

Seminole Integrated Wind-Water Demonstration System

Progress Report for July-September 2010

Submitted to

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Submitted by

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1.0 INTRODUCTION AND OVERVIEW

1.1 Scope and Content This progress report is submitted jointly to the Texas Department of Rural Affairs (TDRA) and to the Texas Water Development Board (TWDB). TDRA formerly was called the Office of Rural and Community Affairs (ORCA). The report is submitted as part of TDRA contract number 728082 and TWDB contract number 0804830832. In addition to project funding from the TDRA and the TWDB, major participants include the City of Seminole, Texas Tech University and the US Department of Energy through Texas Tech University. The project was initiated in April 2009 and is expected to run for two years.

1.2 Project Description This project addresses the continuing depletion of the Ogallala aquifer, the current principal source of potable groundwater for much of west Texas and northward through Kansas. The approach is to access, lift and purify brackish, much deeper water-bearing formations in the Santa Rosa of the Dockum group. On the basis of preliminary evidence, these formations are believed to occur in Gaines County at depths ranging from 1500 to 2000 ft. There may also be water bearing strata between 600 and 800 ft.

The purification will be accomplished using reverse osmosis (RO). The electrical energy required for the well lift pumps and those of the RO system will be supplied principally by a grid-connected wind turbine. The purified water is to be utilized as part of the municipal water supply of Seminole, Texas, a community with a population of about 7,000. Seminole is located in Gaines County in the southern panhandle of west Texas bordering New Mexico. The results are expected to be applicable to many other arid and semi-arid regions as well.

The project encompasses the following broad tasks:

- 1) The siting, permitting, drilling and characterization of a well drilled into the Santa Rosa, including site acquisition, pre-drilling hydro-geological investigations, permitting, logging, well completion and test;
- 2) The design and construction of required infrastructure, including well completion, site preparation, foundations and civil works to support the wind turbine, RO system and other system elements;
- 3) Installation and commissioning of a wind turbine including the foundation, electrical infrastructure and liaison with the local utility;
- 4) The procurement, installation and commissioning of a commercial reverse osmosis system, including necessary permits, civil structures, electrical work and piping;
- 5) The design, permitting and construction of an evaporation pond or other means for dealing with the concentrate from the RO system;

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- 6) Operation and characterization of the integrated wind-water purification system for a period of 12 months;
- 7) Documentation and reporting of project results and performance.

2.0 SUMMARY OF ACTIVITIES THIS PERIOD

2.1 Overview During the last quarter, collaboration between the City of Seminole, WRC and WiSE researchers, and engineering/management consultants continued.

2.2 FAA Application After previous submittal of an application by Parkhill Smith & Cooper (PSC) for FAA approval of the proposed 50-kW wind turbine site near the Seminole airport, the FAA approved the location for a turbine no taller than 127 ft (top of blade).

2.3 Site Layout and Balance of System Design West Texas Consultants (WTC) continued work on the infrastructure for the demonstration project. In a meeting of all parties on August 5, 2010, Tommy Phillips of the City indicated that concentrate management through discharge to the City's wastewater treatment plant, which will require a sewer line and lift station to move the flow. WTC is working on that aspect, as well as the building and associated amenities at the site.

2.4 Wind Turbine Grant The WRC and WiSE were awarded a grant of \$162,000 from the State Energy Conservation Office (SECO) to be applied toward the purchase of the wind turbine. Final contract details will be completed in the next quarter, and procurement will begin with additional funds from the City's Texas Department of Rural Affairs (TDRA) grant.

2.5 RO System Procurement The WRC team worked with PSC to successfully procure an RO system from Crane Environmental. The cost of the installed system is about \$85,000, with another \$5,000 for spare parts. The system will be delivered to Seminole at a later date. PSC will work with the City and WRC to get Texas Commission for Environmental Quality (TCEQ) approval for the demonstration project in the coming quarter.

2.6 Santa Rosa Well Procurement PSC and the City's grant consultant Kay Howard are working with the City to get out a request for bid for the Santa Rosa well. The paperwork was completed, and the request for bids should go out in the next quarter.

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