

FEED-SYSTEM INNOVATION FOR GASIFICATION OF LOCALLY ECONOMICAL ALTERNATIVE FUELS

PRIMARY PARTNER

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Description

Gasification processes are unique in that they can convert various carbon-based feedstocks to electricity, steam, fuels, chemicals, and/or hydrogen. To be economically attractive, gasification must offset the higher capital cost of the gasifier and gas cleanup systems through the use of lower cost or negative-value fuel sources.

In order to broaden and extend the potential applications of gasification and thus accrue the environmental and resource advantages, a wider variety of alternative feedstocks needs to be available to commercial plants. In most cases when alternative feedstocks are cofed, the secondary fuel is likely to be significantly different in physical and chemical properties from the primary coal fuel. Discontinuities and nonuniformities in handling and feeding the differing materials may be expected in some of the feed mechanisms and must be addressed in the design and operation of feed systems to ensure smooth and uniform performance during transient and steady-state operations.

The following one-line diagram shows an experimental set up to address two primary issues relative to cofiring biomass in the E-gas gasifier. The first involves overcoming a significant pressure boundary (400 psig). The second addresses proper entrainment of biomass particles. Sludge is being considered by Global Energy for cofiring. A sludge pump will provide flow to a pressurized vessel. This testing is necessary to prove the capability of an off-the-shelf high-pressure pump, which has not been previously tested for this application. Upon completion of the pressurized testing, the low-pressure entrainment tube will be used to investigate proper dispersion and entrainment of sludge particles. Larger particles cannot be carried by the gasifier's relatively low velocities, and modeling this phenomenon is crucial to the implementation of a fuel dispersion mechanism.



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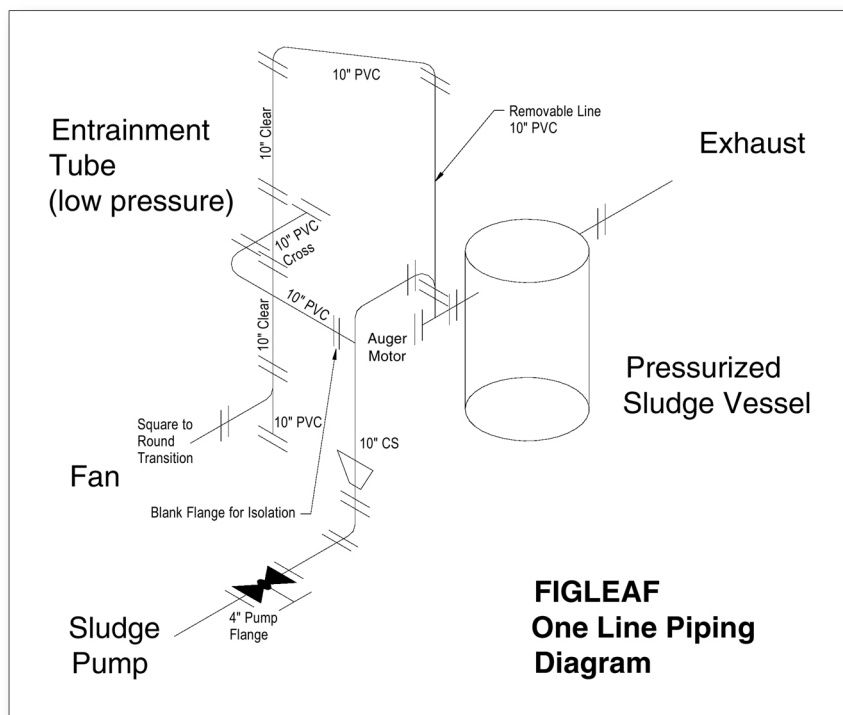
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Goal

Develop a feed system for opportunity fuels for use in integrated gasification combined cycle and gasification coproduction facilities.

Benefits

This technology offers the option of feeding biomass and other waste materials into high-pressure coal-based gasification plants, paving the way for increased use of such materials in the power generation market.

Using a renewable feedstock to displace a portion of the coal feed in a 260-MWe IGCC plant would reduce plant fuel cost by more than 35% (an annual fuel savings of more than five million dollars) and reduce CO₂ emissions by 700 tons per day.