UR 1963/120-124

Dec. 1963

120.

ARTESIAN WATER AT SPREYTON

by W.L. Matthews.

During the 1920's a search for coal and petroleum in the lower Mersey Valley and surrounding districts was carried out by companies known as the Mersey Valley Oil Company, the Adelaide Oil Exploration Company, the Adelaide Oil Exploration Company and the Tasmanian Oil Company. A number of deep bores were drilled, some of which produced artesian water from a bed at the base of the Permian. One such bore was drilled on a property belonging to Mr. H. Smith just to the east of Spreyton Railway Station and about ¼ mile to the NNE of Mr. G.P. Ayers's property. Water was tapped between 425 and 437 feet from the surface. A little to the west of Spreyton Station, when drilling at the bottom of a coal pit, artesian water was struck at 760 feet from the surface. About a mile to the south of Ayers's property, on the northern end of Bonneys Tier, artesian water was struck in a shaft at 128 feet below the surface. Artesian water was also obtained from the basal Permian bed on Native Plain, about 2½ miles to the east of Railton, in one bore at a depth of 263 feet.

Only a few of the bores which penetrated the basal Permian produced pressure water. Three holes, 1½ to 3 miles to the SE of Smith's bore, entered basement rocks without pressure water being recorded. It appears, therefore, that favourable conditions for artesian water in the area are localized.

Mr. Ayers, knowing of the success in the bore on Smith's property which has been rigged for use, and requiring water for orchard irrigation, requested advice on the possibility of obtaining artesian water on his property.

GEOLOGY

The Spreyton area is underlain by Permian sediments and some recent deposits which occur in a wide band along the Mersey River. Burns (1964) gave the following sequence for the Permian, from top to bottom:-

Kelcey's Tier Beds:- This unit is 600 feet thick and consists of a sequence of mudstone and pebbly mudstone with bands of siltstone, sandstone and pebbly sandstone.

Mersey Coal Measures:- This is 62-95 feet thick and consists of an upper and a lower sandstone bed separated by a band of mudstone. Several coal bands occur but only one is persistent.

Spreyton Beds:- This unit is 159-578 feet or more thick and consists of mudstone with pebbly bands of mudstone and layers rich in fossils. To the south of Spreyton, the tasmanite oil shale bed occurs at varying heights above the base.

Basal Conglomerate:- The thickness of this unit ranges from 0 to more than 180 feet. It generally has a sand matrix which distinguishes it from the Spreyton Beds. It is from this basal bed that artesian water is obtained.

The Permian sediments have a regional dip to the north of about 10° and the intake area must be to the south, although the exact position is not known. The basal Permian beds are, however, exposed on the northern end of Bonneys Tier. A small fault was encountered in the drilling of Ayers's bore just above the coal seam.

The section below the coal seam appears to be unfaulted in Ayers's hole although there is a possible fault about 355 feet below the collar. Comparing the thickness of sediment between the coal seam and the aquifer in both Ayers's and Smith's bores, a thickening to the south is indicated. In Smith's bore, this thickness was 260 feet and in Ayers's bore it was 295 feet. Drilling of Ayers's bore also indicated a fairly constant slope for the aquifer from the shaft on the north end of Bonneys Tier tp Smith's bore. This constancy in slope indicates that between these three points the pre-Permian surface is sloping fairly evenly.

It is not known for certain whether the basement rocks in the Spreyton district are Ordovician or Precambrian. The core logs from Smith's bore showed quartzite under the Permian which could be of either age. Bores to the SE entered limestone which is probably Ordovician, quartzite which again could be of either age, and schist which is undoubtedly Precambrian. Ayers's bore did not pass through the aquifer completely because of drilling difficulties.

DRILLING OF AYERS'S BORE

Date Commenced : 13/2/63
Date Completed : 16/5/63

Size of Hole : No. 3 to 61'11"
NX from 61'11" - 395'

Casing in Hole : 150'9"

	Ayers	Smith
Depth to Aquifer	395 ft.	425 ft.
Altitude of Collar	c. 100 ft.	40 ft.
Output gal./hr.	2500	21600 (1924) (1963)
Temperature (F)	65°	69°
Pressure at Surface, lbs./in^2	stated to be 35	72 1924 1963

WATER QUALITY

	Ayers p.p.m.	Smith p.p.m.
Total Dissolved Solids	304.1	312.4
Ca	69.8	65.5
Mg	14.0	13.8
Na	not determined	26.8
Cl	21.2	26.8
SO_4	0.7	8.3
CO_3	155.0	140.2

pH 8.0

Analyses indicate very similar quality water with impurities occurring in roughly the same proportions.

REFERENCES

Burns, K.L., 1963 - Deep Drilling near Latrobe. Tech. Rep. Dep. Min. Tas., 7, 28-36

Burns, K.L., 1964 - Devonport. Explan. Rep. Geol. Surv. Tas 1 - mile Map Ser. K/55/6

Reid, A.M., 1924 - The Oil Shale Resources of Tasmania. Miner. Resour. Geol. Surv. Tas. 8 (vol.1)

APPENDIX

LOG OF AYERS'S BORE

by A.B. Gulline

From ft.	ins.	To ft.	ins.	Recovery ft.	ins.	Rock Type
	0	2	7	1	6	Decomposed rock and soil
2	7	7	5		4	Quartz pebbles
7	5	10			10	Decomposed fine micaceous sandstone
10		12	7	1	4	Sandstone ending in conglomerate
12	7	14			5	Pebbly sandstone
14		16			1	Clay
16		17		1		Shaley siltstone
17		17	9		5	Clay
17	9	20		1	3	Light grey shale
20		25		2	2	Friable grey shale
25		33	10	7	9	Grey shale
33	10	34	6		8	Very fine sandstone
34	6	39	1	3	3	Very fine sandstone becoming shaley and having calcite veins.
39	1	45		2	3	Shale
45		55		9	8	1' shale then calcareous fossiliferous fine sandstor
55		62		5	9	Fossiliferous shaley sandstor
62		70		1		Calcite vein in fine sandy limestone
70		75		2	4	Fine to medium sandstone
75		79		4		Dark grey sandy shale

From ft.	ins.	To ft.	ins.	Recovery ft.	ins.	Rock Type
79		84			5	Shale
84		87	9	1	9	Fine sandstone
87	9	92	6	1	10	Broken mixed sandstone and shale (fault zone)
92	6	100		2	3	Sandstone fine at top, coarse at bottom. Last 3" coal.
100		101		1		Coal
101		125		16	5	Very fine to medium grained sandstone, dark bands with mica and organic remains.
125		126		1		Fine sandstone to siltstone
126		135		7	1	Medium sandstone
135		141	9	6		Very fine to fine sandstone with carbonaceous remains.
141	9	150		7	3	12" of carbonaceous shaley sandstone, then medium light grey sandstone with pyrite
150		160		7	7	Silty very fine sandstone
160		163	6	1	11	Medium to fine sandstone with small 2 mm pebbles
163	6	168	8	5	2	Dark grey silty sandstone
168	8	172	1		2	2" quartzite pebbles
172	1	179	4	5	3	Dark grey silty fine sandston
179	4	184		3	2	Mainly dark grey siltstone
184		194	6	8	9	Siltstone to very fine sandst
194	6	199		1	4	Limey very fine to medium san stone
199		201	4		5	Limey very fine sandstone
201	4	208	4	6	8	Limey fine sandstone
208	9	211	4	1	6	Shaley and fine dark grey samdstone
211	4	220		5	5	Dark grey siltstone
220		232		3	10	Dark grey siltstone to fine sandstone
232		239		1	6	Siltstone with calcite and 2" pebbles
239		241	9	2	6	Siltstone
241	9	252	4	7	3	Siltstone and fine sandstone
252	4	282		8		Pebbly mudstone
282		290		7		Dark grey sandstone and silt-stone with pebbles up to ½"
290		294			2	Dark grey siltstone, pebbles increasing to base
294		203	5	2		Siltstone to fine sandstone with 2 mm pebbles
303	5	313			9	Fine to medium conglomerate with a sandy matrix.

124

From ft.	ins.	To ft.	ins.	Recovery ft.	ins.	Rock Types
313		316	4		5½	Fine sandstone with siltstone
316	4	325		1	9	Fine pebbly sandstone with siltstone
325		329	6		6	Sandy siltstone with 2" pebbles
329	6	337	6	2	4	Siltstone to coarse pebbly sandstone
337	6	340			5	Quartzite and jasper pebbles
340		346		5	6	2'9" mainly coarse pebbly sandstone with minor finer bands and fossils, 1'10" siltstone, rare fossi 3" coarse pebbly sandstone 5" siltstone 5" coarse sandstone with pebbles
346		355		7	5	1' broken siltstone and coar sandstone 2" siltstone with pebbles 1' Coarse to fine sandstone with fossils 2'9" fine sandstone to silt-stone with pebbles Then coarse sandstone with pebbles, calcite veins and some siltstone. Possible fault at 355'
355		356	5		4	Coarse to fine sandstone with pebbles
356	5	361		1	8	Pebbly fossiliferous (Straphaloria) limestone
361		369		1	7	Limestone
369		380			8	Limestone with pebbles
380		395			11	Pebbles of quartzite

Percent Recovery 47.9