National Renewable Energy Laboratory
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Office of Energy Efficiency & Renewable Energy
Innovation for Our Energy Future

Feasibility of Ceramic Membranes in Lignocellulosic Processing

Cooperative Research and Development Final Report

CRADA Number: CRD-06-00198

NREL Technical Contact: Daniel J. Schell

CRADA Report
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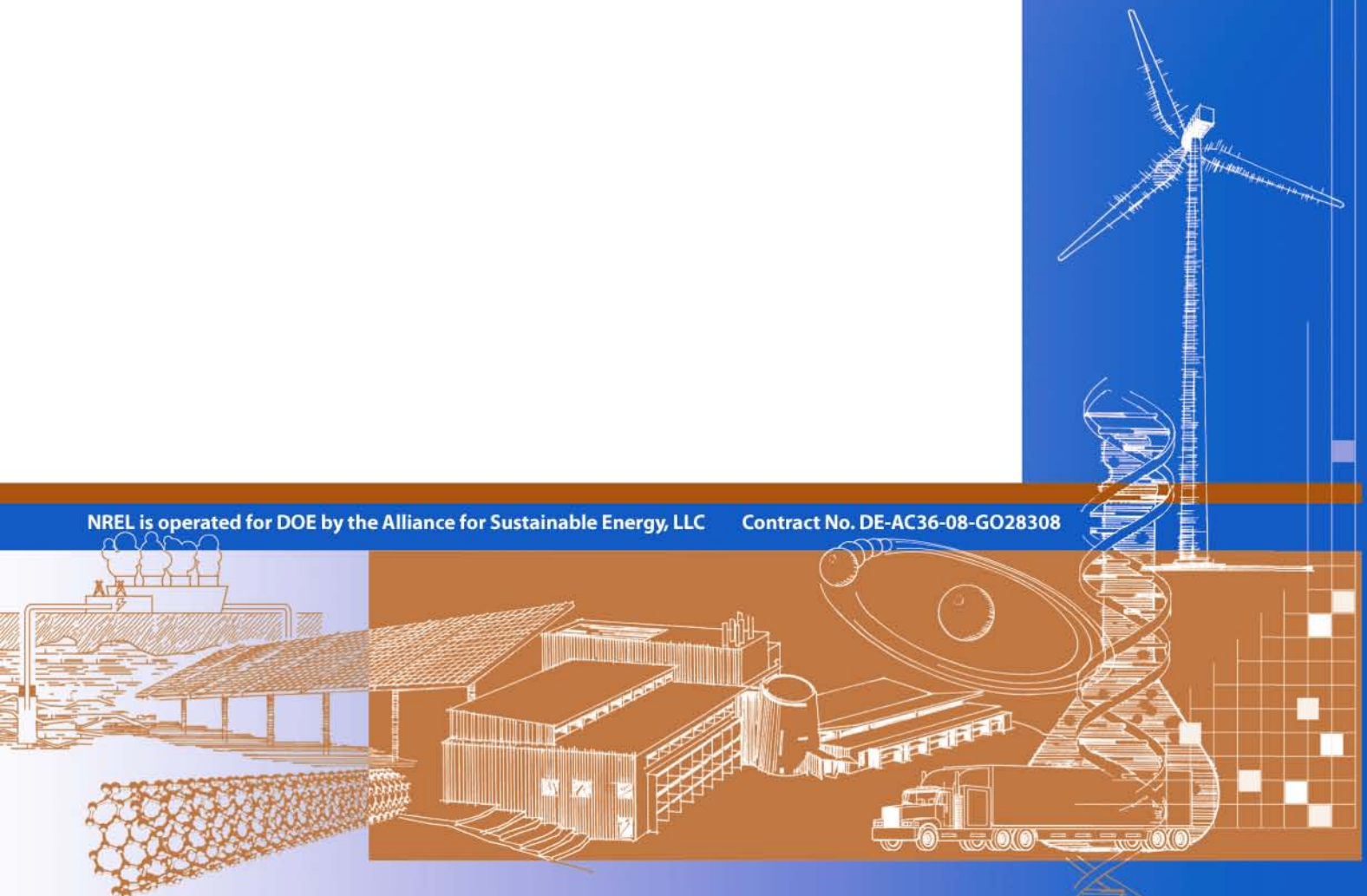

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Cooperative Research and Development Final Report

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-06-00198

CRADA Title: Feasibility of Ceramic Membranes in Lignocellulosic Biomass Processing

Parties to the Agreement: CeraMem Corporation + NREL

Abstract of CRADA work:

NREL will conduct field trials in their biomass process pilot plant using CeraMem developmental membranes and system supplied by CeraMem. They will also conduct an engineering analysis to determine process options for integrating CeraMem's membrane technology into biomass processes for chemicals production.

Summary of Research Results: A HPD (formerly CeraMem) separation system was considered as a filtration unit upstream of an ion-exchange column that could be used to remove acetic acid from the hydrolysate liquid generated by dilute acid pretreatment of lignocellulosic biomass. This option was included in the 1999 biochemical ethanol design report. Experimental work at NREL tested the ability of HPD's system to removed solids from hydrolysate. The experimental data produced by this work was used to access the economics of the proposed separation process. In 2007$, the system increases the ethanol production cost from $1.77/gal to $1.82/gal. This is justified economically when compared to an alternative solution in which the liquid is not filtered and three ion-exchange columns are operated in rotation, with frequent cleanings. The HPD system is also proposed as a conditioning step before a chromatographic separation of the hydrolyzate liquid, from which valuable products can be separated and purified. Possible economic justification exists for recovery of acetic acid and limited quantities of xylose.

Subject Inventions listing: None

Report Date: 3/8/2010 Responsible Technical Contact at Alliance/NREL: Schell, Daniel J.

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