Appendix L

Operations and Maintenance Plan

TWO RIVERS WIND PROJECT
OPERATIONS AND MAINTENANCE PLAN

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1.0 Introduction

Proper maintenance of the Two Rivers Wind Project (Project) components is integral to achieving maximum efficiency. Properly trained and equipped technicians will be employed to perform the necessary project maintenance. This work force will include wind turbine generator (WTG) technicians that will be trained and certified high voltage technicians (for substation and electrical collection system). Two Rivers Wind LLC (Two Rivers Wind) technicians will perform almost all of the scheduled and unscheduled maintenance activities on site. Two Rivers Wind may engage external specialized technicians or contractors for some maintenance activities.

As compared to many other forms of electrical energy generation, wind energy facilities do not have high operation staffing requirements. The applicant will hire onsite staff to manage the Two Rivers Wind Project Facility prior to it producing commercially available energy. An operations and maintenance building is anticipated to be located on site at the facility and is expected to house offices, kitchenette, washrooms, a workshop and spare parts inventory and vehicle storage. The Two Rivers Wind Facility will be monitored with a 24/7 remote monitoring center, located at the applicants Head Office in Calgary, Alberta. Operators will watch for alarms or issues with the project's components, manage any outages, and coordinate with on-site Operations & Maintenance technicians, utilities and regulators.

Operations and Maintenance (O&M) procedures will be further established and detailed in this Plan prior to the Project's commercial operation date and will define specific routine maintenance and inspection activities in accordance with the WTG manufacturer's recommendations. The final plan will address all aspects of the design including:

- Scheduled WTG Maintenance
- Unscheduled WTG Maintenance
- Road Maintenance
- Collection System
- Substations
- Other Facilities

2.0 Operations Staff

As the construction of each phase of the project is completed, operations and maintenance personnel will take over the responsibility. Based on operations workforce estimates from other recent wind energy projects in Wyoming, Two Rivers Wind estimates around 8 permanent jobs during operations. It is anticipated that Two Rivers Wind will look first to the local labor pool to fill these positions. The various job functions during operations include: management and administration, operations, WTG maintenance, balance of plant maintenance. It may also be necessary to employ additional personnel temporarily in response to some maintenance issues. The staffing needs and length of deployment will be determined at the time of the issue occurrence.

3.0 County Operations and Maintenance Requirements

Two Rivers Wind will comply with applicable operation and routine maintenance requirements pursuant to the *Carbon County Zoning Resolution of 2015*(Amended June 2020); Chapter 5, §5.9 – Wind Energy Facilities-Overlay District Regulations. Such applicable county regulations address some or all of the following activities:

- Repainting and upkeep of equipment and structures, and up-keeping the grounds or landscaping of the Project site.
- Control and eradication of noxious weeds and invasive weed species within areas disturbed by Project construction.
- Handling, storage, or disposal of all solid wastes and hazardous materials related to the construction, operation, and maintenance of the Project.
- Submittal of a written notice of all inoperable WECS due to the County Planning Department on the dates specified by each county (greater than 6 months for Carbon County).

4.0 Wind Turbine Generators

Using both internal and external sensors that detect the conditions of the wind, power grid and the WTG itself, WTGs operate autonomously. Operation of WTGs and power generation will occur automatically if the electric grid is available to accept power generation and there is sufficient wind. If an issue is detected by the WTG's sensors, the WTG will shut down automatically and send a message via the supervisory control and data acquisition (SCADA) system to notify the on-site technicians and remote operations center of any issues with the WTG or grid and the nature of the issues. The electrical collection and transmission protection systems also respond automatically to the requirements of the electrical grid.

To maximize performance and detect potential malfunctions, annual OEM prescribed maintenance will be performed on the WTGs. O&M procedures will be further established and detailed in this Plan prior to the Project's commercial operation date, and will define specific routine maintenance and inspection activities in accordance with the WTG manufacturer's recommendations and balance of plant requirements.

Generally, scheduled routine maintenance would be conducted on each WTG every six months. Routine maintenance performed by O&M personnel will include scheduled replacement of lubricating fluids, filters, greases, and other consumables, inspection of all turbine safety equipment and systems, testing all critical operation components, sampling of all oils and greases annually, visual inspections on all major components, periodic turbine and foundation hardware torqueing and tensioning, foundations inspections and blade inspections. Balance of plant inspections and maintenance will be performed on collector circuits and equipment, substation and control building, operations building, all site civil requirements, vehicle maintenance, tooling calibrations including general monthly inspections, Site staff will also oversee all electrical substation annual maintenance. Repairs to the Project's facilities will be conducted by the O&M staff, with the assistance of contracted personnel as needed.

Each WTG will be continually monitored by the (SCADA) system, which reports all major aspects of operation through fiber optic communication lines linking the WTGs to the O&M building and

remote operations monitoring center. Alarm systems will be designed to trigger in the event operational characteristics fall outside predefined limits. Each WTG has an automatic primary and back up redundancy system to shut down the rotor in the event of malfunction or excessive wind speeds. Any problems that arise are immediately reported to onsite O&M personnel for correction.

5.0 Transformers and Substations

Step-up transformers, substations, and pad-mounted transformers would be maintained as part of the normal O&M activities in accordance with North American Electric Reliability Corporation standards.

In general, transformers located at the base of each WTG are inspected visually during the turbine planned inspections and via infrared scans every six months. The oil in WTG transformers is sampled once per year. Substation transformers receive visual inspections and infrared scans at least monthly as part of O&M staff duties and oil sampling annually during the substation planned maintenance. Based on sample results, transformers may require complete filtering. Filtering typically occurs every ten years.

Substation safety equipment is inspected every three to six months; batteries, chargers, and building heating, ventilation, and air conditioning (HVAC) equipment are checked every six months; disconnect switches have their operation and alignment inspected annually. The operation of interrupting equipment (e.g., breakers, re-closers) is inspected annually and their timing and calibration is assessed every five years. Protective relays are generally tested and calibrated every five years unless more frequent assessments are required by the interconnecting utility. In the event that a transformer or other device fails, replacement of the equipment will be accomplished as quickly as possible from predetermined suppliers to reduce down time.

6.0 Power Collection Lines

Underground collection lines are relatively maintenance-free but will be maintained as needed. Depending on the method of installation, maintenance of the buried collector lines is typically limited to an approximate five-foot to ten-foot wide linear corridor, with protective material placed both above and below the electrical and fiber optic lines. Upon back-filling, the surface is reclaimed and revegetated. All electrical terminations are to be located above ground in appropriate weather-tight, secure electrical enclosures to facilitate ease of maintenance.

7.0 Overhead Transmission/Distribution Line

Transmission lines will be inspected both visually and by Infrared camera annually plus after any strong storm events. Such inspections would occur from the ground and using nearby project roads and access points. Two Rivers Wind will also perform any necessary vegetation management around overhead collection system lines to remove tree branches within about 50 feet of the structures or conductor.

8.0 Access Roads

The Project roads will receive continuous maintenance as needed. Road surfaces will be bladed and maintained to allow for safe access to all Project areas and to minimize dust generation. Periodic inspection, cleaning, and maintenance will be done for all drainages and erosion control measures.

9.0 Other Facilities

The met towers on site will receive annual and as-needed maintenance to replace sensors, check structure conditions, and check guy wire tension (if applicable). As with the wind turbines, aviation warning lights will be mounted to the met towers.