

elsewhere had decreased in sympathy, and shortly after the complete emptying of the headrace they fell away very greatly, and by Tuesday, the 17th instant, had entirely ceased. Certain cracks were observed in the back of the power-house on the first morning of the trouble, and a small quantity of water was seeping through these. This, of course, stopped when the other leaks stopped.

As the water in the forebay and headrace was lowered, the cracks tended to close, and when the water pressure was entirely removed it may be said that in a general way the cracks closed up to half the width at which they were at the maximum. The maximum width of the cracks was 2 in. at one point, gradually fading away to a hair crack at each end. This is now 1 in., and fades away to nothing in a shorter distance than previously.

Very careful measurements both by direct measuring from known fixed points and by triangulation from parts of the country remote from the scene of movement all indicated that the movement, small as it was, was definite and in the direction from the penstocks to the tailrace—in other words, towards the gorge in which the Waikato was running prior to the diversion in 1928.

At the time of my visit on 9th June investigations indicated that some movement had taken place in connection with the power-house, the turbines being slightly out of true level. It was also ascertained that the high-level suspension-bridge spanning the gorge had sagged to some extent, presumably on account of movement of one of the supporting towers. Also, the heavy-traffic low-level bridge just below the power-house gave indications that movement had taken place there. All these displacements support the theory that whatever movement took place was inwards towards the old gorge.

It was apparent almost from the first that extensive work would be necessary to make good the position, and that the plant would of necessity have to be shut down for a considerable period. The entire emptying of the lake was therefore decided upon, and the lake was finally drained on the morning of the 24th June. As the water in the lake was lowered certain overhanging material from the cliff wall above the intake to the diversion-tunnel slipped away at intervals during the night of 13–14th June with the result that the gates of the diversion tunnel became blocked on three occasions. The blockage was overcome by raising the gates and thereby increasing the opening, the pressure of water sweeping the slipped material through the diversion-tunnel. Apparently the gates were not affected by these blockages, as they were successfully operated again immediately afterwards.

On Friday, the 20th June, certain cracks, one-fiftieth of an inch in width, were reported as having been discovered in the floor of the power-house round No. 2 unit, and, on telegraphing for further particulars as to the positions and directions of these cracks, the information was received next day that they had become visible round all three machines, and extended from the upper machine-floor down approximately to the top of the turbine scroll cases. These cracks were believed by the staff to have developed in the last few days, as with quite a number of men constantly looking for signs of damage it seems inconceivable they could have been missed previously if there.

As soon as it became evident that it would be necessary for the plant to shut down Auckland was communicated with, and arrangements made with the Power Board for it to take up its own load at its King's Wharf steam plant, and arrangements were also made to get steam on the Department's steam set at Grand Junction, and also to ensure that the Department's Diesel plant at Penrose was ready for immediate service. It was also arranged that all the power available from McLaren's Falls plant, which belongs to the Tauranga Borough Council, from which the Department has in the past taken power over a considerable period, should be drawn upon. Further, the Government's plant at Rotorua, which has been shut down for some time; was also got ready for immediate action. As a result, when the water fell too low for the machines at Arapuni to operate, which occurred on Wednesday, the 11th instant, at 3.40 p.m., the load was taken up by the plants indicated above in addition to the Department's station at Horahora, and has been carried in this way ever since.