Hydro Section.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk. 59/38
G.S. 2941
D.M. 864/64
Hyd. 1603

REPORT ON GROUNDWATER PROSPECTS

Sections 64, 66/7, 73, 108/13, 139, 149, 150, 1484/8, 1566, 1574/5 and 1585/6, Hd. Kapunda

- S. Kidman & Co. Pty. Ltd. -

This inspection was made on 24th July, 1964.

REQUIREMENTS

Advice on the possibility of obtaining a supply of some 20,000 gallons per hour for irrigation of Lucerne.

LOCATION, TOPOGRAPHY

Situated on the western outskirts of Kapunda Township, the portion of the property south-west of the road to Tarlee straddles Ross's Creek. Small water courses tributary to Hawker's Creek to the south-west lie across the western portion. Ross's Creek, lying across a fairly flat area, has deeply incised into the sediments and basement rocks and the bottom lies some 30 ft. below the surrounding surface. Tributaries to Allen's Creek rise on the higher levels of the property east of the main road.

The area is cleared and in use for pastures with the exception of small areas which are lightly timbered. Annual rainfall averages some 17 inches.

GEOLOGY AND HYDROLOGY

Basement rocks in this area belong to the Sturtian Series (Adelaide System) and consist of tillites, fine laminated slates, some arkoses and some marble interbedded in silty shales. These rocks are folded and anticlinal axis lies across the sections 110, 113 and 112. It is flanked by a synclinal axis which lies just east of the trig point 1061 and is orientated slightly west of north and almost parallel to the anticlinal. On the eastern flank of the anticline only the more resistant tillites and arkoses are outcropping and reasonably fresh rocks exposed. The inter-

bedded slates and silty slates can be best observed in the valley of Ross's Creek where they often occur in a weathered and thus clayey state. The marbles occurring on the eastern flank of the syncline are barely exposed their occurrence recognised by some single floaters along the road between the sections 1575 and 1585.

Fine grained rocks such as slates and silty slates tend to decompose into clayey weathering products which commonly block the passage of groundwater. These rocks are in themselves tight and the groundwater should be stored in the intercommected joint system, but since it is partly filled with clay, the supplies are commonly limited. In addition the slow moving groundwaters tend to dissolve soluble salts and therefore the salinity of the water stored is often in the order of 3,000 parts per million being marginal for irrigation of pastures. Drilling to obtain a large supply of groundwater on sites where these fine grained rocks are penetrated cannot be recommended as the yield of the slatey rocks is believed to be not more than some 500 gallons per hour.

There is about 45 ft. wide arkose which outcrop on the northern part of Section 111 and is also exposed in Ross's Creek. This horizon is well jointed and owing to its sandy nature the prospects of obtaining a moderate supply of water from the aquifer are considerably better. However a supply of 20,000 gallons per hour as required is well above the expected yield of this aquifer. The annual run-off in Ross's Creek should refresh the groundwater stored in these rocks and thus the quality is expected to be below 3,000 p.p.m. Drilling of a bore about 150 to 200 ft. deep, on the site A as shown to the manager and indicated on the attached map is warranted.

The marbles are considered the best potential aquifers and these calcareous rocks probably would yield a large supply. In addition the salinity of the groundwater stored is probably the lowest in the area. They occur only in a narrow bed and are intersected by a tributary to Allan's Creek which would recharge the aquifer annually. Drilling of a bore 200 ft. deep on the site B as shown to the manager and indicated on the attached map

is recommended. It must be borne in mind however that even this aquifer is probably not capable of yielding a supply of 20,000 gallons per hour as required.

CONCLUSIONS AND RECOMMENDATIONS

Rocks of the Sturtian Series are, in this district, generally poor aquifers as evidenced by the limited supplies obtained from bores. Therefore drilling on sites where the slates are penetrated cannot be recommended. The arkoses are slightly better aquifers and investigating their yield by means of a bore on site A is warranted. The best potential aquifers in the district are the marbles and drilling of a 200 ft. deep bore on site B is recommended. It must however be borne in mind that a yield of 20,000 g.p.h. as required may be well above the capacity of this aquifer.

C. BLEYS,
SENIOR GEOLOGIST,
HYDROLOGY.

CB:EMD
11.8.64