Portishead B Power Station

Electrical

Each alternator is solidly coupled by four 1.25 square inch cables per phase to a 72,000 kilovoltampere generator transformer having a no-load voltage ratio of 11,800/141,600 volts with a voltage range through on-load tap-changing equipment for a nominal secondary voltage of 132,000 volts ± 10 per cent over fourteen equal taps. Each transformer is of the ON/OFB type with natural cooling up to 50 per cent full load. The high voltage side is connected to the Grid switching station.

Facilities are provided to tap the leads to the generator transformer to connect to the 6,000 kilovoltampere unit transformer, thus providing a source of starting supply for the generating station in the event of a complete shut down of the A station from which starting supplies are normally obtained. The generator transformers and the unit transformers are sited in outdoor cells along the east wall of the turbine house.

Starting and common auxiliaries supplies are obtained from three 7,500 kilovoltampere, 33,000/3,300 volt delta/star connected transformers fed from the 33,000-volt main busbar system on the A station. These transformers are of the ON type with off-load ± 2½ per cent and ± 5 per cent tap-change. Each feeds a separate 3,300-volt station distribution board, emergency inter-connection facilities being provided between the various boards throughout the station. In addition to controlling the larger common auxiliaries such as ash pumps, recirculating pumps, standby boiler feed pumps, and coal and ash circuits, the three station boards provide supplies to each 3,300-volt unit board for starting purposes.

Each 3,300-volt unit board controls the larger auxiliaries of its associated boiler/ turbo-alternator set together with one out-going circuit to the 415-volt unit board, through a 1,000 kilovoltampere, 3,300/415 volt delta/star connected unit transformer. The 415-volt unit board controls in turn the supplies to the turbo-alternator auxiliary board, transformer auxiliary board, boiler auxiliary board, general service pumps, precipitators, and mill group boards. An emergency inter-connection is also provided to this board from the 415-volt station boards, which take their supplies from the 3,300-volt station boards through 2,500 kilovolt-ampere, 3,300/415-volt delta/star connected station auxiliary transformers.

Auxiliary Motors

For all electric motors above 100 horse-power, a pressure of 3,300 volts is adopted. For 100 horsepower and below, the motors are connected to the 415-volt system.

The variable speed drives on the boiler auxiliaries are by alternating current commutator motors with induction regulators.

Neutral Earthing

In order to meet the particularly low value of resistance to ground required by the G.P.O. the cast iron linings of the three pump pits and the two cable tunnels are being used for station earthing.

The neutrals of the 72,000-kilovolt-ampere transformers are earthed solid. Each alternator is provided with a 22 ohm resistance for earthing the neutral point of its stator windings.

Lighting

Lighting transformers feed a 415/240-volt 3-phase, 4-wire, 50-cycle system from the station auxiliaries network. These transformers supply the main lighting distribution boards. These are interconnected to facilitate a transfer of load from one board to another for maintenance purposes or in the event of a fault.

For emergency lighting a supply is taken from the station 240-volt battery and automatic contactors energise the emergency system from the battery on the failure of the alternating current supply.

For use with hand lamps special wound transformers with a secondary voltage of 25 volts are installed.

Extracted from CEGB booklet published 1960.