the ENERGY lab

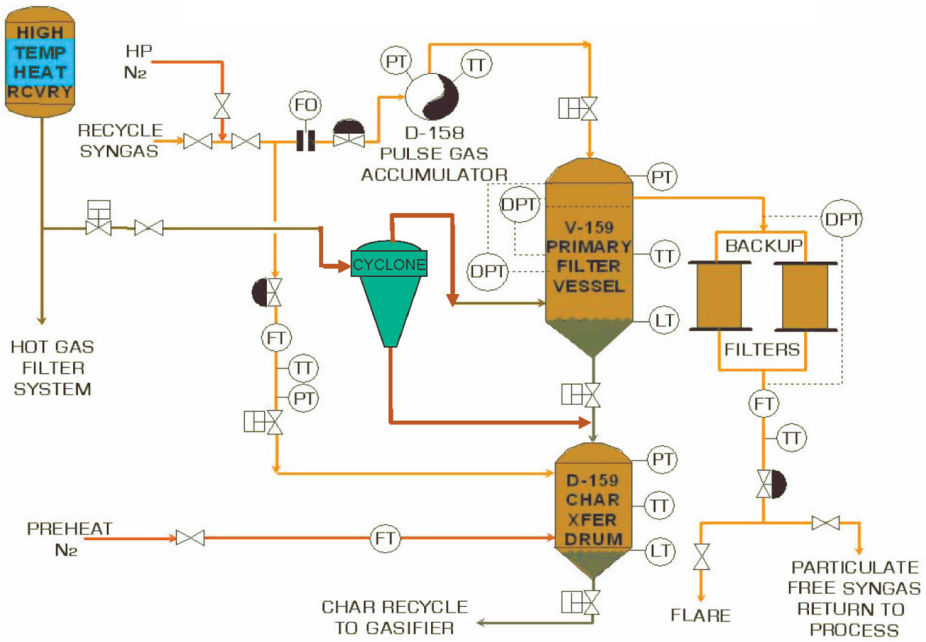
PROJECT FACTS

Gasification Technologies

Evaluation of a Cyclone and Hot Gas Filter System

Description

The Wabash River Coal Gasification Plant uses an oxygen-blown E-Gas gasifier technology, owned by ConocoPhillips, which produces fuel gas containing significant amounts of fine particulates. Currently, particulates are cleaned from the fuel gas with metal candle filters. These filters require two costly plant shut-downs per year for cleaning or replacement. During the U.S Department of Energy-supported project "Gasification Plant Cost and Performance Optimization Study", DE-AC26-99FT40342, performed by Bechtel Corporation, Global Energy Inc., and Nexant Inc. , it was determined that particulate removal system optimization would have a significant impact on plant economics. As a result of the study, ConocoPhillips decided to test those findings at the Wabash plant. The plan is to develop a hybrid cyclone-filter particulate cleanup system that would reduce the load on the candle filter. The cyclone is expected to remove up to 95 percent of the char, which will result in a smaller candle filter system and longer filter life. Thus both capital and maintenance costs will be reduced. This project will evaluate the potential of this hybrid system using a slipstream from the Wabash River Coal Gasification Plant. The vision is to use a hybrid cyclone-filter hot gas particulate cleanup system in the next generation E-Gas plant.



Cyclone-Filter Slipstream Test Unit

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PARTNER

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COST

Total Project Value
$899,994

DOE/Non-DOE Share
$719,995 / $179,999

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U.S. DEPARTMENT OF ENERGY

Primary Project Goal

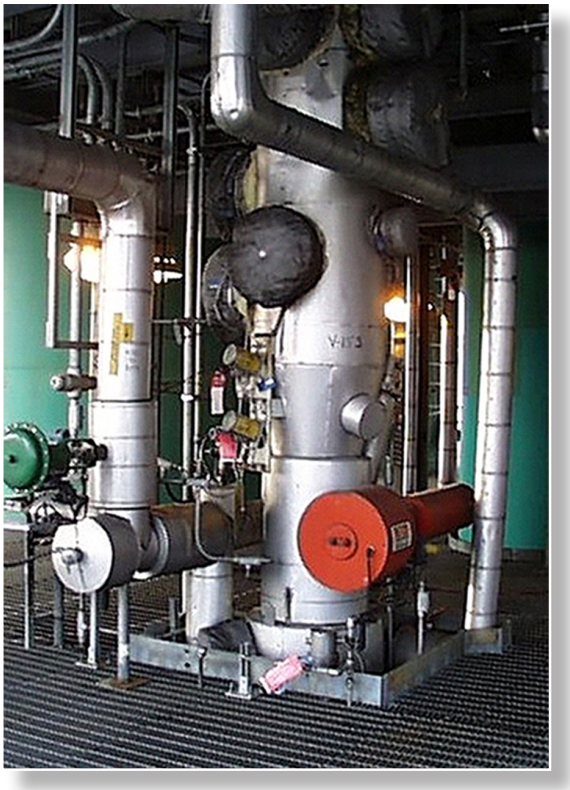
To develop a hybrid particulate cleanup system that will reduce the load on the candle filter, resulting in reducing the: (1) maintenance frequency to once per year and (2) initial cost of the particulate clean-up system.

Accomplishments

- Completed the design, engineering, construction, and shakedown tests of the cyclone-filter hybrid particulate cleanup system.
- Tested the cyclone-filter hybrid particulate cleanup system for 500 hours, starting at filter face velocities representative of a commercial filter system, and increasing this face velocity over the course of the test.
- Tested system under stable conditions at a filter face velocity twice that of the commercial filter system.

Benefits

Success of this project will result in reduced capital and maintenance costs of coal syngas generation or power production systems.



Filter vessel installed at Wabash plant