

Mercury Research Center

The facility will be a 5-megawatt equivalent slip-stream facility equipped with a complete system of flue gas cleanup technologies that will be open for R&D proposals from around the nation and the world to conduct specialized testing.

The research will include redirecting a small amount of emissions from Plant Crist's Unit 5. The emissions will be treated by various combinations of the different systems to determine the best methods for mercury reduction.

The center includes a selective catalytic reduction unit, a rotary air preheater, a baghouse, an electro-static precipitator and a wet limestone scrubber.

Researchers will be able to bypass any or several of the five areas to see which one performs better at reducing mercury emissions.

ELECTROSTATIC PRECIPITATOR

The electrostatic precipitator (ESP) uses 30,000 to 50,000 volts of direct current to remove solid particles of ash from exhaust gases. Like a television or computer monitor screen attracts dust, the ESP collects more than 99.9% of the ash left from the non-burnable minerals in the coal fuel. The ESP collects any mercury attached to the ash and can be used to collect activated carbon used to capture mercury.

PREHEATER

The air preheater primarily is used to save fuel by taking heat from the exhaust gases and preheating the air required for combustion of the coal. It may save as much as 10% of the fuel needed to make electricity, reducing emissions by up to 10% as well. The air preheater is involved in the mercury chemistry that determines scrubber capture.

SELECTIVE CATALYTIC CONVERTER

The selective catalytic reduction (SCR) system uses ammonia and a rare metal catalyst made from vanadium. The flue gas passes through 3 or 4 layers of honeycomb catalyst where the emissions of nitrogen oxides (NOx) combine with the ammonia to make harmless water and nitrogen. The SCR can change mercury chemistry to make it easier to capture.

BAGHOUSE

The baghouse removes ash in exhaust gases similar to a giant vacuum cleaner that filters the solid dust particles from the exhaust gases. Periodically, dust is cleaned from the surface of the bags. The baghouse either captures mercury already on the ash or on another solid like activated carbon.

WET SCRUBBER

The scrubber is intended to remove acid gases – like sulfur oxides (SO₂ and SO₃) or hydrogen chloride (HCl) – from power plant exhaust. By combining the acid gases with a slurry of water and limestone to neutralize the acid, the exhaust gases are cleaned. The gas leaves the scrubber loaded with water vapor and will create a steam plume when the gas exits the exhaust stack. The scrubber collects mercury in the oxidized type, most often mercury chloride.



For more information on the Mercury Research Center, go to gulfpower.com and click on "Planet Power" or MercuryResearchCenter.org.