5930
5931

Rept. Bk. 57/27
G.S. 2682
HYD. 1488

# DEPARTMENT OF MINES
# SOUTH AUSTRALIA

GEOLOGICAL SURVEY
HYDROLOGY SECTION

## POLDA BASIN

## QUARTERLY PROGRESS REPORT

## PERIOD ENDING 30th JUNE, 1963

by

R.G. SHEPHERD

DM.1474/62

57/27

5/8/63

Section

Rept. Bk. No. 57/27
G.S. No. 2682
D.M. 1474/62
HYD. No. 1488

DEPARTMENT OF MINES
SOUTH AUSTRALIA

# POLDA BASIN

## QUARTERLY PROGRESS REPORT

## PERIOD ENDING 30TH JUNE, 1963.

### INTRODUCTION:

Test drilling in the Polda area has been continuous throughout the peried and, since drilling commenced, 159 bores have now been drilled.

During the last quarter, 96 bores have been sunk mainly in the area north-west and south of Polda. Bores have also been drilled at one mile intervals along the main road to Elliston. Plans accompanying this report show water level centours for June, 1963, and also locations of bores and salinities.

Pumping from the trench at Polda was temporarily suspended in April, and since that time, there has been a gradual rise of the water table in the vicinity, so that it is now above its original level.

### DRILLING RESULTS:

Drilling up to the end of the period has shown that good quality water occurs from Terre Station to Polda and a considerable area to the north and south. Water of high salinity was obtained in a number of bores in the vicinity of Peelpena Swamp, where water of more than 1,100 grains per gallon (16,000 p.p.m.) occurs. The area of poor quality water has now been defined and extends for at least 6 miles in a westerly direction on the northern side of the main road. It is up to one mile wide and its eastern limit lies about ¾ mile from the trench at Polda. Several bores along the road west of Polda

yielded quite brackish water, including bores 102, 149 and others. The salinity of these bores varies from 200 to almost 600 grains per gallon (2,900 - 8,600 p.p.m.) and they appear to be situated on the fringe of the salt water zone of Poelpena Swamp. Brackish water was also obtained in the northern part of the area tested, about 6 miles north of Polda. Bores in this area yielded water of more than 200 grains per gallon (2,850 p.p.m.), and are probably close to the northern boundary of the Basin. The aeolianite of this area is thin and contains a considerable proportion of clay.

In order to check the quality of the groundwater southward from Polda, a number of bores have been drilled along a track adjacent to the Squire - Tinline hundred boundary. Bore 36, situated about 3½ miles south of the trench, yielded water of 50 grains per gallon (715 p.p.m.) and bore 86, situated one mile further south, contained water of 95 grains per gallon (1,350 p.p.m.). Further south, there is an increase up to 162 grains per gallon (2,315 p.p.m.) in bore 87, but the quality improves in bore 91, where salinity of the groundwater is only 20 grains per gallon (285 p.p.m.). The area between bores 36 and 91 is relatively high limestone country where the water table lies at 70 ft. or more below the surface. This is probably the reason for the higher salinity as replenishment of the groundwater is much slower than in the low lying country in the vicinity of Polda, where the water table lies at about 5 ft. below the surface. Probably the low lying limestone area around Kappawanta would yield good quality water at shallow depth. Sampling of wells in this area indicated that good quality water is widespread.

During the period, drilling was commenced in the area west of Tooligie and, to the end of the period, 20 bores were drilled at one-mile intervals along the road to Sheringa. Good quality water occurs at depths of 40 to 70 feet a few miles west of Tooligie, but the aquifer is quite thin. In some

places, particularly in bores 202, 203, 204 and 206, the groundwater is brackish varying from 115 to 378 grains per gallon (1,640 - 5,400 p.p.m.), but further west, it is generally of good quality.

The aquifer appears to be thickening towards the west, to more than 25 feet in bore 219 where the salinity of the water is 43.9 grains per gallon (627 p.p.m.).

Recommendations for pump testing from a large diameter bore were made earlier in the period. Three large diameter holes have now been drilled, one of them close to the trench and the others, several miles to the south-west. In the first of these, which is situated adjacent to bore 6, the clay beneath the aeolianite was intersected at 15 feet, and there was only 10 feet of water in the bore. Subsequently, it was decided to drill a second hole in the vicinity of bore 34, but in this bore the clay occurs at 9 feet, with only 3 feet of water in the overlying aeolianite.

Further testing was done in the vicinity of bore 75, but here also the aquifer was found to be quite thin, when one large diameter hole was sunk at this site. It was then decided to drill a series of test holes at about 200 yd. intervals in the vicinity of the trench. Information has now been received that in one of these bores, the aquifer was found to be 25 feet thick with about 20 feet of water. This is probably a suitable site for pump testing, but the samples have not yet been examined. Possibly a centrifugal pump could be used initially for the test, as it is considered that the drawdown is unlikely to be excessive.

It will be necessary to make arrangements for the discharge water to be pumped into the mains for the test to give a true value of the yield obtainable. However, before the necessary tanks and piping are installed, it is considered that a limited pump test should be done, the discharge water to be piped a short distance away. Such a test would give some

information on the capacity of the bore and could probably be continued for at least 24 hours before any recirculation occurs. This period could be lengthened by having a greater length of discharge pipe, but in any case, it is considered that a minimum of ½ mile of pipe would be necessary.

CONCLUSIONS:

At the end of June, 1963, a total of 159 observation and pump test bores have been drilled in the Polda area. Results of the drilling indicate that good quality water occurs over a wide area at shallow depth. Where the water lies at depths greater than 50 ft., such as in the higher ground south of Polda, the salinity may rise to more than 150 grains per gallon. Generally, in those areas where the water table is shallow, the quality is good, the exception being in the vicinity of Poelpena Swamp. In this area, the sediments consist mainly of sandy clay with some limestone and is much less permeable than the surrounding aeolianite.

Pumping from the trench ceased temporarily in April and, since that time, the water table has recovered and is now about the same as the level of December, 1962.

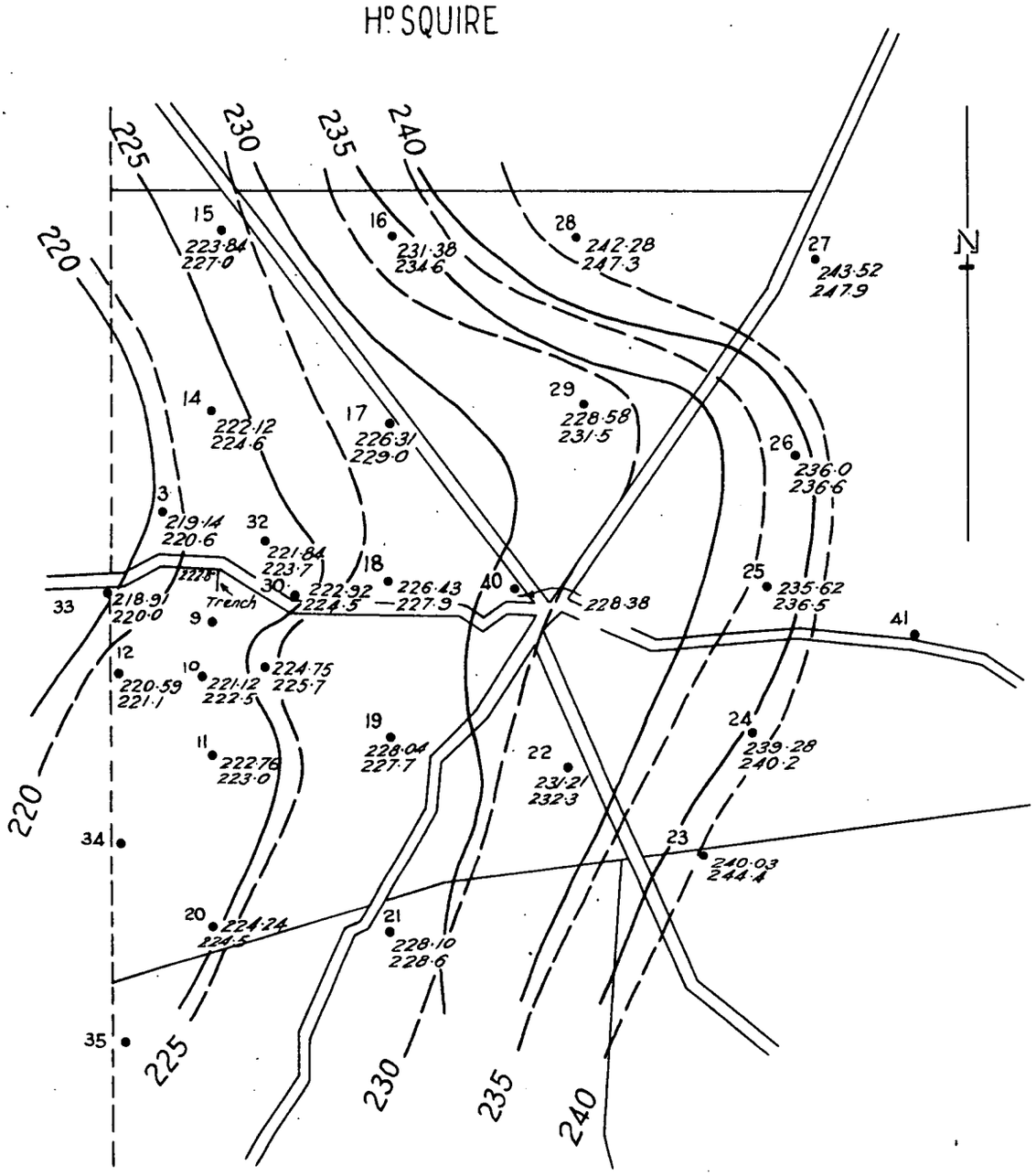
Several areas in the vicinity of the trench have been tested with the object of doing a large scale pump test. Several 16 inch diameter holes have been drilled and one of these is probably suitable for a continuous pump test. This bore is situated close to the trench and discharge water could eventually be pumped into the main.

In addition to the testing in the vicinity of Polda, 20 bores have been drilled along the road west of Tooligie and these have generally yielded good quality water. Within a few miles of Tooligie, the quality of the groundwater is variable, as this is a marginal zone between aeolianite to the west and clay and sandy clay to the east.

RGS:EMD:AGK
5/8/63

R. G. Shepherd
Assistant Senior Geologist
HYDROLOGY

Hº SQUIRE




Observation bores with number $^{21}$● 228·10 R.L. of water table at 28·2·63
227·9 " " " " 17·6·63

Water table contours at 28·2·63 — — — —
" " " " 17·2·63 ————

CHS. 80 40 0 1 2 3 MILES

*To accompany report by R.G. Shepherd*

**S.A. DEPARTMENT OF MINES**

| Approved | Passed | Drn. | POLDA BASIN<br>WATER TABLE CONTOURS<br>AT 28·2·63 & 17·6·63 | D.M. | Scale 1" = 1 mile |
|---|---|---|---|---|---|
| | | Tcd. RA | | Req. | S 3496 |
| | | Ckd. | | | DL 2/4 |
| Director | | Exd. | | | Date 22·8·63 |

200—2·61 3805