DOE/GO/10459-Q

DOE/EE/10459-2

FIELD VERIFICATION PROGRAM FOR SMALL WIND TURBINES

"Supplemental power for the Town of Browning waste-water treatment facility"

Quarterly Report for the Period January 2000 – March 2000

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U.S. DEPARTMENT OF ENERGY
Under Cooperative Agreement
No.: DE-FC36-99GO10459**

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**FIELD VERIFICATION PROGRAM FOR
SMALL WIND TURBINES
DOE/EE/10459-2**

1. Background

Cooperative Agreement No. DE-FC36-99GO10459 was put in place and authorized on Sept 30, 1999. The agreement between the USDOE (DOE) and Siyeh Development Corporation (Siyeh) of Browning, MT, is under The Field Verification Program For Small Wind Turbines and is titled "*Supplemental power for the Town of Browning wastewater treatment facility*".

A team of organizations was assembled as project partners and contributors in this endeavor. Included in that number are: Siyeh Development Corporation (Siyeh), the Town of Browning, MT (Browning), Bergey Windpower (Bergey), the Indian Health Service (IHS) and the Blackfeet Indian Housing Authority (BIHA).

The funding levels requested will cover a project duration of three full years, in which time the hardware will be installed/commissioned and performance data collected for purposes of program assessment. The project will be closely examined at the end of the three-year project period, in terms of hardware performance, overall applicability and effectiveness of the operation. A reporting of the evaluation will be provided to the DOE and to each of the project partners. The report will also be made available to others as a matter of public record.

Martin Wilde (Wilde), Director of Energy Development for Siyeh, in coordination with William Morris (Morris), the Mayor of Browning, made a proposal the DOE "Field Verification Program for Small Wind Turbines" program to install four small turbines to provide supplemental power the waste water treatment facility located immediately to the east of the town. It was agreed that this would be a good community development project and an opportunity to put wind power to good use, as well as an opportunity to test the Bergey Excel/S turbines in the "winds of the Blackfeet".

2. Summary of work this quarter

At the conclusion of the last quarterly report the proposed "next steps" were as follows:

- a. To design and install a data acquisition system which will efficiently monitor the site conditions and the generation system
- b. Work to refine the operation of the Trace inverters
- c. Work with Bergey to repair the furling mechanism on turbine #4

During the quarter currently being reported the DAS has been designed and ordered in cooperative effort with Trudy Forsyth of NREL, Ken Craig of Bergey and a number of equipment vendors.

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Data Acquisition System

The DAS system to be used at the site for performance tracking will be based on the Campbell 23X data logger. The elements of the system are listed below.

<u>Campbell Scientific, Inc.,</u>		
CR23X-4M	Micro logger w/4 Meg	2,650.00
10518	Battery Case & charger	330.00
CERT-CR23X	Calibration Cert.	150.00
PC208W	Software	300.00
SM4M	4M Storage Module	425.00
13690	Mounting brackets	17.00
SC532	9-PIN to RS232 Interface	190.00
ENC 16/18	16" X 18" Enclosure	335.00
CURS100	100 Ohm Shunt module (qty 4)	148.00
FRGT_INS	Freight and Insurance	56.02
<u>Ohio Semitronics</u>		
W059A	Watt/Watt-hour Transducer (qty 4)	470.00
<u>Second Wind</u>		
200P	#200P Mud Vane	135.00
TEMP	Temperature Sensor	256.50
MH-28	Mid-tower boom- 36 inches	72.00
M40C	Maximum #40 calibrated	202.50
8723-D	Sensor Cable, (400 ft)	144.00
MH-16	Dual sensor stub mast	40.50

The above listed system will be installed during the coming quarter.

Site

All site wiring work was complete on the 26th of January. This work consisted of burying the last of the junction boxes and mounting and hardwiring the last three inverters.

3. Technical Issues

Turbines

The turbines have been operating mechanically without incident. The tail of turbine #4 has had to remain tensioned using the winch, to assist it in furling. Ken Craig of Bergey and Wilde believe that the tail base support may be holding the tail boom in an over-center locked position; this causes the tail not to furl in high winds. Bergey has sent thick shims and pads to adjust the center position of the tail. This work will be accomplished during the next quarter.

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Inverters

Trace Technologies sent a team out to retrofit the Gridtek inverters in January. The work that was done seemed to make the inverters less functional than they already were. The inverters have operated since that time without a readable display. Trace will be coming for a second retrofit during the coming quarter

4. Management Issues

DOE approved the additional budget request for \$22,000.00.

5. Action Items and Remarks

The next steps are:

- a. Install the data acquisition system during the coming quarter and data collection of the site wind conditions and the generation system output.
- b. Work with Trace on second retrofit of inverters during the coming quarter
- c. Repair the furling mechanism on turbine #4 by installing thick shims and pads to adjust the center position of the tail.

It is anticipated that these tasks will be accomplished by the time of the April-June 2000 quarterly report.

6. Performance

No performance data are available at this time.

7. Conclusion

The DAS has been designed and ordered. The site wiring work has been finalized. Trace has made preliminary repairs to the inverters and has scheduled more work at the site for the coming quarter.

During the last quarter the turbines have been repeatedly exposed to 80+ MPH winds and have occasionally experienced winds above 100 MPH. No failures have occurred.

Tasks I – VIII, of XII in the proposed statement-of-work (SOW) schedule have been completed, with the exception of the installation of the data acquisition system.