

DEPARTMENT OF MINESSOUTH AUSTRALIAREPORT ON PROSPECTS OF OBTAINING BRINEFROM SUBSURFACE SOURCESL. FOWLER, HD. MELVILLE- AUSTRALIAN SALT CO. LTD. -

Lake Fowler was inspected during the week ending 1/7/55.

REQUIREMENTS:

Indefinite as regards quantity and quality.

Lake Fowler is a natural evaporating pan for surface runoff, from which some thousands of tons of salt are harvested each year. In a similar area on Peesey Swamp some miles westward, brine is pumped from shallow subsurface sources and used to boost the quantity of water available for evaporation. A similar project has been suggested at Lake Fowler.

LOCATION, TOPOGRAPHY:

Four miles south of Yorketown, Lake Fowler is an irregularly shaped shallow depression with a maximum length of about 3 miles. The surrounding area is a peneplain with an elevation of about 100 feet above sea level, variations in the topography being the result of the occurrence of numerous small and roughly circular shallow lakes, and occasional gypseous dunes.

Topographically therefore it differs significantly from the Peesey Swamp area, which is only a few feet above sea level, and lacks the lakes and dunes, being rather a flat swampy area with irregular sheets of drainage water lying on it.

GEOLOGY, HYDROLOGY:

On Southern Yorke Peninsula three different rock types commonly occur. Basement is a series of ancient metamorphic and igneous rocks, above which has been deposited a glacial boulder clay which is known to be in places several hundred feet in thickness, and is believed to be Permian in age. Above this

are Tertiary to Recent sediments.

At some period subsequent to the deposition of the tillitic material the "toe" of the peninsula, comprising the Hundreds of Para Wurlie, Coonarie, Warrendben and Carribie, was an island separated from the remainder by a north-south channel of the sea, just east of Warooka. This channel was gradually filled with sediments and is now a deserted seaway, still at no great height above sea level. Its flat surface is a swamp area on which surface runoff collects and evaporates, the residue of salt being harvested commercially. The whole mass of underlying Tertiary - Recent sediments is impregnated with saline water which is pumped out of shallow bores and discharged on the surface for evaporation, increasing the volume of brine from which the salt is commercially harvested.

On the higher land area south of Yorketown, these conditions do not appear to obtain. The glacial boulder clays are at present intermittently capped with aeolianite and travertine of recent origin, and the topography strongly suggests that this area is a glacial outwash plain, the numerous lakes being originally "kettles". Howchin (Royal Soc. of S.A. Vol. XXV.) speculated on the origin of these lakes, and suggested that their formation was the result of either wind erosion or chemical action. The present writer believes that they originated as kettles, and that wind action, of which there is evidence in the accumulation of gypseous deposits on the basin margins, has preserved and enlarged them.

LAKE FOWLER:

Examination of Lake Fowler itself discloses that glacial till outcrops along a considerable proportion of its margins, and is suspected to be concealed below a shallow soil cover almost everywhere else. There are two places where this may not apply, and where recent gypseous sands or other nonglacial materials occur, but the extent of such material away from the lake margin is open to question.

As a possible source rock for brine, the glacial beds can be disregarded. They yield little water of any kind, and local evidence, in the form of springs on the northern shoreline, and wells on the adjacent farmlands, is that the water is of very good quality, containing only about a quarter of an ounce of salts per gallon.

Adjacent to the Australian Salt Co's. leases the only area where these glacial beds do not occur along the lake margins is on the south and southeast, an area occupied mainly by a gypsum dune, from which the gypsum has in the past been open cut. It is possible that some saline water might be recoverable from a bore at the lake margin adjacent to this, but since the glacial beds are believed to occur at shallow depth, and since also the dune area is backed by only a narrow swamp with glacial till behind, the volume of water available for pumping may not be very large. The lease is difficult of access in this locality, and the expense of setting up a drilling plant, and drilling with what can be considered only very doubtful prospects, does not commend itself. The Company may wish to satisfy itself in this regard by constructing at least one trial hole, but it could be encouraged to do so only in full cognisance of the above facts, and on the understanding that the prospects of obtaining any quantity of brine are considered very poor. Drilling should be discontinued immediately the glacial clays are encountered, which will probably be at a depth of less than 20 feet below lake level.

CONCLUSIONS & RECOMMENDATIONS:

Geological conditions at Lake Fowler differ from those in the Peesey Swamp area, and are not considered favourable for obtaining brine from subsurface sources near the lake. There is only one place adjacent to the Company's leases where geological conditions do not preclude the occurrence of brine, and this is along the gypsum dune and on the south and south eastern shore.

Drilling in this area cannot be recommended except as a speculation, and it might be cheaper and easier for the Company to test prospects by means of a post hole digger. The lake shore is difficult of access for a drilling plant, and the cost of moving and setting up the drilling plant would be possibly £100, with drilling to 30 feet estimated at a further £45.



SENIOR GEOLOGIST
HYDROLOGY

EPO'D:AGK
6/7/55.

Approved		Passed		Dir. R.R.		S.A. DEPARTMENT OF MINES		D.M.		Scale 40 Chns. to 1 inch	
Director				Tcd. Ckd. Exl.		GROUND WATER SURVEY LAKE FOWLER HP MELVILLE		Req.		S 1107 Ch 16	
										Date 8-7-55	

LEGEND

Glacial erratics --- ▲▲▲

Glacial till ---

Clays believed to be glacial till ---

Gypsum area, representing the only part of Lake margin where drilling is not considered hopeless --- xxx

