Welcome to the Dry Fork Station

The Dry Fork Station, seven miles north of Gillette, WY, is a coal-based electric generation power plant owned by Basin Electric Power Cooperative and the Wyoming Municipal Power Agency.

Sub-bituminous coal from the nearby Dry Fork Mine north of Gillette fuels Dry Fork Station via a conveyor system approximately one mile in length.

The rated capacity of the Dry Fork Station is 422 megawatts (MW); however, the net generation is about 385 MW. One megawatt of capacity is generally considered to be sufficient for 800 homes, so the Dry Fork Station’s output can provide enough electricity for about 308,000 homes.

The need for the power plant was first identified in 2002. Studies projecting Basin Electric’s long-term power requirements showed a need for additional electrical generation to meet its members’ needs by 2011. After an extensive analysis of the region’s transmission grid, alternative sources of fuel and water, and work force availability, Basin Electric selected a plot of land north of Gillette as the preferred location for the new baseload power plant. The project was announced in December 2004.

Before construction could begin, Basin Electric had to obtain several regulatory permits, including an Industrial Siting Permit and an air permit. On Oct. 17, 2007, two days after the air permit from the state of Wyoming was in hand, construction on the power plant commenced.

The Dry Fork Station experienced a peak construction work force of more than 1,300 construction workers from more than 36 states in September 2009. The work force amassed more than 6 million man-hours without a lost-time incident during construction.

The $1.35-billion power plant was completed in 2011. Basin Electric employs 85 full-time staff. Basin Electric is the majority owner and the operator. Wyoming Municipal Power Agency of Lusk, WY, has a 7.1-percent ownership share in the Dry Fork Station.

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Basin Electric Power Cooperative
Basin Electric is a consumer-owned, regional cooperative headquartered in Bismarck. It generates and transmits electricity to 135 member rural electric systems in nine states: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming. These member systems distribute electricity to about 2.8 million consumers.

Basin Electric has a 92.9-percent ownership share in the Dry Fork Station.

Wyoming Municipal Power Agency
The Wyoming Municipal Power Agency (WMPA) is the wholesale electricity provider for eight public power communities in Wyoming: Cody, Powell, Lusk, Lingle, Guernsey, Fort Laramie, Wheatland, and Pine Bluffs. The agency also operates the Dry Fork Station, which is owned by Basin Electric. WMPA has a 7.1-percent ownership share in the Dry Fork Station.

Requests for information about WMPA should be directed to:
Wyoming Municipal Power Agency
4641 U.S. Highway 20
Lusk, WY 82225-0900
Phone: (307) 334-2170

Requests for information about Basin Electric or the Dry Fork Station should be directed to:
Basin Electric Power Cooperative
1717 E. Interstate Ave.
Bismarck, ND 58503-0564
Phone: (701) 223-0441
www.basinelectric.com

Dry Fork Station
Plant Manager
12460 N. Highway 59
Gillette, WY 82716
Phone: (307) 687-8400
From coal to electric energy

Production of electricity at a coal-based power plant involves heating water to make steam. The steam spins a turbine connected to a generator, which produces electricity. This cycle is basically the same whether a plant gets heat from burning coal, oil or natural gas, or from nuclear fission. Beyond the similarity in this cycle, power plants are quite different from each other.

The Dry Fork Station employs advanced sub-critical pulverized coal technology. The largest piece of equipment inside the Dry Fork Station is the boiler, measuring more than 186 feet tall. At maximum production, it consumes 220 tons per hour of sub-bituminous coal from the nearby Dry Fork Mine to produce superheated steam at 1,050 degrees Fahrenheit and 2,415 pounds per square inch of pressure.

The steam is used to drive a multi-stage turbine connected to a generator. The turbine develops about 563,220 horsepower to spin the generator at exactly 3,600 rpm to produce electricity. The speed of the turbine-generator is constant, regardless of generator output.

Once the steam exits the turbine, it is directed to the air-cooled condenser. The condenser acts like a giant radiator, where the steam is cooled back to water. The cooled water is then returned to the boiler for reheating so it can be used again.

The water-to-steam-to-water cycle is a closed-loop process. Make-up water is added as needed to maintain water quality and quantity. The Dry Fork Station is a zero-discharge facility, and its dry cooling technology is designed to conserve water resources.

The majority of electricity produced at the Dry Fork Station is sent via 125 miles of 230,000-volt transmission line to substations in northeast Wyoming, where it connects to the transmission grid.

Environmental controls

More than $336 million has been invested at the Dry Fork Station for advanced environmental technologies for capturing and removing emissions of sulfur dioxide, mercury, ash and oxides of nitrogen. The plant spends about $5 million annually in operating this equipment.

The scrubber technology selected for the Dry Fork Station is called a reflux circulating fluid bed scrubber. It uses lime to capture and remove more than 95 percent of sulfur dioxide emissions. It also captures some mercury emissions. The Dry Fork Station’s scrubber is the largest of this design.

An air-cooled condenser uses outside air to condense steam back to water. This reduces the amount of water required for plant operations. It is the largest in North America and the first application of this kind of cooling technology in Basin Electric’s generating fleet.

Three technologies are used to significantly reduce oxides of nitrogen (NOx) emissions – low-NOx burners, over-fire air and selective catalytic reduction, or SCR.

Twenty low-NOx burners control the formation of oxides of nitrogen at combustion. Over-fire air injects air into the boiler above the combustion zone, lowering the combustion temperature and limiting NOx emissions. The SCR is located post combustion in the boiler building. Ammonia is injected into the flue gas stream to assist with NOx removal. An SCR is very similar to a catalytic converter used in automobile exhaust systems, except on a much larger scale.

Mercury emissions are captured by injecting activated carbon post combustion to absorb mercury as a particulate. It is then captured in the baghouse along with the fly ash particles and transported to the landfill for disposal. Bottom ash in the boiler is removed using a dry, chain-driven system that’s the first installation of its kind in the United States. The bottom ash is also disposed in the landfill.

The environmentally secure landfill is located to the east of the power plant. The area identified for disposal is large enough to accept ash for the projected 60-year life of the power plant.