energy economy environment

Mountaineer Plant Carbon Capture & Storage Project

# Protecting the Environment at a coal-fueled power plant

Mountaineer Plant is equipped with state-of-the-art environmental controls. In fact, while the original plant cost approximately $531.7 million to build, AEP has made additional investment of more than $498 million plus the cost of associated equipment since 2000 to improve the plant's environmental performance. Mountaineer now is equipped with numerous environmental control systems.

**Low NOx burners** reduce nitrogen oxide (NOx) emissions by up to 60 percent. Low NOx burners control the way coal is burned to reduce the formation of NOx, a precursor to ozone.

A **selective catalytic reduction (SCR) system** reduces NOx emissions by up to 90 percent. Ammonia injected into the plant's exhaust gases causes a chemical reaction as the gases pass over a catalyst, converting the NOx to harmless nitrogen and water.

A **sulfur trioxide mitigation system** injects a dry sorbent into the flue gas. Based on performance and cost, AEP's preferred sorbent is trona. The final products are sodium sulfate and sodium bisulfate, which are collected with fly ash in the electrostatic precipitator.

**Electrostatic precipitators** remove more than 99 percent of all fly ash particles produced by coal combustion. In precipitators, fly ash from burning coal passes through electrically-charged plates, which pull the ash particles out of the exhaust gas stream. The ash can be marketed for beneficial use in land reclamation, in concrete and lightweight aggregate and in the production of paints, plastics and other products.

A **flue gas desulfurization (FGD) system** or scrubber uses a limestone-water slurry to remove up to 98 percent of the sulfur dioxide ($SO_2$) that results from coal combustion. The resulting product is gypsum, which is safely managed in a landfill. Alstom, AEP's carbon dioxide ($CO_2$) capture partner, also provided the plant's FGD system.

An automated **continuous emission monitoring system (CEMS)** monitors stack gas emissions. This highlyaccurate system helps ensure

compliance with clean air requirements for $SO_2$, NOx and $CO_2$ emissions and opacity.

A hyperbolic **cooling tower** provides the plant with a closed cycle cooling system. The plant uses water from the Ohio River to cool the steam back into water for reuse in plant processes. The closed system means that heated water is not discharged back into the source where it could affect aquatic life.

Mountaineer Plant hosts a **$CO_2$ capture and storage** project that uses Alstom's chilled ammonia process to remove approximately 90 percent of the $CO_2$ from a 20 MWe slipstream from the plant's flue gas. The captured $CO_2$ is compressed and injected for permanent storage in deep geologic layers more than a mile beneath the plant.

Mountaineer Plant has been recognized for its environmental initiatives including its wildlife habitat certified by the Wildlife Habitat Council.

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