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Research Boiler ^[1]

The research boiler is a 1,000 lb steam/h watertube boiler that is used for evaluating combustion and emissions performance of solid, liquid, and gaseous fuels. ([view schematic](#) ^[2])

Fluidized-Bed Combustor/Gasifier ^[3]

The fluidized-bed test unit can be operated in either the circulating or bubbling bed mode and can be operated as either a combustor or gasifier. It is used for investigating fundamental fuels combustion/gasification performance, emissions characterization, and deposition/agglomeration behavior. ([view schematic](#) ^[4])

Down-Fired Combustor

The down-fired combustor is a refractory-lined combustor designed to evaluate the combustion performance, pollutant emissions, and mineral matter transformation behavior of various fuels (natural gas, coal, biomass, coal-water slurry fuels). ([view schematic](#)) ^[5]

Drop-Tube Reactor ^[6]

The drop-tube reactor is an electrically heated unit used for a variety of fundamental studies including pyrolysis and oxidative kinetics parameters, release profiles of volatile matter, nitrogen, and carbon, and depositional characteristics when using coal and opportunity/biomass fuels. ([view schematic](#) ^[7])

Gasification Reactor ^[8]

The gasification reactor is a laboratory-scale fluidized-bed reaction system capable of gasifying a variety of traditional fossil fuels as well as opportunity/ biomass fuels. It is used for fundamental kinetics studies and fuels evaluation. ([view schematic](#) ^[9])

Wet Flue Gas Desulfurization Scrubber

The WFGD test facility is integrated with the research boiler and is used for characterizing and evaluation limestones as reagents, and additives for reducing SO₂ emissions. ([view schematic](#) ^[10])

Fuel Preparation/Processing Equipment ^[11]

Fuel preparation and processing equipment are available for cleaning coals, size reduction and classification of coal and biomass, dewatering of fine coal, and coal-water mixture (CWM) preparation. Pilot-scale facilities include a double-stage froth flotation circuit (rougher and cleaner cells), two continuous ball/rod mill systems, several crushers, a hammermill, an air-swept pulverizer, three high-speed centrifuges, and mixing tanks/pumps for CWM preparation and handling. Bench-top facilities include several types of mills, crushers, and screening systems for fuel processing.

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