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TITLE: REPORT ON WATER SUPPLY, CUNDEELEE MISSION, N.E.COOLGARDIE GOLDFIELD, W.A.

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REPORT ON WATER SUPPLY, GUNDEMELEE MISSION, N.E. COOLGARDIE GOLDFIELD, W.A.

by

J. Sofoulis, B. Sc.,

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C O N T E N T S

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INTRODUCTION

The developed sources of water supply at the Cundeelee Mission are completely inadequate and can provide only a small portion of the total requirements. The present needs are met by purchase from external sources.

A Government boring plant has previously tested within 500 yards of the Mission site with unsuccessful results.

Following a request from the Department of Native Welfare, the writer was assigned to investigate the underground water potentialities of the area with a view to selecting suitable sites for test-boring.

The present report results from an investigation made on June 19th-21st 1962, and is accompanied by a geological map of the area (scale 106 chains = 1 inch).

LOCATION AND ACCESS

The Cundeelee Mission lies within the North-East Coolgardie Goldfield, approximately 120 miles due east of Kalgoorlie. It is linked by 24 miles of graded road running south-south-east to Zanthus, a siding on the Transcontinental Railway. A graded road also follows the south side of the railway line and connects Zanthus to Kalgoorlie (133 miles).

Air strips are located at Cundeelee and Zanthus and both settlements are in radio communication with the "Flying Doctor Service" based at Kalgoorlie.

GENERAL INFORMATION

Cundeelee previously existed as a Native Ration Station, but since 1950 was established in its present form by the Australian Aboriginal Evangelical Mission and the Department of Native Welfare.

The present native population ranges from 150 to 200 persons, but can reach 350 persons during certain

periods of the year.

Mission facilities include living quarters, a store, school, and hospital. The "Flying Doctor" regularly visits the area, and urgent medical cases are flown to Kalgoorlie for treatment.

PRESENT WATER SUPPLY

Developed Sources:

A dam has been constructed recently on a drainage located 1 mile south-east of the Mission. This dam has a reasonable catchment and is said to fill after half an inch of rain. For conservation, the collected waters are pumped into holding tanks as soon as possible after catchment as the poor holding nature of the ground would allow the filled dam to drain within two days.

Other smaller dam and roof catchment sources are located at the Mission and provide a small but useful supply.

Collectively, these sources are inadequate for the present population and, coupled with the general low rainfall of the region (average 7 inches per annum) and high evaporation factor would, at best, supply only 10 per cent of the annual water requirements.

Natural Sources:

Small soaks and rock holes are known about the general region, but these are of limited capacity and exist only for short periods after rain. When charged, such sources provide useful waters for native "sandalwooding" parties or itinerant natives.

Unlimited supplies of salt water are available sub-surface (3'-4') in the floor of Goddard Creek.

External Sources:

The bulk of the Mission's water requirements are met by purchase of "scheme water" railed from the Goldfields Water Supply at Kalgoorlie. With subsidised freight, this

water is made available at Zanthus siding at a cost of £47 per 9,000 gallons.

GENERAL GEOLOGY

The Mission is situated in undulating hills forming the dissected north-east slopes of the Goddard Creek drainage valley. The surrounding country consists of crystalline Precambrian rocks locally containing shallow basins of Palaeozoic sediments. Superficial soils mantle a large proportion of the area.

Precambrian Rocks.

These consist of broad developments of medium to coarse grained hornblende-microcline gneisses, interbedded with narrow belts of metamorphic rocks. Quartz bars and networks of pegmatitic veinlets (of simple mineralisation) are general throughout the gneissic terrains.

The metamorphic rocks are mainly of sedimentary origin. Those at the Mission site contained minor galena mineralisation, and included granulite-quartzites, muscovite schists, and thin amphibolite bands.

Both the gneisses and metamorphics are regionally disposed along north-east lines, and show moderate to steep south-east dips.

Palaeozoic Rocks.

Flat-lying unfossiliferous sediments of fluvioglacial origin occupy valley depressions in the Precambrian basement rocks. Principal lithologies include micaceous siltstones, current-bedded sandstones and grits. The beds locally contain unsorted pebble and boulder layers, and scattered erratics. They are generally capped by a siliceous "billy", and where dissected, give rise to extensive spreads of rounded, or facetted quartz pebbles and boulders.

These Palaeozoic sediments are believed to represent further extensions of the "Wilkinson Range Beds" of Lower Permian age.

The Goddard Creek drainage follows a Palaeozoic valley. It has now cut down to basement but valley side benches of Palaeozoic sediments (showing up to 80 feet of section) are exposed on either flank. A major tributary drainage located 1 mile east of the Mission similarly follows a Palaeozoic valley but is cut to basement only in its lower reaches.

Superficial Soils

The widespread soil mantles include various sand plain forms, gritty eluvial soils and alluvium.

The sand plains are usually restricted to the upland areas but low dune forms also occur about the Goddard Creek drainage.

Gritty eluvial soils are general about the margins of the gneissic hills.

Alluvial soils are confined to drainage lines. These may contain calcareous sub-soils or hardpan particularly in the lower drainage sectors.

GROUND WATER POTENTIALITIES

Goddard Creek serves as the major drainage of the area but all available waters from this source are saline.

The best possibilities lie in the upland areas where suitable intake and storage areas exist.

The hills lying to the north-west of the Mission are mostly fresh gneisses with sand veneers and sand fillings. In these areas, the loci of run-off waters are the drainage lines, and providing suitable storage areas are present, such drainages could yield useful supplies of good quality waters.

Alternative upland sources are the Palaeozoic beds filling valley depressions in the basement and serving as present drainage basins. Such a source exists in the major tributary drainage of Goddard Creek lying immediately

to the east of the Mission. The sediments here are sufficiently thick and porous for groundwater storage, and the drainage itself possesses an extensive catchment area.

Selected Sites

The sites selected as having the best possibilities of meeting the intake and storage requirements, are shown on the accompanying map.

It must be stressed that the groundwater conditions of these upland areas are not known, and that the selected sites are for test-boring purposes only, with no guarantee of success.

Sites A, B, and C are located in gullies draining the granitic areas but the thickness and storage capacities of the soils are not known. Alternative downstream sites may be required where fresh gneissic rocks are encountered at shallow depth. Providing suitable waters are located, the occurrence of a "hardpan" layer could effectively reduce the make of water and the sites may require development as wells.

Site B offers the best potential as it has the largest intake area.

Sites D, E, and F are located on the drainage of the Palaeozoic basin and could provide the solution to the present water problem providing the available waters are of sufficient quality.

Order of Testing

Sites D and B should be tested first and the others left in abeyance until the results of these holes are known.

Depth of Testing

Sites A, B,C, each may require up to 60 feet of boring. Sites D, E, F, could be deeper (say 100 feet). Testing of all sites could thus involve a boring programme of 500 feet.

All holes should be continued until fresh basement rocks are encountered.

CONCLUSIONS AND RECOMMENDATIONS

The available sources of water at the Gundeelee Mission are insufficient to meet current requirements.

The holding capacity of the present dam could be improved by sealing, but in view of the low rainfall, this source of supply could still prove inadequate.

Failure of the earlier boring programme was due to unfavourable location and inability of the Mission site to meet intake and storage requirements.

In view of the large expenditure committed to purchasing the present water needs, the testing of the natural resources is strongly recommended.

The suggested programme could involve some 500 feet of test-boring. The sites selected as suitable for testing all lie within 5 miles of the Mission.

Gneissic Rocks
minor Metamorphic remnants
sand cover

60° rockhole

50° 70°

Alluvial soils

70° 50°

Goddard Creek

60° 70°

5 mile rock hole

Site 'A'

Site 'B'

Site 'C'

alluvial soil

To Victoria Rocks

Site 'F'

Site 'E'

muscovite schists

50°

Lat 30°40' Long 123°20' Approx

Cundeelee Mission

Air Strips

small dam

minor galena mineralisation

Site 'D'

Gneissic terrain sandplain mantles

dam & tanks

graded road

Goddard Creek Crossing
18·7 mls from Zanthus Siding

Shallow Well
(salty water)

To Zanthus

GSWA

GEOLOGICAL SKETCH MAP

OF

CUNDEELEE MISSION AREA

NE COOLGARDIE GOLDFIELD W.A.

Approx. Scale 106 chs = 1 inch

Geological Reconnaissance by J. Sofoulis B.Sc. June 19th-21st 1962

Sketch based on Airphotos Cundeelee { Run 6 5605-08 / Run 7 5793-56

REFERENCE

CAINOZOIC

Superficial Alluvium

PALAEOZOIC

Glacial Beds
Siltstones
Sandstones etc

ARCHAEOZOIC

Gneissis with thin metamorphic remnants

Drainage lines

Salt pans

Proposed Bore Sites — Site 'A'

Graded Road

Track

Strike & dip of gneissosity or schistosity — 70° 50°

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