

sideration be given to the WR² of all rotating equipment, to see that it is in line with the intensity and duration of peak loads so that desired regulation can be maintained.

Process steam for pulp mills is normally required at more than one pressure. With by-product power turbines, steam demands should be supplied direct from the turbine extraction or exhaust nozzles for maximum power generation. It is essential that the operating characteristics of turbine governors be specified so as to conform to the plant load conditions if maximum by-product power is to be developed. With two back-pressure turbines, the unit with the lower exhaust pressure should be loaded to the full extent of the low-pressure steam demand before the second turbine takes its share of load surges.

Pulp mill steam requirements in excess of that required to satisfy the power demand must be furnished by by-passing the turbine-generator through suitable pressure-reducing stations. Turbine governor action, power frequency, and steam pressure regulation are affected by the size and sensitivity of the pressure reducing stations, the size and design of piping, and the position at which the pressure element for the reducing valve is located, in respect to boilers, turbines, piping, and steam load connections.

Prior to 1950, the Port Alice mill operated on steam produced in thirteen 150-psig boilers. Process steam was piped direct from the boilers to the mill and to the three condensing turbine-generators, rated 3000 kw, 3200 kw, and 2000 kw, respectively, any two of which developed the peak power demand.

In 1950 it was decided to provide the Port Alice mill with a high-pressure by-product power plant to realize the savings enjoyed by the company's recently constructed Woodfibre high-pressure generating station.

Predicated on the principles out-

lined, the new boiler plant was designed to house two 207,000-lb-per-hr, 600-psig, 725-F total temperature boilers. The existing turbine room was utilized by raising the operating floor level 5 ft 3 in. The existing switchboard and mill electrical distribution system, being no longer adequate, were replaced by a new metalclad totally-enclosed board, in a new switchboard bay. Two Elliott 3500-kw back-pressure turbine-generators were installed at the new operating floor level, one turbine exhausting at 150 psig and the other at 50 psig.

A new deaerator and utility tower was appended to the boiler-house structure to enclose a deaerating heater, chemical lab, toilet, and locker rooms. To reduce the capital expenditure, it was decided to install initially one boiler large enough to provide the plant steam demand burning fuel oil. The old low-pressure boilers were maintained for stand-by service and to dispose of the wood fuel produced in the break-down plant.

Design of the new powerhouse was complicated by the fact that construction work was carried out so as not to interfere with mill production. In 1951, when the Port Alice mill was acquired by Alaska Pine & Cellulose Ltd., it was decided to build a new bleach plant, woodroom, and water supply system. Boiler No. 15 is now being installed and dutch ovens are being added to boiler No. 14 to burn the refuse from the woodroom. When boiler No. 15 is in operation, boilers one to thirteen inclusive, will be dismantled. If more steam than can be produced with boiler No. 14 or 15 is required in the future, a third high-pressure unit will be installed in the space now occupied by low-pressure boilers three to six. The third high-pressure boiler will be of sufficient size so that any two units will provide the mill's total steam demand.

The new bleach plant will double the fresh-water requirements and

necessitate building a new pump-house at Victoria Lake, some 270 ft above the mill and approximately two miles distant from it. By installing the most efficient pumps and prime movers at the lake and taking advantage of the maximum siphon head at the high point in the pipe line, it is possible, by reducing hydraulic losses to an economic minimum, to pass the water supply through a hydraulic turbine, installed in place of the existing 3000-kw condensing turbine-generator, and generate enough power in the recently purchased 2000-kw Elliott generator, to operate the pumps at the lake with a slight power excess. The system is designed so that the water supply will be self-sustaining, even if a disturbance on the main switchboard shuts down the steam-driven generators.

A new screen structure is being built between the digester building and the powerhouse to screen solid matter from the mill water supply. The screen structure is located at sufficient height to permit water distribution by gravity throughout the mill.

Space is available in the turbine room to install a third high-pressure turbine-generator exhausting at 150 psig, should mill expansion exceed the power generating capacity of the existing units.

