United States Environmental Protection Agency

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Research Triangle Park, North Carolina 27713

Research Summary

Multipollutant Control Research Facility (MPCRF)

1.0 Introduction

The U.S. Environmental Protection Agency's (EPA) Multipollutant Control Research Facility (MPCRF) is located at their Research Triangle Park, North Carolina, campus. The MPCRF combustor is a pulverized coal-, natural gas-, and biomass-fired furnace with a maximum firing rate of 4 MM Btu/hour. At its pilot-scale size, viable emissions control technologies may be tested, modeled, and scaled-up to provide results for use by regulatory and commercial/industrial partners. It has been used for testing of dry sorbent injection and electrostatic-based particle removal technologies, as well as a host of studies to investigate pre- and post-combustion control technologies developed to reduce emissions. The facility is operated in a manner to closely mimic the time-temperature profiles of those in commercial utility systems. The combustor can be modified and the flue gas can be routed to utilize or avoid various controls in order to evaluate the emission characteristics and the effectiveness of available emission control technologies.

State of the Art Research Facility

- 4 MMBtu/hr multi fuel-fired facility
- Able to evaluate combinations of technologies
- Able to optimize control of multiple pollutants (SO_2, NO_X, PM, HCl and Hg)

Represents Key Pre- and Post-Combustion Technology Options

- Low NO_X Burner
- Selective Catalytic Reduction (SCR): NO_X and Hg Oxidation
- Lime Flue Gas Desulfurization (FGD): SO_2 and Hg Capture
- Fabric Filter or Electrostatic Precipitator (ESP): Fine PM and Hg Capture
- Conventional and Advanced Sorbents: Hg, SO_2, and/or NO_X

Collaborative Research with Regions, States, Program Offices and Industry.

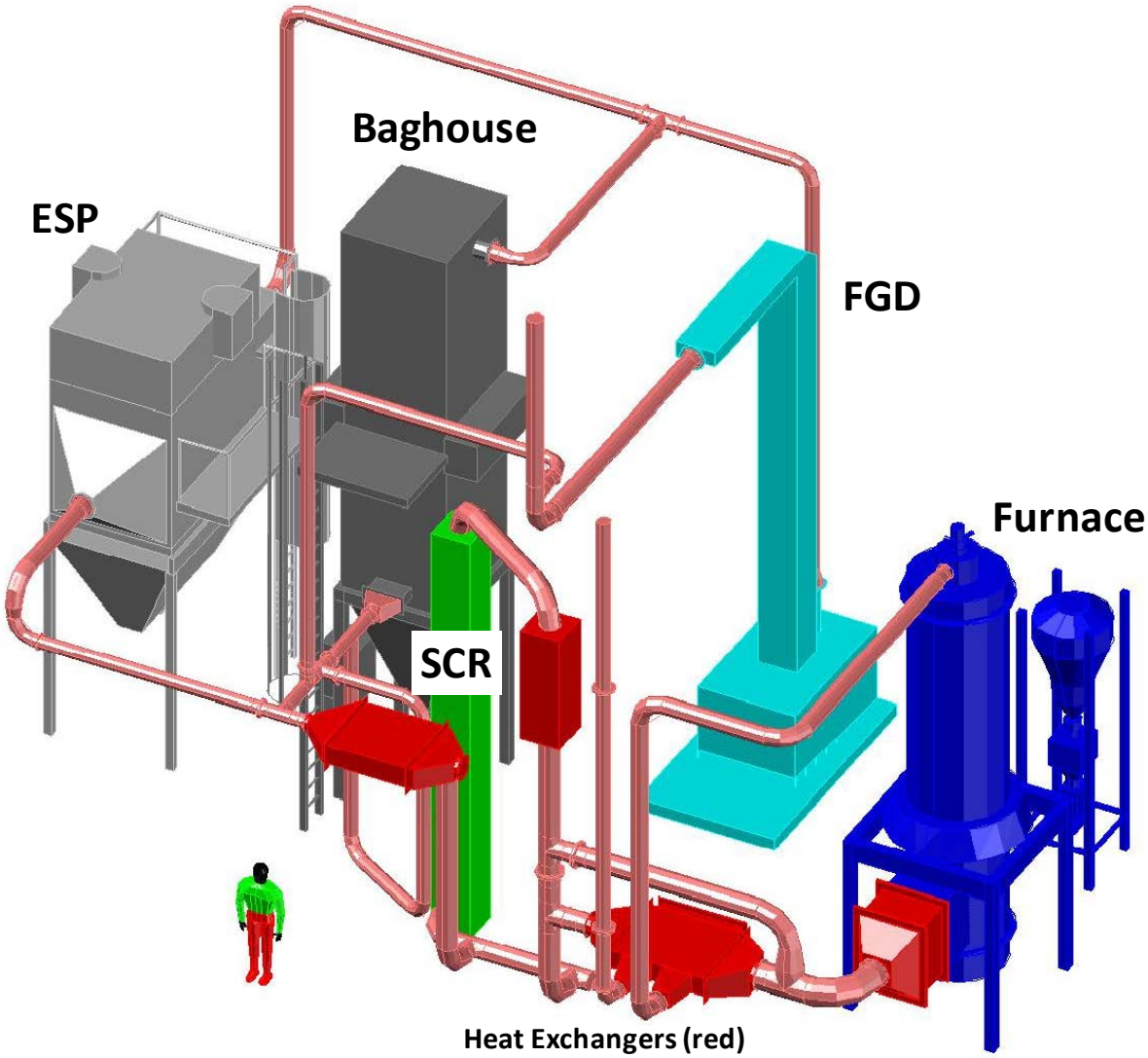
This document has been reviewed in accordance with U.S. Environmental Protection Agency policy and approved for publication.

2.0 MPCRF Components

The MPCRF consists of a furnace and five primary control devices: low NO_X burner, selective catalytic reduction (SCR), electrostatic precipitator (ESP), baghouse, and wet lime flue gas desulfurization (FGD). The effluent path can be directed to bypass the SCR and to flow through either the ESP or baghouse depending on the objectives of the test program. Heat exchangers are located strategically throughout the facility to provide a wide range of testing environments. A detailed description of the facility and its individual components can be found in Yelverton et al., 2016.

T.L.B. Yelverton, D.G. Nash, J.E. Brown, C.F. Singer, J.V. Ryan, P. Kariher (2016) *Dry sorbent injection of trona to control acid gases from a pilot-scale coal-fired combustion facility*, AIMS Environmental Science, 3(1): 45-57.

There are multiple mechanisms to work directly with EPA or with an in-house contractor.



3.0 MPCRF: Past, Present and Future Activities

- Testing of conventional and advanced sorbents for contaminant control
- Coal blending tests to examine effects on Hg oxidation (collaborative w/ EPRI)
- Testing and demonstration of Hg continuous emission monitors
- CO_2 capture technologies (collaborative w/ RTI)
- Testing and demonstration of innovative measurement and control technologies rapid quenching for mercury oxidation enhancement (collaborative with Breen Energy Solutions)
- Surrogate evaluations for Hazardous Air Pollutants (OAQPS)
- Testing of agricultural by-product (biomass) blended with coal up to 80% (by mass)
- Co-firing of natural gas and coal at various blend ratios

4.0 Keywords

Multi-Pollutant, AEMD, Air Research, Tiffany Yelverton, Ed Brown,

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