



Wind Turbine R&D and Certification Services

Cooperative Research and Development Final Report

CRADA Number: CRD-04-00147

NREL Technical Contact: Hal Link

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

CRADA Report
NREL/TP-7A10-48403
February 2011

Contract No. DE-AC36-08GO28308

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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-04-00147

CRADA Title: Wind Turbine R&D and Certification Services

Parties to the Agreement: Underwriters Laboratories Inc. + NREL

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$60,000.00
Year 2	\$ 00.00
Year 3	\$ 00.00
TOTALS	\$60,000.00

Abstract of CRADA work:

NREL and Underwriters Laboratories Inc. are developing a domestic certification program for the US wind and photovoltaic (PV) industry. NREL has previously surveyed US certification bodies and concluded that Underwriters Laboratories, Inc. (UL) could offer the most value to an emerging electrical wind generation and PV industry. UL's experience and expertise in the electrical safety and certification business is recognized worldwide and offers credibility to any product bearing its mark. With UL's expertise in electrical and mechanical systems, it clearly has the technical ability to immediately meet the certification needs of both industries. All these facts make a partnership between NREL and UL a logical choice to facilitate domestic wind turbine industry development, PV industry growth and implement a successful Certification processes.

Summary of Research Results:

During the performance of this CRADA, NREL provided detailed training to several UL staff members to enable UL to conduct a variety of tests and design evaluations on commercial wind turbines. This training enabled UL to initially assist in testing and design evaluations. Eventually, UL was capable of conducting tests and design evaluations independently of NREL. In addition, UL certified one, US-manufactured wind turbine, and provided UL-approval of several aspects of

other US-manufactured wind turbines. The US wind industry viewed these accomplishments as a significant improvement over the prior situation where US manufacturers had to pay European-based certification agents for these services. UL and NREL began planning to construct a UL test facility on the Colorado/Wyoming border. However, reorganization and a change in priorities within UL led to them discontinuing wind turbine certification activities in 2005. This CRADA was modified in 2005 to cover testing of photovoltaic modules.

Specific accomplishments include:

1. Three-Tex Blade Testing: static test of spar, static test of blade and fatigue test of blades.
2. Knight and Carver Blade Testing: fatigue test of one blade
3. Mitsubishi Turbine Field Testing: power performance and noise testing of one turbine and mainframe strain measurement of a second turbine
4. Wind Energy Group: NREL provided technician support and training
5. UL Wyoming Test Site: NREL provided technical advice on layout and site calibration
6. Photovoltaic Cell Testing: NREL calibrated two photovoltaic modules

Subject Inventions listing:

None.

Report Date: 10/3/10 Responsible Technical Contact at Alliance/NREL: Link, Hal

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