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Section 4 – Underground Water

32. WATER SUPPLY FOR BUTTER FACTORY – KING ISLAND

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INTRODUCTION

The butter factory belonging to the King Island Dairy Products Co-operative Society Ltd, is situated on Porky Creek about five miles N of Currie. The creek is one of the few surface streams entering the sea on the W coast of the island.

The factory management requested a report regarding the possibility of obtaining underground water supplies as intended extensions and new processes will require an additional 18,000 gallons per day.

GEOLOGY

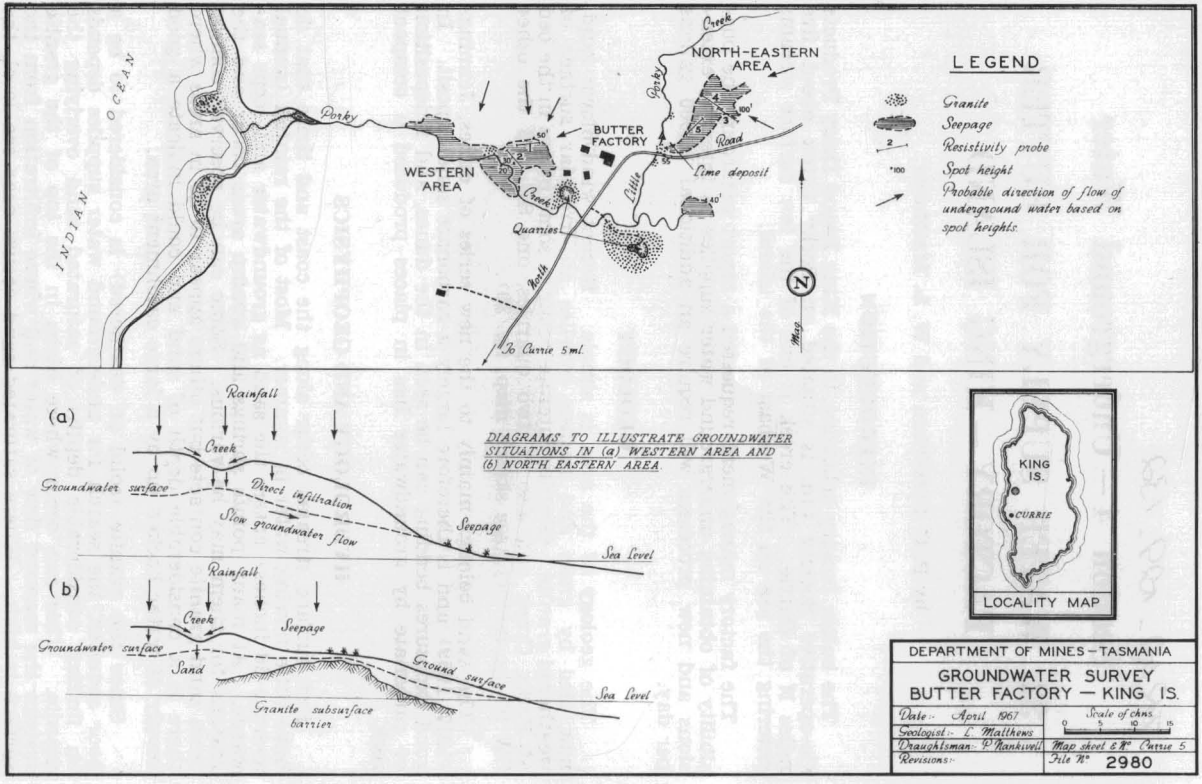
The geology of the area is simple. Recent wind-blown sand, now tied by grass and bushes, overlies an irregular surface of weathered granite. Granite outcrops occur in some places in the bed of Porky Creek and also in two quarries, one SE and the other SW of the factory (see sketch map, fig. 30).

The sand belongs mainly to the new series of dunes, Jennings (1957, 1959) and is therefore largely a carbonate sand deposit. In good exposures bedding can be seen in the dunes, and redeposition of carbonate by groundwater has in places produced a compact rock.

HYDROLOGY AND GEOPHYSICS

Few surface streams occur along the coast and those that do have little flowing water in summer. Most of the rainfall (annual average 36 inches) enters the sand as groundwater and seeps seawards. At many points springs and swamp areas occur and the reasons for them may be various. Some can be observed coming from sand granite contacts but others appear to be in areas where there is a considerable depth of sand and could indicate a good supply of water backed up by a large catchment area.

Since the granite (solid or weathered) is considered to be a poor acquifer, the search for underground water supplies depends on finding considerable depths of saturated sand overlying the granite. This can occur where highs in the top of the granite restrict the seaward flow of water and where infiltration from the surface is high. Where saturated sand occurs near sea level, the head producing seaward flow is correspondingly reduced and good depths of saturation may also be obtained.



5 cm

FIGURE 30

Electrical resistivity probes, which determine the distribution of electrical resistivity with depth were used in the survey. The resisitivities which correspond with rock types in this area are as follows:—

Dry sand—very high resistivity.

Saturated sand—low resistivity.

Saturated weathered granite—low resistivity.

Unweathered granite—high resistivity.

The resistivity work carried out could not, therefore, distinguish completely between rock types known to exist in the area, but the groundwater conditions could be determined with reasonable certainty.

Rain falling inland of the factory could be expected to infiltrate and make its way slowly seaward as groundwater. Additions would be made to this moving body of water by infiltration from the waters of Porky Creek. Where solid granite approaches the surface or where the ground is low lying, surface seepages occur. The general situation is summarised in the diagrammatic sections.

In accordance with these ideas two areas were examined in detail. One to the NE of the factory appears to be a depth of saturated sand where the groundwater flow is obstructed by subsurface barriers of granite. This flow is augmented by infiltration from Little Porky Creek. The area is represented on the surface by a swamp. The other area, to the W of the factory, is also swampy but in this case the seepage is due to the low lying surface of the ground intercepting the groundwater flow. The flow is confined by a granite barrier to the SW of the factory and perhaps by one to the W of it further down the creek.

(1) North-Eastern Area

This is an area of swamp land between Little Porky Creek and North Road. The creek bed is incised to a depth of about 20 feet and a number of granite outcrops have been exposed. If one assumes the granite top is flat, there would be about 20 feet of saturated sand beneath the swamp. The land surface rises again to the E and a small spring comes out of the side of the hill and runs into the swamp. The whole swamp area is backed up by the large catchment area of Little Porky Creek and if sufficient depth of saturated sand occurs this could be a good proposition for obtaining the supplies required. The electrical measurements showed that a zone of saturation does exist at depth in this area but it may pass down into weathered granite.

(2) South-Western Area

This area is on the factory property and consists of a large seepage which appears to come out on top of and is probably partly confined by a granite outcrop on the W side. It is also confined by a granite high on the E side. A considerable depth of sand could occur between these granite outcrops, in which case this is an area worth testing. The electrical indication were of a zone of saturation but not of such a depth as is found in the north-eastern area.

RECOMMENDATIONS

From the results of the resistivity probes and general examination of the geology and catchment areas, it would appear that the NE area is the better prospect. Both areas inspected are suitable for testing with spear bores (as used by the Currie Council in their water supply area). Using this method, depth of sand and water levels can be measured and pump tests can be carried out on each bore. If a bore is a failure, the spear can be removed and another site tried. If it is found that a sufficient depth of sand occurs beneath the swamp E of the factory, a pattern of bores could be installed across the swamp and the water withdrawn by one central pump. It would probably be necessary to test a series of bores over a long period to see if the water pumped is being replenished at a high enough rate.

Tests on quality could be important if specific uses are planned for the water.

References

JENNINGS, J. N., 1957.—Coastal dune lakes as exemplified from King Island, Tasmania. *Geogr. J.* 123.

———— 1959.—The coastal geomorphology of King Island, Bass Strait, in relation to changes in relative level of land and sea. *Rec. Q. Vict. Mus. Launceston. N.S. ii.*