REPORT ON POSSIBILITIES OF OBTAINING UNDER-GROUND WATER SUPPLIES IN THE GEEVESTON DISTRICT.

INTRODUCTION -

The Geeveston district was geologically surveyed by Q.J. Henderson, Cadet Geologist, who prepared a geological report and map thereof. The present report is intended to accompany and supplement his report and map.

The mapping shows that the country included within the drainage system of the Kermandie River is composed chiefly of diabase (dolerite) rock, which is estimated to occupy 75 per cent of the surface. The remainder is occupied mainly by sedimentary rocks of the Permo-Carboniferous system consisting of fine-grained impure (argillaceous) sandstones and mudstones.

The main body of diabase is transgressive with respect to the sedimentary rocks, but two sills from it occur in the north-eastern part of the district.

POSSIBILITIES OF UNDERGROUND WATER.-

Diabase is an impervious rock, but the joint planes &c. might contain underground water. The quantity would be so small and the rock so hard to drill, that it is not recommended as a water containing rock suitable for drilling.

The Permo-Carboniferous rocks would be somewhat porous but their "specific porosity" is probably low.

The bedding and joint planes in them would also contribute to the quantity of underground water. The water-yielding capacity of these rocks must therefore be regarded as fairly low.

It is extremely doubtful if those areas of Permo-Carboniferous rocks overlain by diabase sills could be considered as possible sources of underground water owing to the lack of opportunity for access of water. The outcropping portions might, however, yield small quantities of water.

The two largest tracts of Permo-Carboniferous rocks are:-

(1) That south-east of Geeveston. The area of this tract included in the Kermandie watershed is about 2½ square miles.

(2) That west and north-west of Geeveston. The area of this tract included in the Kermandie watershed is about 5 square miles. It must be noted however, that several small outcrops of diabase occur in this tract and the underground structure is somewhat obscure and diabase might occur in some parts at shallow depths.

QUANTITY OF WATER.

The possible quantities of water likely to be obtained are indicated in the following very approximate calculations. The average annual rainfall at Geeveston is 36 inches. The average annual rainfall over three consecutive dry years is the figure usually adopted in calculations and this agrees closely with 75% of the average annual rainfall.

The percolation i.e. that portion of the rainfall which percolates underground and forms the source of underground water, has been assumed in other parts of the State to be 20 per cent. This figure will be adopted for Geeveston district, but it is probably too large.

The quantities available in the above areas will be:

(1) area 5 square miles
78,110,000 gallons per annum.
or 241,000 " " day.

(2) area 2½ square miles.
39,055,000 gallons per annum.
or 107,000 "

The total quantity that might be obtained is therefore approximately 321,000 gallons per day.

NUMBER OF WELLS.

As to the number of wells necessary to give this quantity, the following will indicate generally this factor. No bore-holes have been sunk in Permo-Carboniferous rocks under very similar conditions and so direct experience is not available. I would consider that it is probable that a maximum of 200 gallons per hour or 4,800 gallons per day would be obtained from each hole. It would be necessary therefore to sink 67 holes to obtain the above quantity. If it was intended to develop the underground water supplies, I would recommend that a small number of boreholes be sunk to actually the determine the yield per hole before a comprehensive scheme was decided upon.

CONCLUSIONS.-

It is evident from the above descriptions and very approximate calculations that the maximum quantity of underground water obtainable in the Kermandie watershed, is approximately 321,000 gallons per day. This quantity is roughly one-third of the actual amount (1,000,000 gallons) required by the company.

It is assumed that 4,800 gallons per day would be produced per well, but it is recommended that several trial bore holes be sunk to determine the yield before any scheme of development of the underground water supplies be considered.

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