

## Bruce Mansfield Plant



*The plant is located in Shippingport, Pennsylvania, along the Ohio River, approximately 25 miles northwest of Pittsburgh. The site covers 473 acres.*

### Facts At A Glance

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- Bruce Mansfield is FirstEnergy's largest coal-fired power plant.
- Three coal-fired units produce 2,490 megawatts (MW) of electricity.
- Unit 1, online in 1976, generates 830 MW; Unit 2, online in 1977, generates 830 MW; and Unit 3, online in 1980, generates 830 MW.
- At full capacity, the plant's generating units can produce 59-million kilowatt-hours of electricity daily.
- The plant uses more than seven million tons of coal annually.
- The Bruce Mansfield Plant employs approximately 350 people.
- The plant pays approximately \$1.5 million annually in property taxes.

### Environmental Measures

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The Bruce Mansfield Plant is a recognized showplace for environmental technology. More than one out of every three dollars spent to build the \$1.4 billion facility was spent on environmental protection.

One out of three employees operates pollution control equipment. Most recently, the plant was updated to comply with the U.S. Environmental Protection Agency's Mercury and Air Toxics Standards (MATS).

The plant is also equipped with full-scale air quality control systems designed to remove virtually all particulates and 95% of the sulfur dioxide from boiler flue gases.

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## Environmental Measures *(continued)*

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Units 1 & 2 are equipped with massive ductwork “scrubber trains” – large enough for a tractor-trailer to pass through – located between the boilers and the 950-foot chimney. Scrubbers have been a part of the plant since its construction.

Unit 3 is equipped with a precipitator/absorber system – four electrostatic precipitators, four induced draft fans, five parallel absorber modules and a 600-foot chimney.

Units 1, 2 & 3 are equipped with Selective Catalytic Reduction (SCR) systems for removal of nitrogen oxides from the flue gases. The SCR is a large vessel that transforms nitrogen oxides into nitrogen – which becomes part of the ambient air – and water.

The air quality control systems require about 150,000 tons of lime per unit each year, or one ton of lime for every 11 tons of coal. As a result, more than 400,000 tons of sulfur dioxide are removed from plant emissions each year.

The coal and lime needs for the Bruce Mansfield Plant are handled through a docking facility located on the Ohio River, the largest such inland facility in the U.S.

Rail unloading capacity is available for coal and aqueous ammonia delivery, which is used in the SCR process.

At full capacity, each unit’s air quality control system can produce up to four million gallons of scrubber slurry daily.

A separate pollution control system is used to dispose of this slurry. It includes a treatment and pumping facility at the plant site, seven miles of underground pipeline and a 1,300-acre disposal site, complete with the largest earth and rock fill embankment dam in the eastern U.S.

The plant uses more than 70 million gallons of water a day. Water from the Ohio River is returned in a condition that is equal to or better than when it was withdrawn.

Three 410-foot natural draft cooling towers reduce the temperature of approximately 310,000 gallons of water per minute by 27 degrees. A plume of water vapor leaves the top of the tower while cooled water collects at the base where it is mixed with water pumped from the Ohio River to make up for evaporation.

## Reuse/Recycling Activities

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### Forced Oxidation Gypsum Plant

The scrubber system at the Bruce Mansfield Plant creates a byproduct called calcium sulfite, which is normally disposed of in a landfill. FirstEnergy developed a process that converts that byproduct into gypsum, which is then used in a nearby factory to produce drywall. Nearly half a million tons of gypsum is sent to the wallboard plant each year, which can be made into enough drywall for 70,000 new homes.

The recycling process is called Forced Oxidation Gypsum, or FOG. Launched in 1999, the FOG plant, a separate building on the Bruce Mansfield property, is the only one like it in the world. Once the calcium sulfite is transformed into gypsum, an enclosed conveyer belt transports it to a National Gypsum Company drywall production facility across the street.

The technology benefits FirstEnergy in two ways: the company generates additional revenue by selling the gypsum and it reduces disposal costs. National Gypsum benefits by buying a raw material at reduced costs and without shipping expenses. And, it benefits the environment by lowering the impact on landfills and reducing further need to mine gypsum from the earth.