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Glacier Ridge Wind Farm Application for Certificate of Site Compatibility, Case No. PU-16-539: Late-Filed Exhibit No. 28 (Revised)

The Glacier Ridge Wind Farm will include a Supervisory Control and Data Acquisition (SCADA) system. The overall system will be managed by two integrated units. These systems are comprised of the substation remote terminal unit (RTU) for substation data and the wind turbine SCADA system for turbine and MET tower data. The overall wind farm SCADA system will permit automatic, independent operation as well as remote supervision to allow continuous, simultaneous control of all wind turbines in a manner consistent with industry standards and acceptable to Independent System Operators and transmission owning utilities.

For wind farm monitoring, there are essentially three layers: on-site, RES Americas and RES Group. Outside of normal business hours, one of the on-Site employees is designated as “on-call” on a rotating basis. On-call employees are responsible for responding to any issues at the wind project on nights, weekends, and holidays. As a secondary redundancy, the RES Americas’ operational team in Broomfield, Colorado will respond to any issues if it elevates past the on-site personnel. Lastly, the RES Group Operating Center in Glasgow, Scotland is also notified. If the Broomfield team is unavailable or needs backup, then the Operating Center in Glasgow is able to deploy resources remotely. The Operating Center in Glasgow will be monitoring the project 24 hours per day, 7 days per week by a staff that is rigorously trained in identifying and responding to any wind farm operational issues. The turbine manufacturer will also continuously monitor the turbines. This, along with the multiple RES monitoring systems in place, results in multiple layers of redundancies in monitoring.

The SCADA system offers access to the following data: wind turbine production, availability, meteorological, communications, and alarms. Performance data and parameters for each wind turbine (generator speed, wind speed, power output, etc.) can also be viewed, and turbine status can be changed. In addition to the continuous, live monitoring, the SCADA system will include data storage capability to aid in diagnostics and troubleshooting.

The primary functions of the SCADA system are to:

- Monitor wind farm status
- Allow for autonomous turbine operation
- Alert operations personnel to wind farm conditions requiring resolution
- Provide a user/operator interface for controlling and monitoring wind turbines
- Collect meteorological performance data from turbines
- Monitor field communications
- Provide diagnostic capabilities of wind turbine performance for operators and maintenance personnel
- Provide information archive capabilities
- Provide information reporting on a regular basis

The wind farm facility will be controlled locally by an automated power plant controller. The wind turbine SCADA system will be able to access the power plant controller for remote monitoring and control. The relevant data from the SCADA systems will be available for the appropriate parties such as the ISO, interconnect entity, market participant, and wind turbine supplier. Remote control will be allowed through the SCADA system as required by the Project agreements; however most of the maintenance, service and troubleshooting will be initiated at the site level with the on-site operations and maintenance staff. Remote communication to the site will be managed by the local telecom provider as well as major carriers. Cyber security for the wind farm will be managed using approved network equipment. Access to the site will be restricted through these devices to authorized personnel and predefined servers.