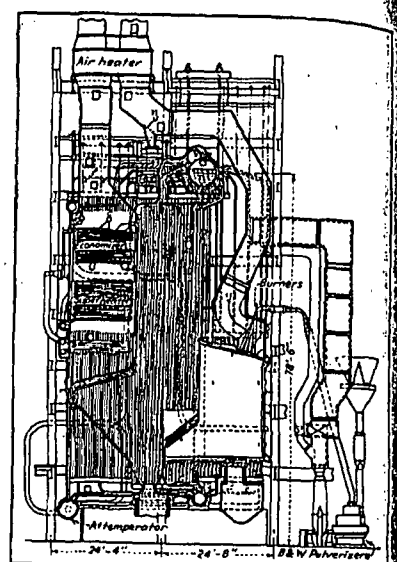
THOUGH FOUR MILLS SUPPLY these eight burners on boiler No. 12, only three mills are needed to develop rated output

FOUR OF THESE STEAM GENERATORS



TWO-DRUM OPEN-PASS BOILER fired with pulverized coal has attemperator located in lower drum for superheat contro

bine for repairs without disturbing the rest of the unit system. The h-p and l-p elements of the main turbine cannot be operated separately.

Auxiliary steam taken from the boiler drums avoids the need for desuperheating. Pressure reduces to 400 psig for the auxiliary oil pumps and air ejectors, and to 125 psig for the heating-system headers.

Bleed steam comes from two points in each of the h-p and l-p turbines, the lower point on the h-p element being at crossover pressure.

Makeup System. City water supplies the makeup system. Two lines from separate sections of the city mains and a 24,000-gal storage pit insure reasonable reliability. Water is pumped from the pit through zeolite softeners and blow-down heat exchanger into the makeup deaerator. From the deaerator the evaporator pumps deliver the water to the evaporator shell. Normally vapor from the evaporator condenses in the evaporator condensers, in the heater rows between the 2nd and 3rd heaters. Evaporator vapor also supplies the makeup deaerator. With the main unit out of service, auxiliary steam produces evaporation, the vapor condensing in the auxiliary condenser, and the condenser drains pass to the condensate-pump suction.

Cooling-Water System. This system has two parts: (1) supply by the generator cooling-water pumps and (2) supply from the river-water pumps. The former feed the generator coolers and the turbine-oil coolers, and the latter the rest of the system. Rotary strainers, at the pump discharges, strain all cooling water. Using two sets of pumps saves power because of the much lower head requirements on the generator-cooling pumps than on the river-water pumps.

Circulating-Water System. Two 76,000-gpm circulating-water pumps serve each main unit condenser. Each pump, in separate sections of the screening basin at the river front, obtains water through one revolving screen and discharges through a butterfly valve into a 6-ft 6-in. dia precast concrete pipe line delivering water to the condenser. Automatic control opens and closes the butterfly valves with starting and stopping of the pumps.

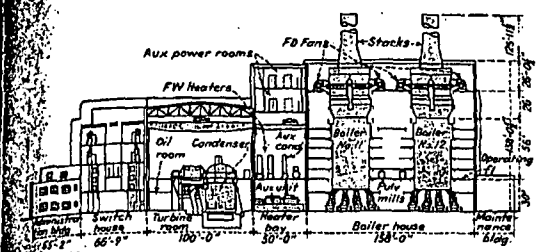
Two pipes, each 6-ft 6-in. dia, were installed instead of one larger pipe because small depth from yard level to pier decking would permit nothing larger. Also, this size is satisfactory for one-pump operation.

An adjustable weir at the condenser discharge prevents breaking the siphon at low tide. Baffling at discharge-tunnel exit dissipates strong currents that might interfere with boat handling in that area.

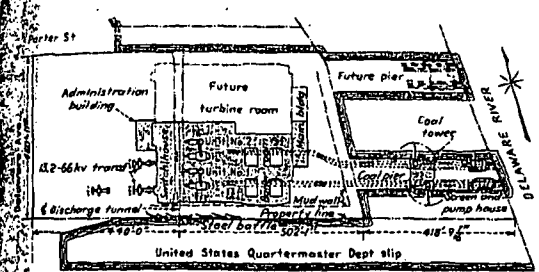
Chlorine, obtained in bulk via rail road tank cars, treats both circulating water and cooling-water systems at the screening basin.

Condensers. These units are Foster Wheeler, surface type, single pass with deaerating hot wells. They are placed

IN THE INITIAL STATION INSTALLATION



CROSS SECTION THROUGH NO. 1 UNIT shows in-line arrangement of main equipment. Auxiliary turbine-generator on ground floor is underneath the heater bay



PLAN OF STATION LAYOUT SHOWS circulating water intake at end of pier on river and the discharge tunnel at right angles leading into slip next to station

with the tubes paralleling main turbine center lines because of the space needed for pulling tubes. Rupture disks provide atmospheric relief to the free exhaust stack.

Steam Generators. Two Babcock & Wilcox boilers supply each turbine-generator. They are 2-drum open-pass set-bottom type having a design pressure of 1075 psig and producing steam at 850,000 lb per hr at 925 psig and 900 F continuously. The 3-hr rating is 935,000 lb per hr. Each boiler has 21,373-sq-ft continuous-tube economizer, a 26,923-sq-ft continuous-tube superheater, a 1125-sq-ft attemperator, two 61,500-sq-ft regenerative-type air heaters and four B&W type E mills. With high-grindability coal three mills will be adequate for the rated steam output of one boiler.

The attemperator, in the lower drum, holds steam temperature to a maximum of 900 F. Steam passing from the first to the second section of the superheater flows through a 3-way valve, which admits the needed amount to the attemperator and bypasses the remainder.

The boiler outer walls are enclosed in full plastic casing, a considerable amount of the insulation being gunited in place.

Provisions have been made for acid washing, and all boilers are being treated before going into service. Tube turbining after completion of the boilers is considered unnecessary.

Retractable soot blowers serve the boiler, and rotary blowers are used on the economizer.

Every boiler has two forced- and two induced-draft fans. Each fan has a hydraulic coupling to provide variable speed. One stack serves each boiler.

A venturi throat at each stack top improves dissipation of gases and prevents down-drag on the leeward side.

Coal Handling. Coal is normally delivered via barge and in emergencies via rail. Speed-o-matic cranes unload it from barges, feed it by apron feeders to Bradford breakers in the coal tower, from here belts transport it to the bunkers, passing over a magnetic separator at the boiler-house entrance. Two complete lines of equipment are each capable of handling 350 tons per hr. One 1000-ton bunker fed by either of the main cross belts serves each boiler. An inverted U-shaped corrugated iron hood covers the inclined belt conveyor. The entire coal system inside the building is encased and the bunkers sealed against dust leakage into the building. For bunker ventilation, air enters through one-way louvers and is drawn out by the induced-draft system.

In the emergency handling system, coal can be unloaded from four 70-ton cars simultaneously. It passes from the unloading hoppers by apron feeders, flight conveyors and gravity-discharge elevator and conveyor through a granulator just ahead of the elevator.

A central control panel for the coal-handling system is located on the conveyor floor of the boilerhouse near the transfer chutes at the No. 1 unit bunkers. A private telephone system connects control panel, crane and yardmaster's office.

Ash Handling. A recirculating type of ash-sluice system removes ash from the boilers. Water recirculates from the clearwell at the end of the system. Ash sluices from the boilers, through trenches to the ash pump pit where it passes through clinker grinders before reaching the pumps. The pumps discharge to a pit in the yard from which a locomotive crane removes the ash and the water decants off to the clearwell. Trench liners are mostly of Ashcolite, but in one section granite blocks have been used as lining for experimental purposes.

A multicyclone-type mechanical collector, between air heaters and induced-draft fans, removes flyash. From here a fan transports the ash to drop-out and storage tanks; when finally passing through unloading valves, it is commercially conditioned with water for disposal.

Model Tests. Many model tests and studies determined design and materials. Core borings and chemical tests were made on the soil. Different types of bearing piles were driven and test loaded before preparing specifications. Arrangement of baffles at the discharge tunnel exit, blading for circulating-water pumps, shape of screening basin at circulating-pump suctions, condenser water-box design, arrangement of burners, windbox design, and material for condenser tubes and other tubes coming in contact with river water were