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BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

REPORT NO.
RECORDS NO.1951/33.

THE ESCAPE OF WATER FROM THE COTTER STORAGE BASIN.

by

W. B. Dallwitz
Petrologist.

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On May 3rd, with Mr. Noakes, Dr. Joplin, and Mr. K. J. Dalgarno of the Department of Works and Housing, Canberra, I visited the Cotter dam to investigate a reported loss of water from the fault on the northern side of the wall. Evidence of such loss near the wall was lacking, because the water level was low, and the fault at the level of the water and approximately up to the height of the old wall, was buried under concrete. The stilling pool was empty, but a little water - several gallons per minute - was flowing from a pool below the coffer dam, which was under reconstruction.

This water probably came from seepages from the storage, through, and perhaps under, the wall, and partly from seepages from the walls of the valley a short distance downstream from the retaining wall.

On June 1st I again visited the dam, this time with Mr. H. Hicks, of the Department of Works and Housing. Rain had fallen between this visit and the last, and the water level was within a few inches of the top of the recently completed wall. The northern fault is exposed on the downstream side of the dam, on the left bank of the river, and extends up the bank in a northerly direction; a small, very steep valley has been cut along its course. The crush zone is much better exposed than it was at the time when my Report 1949/32 was prepared; it is 5 to 6 feet wide, and diminishes in intensity outwards from a central zone of more severe crushing.

Mr. Hicks said that water had earlier begun to flow from the fault, and that the rate of flow had slowly increased as the water level had risen towards the top of the extended wall above the old level. On July 4th he reported that the flow was 8 gallons per minute, and had been constant for at least three weeks; on that date 3 or 4 inches of water were flowing over the spillway.

Whatever the ultimate source of the water in the flows observed on June 1st, it is certain that they are due entirely to the increase in level of water in the storage basin. The fact that water was seeping from cracks and joints, and spurting from one or two small holes, all of them on the upstream side of the fault, suggests that these flows, and the flow from the fault itself, are probably not attributable to water being forced up, under hydraulic pressure, along the fault from the place where the fault crosses the floor of the storage basin.

They probably owe their origin to seepage directly from the increased storage, through cracks and joints, around the northern abutment into the fault zone. Nevertheless, it is still by no means impossible that a body of relatively impervious gouge in the fault zone could divert water entering the fault from the floor of the storage basin into cracks, joints, and other openings, and so be instrumental in giving rise, in part or wholly, to the observed phenomena.

This loss of 8 gallons per minute is not at all serious, but it is impossible to say how much water is escaping from all sources within the storage in a northerly direction along the fault zone itself. This water would enter the general groundwater storage, and would probably be very difficult to detect; it would obviously be impossible to estimate the volume lost, in any case.

It was verbally suggested to Mr. Hicks that the drill-hole laid out in the plan accompanying the above-mentioned report should be put down to investigate the fault, and the flow of water kept under observation as the level of the water in the storage basin falls. As the flow would increase during wet weather, an estimate of the amount of water not attributable to leakage would be possible. Whether or not grouting was to be carried out would depend on the interpretation of these measurements.

As a result of the flow from the fault zone, a long pool of water had accumulated on the northern side of the stilling pool; this water was escaping by seepage underneath the coffer dam, which was almost completed on June 1st. The observed flow was noticeably greater than that issuing from the fault and nearby openings; this increase was due to water added by the various seepages mentioned earlier in this report.

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Canberra,
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