



FuelCell Energy

World Leader in Ultra-Clean Power

facts

Executive Officers

Dan Brdar

President and
Chief Executive Officer

Christopher R. Bentley

Executive Vice President
Government R & D Operations
Strategic Mfg. Development

Bruce Ludemann

Senior Vice President
Sales & Marketing

Joseph G. Mahler

Senior Vice President
Chief Financial Officer

FUEL CELL POWER UTILIZING PROPANE

BACKGROUND

The ability to operate highly efficient, pollution-free, distributed-generation power plants interchangeably on either natural gas or HD-5 grade propane is of interest to the U.S. Army and the U.S. Department of Homeland Security as a way to maintain secure power for critical power operations. Continuous long-term operation on HD-5 propane also provides a valuable proposition to islands, remote sites, national parks, data centers, military bases, hotels, and hospitals where natural gas is not available. Although natural gas distribution through utility pipelines is convenient, it is vulnerable to natural disaster, threats of terrorism, and repair outages. Propane, however, is routinely transported and stored as a liquid at ambient temperatures and offers a secure option for fuel cell operations. An adequate quantity of propane can be stored on-site to sustain operations for several days in a variety of weather climates.

SUMMARY

This test program demonstrated for the first time that a DFC300A commercial fuel cell power plant, normally operated on natural gas, can be operated on HD-5 propane at high load for long-term, high efficiency power production, and make instantaneous fuel swaps between natural gas and propane while operating on-load in both grid-connected and grid independent operation.

Operation of the DFC300A fuel cell power plant on HD-5 propane commenced on January 22, 2006 and ended on August 31, 2006. During this demonstration period the power plant accumulated over 3,900 hours of propane operation, generating 603 MWh of electricity. In addition, operation on natural gas accumulated 1,107 hours and generated 139 MWh.

Power plant efficiency during propane operation was independently measured by Concurrent Technologies Corporation, with third party gas analysis, at part load and full load. The data indicates that the efficiency on HD-5 propane is high at 45 - 47 % (LHV) and is maintained over a wide range of power output. This efficiency is comparable to typical efficiency on natural gas.



A self-contained commercial-grade power plant providing high-quality, base-load electric power using propane. In addition, ability to switch from natural gas to propane and back was demonstrated on-load with no loss of power.