NY/NJ DISTRIBUTED WIND POWER FIELD VERIFICATION PROJECT

Quarterly Report for the Period August – October 1999

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Significant Accomplishments this Period

1. Notification of Award to Host Organizations.
2. Installation of one Bergey Windpower Company (BWC) 10 kW EXCEL-S/E at the National Wind Technology Center (NWTC) near Boulder, CO.

NWTC Installation

The first component of the *Field Verification Program for Small Wind Turbines* includes the installation of one wind turbine, identical to the turbines selected for installation at the host sites, at the NWTC near Boulder, CO. The National Renewable Energy Laboratory (NREL) is responsible for providing a test site, conducting the tests, documenting the results, and preparing test reports for public dissemination. Tests will be performed for safety, IEC power performance (IEC 61400-12), noise, and IEC duration (IEC 61400-22). During the test period, the wind turbine must achieve a minimum of 1500 hours of generation without major repair and achieve an availability of at least 90%. The wind turbine must also be exposed to at least 250 hours of normal operation at 10-minute average hub height wind speeds ≥ 10 m/s, of which at least 25 hours shall be at average hub height wind speeds ≥ 15 m/s. Under the first program component, AWS Scientific, Inc. (AWS) is responsible for turbine purchase, installation, and removal of the turbine at the end of the test period by the manufacturer at the NWTC. AWS is also responsible for maintaining and repairing the turbine, as necessary, during the NREL testing process.

To assist NREL in preparing the test site (1.4), AWS and BWC provided NREL engineers with the following information:

- Tower height - 37 m (120 ft)
- Configuration – guyed lattice tower, 18.5 m (60 ft) guy radius, 3 anchor pads, 3 guy levels [9.6 m (31.4 ft), 21.8 m (71.4 ft), and 33.1 m (108.6 ft)]
- Current, voltage, and power ranges for the turbine and inverter
- One-line electrical schematic
- Anticipated date of arrival at NWTC for the turbine systems and anticipated date for completion of turbine system installation

Significant dates:

- Arrival at NWTC of guy anchor hardware – September 23, 1999
- Arrival at NWTC of turbine – October 4, 1999
- Arrival at NWTC of inverter – October 27, 1999
- Guy anchor and pad installations completed – October 18, 1999
- Turbine system installation completed – October 28, 1999
- Inverter and electrical systems installation completed – October 29, 1999

AWS subcontracted the guy anchor and pad installations to Bill Gage Contracting of Boulder, CO. The guy anchor pads are 1 m in width, 2 m in length, and 0.5 m in height, and are installed at a depth of 2 m. P/N HMD001 Oval Eye Anchor Rods were aligned with the center of the base pad and oriented at a 45° angle. Reinforcing bars were placed across both faces with maximum spacing of 30 cm. Installation took place from October 13th to the 15th, and the holes were backfilled on the 18th. An existing tower base pad at the site proved adequate for the BWC installation, and therefore no base pad construction work was required other than the installation of a pier pin for the BWC tower base.

Dan Bernadett of AWS arrived at the NWTC on October 25th and participated in ES&H Pre-Construction Orientation and Site Safety meetings. AWS had previously provided a Safety Plan for Turbine Assembly, Installation and Test on October 22nd. The Safety Plan was developed in response to numerous issues raised by the Safety personnel at NREL and represents a significant enhancement to previous plans submitted in preparation for a BWC installation at site 1.9. Dan Bernadett was designated as the Site Safety Manager for turbine installation. On Tuesday, October 26th, Dan and NREL staff assembled the tower sections. Pieter Huebner of BWC arrived at the NWTC on October 27th. Installation of the turbine head and tower wiring took place on the 27th. High winds delayed efforts to raise the tower until the morning of the 28th.

AWS subcontracted the electrical work to Mountain Valley Energy Inc. of Milliken, CO. This work consisted of the installation of the GridTek 10 inverter and the associated connections. NREL provided existing wiring from the turbine base to the control building, and AC disconnect switches. Installation work took place on October 26th and 29th.

Plans for Next Period

1. Monitor progress on data acquisition system installation at the NWTC.
2. Provide an updated power curve for the inverter.
3. Begin performance testing.
4. Begin working with Host Organizations to prepare for host site installations.