

BOILERS

A. NO. 1 & 2 BOILERS

These steam generators are Riley Stoker Corporation units with a continuous capacity of 500,000 #/hr. (550,000 #/hr. with feedwater heater in full service). of steam per hour at 1300 psig superheater outlet pressure, 1425 psig maximum drum working pressure and 950°f. total steam temperature. No. 1 unit is equipped to burn only natural gas; #2 unit can burn both fuel gas and hydrogen.

The steam generating unit includes a 60 inch I. D. steam drum; a 42 inch I. D. lower drum; a water cooled furnace; a continuous vertical loop, high velocity superheater; a continuous loop economizer; a tubular single pass cross flow air heater and a steam temperature control ~~valve~~ *damper* for bypassing products of combustion around the superheater.

The units are designed to permit free movement of parts, both vertically and horizontally, due to expansion, without placing strains on any part of the unit. The boiler drum and headers are suspended from overhead steel supports and the boiler and setting expands downward from the top. ~~Refer to Procedures Manual for acidizing and/or startup instructions.~~

Water and Steam Paths

Circulation is based on the ring flow principle, that is, flow in each tube remains in one direction regardless of steam output fluctuations. All tubes exposed to high temperatures carry upward flows of water and steam mixtures and the down flow tubes receive water from the main drum after all steam has been removed. Steam is liberated above the working water level in the drum, the internals of which provide definite and rapid separation of steam and water.

Feedwater from the boiler feed system enters the economizer through the stop and check valves, passes through the economizer, and enters the steam drum through the condenser elements of the steam purifier unit. The feedwater passes through the condenser purifier so that the temperature of the purifier elements is lower than the steam temperature. A certain percentage of the steam is consequently condensed in the purifier fins as it passes over the purifier elements and dirt particles are washed away by the steam condensate. The steam then passes through the dryer section of the steam purifier which minimizes carryover of any entrained moisture and results in a high steam purity.

Water from the upper 60 inch drum flows by gravity through 2½ inch downcomer tubes, which are located behind the rear baffle, and

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also through 3½ inch downcomer tubes, which are located in front of the rear baffle, to the lower 48 inch drum. The 3½ inch generating screen tubes carry the water-steam mixture back to the upper drum. In addition, the lower drum supplies the 14 inch front and the 12-3/4 inch side wall bottom headers through 3½ inch feeder tubes. The water absorbs heat in the 3½ inch side and front wall tubes and rises to the drum in the form of a water-steam mixture which in the case of the side wall tubes rises to the top 12-3/4 inch side wall headers and then to the steam drum through the upper side wall header release tubes. The front wall header also has a row of 3½ inch screen generating tubes leading directly to the steam space of the upper drum.

Safety Valves

Disregard blue hi-lite

Each boiler is provided with ~~two safety valves on the steam drum~~ and one ~~safety valve on the superheater outlet header~~. In addition, a ~~power control valve~~ is located in the main steam header which may be operated either by excessive pressure on the header or by operation of the selector switch on the Mechanical Console Board.

One steam drum relief valve is a welded Consolidated 1500 psi 3 inch valve set to pop at 1498 psig and close at 1438 psig. The other steam drum valve is a welded Consolidated 2½ inch 1500 psi valve set to pop at 1455 psig and to close at 1397 psig. The superheater relief valve is a welded Consolidated 1500 psi 2½ inch valve set to relieve at 1370 psig and close at 1330 psig. The power Control electromatic relief valve is a welded Consolidated 2½ inch valve set to pop at 1320 psig and close at 1307 psig.

Burners

Disregard blue hi-lite

~~Boiler #1~~
Each boiler unit is provided with ~~ten~~ burners arranged on two horizontal rows of five burners each. Fuel is supplied to the boiler with ten Peabody type H-26 4 inch insulated burners with center fired gas units.

The burner consists of the air register with its simultaneously adjustable doors, the gas units inserted through the hub of the air register. The air for combustion passes along the gas burner placing it in the zone of active air flow, and thus keeping it relatively cool.

Fuel gas or oil to the burners will vary in pressure depending on the steam load and number of burners in service.

~~Refer to section on burners~~

Boiler #2 is provided with ten burners arranged on two horizontal rows of five each. They are of the Todd Dynaswirl dual fuel type; hydrogen is burned in eight "pokers" with attached "poker shoes" arranged radially in the outer periphery of the burner. Natural gas is burned in a center unit. These burners are of the low NOX, low O2 design for the reduction of emissions.

Steam Sampling

Four 1 inch tandem valved sampling lines lead from the boiler steam drum and connect to a common header in order to permit spot sampling or the steam just before it enters the superheaters. The steam sample is cooled and degassified in a Powell-McChesney type steam conductivity cell. In this type of apparatus, a stainless steel capillary sampling line throttles the steam flow and condenses part of the sample by radiation. The condensed part of the sample entering the condensate cell is kept at the boiling point and continuously swept by uncondensed vapor so that the gases in the steam cannot go into solution. The electrical conductivity is measured in the condensate cell and is recorded on Recorder Number 27 on the Process Auxiliary Board.

Air Preheaters

The air preheaters are of tubular, single pass counterflow design. Hot gas from the furnace flows through the inside of the tubes and air flows over the outside in the opposite direction. Air distribution chambers are provided on the sides of the air heater, both at the cold air entrance and hot air exit. Air heater tubes are arranged in bundles with distributing air lanes between

Miscellaneous Connections

On each boiler, the lower drum and the front wall header are each provided with two 1- $\frac{1}{2}$ " tandem valved blow-down connections, while the lower side wall headers are each provided with a single 1- $\frac{1}{2}$ " tandem valved blow-down connection for the purpose of intermittent blowdown of boiler solids, for use during start-up, for draining of the boiler and also for emergency lowering of the drum level during upsets. For draining purposes, the 1- $\frac{1}{2}$ " lines connect with a 3" line to waste which is blocked with a 3" gate valve. For intermittent blow-down purposes, the 1- $\frac{1}{2}$ " lines connect to a 4" line which drains into the intermittent blowdown tank. A 4" gate valve blocks this line. Installed as a by-pass around this 4" gate valve is a 2" pneumatically actuated control valve operated remotely from the Control Room. It is used primarily for controlling drum level during start-up. A 3" condensate make-up line for filling the boiler is connected upstream of the aforementioned 4" block valve. A high pressure check valve with bleed valve prevents high pressure build up against the low pressure make-up line.

There is also a 1- $\frac{1}{2}$ " line economizer inlet header drain; the two 3/4 inch gauge glass blow-offs; the two water column drains; the two superheater header drains. ~~An isolation and block valve arrangement in this 3 inch line permits filling with condensate through a 3 inch line from the condensate make-up pumps.~~ The two superheater header drain lines are provided with acid cleaning connec-

Connected to the lower water wall header blow-down lines on both units is a 1- $\frac{1}{2}$ " line tied into the suction of a small centrifugal pump. The discharge of the pump is tied to a connection on the superheater outlet header of each unit for the purpose of recirculating the chemical treated boiler water during long duration outages of the unit. This is to prevent corrosion on the water side which would occur if the unit was open to the atmosphere.

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to place it on the water side.

Draft System

Air for combustion is supplied by two Westinghouse-Sturdevant turbo-vane forced draft fans driven by Westinghouse 200 HP, 1200 RPM motors. The fans discharge through the air heater, the wind box and into the furnace. The fan capacity is regulated by inlet louvers positioned by piston operators that are actuated by the combustion control system. The gases of combustion are drawn through the superheaters, the boiler gas passages, the economizer and air preheater by two Westinghouse-Sturdevant turbo-vane Induced Draft fans driven by Westinghouse 350 HP, 990 HP, RPM motors. ~~The fans may be started and stopped either locally or from the Mechanical Console.~~

Thermocouples are located on both fan and motor bearings, and the temperatures are recorded on bearing temperature recorder located ~~on the Mechanical Vertical Auxiliary Board.~~ *in the Cont. Room* Annunciation of high temperature is provided on the Mechanical Vertical Board.

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Continuous Blowdown System

The continuous blowdown system is provided to maintain the proper concentration of dissolved solids in the boiler water. A perforated header, running lengthwise through the steam drum below the normal water level is connected at one end of the drum to the continuous blowdown line. The blow-down rate is controlled by manual adjustment of needle valve with a graduated scale on the bonnet for precise setting of the valve opening. The discharge from this valve is to a continuous blowdown tank (flash tank) where approximately 33% of the hot liquid flashes into steam; the remaining liquid is drained through traps into a heat recovery header connected to a heat exchanger (demin heater) at #1 condensate storage tank; this exchanger utilizes the heat in the blow-down water to heat the demin water being pumped into the storage tank, thereby conserving 30% steam in the deaerators. The 33% flash steam discharges from the top of the flash tank through a liquid separator and then on to a connection on the 30# steam header. The flash tank can be by-passed during normal operation for maintenance, etc.

Sample lines are connected to each continuous blowdown line ahead of the graduated valve to coolers and then flow over conductivity and pH cells for continuous monitoring of these parameters of boiler water. The readings are recorded on a CRT located in the control room. Alarms for high conductivity and low or high pH are provided.

The Flash Tank is provided with a high level alarm that annunciates on the Mechanical Vertical Board.

~~deaerators 1 and 2 to control pH in these deaerators. This system however, has never been used since Boiler pH has been controlled by feeding Caustic directly to the steam drums.~~

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Chemical Feed System

The chemicals used for boiler water conditioning are trisodium, disodium, and monosodium phosphate, sodium sulfite and caustic soda.

The phosphate reduces hardness and minimizes scaling by combining with any calcium in the boiler water to precipitate calcium phosphate. Calcium phosphate has very desirable properties for boiler sludge. It forms a finely divided fluid sludge which can be carried by the boiler recirculation and can, in general, be removed by blowdown. As calcium phosphate is the most soluble of the calcium salts that form in the boiler water, phosphate control prevents formation of all calcium scales such as calcium carbonate, calcium sulfate or calcium silicate.

The phosphate for Boilers 1, 2, 3, 4 and 5 is mixed in neoprene-lined tanks with covers, one for each boiler. Condensate from the condensate makeup line is admitted to the bottom of the tanks through a 3/4-inch swirl jet connection for dissolving the phosphate. Chemicals for each individual boiler are mixed in their respective tanks. Each tank is connected to a diaphragm pump for injecting solution into boilers. Boilers 1, 2 and 3 have interconnecting piping allowing chemicals to be pumped to each boiler with any one of the three pumps. Boilers 4 and 5 feed stations are at different locations, so piping is not interconnected. Dosage can be adjusted by chemical weight and stroke on pump.

For standby purposes, we have surge bottles at each of the three chemical feed stations. The solution is drained by gravity through a one-inch line to the surge bottle where feedwater taken off the feedwater header through a 3/4-inch line injects the solution into the boilers.

No matter how efficiently a deaerator is designed or operated, some oxygen, however little, passes through with the water coming out of a heater. Therefore, sodium sulfite is added to the water in order to scavenge this oxygen and minimize corrosion by combining with the oxygen to form sodium sulfate. It is fed into feedwater line downstream of feedwater regulators to each boiler.

The sulfite for Boilers 1, 2 and 3 is mixed in one neoprene-lined tank with cover. Condensate from the condensate makeup line is admitted to the bottom of the tank through a 3/4-inch swirl jet connection for dissolving the sulfite. Suction from the tank goes to three diaphragm pumps used for injecting the solution into each individual boiler. Boilers 1, 2 and 3 have cross-connecting piping off the discharge of these pumps allowing the feeding of any of the three boilers with any pump. Boilers 4 and 5 have their own neoprene tanks and each has a diaphragm pump.

In addition, an EDTA chelant is fed to all boilers to aid in the control of iron. Necessary storage, mix, and pumping facilities are provided for each boiler.

Low level in the mixing tanks is annunciated on the Mechanical Vertical Board and also on the Process Auxiliary Board. The pumps are started and stopped at local pushbutton stations.

Chemical Feed System (cont'd)

Caustic soda is added to regulate the pH of the feedwater and of the boiler water. It is mixed when necessary directly with the phosphate in the phosphate mixing tanks.

Refer to safety operating procedure section for feeding chemicals to boilers.

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B. NO. 3 BOILER

Boiler #3 is a Babcock & Wilcox unit with a continuous capacity of 750,000 #/hr. of steam (825,000 #/hr. with feedwater heater at full pressure) at 1300 psi superheater outlet pressure, 1450 psi maximum drum working pressure and 950°F total steam temperature with natural gas or oil.

The steam generating unit includes a 66 inch nominal diameter steam drum, a 48 inch nominal diameter lower drum, a water cooled furnace, a continuous vertical loop high velocity superheater, a double flow economizer, a Ljungstrom rotary type air preheater and a spray attenuator steam temperature control valve.

The unit is designed to permit free movement of parts, both vertically and horizontally, due to expansion without placing strains on any part of the unit. The boiler drum and headers are suspended from overhead support steel and the boiler and setting expand downward from the top supports.

Refer to Procedures Manual for startup curve.

Water and Steam Paths

Water and steam path in #3 Boiler is basically the same as on Boiler 1 and 2. Only the tube, drum and header sizes are different.

Safety Valves

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The boiler is provided with three safety valves on the steam drum and one safety valve on the superheater outlet header. In addition, a power control valve is located on the main steam header which may be operated either by excessive pressure on the header or by operation of the selector switch on the Mechanical Console Panel.

All three steam drum relief valves are welded Consolidated 3 inch valves. One is set to pop at 1450 psi and close at 1392 psi, another set to pop at 1470 psi and close at 1411 psi, and the third to pop at 1490 psi and close at 1430 psi. The superheater relief valve is a welded Consolidated 1500 psi 3 inch valve set to pop at 1370 psi and close at 1305 psi. The power control electromagnetic relief valve is a welded Consolidated 2 1/2 inch valve set to pop at 1340 psi and close at 1327 psi.

Burners

The unit is provided with ~~three~~ F & W Multispud type gas burners arranged in three horizontal rows of four burners each. ~~This type gas burner can be effectively used to burn natural gas, refinery gas, butane gas and propane gas.~~ The design of this type burner is such that it can be used either as a gas burner only, or included in multifuel burner arrangements for (a) gas or oil firing, (b) gas, oil or pulverized coal firing.

The burner consists of the air register with its simultaneously adjustable doors, the eight gas burner spuds inserted through the hub of the air register, an impeller plate to diffuse combustion air at the burner tips and electric igniter and gas pilot for lighting the burner. The combustion air passes along the burner spuds and through the impeller plate placing them in the zone of active air flow, thus keeping them relatively cool. Each burner spud is provided with two quick connective couplings to be connected by hose to high pressure air for removal of individual spuds while the boiler is on the line.

Air Preheater

The boiler is provided with a Ljungstrom Rotary, vertical, type VIX, air preheater. This air preheater is of the regenerative type in contrast to the tubular recuperative types on Boilers 1 & 2.

The unit consists of the rotor and associated heat transfer elements; a rotor drive unit consisting of two General Electric 10 h.p. drive motors (one for service and the other for stand-by) and a Falk speed reducer; rotor housing; an oil immersed rotor guide bearing mounted on the lower end of the rotor post; an oil immersed rotor support bearing (of the Kingsbury type) mounted on the upper end of the rotor post to support the weight of the rotor; a thermostatically controlled integral rotor support bearing oil circulating system consisting of a pump and cooler mounted on the rotor support bearing housing; ~~a heating element cleaning device consisting of a drive motor, speed reducer and oscillating nozzle connected to the 235# process steam system~~

The air preheater absorbs waste heat from the flue gas, then transfers this heat to incoming cold air by means of continuously rotating heat transfer elements of specially formed metal plates. Thousands of these high efficiency elements are spaced and compactly arranged within twelve sector shaped compartments of a radially divided cylindrical shell, called the rotor. The housing surrounding the rotor is provided with duct connections at both ends and is adequately sealed by radial and circumferential sealing members -- forming an air passage through one half of the preheater and a gas passage through the other.

As the rotor slowly revolves the mass of elements alternately through the gas and air passage, heat is absorbed by the element surfaces passing through the hot flue gas stream; then, as these same surfaces are carried through the incoming air stream, they release the stored up heat -- thus greatly increasing the temperature of the incoming combustion air.

Miscellaneous Connections

On this boiler the drains and valve arrangements differ from Boilers No. 1 and 2. Each of the two side wall headers is provided

with three single valved $1\frac{1}{2}$ " drain connections on a $1\frac{1}{2}$ " header with a downstream block valve of the same type. The floor header and rear wall header are each provided with four single-valved $1\frac{1}{2}$ " drain connections on a $1\frac{1}{2}$ " header with a downstream block valve of the same type. The lower drum and the intermediate header are each provided with two $1\frac{1}{2}$ " tandem-valved drain connections. Since no intermittent blowdown of this boiler is required, all these connections are referred to as drains rather than blowdowns. If it is necessary to blowdown because of high drum level, it is recommended that only the lower drum be blown.

For draining purposes, the $1\frac{1}{2}$ " lines connect with a 3" line to waste which is blocked with a 3" gate valve. For blowdown purposes the $1\frac{1}{2}$ " lines connect with a 4" line which drains into the blow-off tank. A 4" gate valve blocks this line. A removable elbow permits filling the boiler with condensate make-up through a 4" line and 4" gate valve by means of the make-up pumps. An acid cleaning connection is provided in the blow-off line.

On this boiler the following tandem-valved lines discharge into a common 3" header which also leads into the blow-off tank: the $1\frac{1}{2}$ " economizer inlet header drain; the two 1" gauge glass drains; the two $1\frac{1}{2}$ " primary superheater

This boiler has a remotely controlled intermittent blow-down control valve and a chemical storage recirculation pump identical to that on Boilers 1 & 2.

Draft System

Air for combustion is supplied by two turbo-vane forced draft fans driven by Allis-Chalmers 400 HP, 1700 RPM motors. The fans discharge through the air heater, the wind-box, and into the furnace. The fan capacity is regulated by inlet louvers positioned by piston operators that are activated by the combustion control system.

The furnace, being pressurized (No ID fans), the gases of combustion are forced through the superheaters, the gas passages, the economizer, the air pre-heater and out the stack.

~~The fans may be started and stopped either locally or from the Mechanical Console.~~ Thermo-couples are located on both fan and motor bearings and temperatures are recorded on the ~~Bearing~~ *Yokey* Temperature Recorder in the Control Room. Annunciation of high temperatures is provided on the Mechanical Vertical Board.

To allow for inspection of the furnace or maintenance on burner lighters while boiler is on the line, 100# air off the plant service air system is supplied at each furnace opening or inspection port for sealing purposes. Low pressure air off the FD fan discharge duct is piped to each opening for cooling purposes.

C. NO. 4 BOILER

No. 4 Steam Generator

Boiler 4 is a Riley Stoker Corporation front-fired, single-drum, radiant boiler constructed for pressurized furnace operation. This boiler is designed for maximum working pressure of 1475 PSIG and will produce 1,100,000 lbs. of steam per hour continuously at 1300 PSIG and 950°F at the superheater outlet, when supplied with feedwater at 274°F at the economizer inlet, when fired with natural gas.

The boiler is supported or hung from a structural steel framework that rises from ground level of 0' and extends upward to elevation 90'. The girders and structural beams at this upper elevation carry all the pressure parts and the boiler setting. The steam drum is supported by two large "U" straps from the top girder. All headers and/or tubes are suspended from hanger bolts or multiple support rods. This entire arrangement of headers and tubes that make up the pressure parts are formed into an air- and gas-tight box or setting by continuously welding construction, covered with heat insulation and stucco embossed aluminum lagging.

Boiler Water Circulating System

The water circulation in this boiler is by natural means only or by the change in the density of the fluid (water and steam) in the boiler. The water being supplied to replace the steam generated and delivered to the Plant steam lines first passes through the economizer before entering the steam drum. On entering the steam drum, the incoming or make-up water is carried by the distributor pipe to the double bank of condenser elements before being released along the entire length of the drum to mix with the boiler water. The mixture of boiler water and feedwater flows directly toward the nearest downcomer, each originating at approximately the 1/4 point of the drum shell bottom and then downward to the main bottom waterwall header. From this main bottom waterwall header, the water is distributed to the side waterwall headers and bottom furnace platen headers. The water will now enter the various wall and furnace platen tubes and flow upward, absorbing heat and decreasing in density and is finally discharged into the steam drum.

Steam generated during this upward flow, as a result of heat absorbed, is released from the accompanying water within the steam drum. Upon entering the steam drum, the mixture is directed through the double bank of primary separators installed along the front and rear wall where the water is removed and the steam continues through the double bank condenser surface. The steam then turns upward passing through rows of drier cartons where all remaining moisture is removed into the dry steam compartment where it is distributed to and enters the superheater supply tubes that originate along the top surface of the steam drum shell. The water deflected by the primary separators again mixes with the incoming feedwater and continues the described circuit.

Boiler Steam Drum

The steam drum has an internal diameter of 66", a minimum wall thickness of 3.550" in the cylinder section and an overall length of 50'7". There are two downcomers originating from the drum cylinder 9'3" from the unit centerline which supply water to all heat absorbing surface.

The drum contains the steam purifying equipment that consists of the following items located at the front and rear of the internal cylinder. First are the primary separators immediately in front of the rows of releaser tubes that return the emulsion of steam being generated and accompanying boiler water to the steam drum. The mixture enters these separators where the steam continues toward the center of the drum and the water is returned to the lower part of drum floor. The primary separators are followed immediately by the condensers. After passing through the condensers the steam turns upward and passes through the drier cartons that enclose the dry steam compartment. All moisture has now been removed from the steam. The Riley steam separator-condenser-drier section is 37'6" long and is designed to deliver steam with a maximum of $\frac{1}{2}$ part per million dissolved solids content to the superheater system when the boiler water total dissolved solids does not exceed 500 ppm and the chemical ratios maintained correct. After passing through the steam purifying, steam enters the four rows of superheater supply tubes that originate along the top surface of the drum shell.

Burners

Burners no. 9, 10, 11 and 12 can burn either natural gas, hydrogen or syn gas. A different burner is used for natural gas and hydrogen; the same burner for hydrogen is used for syn gas. The only difference between a h2/syn gas burner and a natural gas burner is the size of the holes in the tip
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It should be noted that these burners are arranged and piped in pairs; that i nos. 9 and 10 can burn natural gas or h2/syn gas while nos. 11 and 12 can bur
~~either one or both~~
a different gas than is being burned in burners 9 and 10.

Air Preheater

The principle of operation of the air preheater on this boiler is similar to that described in the Air Preheater Section of this book on Boiler 3. The main difference is this preheater is mounted on a horizontal shaft, whereas, the air preheater on Boiler 3 is vertical. Rotor driving machanism consists of a somewhat larger electric motor and auxiliary motor. All other components are similar.

Forced Draft Fans

The boiler is supplied combustion air by two Westinghouse Electric Corp. forced draft fans, size 2375D Air foil type, double width inlet with top horizontal discharge. The fans are equipped with sleeve type bearings, pedestal mounted with thermocouples in each. Air flow control is by inlet vanes. Shut-off dampers are installed at fan discharge.

Each fan is capable of delivering 180,000 cfm of air with entering temperature of 100F against a static discharge pressure of 27" of water. The fans are driven by 1000 horsepower 1200 rpm constant speed motors.

Combustion Air and Gas Travel

The combustion air delivered by the forced draft fans is discharged to the duct and is conducted to the air preheater. The air flows forward through the Ljungstrom Air Preheater, on to the air measurement device (venturi) located directly beneath the furnace and then turns upward before entering the burner windbox. In the windbox the heated air is distributed to the burners that are in service, and passes through these burners where it mixes with the incoming fuel as it enters the furnace.

In the furnace, the complete combustion of the fuel with the air takes place and the resultant products pass upward giving up heat to the radiant furnace walls and furnace platens. The gases continue upward past the deflection arch and turns rearward above the arch and passes through the rear wall screen tubes that immediately precede the high temperature superheater surface. Upon entering the high temperature superheater, the gases turn downward flowing through the remainder of the high temperature superheater surface, the primary superheater surface and the economizer in the order named.

After leaving the economizer, the combustion gases turn rearward and pass through the air preheater where further heat is removed. From here the gases pass directly to the stack and are then discharged to atmosphere.

Continuous Blowdown System

The continuous blowdown system on this boiler is similar to that on Boilers 1, 2 and 3 previously described in this manual, under Boiler 1 and 2.

Chemical Feed System

Identical
The chemical feed system is ~~also similar~~ to that on Boilers 1, 2 and 3 previously described in the manual under Boiler 1 and 2 ~~except PO4 is fed normally in the same manner as sulfite by use of the Proportioneer chemical feed pumps.~~

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D. NO. 5 BOILER

No. 5 Steam Generator

Boiler 5 is a Riley Stoker Corporation front fired single drum radiant boiler constructed for pressurized furnace operation. This boiler is designed for a maximum working pressure of 1500 psig and will produce 1,600,000 lbs. of steam per hour continuously at 1300 psig and 950 F at the superheater outlet, when supplied with feedwater at 274 F at the economizer inlet, and fired with natural gas.

The boiler is supported and hung from a structural steel framework in the same manner as Boiler 4.

Boiler Water Circulating System

The water circulation in this boiler is the same as in Boiler 4 previously described in this manual.

Boiler Steam Drum

The steam drum has an internal diameter of 66", a minimum wall thickness of 3,528" in the cylinder section and an overall length of 51', 10 1/4". There are two downcomers originating from the drum cylinder 9' 6" from the unit centerline which supply water to all heat absorbing surfaces.

Purification equipment in the drum is the same as described in Boiler Steam Drum section of Boiler 4 in this manual.

Burners

With the exception of this boiler having ~~two~~ Riley Stoker Corporation horizontal flare type burners installed on four elevations on the front furnace waterwall, all other data concerning these burners is the same as described in Burner section of Boiler 4 in this manual.

Air Preheater

With the exception of drive motor sizes, air preheater operation on this Boiler is the same as Boiler 4.

Forced Draft Fans

Except for increased capacity, forced draft fans on this boiler are the same type as described on Boiler 4 of this manual. Fans on this boiler are capable of delivering 270,000 cfm and are driven by 1200 horsepower 1200 rpm constant speed motors.

Combustion Air and Gas Travel

The same as described in Boiler 4 section of this manual.

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Continuous Blowdown System

The same as described in Boiler 4 section of this manual.

Chemical Feed System

The same as described in Boiler 4 section of this manual.

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