

REPORT ON THE GEOLOGY OF THE PROPOSED PET RIVER STORAGE
RESERVOIR SITE.

A preliminary investigation of the proposed site was undertaken on December 17th, 1941, in company with the Burnie Municipal Engineer, Mr. D.R. Maddock, for the purpose of determining the geological features affecting the proposed construction of a dam. On two subsequent occasions brief inspections were made, one in connection with actual drilling and the other for the purpose of collaboration with the Chief Civil Engineer, of the Hydro-Electric Commission, Mr. G. Sheil.

The proposed site is located on the Pet River, approximately six and a half miles south of Burnie, and is about six chains west of the upper fall of the Pet River Falls.

In order to obtain a broader conception of the characteristics of the basalt in this locality, the preliminary examination was extended to include an area bounded by the Darling River on the East and the Guide River on the west.

The general geology of the area is apparently simple and consists of a flow of basalt, of variable thickness, overlying slates and sandstones. The apparent simplicity of the geology really masks a complicated structure, complicated by virtue of the number of individual flows, which contribute to the mass of basalt overlying the bed-rocks. The variation in the total thickness of the basalt, as indicated by the exposures in the Darling, Pet and Guide Rivers, is due primarily to differential erosion between flows and initial differences in height in the pre-basaltic topography.

Until a detailed geological survey of the whole district has been undertaken, a true understanding of the nature and number of basaltic flows constituting the basalt areas of the north-west coast, will not be possible. The basalts are extremely variable in type and range from fine-grained normal, to fine and coarse vesicular types, with abundant development of zeolites and associated bands of clay. Regarding the vesicular types, it is not likely that there is any marked interconnection between the vesicles, so that the specific yield of the rock would not be much greater than the normal basalt.

The steep bank above the 820 feet contour on the right bank marks the western edge of a flow and the consequent erosion along this junction is indicated by the depth of clays and boulders penetrated by the No. 9 diamond drill hole and the areas of slumping, with consequent swamps to the south east of the falls.

It is on the northern edge of this flow that the proposed diversion canal, from the Darling River, will cross the saddle and it can be anticipated that the great depth of weathering indicated in D.D. Hole No. 9 will extend through the saddle.

Regarding the actual site of the proposed dam, few rock outcrops occur outside the river bed, where basalt is exposed along the greater length of the storage basin. Down-stream from the proposed dam, solid basalt persists for a distance of approximately ten chains, then the underlying slates and sandstones are exposed.

The storage area is almost entirely covered with the typical soils and clays derived from the weathering of the basalt. The actual condition of the basalt rock, near the surface, is solely the result of the action of weathering agencies decomposing the rock and the extent to which they have penetrated downwards. There need be no fear that such characteristics, due to the weathering, will increase downwards, as it is not due to causes which have arisen from below, but only to agencies which have penetrated downwards from the surface. The drilling has indicated that the depth of weathering is quite considerable and in one diamond drill hole, No. 9, on the right bank, the drill reached a depth of 79 feet, in clays and boulders, without reaching solid rock. It was unfortunate that this drill hole was discontinued without penetrating solid rock as there is a definite relationship to be established between this zone of deep weathering and the areas of slumping and consequent swamps south east of the falls.

Two prominent systems of jointing in the basalt are apparent in the creek bed. One controlling the vertical columnar structure and the other a system of major horizontal joint planes approximately 50 feet apart. Because it is extremely unlikely that the major horizontal joint planes would be persistent or continuous for any great distance, and the broken condition of the diamond drill cores, no attempt was made to correlate the major joint planes.

The jointing will not affect the suitability of the basalt for foundation purposes, but may permit leakage through the foundation, particularly when the water is behind the dam. It is not anticipated that the leakage would enlarge the joints beyond removing any loose material in them, because the rock would be altered extremely slowly by percolating waters.

Aneroid readings indicated a minimum thickness of basalt of approximately 90 feet under the dam, while the drilling proved it to be at least 94 feet, in No. 1 Bore.

The Pet River Falls, situated approximately five chains east of the proposed dam, consist of two cascades about 40 and 50 feet respectively. This structure is the result of headward erosion by the Pet River "plucking" the vertical columns from major horizontal joint planes.

From the evidence available, it would appear that there is ample thickness of basalt to give stability to a dam of the contemplated capacity. The only weakness in the proposed site is the zone of deep weathering in the vicinity of diamond drill hole No. 9, because there is a definite relationship between this area of deep weathering and the areas of slumping on the right bank south east of the falls. Although the great thickness of clay and boulders will be, in effect, a natural dam, that it has not completely dammed the ground waters is evidenced by the springs in the vicinity of the slump areas, and care must be exercised in effectively sealing this zone of deep weathering.

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