Appendix H
Decommissioning Plan

Plum Creek Wind Farm, LLC
Docket No. IP6997 / WS-18-700
November 2019

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Westwood

DECOMMISSIONING PLAN

Plum Creek Wind Farm

Cottonwood, Murray, and Redwood Counties, Minnesota

November 8, 2019

Prepared For:

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1.0 INTRODUCTION / PURPOSE

The Plum Creek Wind Project (the "Facility" or the "Project") is a wind-power-generation project proposed by Geronimo Energy, A National Grid Company (the "Applicant"[1]), in Murray, Cottonwood, and Redwood Counties (the "Counties"), Minnesota. The Facility includes the construction of permanent facilities of up to 110 wind turbine generators, access roads, met towers, collection substations, an overhead transmission line, underground collection lines, and an operation and maintenance (O&M) facility. The purpose of this Decommissioning Plan (and its succeeding and revised Decommissioning Plans, the "Plans") is to describe the means and methods that can be used to remove project facilities, and reclaim, restore, and return the land altered during the construction and operation of the wind project to its predevelopment condition to the extent feasible, in accordance with the requirements of Minn. R. 7854.0500, subp. 13. The useful life of commercial-size turbines is generally considered to be 30 years.

2.0 LEASE REQUIREMENTS

The Facility is sited on land on which Plum Creek has obtained lease rights for installing Facility infrastructure. The leases Plum Creek has with the applicable landowners require removal of all permanent facilities to a depth of four feet or more below grade within twelve months of commencing the activities within this Plan.

3.0 ENGINEERING TECHNIQUES

Decommissioning includes several phases and activities such as:

- Preparation of crane paths to accommodate movement of large industrial cranes to and from each turbine location;
- Preparation of crane pads for removal of turbine components;
- Removal of aboveground components (turbines, transformers, met towers, substation(s), and possibly the operation and maintenance facility);
- Removal or abandonment in place of underground collection system and fiber optic cables;
- Removal of access roads (unless the landowners request the roads to remain) and crane paths;
- Reclamation, re-grading, and restoration of disturbed areas including top soil reapplication and decompaction of soils;
- Application of necessary sediment and erosion controls during and following decommissioning; and
- Repair of public roads and culverts to pre-decommissioning conditions

During decommissioning, participating landowners will be consulted to determine the scope and extent of reclamation work to be completed. Some Facility infrastructure such as the access roads may be left in place at the landowners' request.

All dismantling, removal, recycling, and disposal of materials generated during decommissioning will comply with rules, regulations, and prevailing laws at the time decommissioning is initiated, and will use approved local or regional disposal or recycling sites as available. Recyclable materials will be recycled to the furthest extent practicable. Non-recyclable materials will be disposed of in accordance with state and federal law.

[1] "Applicant" refers to any operator, subsequent owner, or transferee of the Facility.

4.0 DECOMMISSIONING

Public Road Modifications and Removal

Temporary turning-radius modifications are not expected to be needed for decommissioning as turbines that have reached the end of useful life have scrap value. Transportation of the turbine components off-site will be accomplished using conventional over-the-road trucks. Following removal of the decommissioned turbine components, any turning-radius modifications required for decommissioning will be removed and any disturbed areas will be restored to preconstruction conditions using thorough decompaction techniques and re-application of topsoil. After all hauling activities are complete, the public roads will be restored to pre-decommissioning conditions, or a payment for road-life consumed will be made.

Crane Path Preparation and Removal

To facilitate the movement of the large industrial cranes used to disassemble the turbines, crane paths will be required between the turbine sites. A crane-path network will be designed for the construction of the wind project. The same corridors are likely to be used for decommissioning. Some turbine access roads may be temporarily widened from their operational width by compacting in place soils to create crane shoulders on roads that were configured to accommodate crane travel during the construction of the Facility. Preparations include compaction of native soils, construction of temporary road crossings, and construction of crane mat crossings, low water crossings, and/or temporary culverts to cross streams. Following disassembly of the wind turbines, the temporary crossings will be removed and the crossing areas will be restored to pre-decommissioning conditions. The soil on the crane paths will be decompacted and restored to a tillable condition.

Crane Pad Preparation, Removal, and Restoration

A crane pad will be prepared at each turbine location to be used during dismantling of the turbines. Temporary alteration of turbine pads may be necessary to facilitate crane movements during decommissioning of above-ground turbine components. If such alteration is necessary, topsoil from the additional disturbed areas will be stripped and isolated, for re-application after turbines have been dismantled and crane pads removed. After removal of all turbine components, the crane-pad area will be removed by excavating any granular materials placed during the initial construction of the crane-pad. Disturbed areas will be restored to preconstruction condition by re-grading the area, reapplying topsoil, and de-compacting the subsoil and topsoil. See section 3.1 for additional information on reclamation and restoration.

Wind Turbine Removal

Each turbine consists of steel tower segments, nacelle, rotor and hub assembly, and three blades. The turbine disassembly will be accomplished using large industrial cranes. If it is not cost effective to resell the turbines, the components will be processed on site into sizes which conform to scrap metal recycling requirements. The materials can then be sold for scrap material value and recycled. The tower sections, in particular, represent a substantial amount of high-quality steel materials. The processed scrap materials will be loaded on tractor-trailers and removed from the site to a prearranged receiving location, or directly to a recycling or disposal facility. If the components are resold, the individual components will be loaded onto turbine transport vehicles similar to the vehicles originally used to deliver the turbine parts.

Turbine Foundation Removal and Restoration

Turbine foundations are fabricated from concrete and rebar. Topsoil and aggregate from the area surrounding the foundations will be stripped, segregated, and stockpiled near the work site for to reapplication during restoration. The turbine foundation will be exposed using backhoes, bulldozers, or other earth moving equipment. The pedestal (upper part of the turbine foundation) will be removed down to four feet below grade. Demolition of mass concrete is generally accomplished using hydraulic hammers mounted on a backhoe or similar equipment (hoe ram), or by the use of expansive chemicals placed in holes drilled in the concrete. Concrete and rebar will be broken into manageable-sized pieces and loaded into dump trucks to be hauled off site for recycling as aggregate or disposal.

Following the removal of turbines and foundation pedestals down to four feet below grade, the resulting voids will be backfilled with clean native subsoils and compacted to a density similar to surrounding subsoils. Topsoil will then be reapplied to the site and graded to blend with the surrounding grade and preserve pre-existing drainage patterns. The soil and topsoil will be de-compacted and restored to a tillable pre-construction condition, or re-seeded to promote re-vegetation. If necessary, the site will be temporarily or permanently re-vegetated, depending upon location, time of year, and anticipated post-decommissioning land use. Any drain tile lines damaged during removal and restoration of turbine foundation areas will be repaired to ensure drainage is maintained.

Access Road/Met Tower Road Removal and Restoration

Access roads will be removed or left in place based on the individual landowner's request. Removal of access roads will entail removal of the road base aggregate and any other materials used for constructing the roads. During removal, the topsoil adjacent to both sides of the roads will be stripped and stockpiled in a windrow paralleling the road. The road base materials will then be removed by bulldozers and wheeled loaders, or backhoes, and hauled off site in dump trucks to be recycled or disposed at an off-site facility. On-site processing may allow much of the aggregate to be re-used to improve public roads. If geotextile fabric was utilized under the aggregate base, it will be removed and disposed of in a landfill off-site. The access-road removal will proceed from the turbine area to the public roads to limit tracking and provide stable access during removal. Following removal, topsoil will be reapplied and graded to blend with surrounding contours to promote pre-construction drainage patterns. Topsoil to cover the access roads, turbine rings, and met tower rings will be acquired from the areas where it was stockpiled (or wasted) during the original construction. Since topsoil stayed with each landowner during construction of the wind farm there will be adequate topsoil to restore each area to its pre-construction condition. The soil and topsoil will then be decompacted to a minimum depth of 18 inches and restored to pre-construction tillable conditions or re-vegetated.

Underground Electrical Collection Lines

The electrical cables and fiber optic conduits will be installed at a depth of a minimum of 48 inches (by plan), and contain no material known to be harmful to the environment. The only exception is cables entering ground-mounted transformers and junction boxes. Accordingly, the majority of underground cables will be left in place, non-functional. Following cable, junction box, and route marker removals, disturbed areas will be restored by the restoration methods described above for access roads, including the reapplication of topsoil to match the surrounding grade and preserve or promote pre-existing drainage patterns.

Overhead Electrical Transmission Lines

The overhead electrical lines associated with the Facility connect the voltage step-up substation(s), located within project footprint, to the interconnection switching station north of the project. All poles, conductors, switches, and lines associated with this interconnection link will be removed and hauled off-site to a recycling facility or disposal site. Underground infrastructure such as pole foundations will be removed down to four feet below grade. Pole foundation holes will be filled with a suitable clean compactable material. Topsoil will be applied and the areas and re-vegetated to pre-construction conditions. The interconnection substation will be owned by the transmission line owner, so the scope of interconnection facility decommissioning is not included with this plan.

Substation

All steel framing, conductors, switch gear, transformers, security fence, and other components of the step-up facility(ies) will be disassembled and recycled or reused off-site. The rock base will be removed using bulldozers and wheeled loaders or backhoes. The material will be hauled from the site using dump trucks to be recycled or disposed at an off-site facility. Permanent storm water treatment facilities, such as retention basins, will be removed. Topsoil will be reapplied to blend with the surrounding grade to promote pre-construction drainage patterns. Soil and topsoil will be decompacted and the site will be restored to the pre-construction tillable conditions or re-vegetated.

Operations and Maintenance Facility

Plum Creek may rent an existing building or construct a new building for its O&M facility. Hydraulic oil and lubricants will be stored in the building during operation of the wind project. The project will have a Spill Prevention Control and Countermeasure plan in place during operations that will require immediate clean-up of any spilled hazardous materials, so the cleanup of any hazardous materials is an operating cost and not a decommissioning cost.

The O&M facility, if constructed, will likely be a sturdy, general-purpose, steel building. Buildings have a longer useful life than wind turbines so the building will not likely be at the end of its useful life when the Facility is decommissioned. Decommissioning will consist either of the sale of the building, the donation of the facility, or the demolition and removal of the structure, foundation, and rock base parking lot and associated storm-water treatment facilities.

If demolition is undertaken, all associated materials, (including concrete and rock) will be removed from the site using backhoes and bulldozers, and hauled off-site in dump trucks. All materials which can be recycled will be brought to an approved facility. The remaining materials will be disposed of at an approved landfill. Topsoil will be reapplied to the site and graded to blend with the surrounding grade to promote existing drainage patterns. The topsoil will be de-compacted and restored to pre-construction tillable conditions or re-vegetated.

4.1 RECLAMATION

In addition to the reclamation activities described above for each decommissioning activity, all unexcavated areas compacted by equipment and activity during the decommissioning will be de-compacted. All materials and debris associated with the Facility decommissioning will be removed and properly recycled or disposed of at off-site facilities.

As necessary, the topsoil will be stripped and isolated prior to removal of structures and facilities for reapplication to promote future land use activities. The topsoil will be reapplied following backfill, as necessary, and graded to blend with adjacent contours to maintain pre-construction drainage patterns. The topsoil reapplied will be free from rocks larger than four inches and will

not contain debris from decommissioning. If the area is not going to be used for crops, the topsoil will then be re-vegetated using seed mixes approved by the local Farm Service Agency, Soil and Water Conservation District, or Natural Resource Conservation Service. Temporary erosion protection such as mulch, hydromulch, or erosion-control blankets will be applied in accordance with the requirements of the project Storm Water Pollution Prevention Plan (SWPPP).

5.0 DECOMMISSIONING COSTS AND FINANCIAL ASSURANCE

This cost estimate was prepared: (1) in current dollars; (2) with the salvage value of equipment or materials calculated separately. The estimate includes: (i) an analysis of the physical activities necessary to implement the approved reclamation plan, with physical construction and demolition costs based on applicable Minnesota Department of Transportation unit bid prices and RS Means material and labor cost indices; (ii) the level of effort or number of crews required to perform each of the activities; and (iii) an amount to cover contingencies above the calculated cost. The Estimate is shown on a total-cost and on a per-turbine basis.

The Project decommissioning cost will be reassessed every five years and updated if necessary. In year 10 following the Project's commercial operation date, Plum Creek will establish a financial surety in the form of escrow, bond, letter of credit, etc. to ensure that decommissioning funds are available at the time of decommissioning.

The total cost of the decommissioning of the Plum Creek Wind Project is approximately $19,228,133 ($174,801 per turbine), including a ten percent (10%) contingency on the demolition costs and engineering/administration costs and crop lop loss. Salvage/scrap value of the turbines, transformers, and other materials is approximately $10,373,824, or $94,307 per turbine. Including resale and salvage values the net cost is plus of revenues over costs of approximately $8,854,309, or $80,494 per turbine.

Table 1: Cost Estimate

Plum Creek Wind Project - DECOMMISSIONING COST ESTIMATE	
General Conditions (Field Staff Cost)	$802,000
Operation & Maintenance Building (Demolition and Removal)	$0
Substations (Dismantle and Removal)	$107,112
Met Tower (Dismantle and Removal)	$26,626
Access Road Removal (Remove Agg./Regrade)	$623,382
Crane Path Restoration (Water Crossing Removals and Decompaction)	$40,480
Crane Mobilization (2, Mobilization and Demobilization)	$400,000
Turbine Tower Dismantle and Salvage Prep (Dismantle/Salvaging)	$5,634,247
Transformer Removal	$240,830
Blade Disposal (Dismantle/Disposal)	$1,005,708
Turbine Foundation Removal (48 inches Demolition/Removal)	$1,513,398
Electrical Collection/Transmission Line Removal	$1,396,582
Erosion and Sediment Control BMP's	$119,022
Site Restoration (Final Surfacing following Removals)	$1,029,341
Public Road Restoration	$3,750,000
Subtotal	$16,688,727
Contingency (10%)	$1,670,794
Total Estimated Decommissioning Cost (not including salvaged value)	$18,359,521
Total Estimated Decommissioning Cost per Turbine (not including salvage value)	$166,905
County Administration Costs (2.5%)	$459,000
Crop Loss	$390,400
Total Cost	$19,228,133
Total Salvage Value for Project	$10,373,824
Resale and Salvage Value per Turbine (110 Turbines)	$94,307
Total Estimated Decommissioning Cost (including salvaged value)	$8,854,309
Total Net Decommissioning Cost Per Turbine Minus Salvage Value	$80,494