

kva interrupting capacity connects the generator to the main 6600-v mill bus. This breaker is in a steel cubicle near the generator terminals. All controls are in the main switching room, in the ground-wood mill some 300 ft from the steam plant. Overcurrent, differential and field-ground relays protect the generator.

General Layout. The two new boilers

are arranged so control panels, feedwater-regulating valves and stairways, to either basement or drum platform and fan room, are in or near the passageway between the units. This arrangement aids efficient operation by placing the operator within easy reach of his equipment. When two additional boilers are installed they will duplicate, as nearly as possible, the

present arrangement of equipment. There is ample room around all equipment for maintenance and operation and, while no effort was made to "dress up" the plant, the general appearance is good. An important factor is the painting scheme; the system developed by Pittsburgh Plate Glass Co. and known as "color dynamics," has been followed when doing this work.

PRINCIPAL STEAM AND ELECTRICAL EQUIPMENT

Steam and Power Plant, Fraser Companies

STEAM-GENERATING EQUIPMENT:

Boilers, superheaters.....Combustion Engineering Co
Boilers, 2; best-boiler, 2-drum, watercooled furnace; 9215 sq ft of heating surface in each boiler; 1763 sq ft in waterwalls; rated continuous steaming capacity 100,000 lb per hr; 620 psi at superheater outlet; 700-P total steam temperature; 8000 cu ft furnace volume; 25,000 Btu full-load heat release per hr per cu ft furnace volume; 60,000 Btu full-load heat release per hr per sq ft of projected watercooled furnace surface
Air heaters.....Combustion Engineering Co
Plate type, 7600 sq ft heating surface
Boiler-supporting steel, casings, ducts and breechings.....Combustion Engineering Co
Boiler blowers.....Vulcan Boat Blower Co
Chimney.....Canadian Chimney Co, Ltd
One: radial brick, 9-ft inside diameter, 225 ft high

COMBUSTION EQUIPMENT:

Automatic combustion control.....Bailey Meter Co
Coal pulverizers, feeders and primary air blowers.....Combustion Engineering Co
Pulverizers, 2 per boiler; bowl type, 7000 lb per hr each; coal grindability 70; proximate analysis %: volatile 27, fixed carbon 60, ash 13, moisture 10; ash-softening temperature 1900 P
Coal-pulverizer and primary-air-fan motors.....Canadian G-E Co, Ltd
4: 50 hp, 550 v, 1800-rpm, squirrel cage
Pulverizer-drive-motor starters.....Canadian G-E Co, Ltd
Coal-feeder controllers.....Bailey Meter Co
Pulverizer-coal burners.....Combustion Engineering Co
Circular, 4 per boiler, 3500 lb per hr
Automatic coal scales (Richardson).....Peacock Bros, Ltd
Fore-draft fans.....Canadian Sirocco Co, Ltd
One per boiler, motor driven, vane control, 27,100 cfm, 7.5-in. wg
P-d fan motors.....Canadian G-E Co, Ltd
3: 75 hp, 550 v, 1760 rpm, squirrel cage
P-d fan motor starters.....Canadian Sirocco Co, Ltd
Induced-draft fans.....Canadian Sirocco Co, Ltd
One per boiler, motor driven, hydraulic-drive speed control, 55,800 cfm, 9.63-in. wg
Hydraulic drive, scoop control.....Canadian Sirocco Co, Ltd
1-d fan motors.....Canadian G-E Co, Ltd
1-d fan motor starters.....Canadian G-E Co, Ltd

COAL AND ASH-HANDLING EQUIPMENT:

Coal conveyors, 2, 20-in. troughed belts.....United Steel Corp, Ltd
Coal-conveyor motors.....Canadian G-E Co, Ltd
Coal-conveyor motor starters.....Canadian G-E Co, Ltd
Dust collectors.....Canadian G-E Co, Ltd
One per boiler, multicone, 42,500 cfm, 300 F, 3-in. draft loss
Ash conveyor, pneumatic.....Taylor Engrs & Const Co
Ash-storage tank, 100-ton capacity, tilt.....Taylor Engrs & Const Co

VALVES, PIPING AND TRAPS:

Safety valves, boilers.....Crosby Steam Gage & Valve Co
Safety valves, reduced-pressure flows.....Hopkinson, Ltd
Nonreturn valves.....Canadian Westinghouse Co, Ltd
Blowdown valves.....Edward's Valve & Mfg. Co
High-pressure valves.....Cresna, Ltd
Low-pressure valves.....T. McAvoy & Sons
Pressure-reducing valves, desuperheaters.....Schutte & Koerting Co
Controls for reducing valves and desuperheaters.....Bailey Meter Co
Fabricated piping.....Canadian John-Manor Co, Ltd
Pipe insulation.....Canadian Patbanks-Morse Co, Ltd
Steam traps.....Canadian Patbanks-Morse Co, Ltd

FEEDWATER SYSTEM:

Water conditioning (Hall Laboratories).....Dominion Flow Meter Co
Water columns.....Relliance Gauge Column Co
Feedwater control, 3-element, air-operated.....Bailey Meter Co
Mechanical equipment and piping for coagulation and filtration installations.....Roberts Filter Co of Canada
Filter-flow-rate controllers.....Simples Valve & Meter Co
Acid, ferrous, soda-feeding equipment.....Roberts Filter Co of Canada
Water softeners.....Permutit Co of Canada
2: 7 ft, 8-in. diameter, 125-pal working pressure
Degasifier.....Permutit Co of Canada
Deaerating heater, one, horizontal, spray-type.....Permutit Co of Canada
200,000 lb per hr; oxygen not more than 0.005 ml per liter
Continuous blowdown.....Permutit Co of Canada
Phosphate-feed pumps.....Milton Roy Co
Blowdown tank.....Dominion Bridge Co, Ltd
One: 34-ft diameter, 75-ft length, 225-pal working pressure
Acid-storage tank.....Dominion Bridge Co, Ltd
Clearwell pumps, 2, Worthington, 4-stage.....John Jagels Co, Ltd
Motor-driven, vertical-shaft, deepwell, 550 gpm, 210-ft head
Clearwell-pump motors.....U. S. Electrical Motors
2: 15 hp, 550 v, 1760 rpm, squirrel cage
Clearwell-pump motor starters.....Canadian G-E Co, Ltd
Low-pressure feed pump.....Canadian Ingersoll-Rand Co
One, all iron, 2-stage, motor-driven, 800 gpm, 600-ft head
Feed-pump motor.....Canadian G-E Co, Ltd
One, 25 hp, 550 v, 3540 rpm, squirrel cage
Feed-pump motor starters.....Canadian G-E Co, Ltd
High-pressure feed pumps.....Canadian Ingersoll-Rand Co
One turbine-driven and one motor-driven
Turbine-driven pump: 6-stage, 300 gpm, 1725-ft head, 3540 rpm
Turbine (to drive feed pump).....Moore Steam Turbine Div
225 hp, steam conditions 170-pal throttle, exhaust 21 pal
Motor-driven pump: 6-stage, 608-gpm, 1725-ft head, 3450 rpm
Motor (to drive feed pump).....Canadian G-E Co, Ltd
400 hp, 550 v, 3540 rpm, squirrel cage
Motor starter.....Canadian G-E Co, Ltd
Brine pump.....Canadian Ingersoll-Rand Co
One, motor-driven, all bronze, 20 gpm, 10-ft head

METERS:

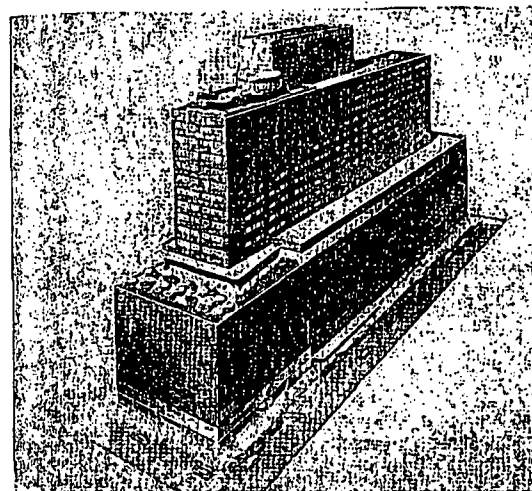
Boiler-meter and control panels.....Bailey Meter Co
Boiler meters, steam flowmeters, pressure and temperature recorders, feedwater flowmeters, blowdown meters, boiler-water-level recorders, boiler-load indicators, 10-pal draft gages.....Bailey Meter Co
Thermometers, industrial.....Taylor Instrument Cos of Canada
Pressure gages, (Ascherl).....Mechanical Equipment Co, Ltd
Turbine pressure and temperature recorders.....Bailey Meter Co

POWER-GENERATING EQUIPMENT:

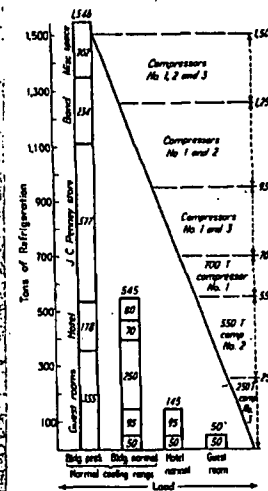
Turbine-generator.....Brown Boveri (Canada) Ltd
One, 1500 kw, 3600-rpm, backpressure turbine; throttle conditions, 600 psi, 700 F, exhaust 170 psi. Generator, 4750 kva, 0.80 pf, 6000 v, 60 cycles, 3-phase
Air cooler.....Brown Boveri (Canada) Ltd
Oil gland condenser.....Foster Wheeler, Ltd
Switchboard.....Canadian Westinghouse Co, Ltd
Generator oil circuit breaker.....Canadian Westinghouse Co, Ltd
One, 550,000-kva interrupting rating at 7500 v
Generator control, protective equipment and voltage regulator.....Canadian Westinghouse Co, Ltd
Turbine-room crane.....Herbert Morris Crane & Hoist Co

MISCELLANEOUS:

Vacuum-cleaning system.....Sheldons, Ltd
Instrument and control air compressor.....Gardner-Devere Co
Gas, motor driven, 854.5/4 vertical duplex, single-stage, water-cooled, 133 cfm, 100 psi



1 Application of a central refrigeration system to air-conditioning a heavily glassed 10-story hotel and a windowless 7-story department store means special design



2 Various load combinations and equipment scheduling makes above chart

Central Refrigeration Handles Load

Terrace Plaza Hotel, Cincinnati, sets atop a 7-story department store. Handling air-conditioning loads from many sources, says H C Hoffman, project engineer, Carrier Corp, calls for smart planning, full, effective equipment use, good controls

► PUT A 10-STORY HOTEL on top of a 7-floor department store and you can expect unusual air-conditioning application problems. Load varies from a low of supplying summer-evening cooling for hotel rooms only, to the anticipated 1500-ton peak imposed by both store and hotel demands.

These demands differ considerably. For example, the lower 7-floor section of the building, Fig. 1, is of windowless construction whereas the 10-floor upper division has a widespread use of glass. Over and above the space differences these present, there are a 400-seat cafeteria and a number of small independent shops in the first floor and basement areas.

Single Refrigeration Source. Central refrigeration for all air-conditioning purposes is supplied by three centrifugal compressors in the sub-basement. Maximum flexibility, with respect to anticipated 1500-ton peak load and the many variations of load, is met by a combination of three different-sized compressor units, Fig. 2. Electric motors drive these three machines (250-, 550- and 700-ton units) through gear reducers to supply the desired capacity variation. In addition, drum-controller starters give five balanced points of speed operation on individual compressors. All three machines through a series of interconnections feed a main chilled-water loop. This inter-

connection permits any one or all units to meet the refrigeration load.

The main chilled-water loop, a 12-in. line, handles up to 2400 gpm from two of three 1200 gpm, 60-ft head pumps. From this central supply loop, Fig. 3, separate pumps draw chilled water for either hotel or store loads. Two pumps of 800 gpm deliver water at an 80-ft head to the store system. A third similar-sized pump furnishes the hotel needs at again an 80-ft head. Cross-connected piping permits a fourth pump of 800-gpm rating to act as a common standby.

Now for the hotel and store systems themselves. Separate supply and return lines are used for each—a 10-in. one for the stores and an 8-in. line for the hotel. The load divides about 1000 tons for stores and 500 for hotel. Completely separate systems for these, major divisions of load enable the central refrigeration system to supply either one load alone or both.

A central shaft distributes chilled water to the various main air-conditioning fan rooms. These rooms are in the