Liaison 985

REPORT ON UNDERGROUND WATER IN THE TOUWS RIVER AREA WITH SPECIAL REFERENCE TO QUALITY

Introduction:-

In a letter W(M)9/1/75/1 dated 9th November 1955, the Chief Civil Engineer S.A.Railways, requested the Geological Survey to prepare a report outlining the possibilities of obtaining a potable water supply for town use at or near Touws River.

The investigation was carried out by Mr. G. Menge of the Geological Survey at the end of January and early in February 1956. The investigation comprised:-

(a) the compilation of bore-hole data.
(b) the mapping of bore-hole positions on aerial photographs.
(c) field measurements of dionic conductivity as well as a number of partial chemical analyses of water samples, carried out in the Railway laboratory at Touws River.

The undersigned visited Touws River on the 7th February when the investigation was practically completed.

The area surveyed stretches from Grootstraat on the National Road in the southwest to Jan de Boers in the northeast; northwest of Touws River to Pienaarspoort, and along the Ladismith railway line as far as Merweda Estates. The accompanying plan (G.860) compiled from aerial photographs, shows the positions of the bore-holes. Owing to a lack of cadastral data, no farm boundaries are shown.

Geology:-

The folded Witteberg series which is composed of alternating beds of shale and quartzite is found at Rouws River and in the neighbourhood. About 3 miles north of Touws River towards Jan de Boers an outlier of the overlying Dwyka Tillite has been preserved in a syncline.

According to bore-hole logs, a considerable thickness of unconsolidated materials described as gravel, sand boulders and clay

2/.....

occurs in the valley of the Touws River and its tributaries. The thickness of these alluvial deposits may be as much as 150 feet.

The Occurrence of Underground Water.

In spite of being situated in a low-rainfall area, a study of bore-hole records shows that no great difficulties are experienced in striking supplies of underground water.

Out of a number of thirty bore-holes drilled by the Department of Irrigation in the vicinity of Touws River, 80% were successful, i.e. yielding supplies over 100 gallons per hour. Nearly 50% of the bore-holes had supplies exceeding 1000 gallons per hour.

In the attached list compiled by Mr. G. Menge, the yields of 47 bore-holes are given. Of these, 33 yield more than 1000 gallons per hour; the yield of 11 bore-holes exceeds 10,000 gallons per hour each.

Although these latter figures may be somewhat misleading because a number of weak or dry bore-holes have probably escaped notice, the data nevertheless indicate that high yield bore-holes are by no means exceptional in this area. In fact, compared to the Union as a whole, the percentage of strong bore-holes is very high.

Although the exact nature and permeability of the unconsolidated alluvial deposits are not known, there is no doubt about the existence of large ground-water reserves in these deposits as well as their ability to yield large flows in bore-holes. The whole problem of obtaining adequate supplies of potable water for town use, therefore hinges only on the question of quality.

Quality of Ground Water.

For full details about the quality of the water the attached list of bore-holes and analyses should be consulted. The quantity of dissolved solids varies within very wide limits; from as little

3/....

as 130 to over 5,000 parts per million.

There are only three bore-holes in Touws River and the new township (No's 73,74,75). The water from these bore-holes is not suitable for domestic use. Water struck in two excavations, one in the new township, the other at the sewerage disposal was analysed by the chemical laboratory of the S.A. Railways, with the following results:-

	Extension No.2	Sewerage Disposal Site
Total Hardness as $CaCO_3$ p.p.m.	1270	1976
" Alkalinity as " "	226	292
Magnesium hardness as $CaCO_3$ "	750	1248
Chlorides	1400	1940
Total dissolved solids "	3267	4,000
Flubrine "	0.8	___
pH "	7.6	7.1

Proceeding in a south-easterly direction from Touws River, the quality of water found in bore-holes on the farms Ebenhaeser, Merino, Raoma and Spes Bona with one or two exceptions is extremely poor. Beyond these farms on Sanddam and Merweda Estates the quality improves. Several of the high yield bore-holes have water containing 600-900 parts per million of disssolved solids.

North of Touws River towards Pienaarspoort and Jan de Boers the quality of the water is without exception poor and not suitable for domestic use.

Along the National Road to Cape Town a large number of bore-holes has been drilled. The quality of the water struck is generally fairly good, averaging, 500 to 600 parts per million of dissolved solids, with a few bore-holes yielding water contain-

4/.....

ing as little as 130-170 parts dissolved solids per million. There are, however, also several instances where the dissolved solids content exceeds 1000 parts per million.

The bore-holes with very low figures for dissolved solids are situated at the foot of a low ridge northwest of the National Road. The bore-holes penetrated very little or no alluvial deposits. Because they tap water from joints and fractures in quartzite and shale(?) with a limited storage capacity compared to that of the alluvial deposits, it is doubted whether these bore-holes can deliver a large permanent supply. In fact, there is evidence that some of the bore-holes have weakenend.

Conclusions.

(1) The chances of obtaining an adequate supply say of 20,000-40,000 gallons per day of a satisfactory quality (less than 1000 parts dissolved solids per million) in Touws River including the new townships are deemed very small.

(2) There are two areas in the vicinity of Touws River where large supplies (say 100,000 gallons per day) of reasonably good quality can be obtained. The one is the Sanddam - Merweda Estates area whilst the other is in the valley of the Donkies River along the National Road towards Cape Town where bore-holes No's 16 31 are situated. As bore-holes in these two areas, are drawing water from extensive alluvial deposits, the danger of ground-water depletion at extraction rates of hundred or several hundred thousands gallons per day does not seem imminent. However, a definite evaluation of the potentiality of both areas would require a study of over a period of several years of the effect of such extraction rates on the level of the ground-water.

J.R. Vegter

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(signed) J.R. VEGTER

SENIOR GEOLOGIST

PRETORIA

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