Merom Generating Station

Merom Generating Station in Sullivan County

HOOSIER ENERGY'S MEROM GENERATING STATION IN SULLIVAN COUNTY PROVIDES DEPENDABLE, LOW-COST POWER FOR 18 MEMBER DISTRIBUTION COOPERATIVES IN CENTRAL AND SOUTHERN INDIANA AND SOUTHEASTERN ILLINOIS.

The coal-fired power plant began operation in 1982 and is equipped with advanced emission control equipment to safeguard the environment.

With a production capacity of 1,070 megawatts, the Merom Generating Station is Hoosier Energy's largest power plant. The plant is equipped with electrostatic precipitators for fly ash removal, a flue gas desulfurization system, or scrubber, to remove sulfur dioxide, selective catalytic reduction technology to remove nitrogen oxide and SBS technology to control SO3 (acid aerosol) emissions. Mercury control systems were added in 2015. Throughout the plant's history, Hoosier Energy has proactively installed air emission controls that met or exceeded federal standards, often at an installed cost below the industry average.

From 1983—the first full year of operation at Merom—to 2014, Hoosier Energy reduced air emissions from its plants by 91 percent while diversifying its power supply portfolio to include new generation from natural gas, landfill gas, coalbed methane and other renewables.

Merom's two generating units use up to 10,000 tons of coal a day from southwestern Indiana mines. To provide cooling water for the plant's operation, Hoosier Energy developed the adjacent 1,550-acre Turtle Creek Reservoir. The reservoir is a popular destination for fishing and waterfowl hunting. It's also the site of an education center where students, teachers and other groups have been studying energy, the environment and science since 1995. The center's popularity now extends to environmental educational offerings at member cooperative events as well.

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How Coal is Converted into Electrical Energy

1 A conveyer pushes coal from the stockpile into a crusher that reduces coal to approximately ¾-inch size at a rate of 800 tons per hour.

2 Conveyers transport the crushed coal into bunkers (A) inside the plant. Each Merom unit has six coal bunkers capable of holding 2,610 tons, enough to operate a unit at full load for 10 hours.

3 Coal feeds from the bunkers through a coal feeder and crusher/dryer (B) to mills where it is pulverized into dust-like particles (C).

4 Air is injected through the mills to carry coal dust to burners on the front and rear of the furnace (D).

5 Powdered coal is ignited inside the furnace by oil firing torches located near each burner. The coal fire is then sustained without oil igniters.

6 Air for combustion is blown into the furnace by forced draft (E) axial fans. These fans send combustion air through ducts to the air preheater (F) that utilizes heat from the furnace exhaust gases to preheat incoming combustion air. Ducts then carry heated air to the burner fronts that when mixed with powdered coal, aid in complete combustion.

7 The furnace is a multi-story structure where combustion takes place. Tubes form a solid wall above, around and beneath the fire (G). At various locations within the furnace, other tubes are suspended to absorb additional heat from the fire. This enclosure, together with the furnace walls and other tube sections, is called the boiler.

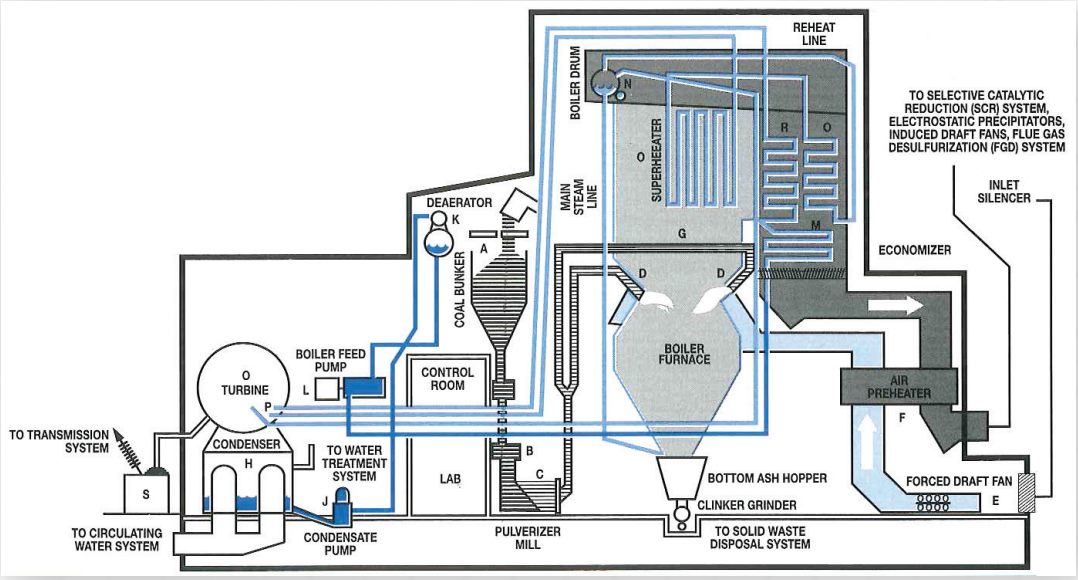
8 To generate steam, boiler water is pumped from the lower section of the condenser (H) via a condensate pump (J) to the de-aerator (K) where the boiler water is mixed with live steam to heat the water and drive out air. From the de-aerator the water flows to the boiler feed pump (L) and is pumped through the first section of the boiler known as the economizer (M) then through furnace walls where most boiling takes place.

9 From the furnace walls, a steam and water mixture flows to the boiler drum (N) where steam and water are separated. The water is allowed to go through furnace walls again and steam is forced through the super heater. The super heater (O) is a series of tubes located at the hottest portion of the furnace where steam reaches its highest temperature. From the super heater, the steam now at 1,005ºF and 2,600 pounds per square inch pressure flows to the main turbine (P). Each boiler at Merom delivers 3,900,000 pounds of steam per hour to its turbine (Q).

10 Each turbine at Merom actually consists of four turbines connected to the same shaft. These turbines—the high pressure, intermediate pressure and two low pressures—each absorb the energy of the steam by allowing it to expand through the turbine blades. The exhausted steam from the high pressure turbine is piped back through a section of the boiler (R) and reheated to 1,005ºF. From the re-heater, the steam is piped back to the intermediate section of the turbine and then to the low-pressure turbines. From the low-pressure turbine, the spent steam is exhausted to the condenser where the final level of energy is absorbed and converted into water. The condensed water is held in the lower portion of the condenser (H) and is circulated again.

11 The rotational motion imparted to the turbine shaft, approximately 720,000 horsepower, is used to turn an electromagnetic field within the generator stator which produces approximately 535,000 kW of electric energy at approximately 23,000 volts.

12 Electric energy is transformed in the main power transformer (S) to 345,000 volts and is transmitted throughout central and southern Indiana and southeastern Illinois via an extensive transmission system.



Learn more about Merom Generating Station.
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