

## EFFECT OF ARAPUNI DIVERSION.

*Diversion of River at Arapuni.*—On the 2nd December, at 4.20 p.m., the Arapuni diversion-tunnel gates were partially closed to commence filling the Arapuni Lake. The flow in the river was then gauged at 8,700 cusecs, of which 7,000 cusecs were required for Horahora, leaving 1,700 cusecs to be impounded. At 10.30 p.m. on the 25th December, the gates were further closed to reduce the flow to approximately 3,000 cusecs, and after some adjustments to allow sufficient water to generate 7,000 kw. at Horahora the gates were left at this setting over the Christmas holiday period. Water commenced to flow over the spillway (320 ft. level) at about 11.30 p.m. on the 31st December. By 12 noon on the 1st January the flow in the new channel was estimated at 2,000 cusecs. The tunnel-gates were closed at 2 p.m. to reduce the flow through them to about 2,000 cusecs, but were opened again at 9 p.m. to increase the flow through them to about 4,000 cusecs, with the object of reducing the erosion in the new channel. The gates were closed completely on the 2nd January for twenty-five minutes for examination, opened again to 4,000 cusecs, closed to 2,000 cusecs at 7 p.m., and completely closed at 9.50 a.m. on the 3rd January.

*Steps taken in Anticipation of Trouble.*—The possibility of trouble with debris was given a good deal of consideration, but except for the construction of the boom across the river above Horahora and for cutting and burning scrub on the Waitete Flat it did not appear practicable to do much to prevent such trouble. The boom served its purpose well in diverting large quantities of pumice and other floating debris and discharging them over the weir; but after the first three weeks the amount of floating material dropped to almost nothing, and also practically the whole flow of the river was required by the turbines, leaving nothing available to carry any floating debris over the weir. In the latter half of January and the first week of February the greater part of the old crib weir was demolished by blasting, to make an effective channel to the Glenfield-Kennedy gate, so that sand and submerged debris could be discharged through it whenever it was practicable to open the gate. All the foregoing work was carried out by the Arapuni office.

*Difficulties met with at Horahora.*—These commenced at 11.15 a.m. on the 1st January when large quantities of pumice, tea-tree, fern, flax, &c., began to come down the river. Most of the floating debris was diverted by the weir, but more came into the headrace than could be coped with. The screens in front of Nos. 1 to 6 turbines are in front of the turbine-pit gates, whereas Nos. 7 and 8 machines have the screens between the gates and the turbines. There was one mechanical scraper for the screens on Nos. 1 to 6 turbines, and a second for Nos. 7 and 8. (A second scraper for Nos. 1 to 6 turbines has since been obtained.)

The original screens (Nos. 1 to 6) require the headrace empty to do anything to them, and they had not been examined for three or four years. They are continuous across the front of the whole six machines, and with, say,  $\frac{1}{8}$  in. rusting the ferrules between bars, the different bars could move sideways and allow the slack to accumulate in one place. Thus there were several gaps of up to 4 in. between bars, with the result that pieces of pumice could get through larger than could pass through the turbines, so that the turbines themselves could get blocked and the governors could not move the moving guide-vanes. After the first few days this happened to varying degrees on all these six turbines, which at this time had all to be shut down in rotation for cleaning, and, after cleaning, the same thing started again, bringing the machine down to half-load or less in about a day at the most.

Nos. 7 and 8 turbine screens were in better condition, and these turbines have large openings which will pass anything that goes through the screens. The minimum load at one time, however, was down to 300 kw., carried on No. 5 machine, at a time when No. 7 and No. 8 had both to be taken off load. This was on Sunday the 1st January. The half-hourly maximum and minimum loads and total units on the following days were as follows:—

## HORAHERA OUTPUT, 2ND JANUARY TO 9TH MARCH.

Date.					Maximum.	Minimum.	Units.
					kw.	kw.	
January	2	..	..	..	4,500	1,900	64,890
"	3	..	..	..	4,000	1,300	74,370
"	4	..	..	..	4,100	2,100	82,950
"	5	..	..	..	4,500	2,800	88,810
"	6	..	..	..	4,700	3,200	95,060
"	7	..	..	..	5,100	3,700	115,570
"	8 (5)	..	..	..	5,700	3,800	115,210
"	9	..	..	..	6,200	..	130,800
"	10	..	..	..	6,000	4,700	131,840
"	11	Shut down 5 hours	..	..	6,800	5,400	125,360
"	12	Shut down 5 hours	..	..	6,800	5,400	128,660
"	13	..	..	..	7,100	..	152,465
"	14	..	..	..	7,400	..	159,445
"	15 (5)	Shut down 7 hours	..	..	6,900	..	93,180
"	16	..	..	..	9,300	5,300	185,430
"	17	..	..	..	9,100	5,700	187,550
"	18	..	..	..	8,600	5,400	177,600
"	19	..	..	..	8,900	6,500	188,135
"	20	..	..	..	9,200	..	193,345
"	21	..	..	..	8,800	6,300	182,280