

Facility Spotlight – National Wind Technology Center

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June 2017

The National Renewable Energy Laboratory's (NREL) National Wind Technology Center (NWTC) includes some 305 acres of land on a plateau sitting just below the foothills of the Rocky Mountains in Colorado. This acreage includes 7 large buildings, numerous outbuildings, and four behemoth multi-megawatt utility-class wind turbines. This research facility certainly presents some unique operations and maintenance challenges. I had an opportunity to speak with Steve Nixon, PE who serves as the Facility Manager for NREL at the NWTC.

The NWTC facility is more than capable of field and controlled environment testing. The research programs include: individual components; complete systems; and grid distribution associated with wind power production. While field testing occurs at many locations, the NWTC has been strategically placed in a region that experiences a wind season from November – April during which the area experiences great variation in wind (perfect for turbine testing) and occasional wind speeds exceeding 100 mph (challenging to facility integrity).

Controlled environment testing includes: wind turbine blade testing; generator cycle testing; and data analysis. Wind turbine blade testing involves schemes to stress materials through lifecycle. Generator cycle testing can be accommodated through the use of the 5 Megawatt Dynamometer. This piece of equipment allows for variable frequency load testing to understand the response characteristics of a given generator. The largest Dynamometer includes an 8,000 horsepower capacity which allows for flexibility in testing and capacity for even the largest of turbines.

Some of the unique challenges faced at the NWTC include: remote location; unique environment; complex systems; and maintenance challenges. The NWTC is located about 20 miles north of the NREL headquarters which places this facility in wide open spaces (as shown in the photo above courtesy of NREL). The location is remote to such an extent that water must be trucked in to support the operations of the facility. The location also presents a challenge in terms of data transfer to the NREL headquarters which houses a U.S. Department of Energy



supercomputer. This computer allows for calculations and data collection at the nano-second level. The data collection at each of the wind turbines must then be connected to the network to NREL.

The unique environmental conditions support the research being conducted at this facility but also poses challenges to maintaining the facility. High winds create maintenance issues with buildings on the site requiring protection of sensitive analytical equipment.

The keystone equipment associated with this research facility requires maintenance from time to time. This maintenance requires the use of specialty equipment, namely cranes, to allow replacement of mammoth parts at dizzying heights.

About the Facility Manager

Steve Nixon coordinates facilities operations activities and initiates and supports projects that maintain and upgrade the facilities supporting the world-class research activities. Prior to the NWTC, Steve was the Building Area Engineer for the Field Test Laboratory Building at NREL. Steve has an extensive background in facilities engineering, facilities management, and implementing building energy efficiency measures. Steve is a registered Professional Engineer, a Certified Energy Manager, and a Project Management Professional. Prior to joining NREL, Steve was the Facilities Operations Manager at the IBM site northeast of Boulder, Colorado.