High Bridge Wind Project Preliminary Operations and Maintenance Plan

High Bridge Wind, LLC

2019

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TABLE OF CONTENTS

General Information 1

O&M Methodology and Process 1

Typical O&M Responsibilities and Maintenance Schedules 2

- Turbines 2
- Balance of Plant Components and General O&M Responsibilities 3

Training and Notifications 4

General Information

An Operations and Maintenance Plan is a project-specific plan that is typically created based on the specific turbine selected, the turbine manufacturer, and other project-specific considerations. This Preliminary Operations and Maintenance Plan ("O&M Plan") is intended to be the foundation of the Final O&M Plan that will be implemented at the High Bridge Wind Project (the "Project") once it becomes operational and reflects typical O&M maintenance requirements based on the experience of High Bridge Wind, LLC ("High Bridge Wind") and its affiliates.

High Bridge Wind-affiliated workers at the Project ("Project Operators") will be responsible for the Plan's implementation. The objective of the O&M Plan is to optimize the Project's operational capacity and availability through best in class maintenance guidelines and inspections that are designed to pro-actively detect any significant safety or maintenance issues.

O&M Methodology and Process

High Bridge Wind has an operational methodology and process that forms the overarching goals and objectives of its operations that enhances personnel safety, environmental stewardship, community relations, reliability, and efficacy for its wind turbine operations. This methodology and process includes:

1. Best in Class
   - Priority One: Personal Safety and Environmental Compliance
   - Initial and reoccurring safety and technical training for site personnel
   - Community and environment stewardship
   - High fleet availability that translates into strong production
   - Technical library that is comprehensive, accurate, and up–to-date
   - Maintaining Wind Turbine Generators (WTGs) to the highest industry standards either using internal resources or long-term service operations and maintenance agreements
2. Taking Ownership
   - Holistic approach to project operations that entails working closely with stakeholders including turbine maintenance providers, Balance of Plant (BOP) providers, utilities, State agencies and local communities
   - Technical oversight of turbine manufacturers' teams on a day-to-day basis
   - Contract compliance
   - Maintenance of critical BOP infrastructure
   - Operational, Quality Assurance/Quality Control (QA/QC), and Safety Audits
3. Asset Optimization
   - Real-time performance monitoring via control center
   - Minimizing unexpected equipment failures and mean time between failures
   - Internal supervisory control and data acquisition (SCADA) system that converts turbine manufacturers' SCADAs to a common platform
   - Key Performance Indicator (KPI) monitoring and management

4. Revenues and Performance Enhancement
   - Standardization of performance metrics
   - Validation of actual production levels regardless of under or over-production
   - Continual validation of wind energy models to real asset performance
   - Site manager KPIs
5. Equipment Protection and Monitoring
   - Lightning detecting program to reduce major damage
   - Equipment performance monitoring – thousands of data points monitored
   - Vibration monitoring
   - Transformer testing
   - Protective relay testing
   - Battery testing
   - Fire Suppression Systems installed where required

Typical O&M Responsibilities and Maintenance Schedules

Wind turbine generators (WTGs) require periodic preventive maintenance as well as corrective maintenance in the event a material deficiency is identified within an individual generator that requires repair. In addition, the electric collection system that ties the generators together, as well as the substation that steps up voltage for delivery to the bulk electric system, require periodic maintenance and may require corrective maintenance.

Turbines

Each individual Wind Turbine Generator (WTG) typically requires preventive maintenance semi-annually. One of these maintenance outages is typically designated as "minor scheduled maintenance" and is completed in one working day per unit. The other is "major scheduled maintenance" and usually takes one to two working days to complete per unit. For a typical wind energy project, each semi-annual maintenance cycle is scheduled to be performed outside of high-wind season and an adequate number of skilled technicians will work on individual units until the entire project maintenance cycle is completed. For a project the size of the High Bridge Wind Project, each maintenance cycle may take four to eight weeks to complete. On any given day during the maintenance cycle, one or more WTGs may be taken out of service for scheduled High Bridge Wind O&M responsibilities and contracting typically include:

1. Ensuring WTG O&M service providers are fulfilling contractual obligations, including (but not limited to):

   i. Adhering to availability guarantees, maintenance schedule, manpower requirements, turbine repairs, safety, etc. (this list is not all inclusive); and

   ii. Providing all-inclusive service for the pre-agreed period of time, which includes scheduled and unscheduled repairs, and all parts, labor, and ancillary equipment or tooling necessary to perform the work.

2. Performing two scheduled O&M maintenance activities each year at approximately 6-month intervals;[1] and

3. Monitoring security, anti-collision lighting, and safety lighting to ensure appropriate function.

Electric Transmission, Gathering and Interconnect Lines

Line inspections will be performed once per year throughout the life of the project to identify whether any issues exist with the line, and to determine whether vegetation needs to be cleared or trimmed with in ROW. Trees which could fall and hit line conductors and that pose a danger to the line will be identified for removal. Once the inspection is complete, the Operations and Maintenance (O&M) group will remove or trim vegetation, as well as any other issues discovered. Prior to the annual inspection, High Bridge Wind, LLC notify affected property owners advising them that personnel will be on their property for the inspection of the collection line. Additionally, public notice will be posted in the local newspapers advising the community of the inspection period if work is to be conducted in the public ROW.

Balance of Plant Components and General O&M Responsibilities

Collection system and substation preventive maintenance activities are typically performed once a year, outside of high-wind season. Annual collection and substation maintenance usually requires the entire project to be shut down. Minor annual maintenance typically takes one to two days, while more extensive maintenance (usually performed at five-year intervals) typically takes three to four days.

High Bridge Wind BOP and general O&M responsibilities typically include:

1. Overseeing operation, repair and maintenance of BOP components including, but not limited to, the collection substation, the electric collection system, interconnect transmission lines, roads, grounds, security lighting, foundations, transformers, etc.;

2. Furnishing (or causing to be furnished) all labor and performing (or causing to be performed) all maintenance, testing, and repair activities, sufficient to maintain the BOP in good working condition, consistent with prudent business practices and any applicable operation and maintenance manual;

3. Maintaining all materials, including spare parts inventory, required to maintain the BOP in the normal course of business;

4. Preparing purchase orders to procure parts, materials and supplies necessary for the operation, maintenance and repair of the components;

5. Scheduling power outages and maintenance shutdowns in coordination with the turbine schedule provider(s), power purchaser(s) and transmission provider(s) to minimize revenue loss and interference with project operations;

[1] Biannual maintenance activities include replacing consumables, torque checks, equipment testing, routine inspections, and housekeeping.

6. Supervising, monitoring and reporting on the operation and maintenance of interconnection facilities, in accordance with the Interconnection Agreement;

7. Responding to trips as reported by the auto-dial monitoring system and providing trip reports of all faults, defects and breakdowns occurring in respect of such electrical system;

8. Calibrating power revenue meters;

9. Producing monthly operating reports including performance, safety and environmental matters, etc.;

10. Coordinating and pursuing all warranty and other claims against suppliers of materials and equipment to the BOP or turbines, including any claims against any insurance carrier for payment of claims, liabilities, or losses in connection with the BOP and turbines or its operation covered by such insurance, and including any litigation associated with any such claims;

11. Overseeing North American Electric Reliability Corporation (NERC) compliance;

12. Operating and maintaining the Project in compliance with all governmental requirements, loan and material project documents;

13. Producing and providing Project data and information requested by governmental authorities; and

Training and Notifications

New High Bridge Wind-affiliated workers at the Project with O&M responsibilities will be provided with a copy of the Final O&M Plan and required to review it and comply with it in combination with their review of other High Bridge Wind policies and plans such as the Emergency Action Plan and Health and Safety Plan. A copy of the O&M Plan and other key plans also will be available at the O&M building.

Beyond new hire orientation, the Project Operator or any High Bridge Wind-affiliated worker's direct supervisor, will provide training in accordance with this O&M Plan as needed to support the worker's specific job functions.

If maintenance activities have the potential to result in temporary impacts that may affect the local community (e.g., temporary transportation impacts), notification of such maintenance activities will be provided in accordance with the construction notification process outlined in the Preliminary Quality Assurance and Quality Control Plan and the Complaint Resolution Plan. If work within a public right-of-way is necessary to conduct maintenance in accordance with the O&M Plan, notification and any necessary work permit(s) will be discussed and obtained from the appropriate agencies prior to starting the work.