Appendix X – Decommissioning Plan

BURNS McDONNELL

South Deuel Wind Decommissioning Plan

DEUEL HARVEST WIND ENERGY SOUTH LLC

South Deuel Wind
6/27/2024

South Deuel Wind Decommissioning Plan

prepared for

DEUEL HARVEST WIND ENERGY SOUTH LLC
South Deuel Wind
Deuel County, South Dakota

6/27/2024

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
ADLS	Aircraft Detection Lighting System
BMPs	Best management practices
kV	kilovolt
MET	Meteorological
MW	Megawatt
O&M	Operations and maintenance
Plan	Decommissioning Plan
Project	South Deuel Wind Project
South Deuel Wind	Deuel Harvest Wind Energy South LLC

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Burns & McDonnell was retained by Deuel Harvest Wind Energy South LLC (South Deuel Wind) to prepare a Decommissioning Plan (Plan) for the up to 260 megawatt (MW) South Deuel Wind Project (Project) located in Deuel County, South Dakota.[1] The purpose of the Plan is to describe the recommended means and methods that can be used to decommission the Project at the end of its useful life and restore the site to its predevelopment condition to the extent practicable. The Plan also contains a detailed cost evaluation and estimate to decommission the Project.

1.2 Methodology

During decommissioning, Project facilities will be removed to a depth of 42 inches below grade, in accordance with the Deuel County Zoning Ordinance B2022-01 requirements. Costs incurred during decommissioning include the removal of Project facilities as well as restoration of the Project site. Above-grade Project facilities comprised of steel, aluminum, and copper are assumed to have significant scrap value to a salvage contractor, offsetting a portion of the cost associated with decommissioning. No resale of the Project facilities for reuse is considered in the decommissioning cost estimate.

1.3 Results

The total cost to decommission the Project at the end of its useful life, based on the assumptions noted herein is estimated to be approximately $1,343,250 ($23,600 per turbine). It is expressly noted that while costs are presented both in total and per turbine, a change in the quantity of turbines may not cause the total decommissioning cost to increase or decrease linearly by the per turbine cost due to non-scalable differences in balance-of-plant costs and other similar factors.

[1] Burns & McDonnell also prepared a decommissioning plan for the Deuel Harvest North Wind Farm dated November 29, 2018, available at https://puc.sd.gov/commission/dockets/electric/2018/el18-053/appendixu.pdf

2.0 INTRODUCTION

2.1 Study Overview

Burns & McDonnell was retained by South Deuel Wind, to prepare a Plan for the Project. The purpose of the Plan is to describe the recommended means and methods that can be used to decommission the Project at the end of its useful life and restore the site to its predevelopment condition to the extent practicable. The Plan also contains a detailed cost evaluation and estimate to decommission the Project.

2.2 Decommissioning Elements

The following Project facilities are included in the decommissioning cost estimate:

- Wind turbines including foundations, towers, nacelles, hubs, rotor blades, transformers, and associated above-ground electrical equipment.
- Electrical Collection and Supervisory Control and Data Acquisition (SCADA) Systems including cabling and junction boxes.
- Collector Substation including foundation, crushed rock, above-ground electrical equipment, and fencing.
- Approximately 6-mile long Generator Transmission Tie Line (Gen-Tie Line) including foundations, transmission structures, and above-ground conductors.
- Operations and maintenance (O&M) Facility including O&M building, parking lot, storage area, and associated facilities.
- Access roads.
- Meteorological (MET) towers including three foundations and tower structures.
- Aircraft Detection Lighting System (ADLS) towers including two foundations and tower structures.

3.0 PROJECT OVERVIEW

3.1 Project Summary

The Project is located in Deuel County, South Dakota. The Project will have an aggregate nameplate capacity of up to 260 MW. The Project is anticipated to remain operational for approximately 30 years, but the actual life span may be longer. The lease agreements provide for a total operation period of 50 years. If equipment were to fail before the end of the useful life of the facility, those components could be replaced with operational ones. At the end of commercial operation, South Deuel Wind will assess whether to decommission the Project or seek to extend the life of the Project. Subject to applicable regulatory approval, should South Deuel Wind decide to pursue continued operations, it will evaluate whether to continue with the existing equipment or to upgrade the facility with newer technologies.

3.2 Site Visit

Burns & McDonnell did not visit the Project site as part of developing this Plan. The contents of this evaluation, including conclusions provided herein, are based exclusively upon desktop analysis and it is assumed that all conditions reflected in the drawings provided by Deuel Harvest Wind Energy South LLC are a complete representation of conditions at the Project site.

3.3 Project Facilities

The following sections provide an overview of the Project facilities. Some Project facilities, such as access roads, the O&M Facility, Collector Substation, and Gen-Tie Line may remain in use or be repurposed after the end of the useful life of the wind energy facility. Project facilities that remain in use or can be repurposed may not be removed during decommissioning. For the purposes of this decommissioning estimate, the following Project facilities were assumed to be removed.

3.3.1 Wind Turbines

The final turbine model has not yet been selected at the time of developing this Plan. For estimating purposes, the Project is assumed to consist of 57 Vestas V163-4.5 wind turbines resulting in a total nominal rating of approximately 256.5 MW. This Plan was prepared based on the Vestas turbine model because, at the time of the Plan, the turbine model was anticipated to be the most optimal turbine for the site. Each Vestas V163-4.5 wind turbine includes a 97.5-meter conical tubular steel tower which supports the turbine nacelle mounted on top. The nacelle of each turbine includes three blades mounted to the nacelle rotor with a total rotor diameter of approximately 163 meters. Where equipment weights were not available, weights are based on similarly sized equipment and Burns & McDonnell's prior experience. To

the extent a different turbine model is selected for construction, the Plan may be revised at a later date to reflect the updated assumptions.

3.3.2 Wind Turbine Foundations

Each wind turbine tower is supported by a concrete foundation. Final foundation design drawings were not available at the time of developing this Plan, therefore dimensions are based on similar projects and Burns & McDonnell's experience. The foundations are assumed to consist of a 20-foot diameter circular concrete pedestal with a depth below grade of 5 feet. The pedestal is supported by a cylindrical base which has a lower diameter of 76 feet and extends to a maximum depth of 11.5 feet below grade with a 6-inch projection above-grade.

All Project facilities are to be removed to a depth of at least 42 inches below grade in accordance with the Deuel County Zoning Ordinance. Thus, the concrete pedestal is to be removed down to 42 inches below-grade and backfilled as part of the decommissioning, and the remaining foundation will be abandoned in place.

3.3.3 Electrical Collection and SCADA Systems

Each wind turbine generates three-phase electrical power that is transformed to 34.5 kilovolts (kV) via an up-tower transformer located on each wind turbine. The electrical cables contain no material known to be harmful to the environment. To minimize land disturbance and associated impacts, it is assumed that all cables (including both power and communication cabling) will be buried at a minimum depth of 48 inches below-grade and would remain in place if the Project were decommissioned. However, if the contractor deems the salvageable value of the electrical collection system to be greater than the cost for removal, the contractor shall remove the electrical collection system at its own cost. The only cost incurred from the electrical collection system will be the above-grade junction boxes.

3.3.4 Collector Substation

Power from each wind turbine is delivered via underground collection circuits to an on-site Collector Substation. Final drawings of the Collector Substation were not available for review at the time of developing the Plan. As such, it was assumed that at the Collector Substation, power is transformed via two main power transformers. The Collector Substation is also assumed to consist of two high-voltage circuit breakers, one dead-end structure, steel structures, medium-voltage circuit breakers, switching devices, perimeter fencing, auxiliary equipment, and a control enclosure. All above-grade equipment within the perimeter fence of the Collector Substation is assumed to be removed, and all below-grade equipment to a depth of 42 inches (per the Deuel County Zoning Ordinance) is assumed to be removed.

3.3.5 Gen-Tie Line

The Project output will be transformed at the Collector Substation from which the Project will be interconnected to an off-site Interconnection Switchyard via approximately 6 miles of 345 kV transmission line with estimated span lengths of 900 feet. Final specifications of the Gen-Tie Line and associated facilities were not available at the time of developing the Plan. As such, structure design sizing are based on similar projects and Burns & McDonnell's experience. The Gen-Tie Line and associated facilities are assumed to be removed.

3.3.6 O&M Facility

The Project will include an on-site O&M Facility. Final design drawings were not available at the time of developing the Plan; however, it is assumed the O&M Facility will include an area for maintenance activities and laydown yard where spare components can be stored. As such, dimensions were assumed for the O&M facilities based on similar projects and Burns & McDonnell's experience. The O&M building is assumed to be approximately 7,300 square feet and is assumed to consist of a pre-engineered metal building with a 6-inch-thick concrete foundation. The O&M Facility includes a concrete parking lot. A perimeter fence surrounds the O&M building and an area of 48,000 square feet of crushed rock is assumed to be contained within the perimeter fence. The O&M Facility is assumed to be removed as part of this Plan, including the concrete and foundations to a depth of 42 inches.

3.3.7 Access Roads

Each wind turbine, MET tower, ADLS tower, the Collector Substation, and O&M Facility will have an access road to support construction and allow for vehicle access to facilitate inspections and maintenance of Project facilities during operation. Access roads are assumed to be surfaced with approximately 6 inches of crushed rock with a final width of approximately 16 feet. Access roads connected to the Collector Substation and O&M Facility are assumed to have a final width of approximately 24 feet wide. Access roads connected to the MET towers and ADLS towers are assumed to have a final width of approximately 10 feet wide. According to the access road layout provided by South Deuel Wind at the time of developing this Plan, approximately 18 miles of access roads are assumed to be removed, decompacted, and seeded as needed.

3.3.8 MET Towers

Three MET towers are assumed to be installed as part of the Project to measure wind data. Project-specific design drawings for these towers were not available for review, so these towers are assumed to be permanent, free-standing, and approximately 98-meter-tall lattice-type towers. These towers are assumed to be fully removed as part of this Plan, including their supporting foundations.

3.3.9 ADLS Towers

Two ADLS towers were assumed to be installed as part of the Project to minimize illumination time of turbine lighting. Project-specific design drawings for these towers were not available for review, so these towers are assumed to be 200-feet-tall lattice-type towers. These towers are assumed to be fully removed as part of this Plan, including their supporting foundations.

4.0 DECOMMISSIONING

4.1 Decommissioning Plan

The following description outlines the assumed means and methods for removal of Project facilities for purposes of this Plan. It is assumed that the contractor will use the most efficient methods at the time of decommissioning.

When the Project is decommissioned, it is assumed that the Project will incur costs for removal and disposal of Project facilities above 42 inches below-grade as well as restoration of the Project site. Above-grade Project facilities comprised of steel, aluminum, and copper are assumed to have significant scrap value to a salvage contractor, offsetting a portion of the cost associated with decommissioning. All recyclable materials will be recycled to the extent practicable, while all other non-recyclable waste materials will be disposed of in accordance with state and federal law.

For purposes of decommissioning the wind turbines, the cost estimate provided herein assumes the wind turbine blades will be removed from the nacelle using a crane, cut into sizes which confirm to transport requirements, loaded onto a trailer, and hauled to a local landfill for disposal or disposed of as South Deuel Wind agrees to within other agreements associated with county or state permitting. The wind turbine blades are constructed from a composite material that is assumed to have no salvage value at the time of decommissioning. The turbine nacelles will be removed from the towers with a crane and loaded onto a trailer. The towers will be disassembled and loaded onto a trailer as well. The nacelles and towers will then be hauled off to a scrap yard for recycling.

The decommissioning cost estimate presented in this Plan includes the cost to haul the turbines and nacelles to the scrap yard. Rather than employing a crane to decommission the wind turbines, the wind turbines may be cut at the base to allow the contractor to fell the wind turbines. The turbine blades will then be cut into manageably-sized sections for transport and disposal. Cleanup of the wind turbines in this manner of decommissioning will also include dismantling the towers and nacelles, cutting the tower steel into smaller manageable pieces for removal, and cleaning up resulting debris. All wind turbine foundations will be removed to a depth of 42 inches below grade; the portions of the foundation that are greater than 42 inches below grade will be abandoned in place. The recovered concrete will be loaded into a dump truck and hauled to a local landfill for disposal or disposed of as South Deuel Wind agrees to within other agreements associated with county or state permitting. Voids left from the removal of the concrete footings will be backfilled with surrounding subsoil and topsoil and fine graded to provide suitable drainage.

The Collector Substation will be removed from the site, including all above-grade equipment (e.g., transformers, breakers, busbars), buildings, crushed rock surfacing, and fencing. All below-grade equipment (e.g., foundations) will be removed to a depth of 42 inches below grade in accordance with the Deuel County Zoning Ordinance.

All crushed rock surfacing will be removed from the Project's access roads. Areas where crushed rock surfacing has been removed will be fine graded to provide suitable drainage. In right-of-way and non-agricultural areas, the ground will be seeded to prevent erosion. The removed crushed rock will be loaded into dump trucks and hauled off-site. Crushed rock can be recycled and reused and typically has a salvage value as a commodity equal to or greater than the cost to haul to an end user. However, for the purpose of this Plan, the cost to remove the crushed rock, load it into dump trucks, and haul it off-site will be at the expense of the Project.

The above grade junction boxes for the electrical collection and SCADA systems will be removed and disposed of as part of decommissioning. The electrical cables will remain in place following decommissioning. These cables will be buried at a minimum depth of 48 inches below grade. At this depth all cables exceed the 42-inch depth of removal requirement set forth in the Deuel County Zoning Ordinance.

All Gen-Tie line facilities will be removed from site, including all above-grade steel towers and transmission cabling. All foundations will be removed to a depth of 42 inches below grade in accordance with the Deuel County Zoning Ordinance.

All balance of plant facilities, including above-grade equipment, buildings, crushed rock surfacing, and fencing, will be removed from the site. In accordance with the Deuel County Zoning Ordinance, all below-grade equipment will be removed to a depth of 42 inches below grade. All debris from the removal of the balance of plant facilities will be transported to a nearby landfill for disposal.

All MET and ADLS tower facilities will be removed from site and materials will be recycled to the extent practicable. In accordance with the Deuel County Zoning Ordinance, all below-grade equipment will be removed to depth of 42 inches below grade. All salvageable scrap from the MET and ADLS tower facilities will be transported to off-set a portion of decommissioning. Debris will be disposed of at a landfill.

Prior to commencing activities associated with foundation removal, crushed rock surfacing removal, or any other earthwork, an approved erosion control plan will need to be developed by the demolition contractor. Best management practices (BMPs) applicable at the time that decommissioning activities

occur will need to be implemented by the contractor for control of storm water runoff. Since decommissioning activities are not anticipated to occur for 30 years or more, BMPs may differ from current standards. However, if decommissioning takes place in the near future, Burns & McDonnell would anticipate BMPs such as silt fencing and proper decompaction, seeding, and mulching practices to be implemented. BMPs will need to be reviewed by the contractor prior to commencing decommissioning activities to determine appropriate BMPs at that time. All BMPs will be in accordance with state and local permitting. To the extent necessary, permits relating to decommissioning activities will need to be obtained. The decommissioning cost estimates included in this Plan are expected to be sufficient for a contractor to develop suitable plans for the control of surface water drainage and water accumulation and, where appropriate, for backfilling, soil stabilization, compacting/decompacting, and grading prior to commencing decommissioning activities.

All disturbed areas at the site will be returned to as close to predevelopment conditions as practicable. In addition to the activities described above for each decommissioning activity, all unexcavated areas compacted by equipment or activity during the decommissioning process will be decompacted as needed to ensure proper density of topsoil consistent and compatible with the surrounding area and associated land use. All miscellaneous materials and debris associated with Project decommissioning but not otherwise addressed in this Plan will be removed and properly recycled or disposed of at off-site facilities. Preservation of topsoil is important for re-establishing vegetation in areas disturbed by decommissioning. Where applicable, topsoil will be stripped and isolated prior to other decommissioning activities, and reapplied after activities are complete to maintain soil quality for future land use activities. This will allow all land disturbed by the construction of the Project to be returned to its predevelopment use at the end of the useful life of the Project. The decommissioning cost estimates provided in the following section include activities and costs to return the land to a condition suitable for agricultural use subsequent to decommissioning of the Project.

The activities associated with the decommissioning plan described above are anticipated to be completed within a 10-month timeframe, according to the following estimated schedule:

- Planning & Permitting: 3 months
- Decommissioning: 4 months
- Site Restoration: 3 months

Additional time may be required for post-decommissioning activities, including monitoring of new vegetation. However, this timetable and the cost estimates below should provide sufficient time and budget to comply with any applicable health and safety regulations.

4.2 Decommissioning Costs

The total cost to decommission the Project at the end of its useful life, based on the assumptions noted herein including the original construction methods of the Project, is estimated to be approximately $1,343,250 ($23,600 per turbine); a detailed breakdown of these costs is included in Appendix A. It is expressly noted that while costs are presented both in total and per turbine, a change in the quantity of turbines may not cause the total decommissioning cost to increase or decrease linearly by the per turbine cost, due to non-scalable differences in balance-of-plant costs and other similar factors.

4.3 Decommissioning Assumptions

In addition to other assumptions noted herein, the following key assumptions are utilized for the decommissioning cost estimates presented herein:

1. All costs are presented in current (2024) dollars using the site cost index of 90.5 percent for Watertown, South Dakota.
2. The decommissioning cost estimates are based on details and equipment defined through conversations with and documentation provided by South Deuel Wind in June 2024.
3. An off-site landfill (Brookings Regional Landfill) is used for disposal of demolition waste. The hauling distance to this landfill is approximately 33 miles from the Project site, and the cost for disposal of debris and concrete is $47.35 per ton.
4. Where applicable, scrap values are based upon an average of monthly American Metal Market prices for January 2023 through December 2023 (i.e., one calendar year). These values include the cost to haul the scrap via truck and/or rail to the major market which provides the best price. Based on hauling and rail prices, the best market at the time of this Plan is Chicago, Illinois. Prices used and quantities of the different scrap materials are included in the following table:

Table 4-1: Scrap Summary

Material	Unit Price	Quantity	Total Credit
Steel	$244.57/ton	24,162 Tons	$5,909,460
Copper	$2.95/lb	765,906 lbs	$2,258,670
Aluminum	$0.38/lb	801,896 lbs	$303,930

5. Fluids located within the turbine nacelle, including oils, fuels, solvents and process chemicals, are assumed to be drained and disposed of off-site as part of decommissioning.
6. It is assumed that all containers and chemical storage tanks owned by the Project will be drained and the material disposed of prior to decommissioning; these costs are excluded from the decommissioning cost estimate.
7. In accordance with Deuel County Zoning Ordinance B2004-01, all underground equipment, including cables, will be removed to a depth of 42 inches below grade. All structures or foundations greater than 42 inches below grade will remain in place and are excluded from the decommissioning cost estimate.
8. Access roads, parking areas, storage yards, crane pads, and all other areas constructed from asphalt, concrete, gravel, or compactable fill will be removed, recycled, and reclaimed.
9. Crushed rock from roads, balance-of-plant areas, and turbine foundation areas is assumed to have value as a commodity for reuse. The cost to remove the crushed rock, load it into dump trucks, and haul it off-site is assumed to be at the expense of the Project; however, it is assumed the third party will accept the crushed rock at no charge. Therefore, the cost of disposal is excluded from the estimate.
10. Costs for grading and re-seeding have been included in the decommissioning cost estimate.
11. Waste material and crushed concrete will be properly disposed of off-site.
12. It is assumed that all Project-specific access roads, fences, gates, and buildings will be removed as part of decommissioning.
13. It is assumed that all disturbed areas will be restored to predevelopment conditions to the extent practicable. Restoration efforts may include all disturbed areas to be graded back to natural contours, decompacted, and seeded, as needed, with vegetation consistent with future land use.
14. Transformers will be removed and processed on-site. The cost to drain and dispose of transformer oil off-site is included in the decommissioning cost estimate.
15. The laydown yard utilized during construction of the Project is assumed to have been previously reclaimed and restored; no further grading, seeding, or other restoration of the laydown yard is included in this estimate.
16. Cost estimates include 5 percent indirects and 10 percent contingency.
17. Market conditions may result in cost variations at the time of contract execution.

5.0 STATEMENT OF LIMITATIONS

In preparation of this report, Burns & McDonnell has relied upon information provided by Deuel Harvest Wind Energy South LLC and other third-party sources. While Burns & McDonnell has no reason to believe that the information provided to Burns & McDonnell, and upon which Burns & McDonnell has relied, is inaccurate or incomplete in any material respect, Burns & McDonnell has not independently verified such information and cannot guarantee or warranty its accuracy or completeness.

Burns & McDonnell's estimates, analyses, and recommendations contained in this report are based on professional experience, qualifications, and judgment. Burns & McDonnell has no control over weather; cost and availability of labor, material, and equipment; labor productivity; energy or commodity pricing; demand or usage; population demographics; market conditions; changes in technology; and other economic or political factors affecting such estimates, analyses, and recommendations. Therefore, Burns & McDonnell makes no guarantee or warranty (actual, expressed, or implied) that actual results will not vary from the estimates, analyses, and recommendations contained herein.

Estimates provided herein were prepared based on current knowledge of site conditions, current regulations, and current material classifications. Burns & McDonnell has no evidence or reason to believe that the cost estimate will be inaccurate at the end of the Project's useful life; however, Burns & McDonnell's estimates do not include allowances for unforeseen environmental liabilities associated with unexpected events not considered part of normal operations. Estimates also do not include allowances for environmental remediation associated with changes in classification of materials.

This report is for the sole use, possession, and benefit of Deuel Harvest Wind Energy South LLC for the limited purpose as provided in the agreement between Deuel Harvest Wind Energy South LLC and Burns & McDonnell. Any use or reliance on the contents, information, conclusions, or opinions expressed herein by any other party or for any other use is strictly prohibited and is at that party's sole risk. Burns & McDonnell assumes no responsibility or liability for any unauthorized use.

APPENDIX A- DECOMMISSIONING COST BREAKDOWN

Table A-1: Estimated Cost for Wind Turbine Decommissioning (2024$)

South Duel Wind Project
Decommissioning Cost Evaluation

Wind Turbine Removal Cost		
Removal	$	4,248,000
Hauling & Disposal	$	635,000
Total	**$**	**4,883,000**
Scrap Value	**$**	**(8,122,000)**
Wind Turbine Foundation Removal Cost		
Removal	$	323,000
Hauling & Disposal	$	352,000
Total	**$**	**675,000**
Collection System Removal Cost		
Removal	$	14,000
Total	**$**	**14,000**
Substation Removal Cost		
Removal	$	278,000
Hauling & Disposal	$	27,000
Total	**$**	**305,000**
Scrap Value	**$**	**(249,000)**
Transmission Line Removal Cost		
Equipment Removal	$	339,000
Hauling & Disposal	$	21,000
Total	**$**	**360,000**
Scrap Value	**$**	**(65,000)**
Civil Works Removal Cost		
Removal	$	456,000
Hauling & Disposal	$	1,438,000
Grading & Seeding Costs	$	127,000
Total	**$**	**2,021,000**
O&M Facility Removal		
Removal	$	83,000
Hauling & Disposal	$	55,000
Total	**$**	**138,000**
Scrap Value	**$**	**(28,000)**
ADLS Tower Removal		
Removal	$	40,000
Hauling & Disposal	$	2,000
Total	**$**	**42,000**
Scrap Value	**$**	**(5,000)**
Met Tower Removal		
Removal	$	28,000
Total	**$**	**28,000**
Scrap Value	**$**	**(3,000)**
Other Costs		
Oils & Chemicals Removal & Disposal	$	69,000
Total	**$**	**69,000**
Total Estimated Cost	**$**	**8,535,000**
Owner Indirects (5%)	**$**	**426,750**
Contingency (10%)	**$**	**853,500**
Total Gross Cost	**$**	**9,815,250**
Total Scrap Value	**$**	**(8,472,000)**
Total Net Cost	**$**	**1,343,250**

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