

Progress report on investigations at Risdon Brook damsite

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Preliminary geological mapping indicated that the following features required further investigation.

- (1) The possible presence of thin continuous clay seams along bedding and joint planes. These could materially reduce the shear strength of the bedrock at the damsite.
- (2) The presence of and the depths to which open joints are present in the rocks at the damsite.
- (3) The possible presence of calcareous or shaley lenses in the otherwise dense mudstone at the site.
- (4) The possibility of a buried stream channel beneath the alluvial deposits.
- (5) The effect of nearby faulting on the rocks at the damsite.
- (6) The possibility and likely magnitudes of leakage along joints, faults and bedding planes through the saddle between the proposed reservoir and Grasstree Hill Road.

In order to investigate these problems a diamond drilling programme has been initiated and a series of trenches and test pits put in. Part of this work is still in progress and only preliminary results are available to date.

Diamond Drilling

One hole (100' depth) has been completed and the second hole is now in progress. The cores have not yet been logged in detail but some general remarks can be made.

The hole encountered dense blue/grey silty mudstone containing occasional subrounded pebbles of quartzite and slate. Joints and bedding planes were oxidised and some clay filled to a depth of about 20 foot (creek level). Below this they appeared to be generally filled with a mixture of calcite and pyrite and no water loss was reported. A clay seam about 2" thick at a depth of about 85' showed polished faces indicating movement. It may be expected that the holes drilled higher up the abutments will encounter a greater proportion of oxidised and open joints.

A series of trenches has been excavated at the proposed damsite to check the condition of the bedrock and to test for the presence of a buried stream bed. These revealed solid rock at shallow depths (between RL's 70 and 73 feet) and no evidence could be found for a buried channel. Detailed mapping of those excavations is incomplete but a layer of clay or weathered shale has been noted at the creek end of the downstream trench. Elsewhere the rock is massive and the joint system widely spaced.

Two trenches have been dug to intersect the main fault which crosses the creek just upstream of the damsite. In both of these the fault zone is occupied by a thin dolerite dyke. The mudstone close to the fault is closely jointed with the joints filled with clay, the sandstone on the other side of the fault does not appear to be badly fractured. The fault plane is filled with a mixture of clay and decomposed, closely jointed, fine grained dolerite. At a later stage it will be necessary to explore the faultzone at a greater depth immediately upstream of the damsite. Some investigation of the possible fault just downstream of the damsite is also desirable.

A number of test pits have been put in across the saddle between the proposed reservoir and Grasstree Hill Road. In two of these pits dips in the shale beds were inclined generally toward the reservoir, which is a favourable direction. However the bedding was somewhat disturbed and the dips high, suggesting that further small faults may be present. It is proposed to extend the geological mapping further in this area. More investigation of this area will be necessary but the magnitude of the problems in that area are related very largely to the height of the proposed dam.

Summary

The following points appear to have been established at this stage.

- (1) The possibility of a buried stream channel at the damsite is excluded.
- (2) The mudstones contain some open joints and some thin clay seams above creek level. However their lateral extent, thickness and the composition of the clay filling has not yet been established.
- (3) Although a good deal of investigation work remains to be done it appears that no major problems are involved in a small dam (up to about 60 ft.). Above this height all the potential problems are magnified and careful, detailed investigations will be necessary of all geological aspects.

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