NREL
NATIONAL RENEWABLE ENERGY LABORATORY

MBMS Monitoring of ClearFuels/Rentech PDU

Cooperative Research and Development Final Report

CRADA Number: CRD-10-386

NREL Technical Contact: Daniel Carpenter

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Cooperative Research and Development Final Report

In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA Number: CRD-10-386

Parties to the Agreement: ClearFuels Technology

CRADA Title: MBMS Monitoring of ClearFuels/Rentech PDU

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	NREL Shared Resources
TOTALS	$ 770,972.00

Abstract of CRADA Work:

NREL will provide detailed on-site biomass gasifier syngas monitoring, using the NREL transportable Molecular Beam Mass Spectrometer (MBMS). This information will be used to optimize the parameters of the gasifier operation, insuring the quality of the syngas made in the Rentech gasifier and its compatibility with catalytic conversion to fuels.

Summary of Research Results:

ClearFuels Technology and Rentech were awarded Recovery Act funding, through DOE's Integrated Biorefinery platform (IBR), to integrate ClearFuels' High Efficiency Hydrothermal Reformer (HEHTR) gasification technology with Rentech's existing natural gas-to-liquids Demonstration Unit. The purpose was to demonstrate integrated, large, pilot-scale (20 ton/day) conversion of biomass-derived syngas to renewable, Fischer-Tropsch (F-T) diesel and jet fuel. A portion of the Recovery Act award was directed to NREL to provide real-time product gas analysis, specifically tar, in both the untreated and conditioned syngas. NREL staff members were responsible for transport, set-up, process interface, and operation of the MBMS during the IBR commissioning stage and the independent engineer (IE) testing. The MBMS instrument was relocated to the Commerce City IBR facility in December 2011 and provided process analytical support for roughly 50 days over a 15-month period. During this period, the IBR logged more than 2,200 hours of HEHTR operation and more than 1,300 hours of integrated fuel production, processing a range of woody and bagasse feedstocks. During the IE test run, biomass-derived syngas was fed to the F-T reactor for approximately 200 hours, producing 1,096 gallons of fuel product. Unfortunately, in February 2013 Rentech announced the closure of the Commerce City facility and the company will not be pursuing commercialization of this technology. Nevertheless, the MBMS was able to provide valuable syngas data in terms of carbon partitioning to tar during the process optimization stage, and most of the project's critical technical success factors were accomplished.

Subject Inventions Listing:

None

Report Date:

February 14, 2014

Responsible Technical Contact at Alliance/NREL:

Daniel Carpenter

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