward movement of surface water.

log - feet

0 - 10 Brown sand with fragments of quartzite

- 115 Purple-brown flaggy micaceous quartzite with shale partings.

Water cut 72 ft., 76 ft. (S.W.L. 51 ft.), salinity 17,100+ p.p.m.

CONCLUSIONS

Drilling has failed to yield adequate supplies of useful water to the Opalfield.

Alternative sources worthy of investigation include the development of a surface catchment and storage area (this would provide short term relief) and installation of desalination plant.

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NON-METALLICS SECTION.

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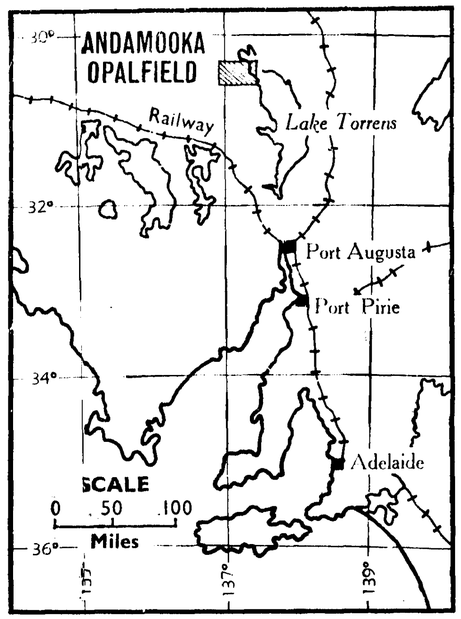

LOCALITY MAP

LEGEND

QUATERNARY
Sand dune .....

CRETACEOUS
Sandstone, siltstone, boulder beds. .....

CAMBRIAN
ANDAMOOKA LIMESTONE
Limestone .....

UPPER PROTEROZOIC
TENT HILL FORMATION
Sandstone, quartzite, siltstone and shale
(YARLOO SHALE AT TOP)

Swamp .....

Strike and dip of bedding.... 15

Horizontal bedding.....

Bore recently drilled for water supply 2

Bore or well — 150′ depth; 60gr./gall. salinity; 1000 g.p.d. supply

137°10′ 137°20′ 30°20′ 30°30′

WELL in 1st/qte. 200′ (80) drives 100 g.p.d.
SNAKE GULLY DAM
DAM
BORE 270′ in 1st/qte.
MIDDLE DAM
WELL 180′ in 1st.
North Swamp
SWAMP DAM
Airstrip
TEATREE DAM
BORE 180′ in 1st/qte.
BORE 150′ in 1st/qte.
BILLS LOOKOUT
DAM
BORE 320 (50) salt 800 g.p.d.
BORE 60′ (15) 60gr./gall. 1000 g.p.d.
Opal Creek
BORE 44 (34) in slate 1600 gr./gall. 100 g.p.d.
Teatree Creek
HORN RIDGE
WELL in qte. 200′
ANDAMOOKA OPALFIELD
BORE 44′ salt
WELLS 30′-75′
BLUE DAM
BORE 70′ salt
BORE dry 0′-94′ kr -170′ ss
3 MILE DAM
BORE 90′
12 MILE DAM
TRIG. BLUFF
Crozier Creek
PIMBA RIDGE
LAKE TORRENS
BORE 0′-44kr -110′ ss
DAM
EDGE HILL
DAM
PHILLIPS RIDGE
WHITE DAM
WELL 92′ 168gr./gall.
DAM
PINE RIDGE
DAM
BORE 0′-102′ kr -162′ qte. 1900gr./gall. 100 g.p.h.
WELL 61′ 60gr./gall.
BICKFORD RIDGE
WELL 50′ in 1st/qte. 90gr./gall
CANEGRASS DAM
COWAN RIDGE

SCALE
Miles 1 0 1 2 3 4 Miles

63-872

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