

TR16-208-209

39. Further interpretation, gravity survey, Whitewater Creek dam site, Kingston.

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Shortly after initial mapping of two proposed dam sites on Whitewater Creek, near Kingston, a gravity survey was undertaken with the objective of examining the structural nature of the dolerite present and its relationship to faulting (Leaman, 1968, pp. 56-59). At that time the geology appeared straightforward. Subsequent investigations including drilling and additional geophysical work (Moore, 1973), have shown the area to be far more complicated than anticipated. A Tertiary lead system as well as additional cross faulting has been located.

Although there is now little prospect of a dam being built at either site in the valley, in view of leakage considerations, it was felt that a more complete interpretation of this survey should now be given. As a survey case-history it also shows that potential methods should not be applied in too restricted a manner.

#### INTERPRETATION

The original interpretation (Leaman, 1968) stated that the faults were not related to selective dolerite intrusions, nor were intruded by them. Further, that if a sheet were present it was common to all fault blocks covered.

A subsequent regional survey (Leaman, 1972) has verified a NE-SW strike to the regional trend which means that the anomaly range across the area (Leaman, 1968, fig. 15), is less than 2 mgals. The regional interpretation would also imply that the blocks west of the Permian/Triassic fault at the upper dam site are intruded by a major sheet and that this is absent to the east. However as the regional station spacing is some twenty five times that of the detailed survey no valid discrepancy can be stated since there is insufficient overlap of the two surveys. The gradient interpreted in Leaman (1972) as due to the sheet edge can now be shown to be not at the implied fault but slightly to the west and probably near the end of line H (Leaman, 1968).

Part of the Tertiary lead system is also reflected in the eastern end of lines A and B, (Leaman, 1968) which were near top water level and just lapped on to the basalt cap of the hill which conceals the lead. The eastern end of lines F, H and J show similar reversals suggesting a N-S lead across H-Q.

#### CONCLUSIONS

Although the original survey located problem areas along the centre lines of the dams and the adjacent faults, no work was carried out above TWL, or into the storage which was later shown to contain an effective leakage path.

Extension of the traverse lines to the west by less than 180 m would have done much to solve the problems of additional faulting through the storage as well as confirm the dolerite edge since postulated. Because the presence of dolerite must be proved for the quarries further west coverage should have been wider.

One or two more traverses south of A, 60 m apart, would have detected the lead system. A traverse has since been done and is included by Moore (1973).

REFERENCES

- LEAMAN, D.E. 1968. Gravity survey of proposed dam site, Kingston. *Tech.Rep. Dep.Mines Tasm.* 12:56-59.
- LEAMAN, D.E. 1972. Gravity survey of Hobart district. *Bull.geol.Surv.Tasm.* 52.
- MOORE, W.R. 1973. Whitewater Creek dam sites and the buried Tertiary channels of the Kingston area. *Tech.Rep.Dep.Mines Tasm.* 17.

The Tropic Water Company is interested in obtaining an underground water supply of water, as surface water available to the factory requires the installation of a filtering system. A private drilling company has drilled a hole to 100 m and has obtained about 1,500 l/h, but about ten times this amount is needed for the factory. A request was made for advice as to whether drilling in another area or deepening the existing bore would yield greater quantities of water. The factory is situated on the east bank of Big Creek between the Bass Highway and the railway line (fig. 6).

GEOLOGY

The geology of Wynyard is situated on the Wynyard Plain, a relatively flat area which rises to about 1 m above sea level, which (see fig. 1) regards as being a pre-Tertiary-Miocene surface that was later eroded and covered with sand, clay and gravel, probably in Pleistocene times. The records that these sediments range in thickness from about 2 m near the coast to at least 10 m inland.

These Quaternary deposits are underlain by the Wynyard Tillite of Pliocene-Carboniferous age. The tillite unit which (see fig. 2) is regarded as being at least 200 m thick is a shallow dipping, sometimes very gently folded, laterally bedded tillite, conglomerate, silts and sandstone. The bore was put down between the factory and Big Creek and entered tillite at least 2 m. The cutting from the bore appears to be mainly of siltstone. A trench for a new part of the factory, dug approximately at right angles to the creek which was 20 m long and about 2 m deep, reached the tillite unit over much of the excavation. Exposure of tillite can be seen along Big Creek (which has cut deeply into Wynyard Plain) upstream from the factory and along the bypass road just south of the main part of Wynyard. The Quaternary deposits in the vicinity of the factory, appear to be thin, consisting of even-grained sand with clay and gravelly clay at lower levels.

HYDROLOGY

There are two possible sources of underground water in the area - the Quaternary deposits and the tillite.

Joints and other features would supply most of the water that could be obtained from the tillite unit and these features could be expected to be more open near the surface than at greater depths. Unless a fault plane which has not been clay filled or some other rock type is struck, it seems unlikely that such water would be obtained by extending the bore any deeper. The area of land owned by the factory is about 2 hectares and it is not expected that conditions for groundwater in the tillite would vary to any great extent over this area.

The other possible source of water is the superficial deposits. If extensive beds of gravel or sand were to occur in the factory area, adequate quantities of water could be obtained. From the drilling, trenching and creek exploration, these deposits appear to be thin in the area around the factory.