

Spotsylvania Solar Energy Center

Decommissioning and Restoration Plan

Special Use Permits

SUP18-0001

SUP18-0002

SUP18-0003

Prepared By



June 2018

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1.0 INITIAL PROJECT DECOMMISSIONING AND SITE RESTORATION PLAN

1.1 Introduction

The Spotsylvania Solar Energy Center (Project) is a 500-Megawatt (MW) photovoltaic (PV) solar project located in western Spotsylvania County, Virginia. The Project Site consists of three non-contiguous boundaries that encompass approximately 6,350 acres, of which approximately 3,500 acres are developed for the Project. The Project is anticipated to operate for 35 years.

The Project will operate under a Special Use Permit with Spotsylvania County. Following the term of the Project contract, a decision would be made to extend the life of the Project or to decommission the Project. If the Project is decommissioned, Sustainable Power Group (sPower) or its successor in interest will be responsible for the removal, recycling, and disposal of all solar arrays, inverters, transformers and other structure on the Project site, depending upon the proposed future use of the Project site. sPower anticipates using the best available recycling measures at the time of decommissioning.

1.2 Existing Land Use

The current and historic land use for the Project Site is silviculture. The area surrounding the Project site also include silviculture with limited agriculture and scattered single-family residences.

1.3 Proposed Land Use

The Project is being developed to provide clean, renewable energy to corporate off-takers. The Project consists of a 3,500-acre, 500 MW alternating current (AC) solar energy facility. All parcels within the Project site will be purchased by sPower or its Transferee.

The Project will involve installation of various facilities, such as ground-mounted solar arrays, switchyard, inverters, electrical conduits, foundations, and an operations and maintenance facility. The majority of the foundations and electrical conduits will be located underground.

1.4 Objectives

This Decommissioning Plan was developed per Section 23-4.5.7 of Spotsylvania County Ordinance No. 23-173. The Decommissioning Plan ensures that if the Project is decommissioned, the site restoration will be accomplished in a way this is environmentally sound, safe, and protects the public health and safety. Decommissioning is a general term used to describe a formal process to remove something from active status whereas restoration objectives aspire to return the land to some degree of its former state, after some process has resulted in its disturbance.

Future conditions that could affect decommissioning are largely unknown at this time; however, the best available technologies and management practices will be deployed to ensure successful project decommissioning and site restoration.

To ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects public health and safety, sPower or its successor in interest will submit a Final Plan for Project Decommissioning to Spotsylvania County for review and approval before the Project's decommissioning begins. Overall, the plan will include a discussion of:

- Proposed decommissioning activities for the Project and all appurtenant facilities that were constructed as part of the Project;
- The activities necessary to restore the Project site if the plan requires removal of equipment and appurtenant facilities; and
- Decommissioning alternatives at the time of final decommissioning.

Satisfying the above requirements should serve as a safeguard, even in the unlikely event that the Project is abandoned.

1.5 Project Decommissioning

When the Project reaches the end of its operational life, the component parts will be dismantled and recycled. All waste resulting from the decommissioning of the facility will be transported by a certified and licensed contractor and taken to a landfill/recycling facility in accordance with all local, State, and federal regulations.

The Initial Project Decommissioning Plan for the project site will include the following:

- The facility will be disconnected from the utility power grid.
- Individual PV panels will be disconnected from the on-site electrical system.
- Project components will be dismantled and removed using conventional construction equipment and recycled or disposed of safely.
- Individual PV panels will be unbolted and removed from the support frames and carefully packaged for collection and return to a designated recycling facility for recycling and material re-use.
- Electrical interconnection, transmission, and distribution cables will be removed and recycled offsite by an approved recycling facility.
- PV Panel support steel and support posts will be removed and recycled off-site by an approved metals recycler.
- Electrical and electronic devices, including inverters, transformers, panels, support structures, lighting fixtures, and their protective shelters will be recycled off-site by an approved recycler.

- Any hazardous materials will be removed and disposed in accordance with the current regulations.
- All concrete that is removed from the switchyard and on-site distribution system will be recycled off-site by a concrete recycler or crushed on site and used as fill material.
- Fencing will be removed and recycled off-site by an approved metals recycler.
- Soil erosion and sedimentation control measures will be re-implemented during the decommissioning period and until the site is stabilized.
- Only minimal grading is expected to be required.

1.6 Site Restoration

Restoration activities will return the Project site to a land use consistent with the surrounding land uses at the time of decommissioning. The Initial Site Restoration Plan for the Project Site will include the following:

- New gravel roads will be removed; filter fabric would be bundled and disposed of in accordance with all applicable regulations. Road areas would be backfilled and restored to their natural contour.
- Existing wells or pumps located on the periphery of the Project Site will be maintained in place. Any ditches used for temporary water transport within the Project Site will be removed for the Project. These irrigation works will be restored if appropriate or necessary.
- Restoration activities would entail one of the following measures:
 - If land is to be used for silviculture use, the nutrient content of the soil would be restored to pre-construction concentration levels (if degraded) and the land would be tilled regularly to ensure aeration of soils and proper weed management; or
 - If the land is to be converted for another purpose, soil stabilization techniques would be deployed to prevent topsoil erosion. Conversion to another use consistent with applicable land use regulation in effect at that time.
- All permits related to restoration would be obtained where required

1.7 Estimated Costs

sPower or Transferee will provide financial security for the performance of its decommissioning and restoration obligations based on the Initial Decommissioning and Site Restoration Plan. A decommissioning cost estimate was prepared and is included as Attachment A. The cost estimate will be used to determine the value of the Performance Bond to ensure that the funds will be available for decommissioning and site restoration (see Section 3.0).

**2.0 FINAL PROJECT DECOMMISSIONING AND SITE RESTORATION PLAN **

2.1 Final Project Decommissioning and Site Restoration Plan

Ninety days (90) prior to decommissioning the Project Site, sPower will submit a Final Project Decommissioning and Site Restoration Plan (Final Plan) to the County for its approval, which approval will not be unreasonably withheld. The Final Plan may contain measures to decommission the Project and restore the Project Site different than the Initial Plan, provided that sPower explains in sufficient detail the reasons for any new or substantially different measures.

2.2 Decommissioning and Restoration: Scope and Timing

2.2.1 Scope of Decommissioning

Decommissioning the Project will involve removal of the Project's components as necessary for reuse of the site, including; the solar panels, panel trackers, anchors, supports and mounts, inverter buildings, electrical conductors, electrical cables, and substation components, other structures and the re-grading of any areas significantly impacted by the removal of any components. Roads may be removed or left in place based upon the landowner's anticipated reuse after decommissioning.

2.2.2 Site Restoration

Restoration of the Project Site will be to a reasonable approximation of its original condition prior to construction allowing for any permanent improvements chosen by the underlying landowners to be left on site as provided in Section 2.3.1. The Final Plan will contain the measures necessary to fulfill sPower restoration obligations.

2.2.3 Timing, Exemptions, and Extension

sPower or any Transferee, as the case may be, will decommission the Project and restore the Project Site within twelve (12) months following project termination. The twelve-month period to perform the decommissioning and restoration may be extended for one additional twelve-month period if there is a delay caused by forces beyond the control of sPower including, but not limited to, inclement weather conditions, planting requirements, equipment failure, wildlife considerations or the availability of equipment or personnel to support decommissioning.

2.2.4 County Access and Reporting

The County will be granted access to the Project Site during decommissioning of the Project for purposes of inspecting any decommissioning work or to perform decommissioning evaluations. County personnel must provide a 5-day pre-notification for site access on the Project Site and must observe all current owner safety standards and protocols. If requested by the County, sPower will provide monthly status reports until this decommissioning work is completed.

3.0 DECOMMISSIONING AND RESTORATION FUNDING AND SECURITY

3.1 Decommissioning and Restoration Obligations

sPower or a Transferee, as the case may be, will post a Performance Bond as described in 3.2 below to ensure the availability of funds to cover sPower decommissioning and restoration obligations. sPower will deliver the Performance Bond to Spotsylvania County after receipt of the Conditional Use Permit and prior to the start of construction. The Initial Plan, to be completed by sPower will include the estimated costs for the Project's potential decommissioning and restoration obligations. The Initial Plan also will provide that such estimated costs will be re-evaluated by sPower at the conclusion of construction of the Project and every two (2) years thereafter from the date of Substantial Completion to ensure sufficient funds for decommissioning and restoration and, if deemed appropriate at that time, the amount of the Performance Bond will be adjusted accordingly.

3.2 Performance Bond

sPower or Transferee, as the case may be, will provide financial security for the performance of its Decommissioning and Restoration obligations assuming the Project Site is restored to silviculture use through a Performance Bond issued by a surety registered with the Virginia Commissioner of Insurance and is, at the time of delivery of the bond, is on the authorized insurance provider list published by the Commissioner. The Performance Bond will be in an amount equal to 100% of the estimated costs for sPower decommissioning and restoration obligations provided in the Initial Plan. The Performance Bond will be for a term of one (1) year, and will be continuously renewed, extended, or replaced so that it remains in effect for the remaining term of the agreement or until the secured decommissioning obligations are satisfied, whichever occurs later.

4.0 PROJECT DECOMMISSIONING AND SITE RESTORATION COST ESTIMATE

The estimated costs for the decommissioning and restoration associated with the Spotsylvania Solar Energy Center project are shown below:

Description	Duration	Labor, Equipment, Materials	Net Recycling	Total Cost
SWPPP & Dust Control Measures	30.6	\$428,328	\$0	\$428,328
Removal of Equipment	26.8	\$16,499,447	(\$21,981,586)	(\$5,482,139)
Site Demolition	8.2	\$985,535	(\$944,867)	\$40,668
Site Reclamation	7.6	\$5,316,857	\$0	\$5,316,857
Contingency, Escalation, PM, Insurance, Fees		\$8,096,834	(\$3,356,468)	\$4,740,366
Opinion of Probable Gross Decommissioning Cost		\$31,327,001	(\$26,282,921)	\$5,044,080

Attachment A

Conceptual Cost Estimate

sPower Group
Conceptual Cost Estimate
for
Decommissioning Highlander
a
647,735.1kW (STC) PV System

May 15, 2018

Prepared for: Daniel Menahem
Senior Project Manager

Documents include: ❖ Executive Summary
❖ Summary
❖ Basis of Estimate
❖ Crew Wage Detail

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SWINERTON
RENEWABLE ENERGY



sPower Group
 Decommissioning Highlander
 Executive Summary

Conceptual Cost Estimate
 May 15, 2018

Description	Duration (weeks)	Labor/ Equip/Mat	Net Recycling	Total Cost
SWPPP & Dust Control Measures	30.6	\$428,328	\$0	\$428,328
Removal of Equipment	26.8	\$16,499,447	(\$21,981,586)	(\$5,482,139)
Site Demolition	8.2	\$985,535	(\$944,867)	\$40,668
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sPower Group
Decommissioning Highlander
Summary

Conceptual Cost Estimate
May 15, 2018

Item Description	Qty	Unit	Labor/ Equip/Mat	Net Recycling	Total Cost
<u>SWPPP & Dust Control Measures</u>					
1 Stabilized Construction Entrances	1	EA	\$3,266		\$3,266
2 Perimeter Silt Fencing	52,040	LF	\$25,293		\$25,293
3 Spill Kits (Emergency Equipment Cleanup)	1	EA	\$305		\$305
4 Street Wash Down (Water Truck)	195	DA	\$129,652		\$129,652
5 Dust Control Watering (Water Truck)	195	DA	\$129,652		\$129,652
6 Mobilization/DeMobilization	1	EA	\$140,160		\$140,160
Subtotal SWPPP & Dust Control Measures			\$428,328		\$428,328
<u>Removal of Equipment</u>					
7 Remove & Recycle Substation Step Up Transformer	6	EA	\$39,251	\$1,800	\$41,051
8 Remove & Recycle Substation Disconnect Switches	12	EA	\$19,347	\$720	\$20,067
9 Remove & Recycle Substation Circuit Breakers	12	EA	\$19,179	\$3,600	\$22,779
10 Remove & Recycle Substation Pedestals	18	EA	\$114,251	(\$441)	\$113,810
11 Remove & Recycle AC Conductor	518,189	LF	\$212,725	(\$652,918)	(\$440,193)
12 Remove & Recycle Conduit	77,730	LF	\$22,582	(\$97,940)	(\$75,358)
13 Remove & Recycle Switchgear Assemblies	1	LS	\$24,126	\$12	\$24,137
14 Remove & Recycle Inverters & Xfmrs	169	LS	\$110,293	\$15,654	\$125,946
15 Remove & Recycle DC Conductor	9,694,572	LF	\$1,136,098	(\$446,340)	\$689,758
16 Remove & Recycle Photovoltaic Modules	1,615,762	EA	\$11,016,129	(\$8,175,756)	\$2,840,373
17 Remove & Recycle Support Assemblies	23,588	EA	\$1,560,052	(\$9,075,893)	(\$7,515,841)
18 Remove & Recycle W6 x 7 x 11' Foundations	214,585	EA	\$1,550,959	(\$2,284,311)	(\$733,352)
19 Remove & Recycle W6 x 9 x 11.5' Foundations	45,148	EA	\$326,317	(\$646,017)	(\$319,700)
20 Remove & Recycle W6 x 12 x 9' Foundations	22,574	EA	\$163,158	(\$337,052)	(\$173,894)
21 Remove & Recycle W6 x 20 x 11' Foundations	2,704	EA	\$19,544	(\$82,242)	(\$62,698)
22 Remove & Recycle W6 x 7 x 11' Foundations	19,235	EA	\$147,595	(\$204,761)	(\$57,166)
23 Remove SCADA and Met Stations	25	EA	\$17,841	\$300	\$18,141
Subtotal Removal of Equipment			\$16,499,447	(\$21,981,586)	(\$5,482,139)
<u>Site Demolition</u>					
24 Remove & Recycle 6' Chain Link Fence	349,570	LF	\$601,640	(\$393,354)	\$208,286
25 Remove & Recycle Gates	1196	LF	\$4,190	(\$1,511)	\$2,679
26 Remove & Salvage 4" Gravel Access Aisles	3,012,514	SF	\$308,111	(\$446,298)	(\$138,187)
27 Remove & Salvage 4" Gravel Staging Area	700,000	SF	\$71,594	(\$103,704)	(\$32,110)
Subtotal Site Demolition			\$985,535	(\$944,867)	\$40,668
<u>Site Reclamation</u>					
28 Apply Manure Compost (@ 24 CY/AC)	29,520	CY	\$1,329,186		\$1,329,186
29 Scarify & Blend ~40% of Site (Depth = 6")	1,230	AC	\$1,429,651		\$1,429,651
30 Seed Mixture across ~40% of Site (@ 25 LB/AC)	1,230	AC	\$2,558,020		\$2,558,020
Subtotal Site Reclamation			\$5,316,857		\$5,316,857
<u>Contingency, Escalation, PM, Insurance, Fee</u>					
31 Subcontractor Bonding	0.75%		\$170,101		\$170,101
32 General Contingency (% of Labor/Equip/Mat)	2.00%		\$453,603		\$453,603
33 Labor & Equip. Escalation (0.75% per Year for 25 Years)	18.8%		\$4,252,531		\$4,252,531
34 Recycled Material Escalation (0.6% per Year for 25 Years)	15.0%			(\$3,356,468)	(\$3,356,468)
35 Construction Management (% of Labor/Equip/Mat)	5.10%		\$1,156,688		\$1,156,688
36 Permits, Inspection & Fees (% of Labor/Equip/Mat)	3.25%		\$737,105		\$737,105
37 Liability Insurance (% of Labor/Equip/Mat)	0.97%		\$219,998		\$219,998
38 Overhead & Profit (% of Labor/Equip/Mat)	4.75%		\$1,077,308		\$1,077,308
39 County Administration Costs (Full-time for Contract Duration)			\$29,499		\$29,499
Subtotal Contingency, Escalation, PM, Insurance, Fee			\$8,096,834	(\$3,356,468)	\$4,740,366
Opinion of Probable Decommissioning Cost			\$31,327,001	(\$26,282,921)	\$5,044,080

Basis of Estimate
Assumptions ❖ Exclusions ❖ Qualifications
for Decommissioning a
647,735.1kW (STC) PV System

This Opinion of Probable Cost is based on professional experience and interpretation of project documents, and is based on Swinerton resource data, current in-house information and estimators' judgment regarding this type of product.

Please notify Swinerton of any errors or omissions in this estimate within ten (10) days of receipt.

General Assumptions

- 1 - Permitting NTP: 09/24/44
- 2 - Mobilization: 11/23/44
- 3 - Total Decommission Duration: 34.5 weeks.
- 4 - Completion Date: 07/22/45
- 5 - This estimate includes zero days of weather delay contingency.
- 6 - Overall Permit, Demolition & Close-out: 9.9 months
- 7 - This PV array is assumed de-energized and ready for demolition.
- 8 - Pricing valid for (60) sixty days from date of release. [07/14/18]
- 9 - Swinerton cannot control the actual conditions of the Project or the market, and as such, this Opinion of Probable Cost is not a guarantee of pricing, but a reasonable estimating tool based upon the assumptions, exclusions, and qualifications contained herein.
- 10 - Labor rates based on Spotsylvania, VA prevailing wages per the Wage Determinations website.
WDOL.gov is part of the Integrated Acquisition Environment, one of the E-Government initiatives in the President's Management Agenda. It is a collaborative effort of the Office of Management and Budget, Department of Labor, Department of Defense, General Services Administration, Department of Energy, and Department of Commerce.
- 11 - Labor productivity metrics have been based on RSMeans Construction Cost Databases.
- 12 - We have escalated labor, equipment and material by 0.75% APR for the assumed (25) year life of this PV power plant.
- 13 - Material and salvage unit costs have been based on historical data for this type and size of project, and RSMeans Construction Cost Databases modified for scale and location.
- 14 - N.B., No attempt has been made to predict the breadth of the recycling/salvaging industry in 2044, and therefore all recycling and salvage rates are based on current knowledge.

Estimating Methodology

This Opinion of Probable Cost was developed based on material take-off quantities generated from current project data. Customized Excel workbooks were the primary estimating tools used to generate this cost estimate.

Basis of Estimate
Assumptions ❖ Exclusions ❖ Qualifications
for Decommissioning a
647,735.1kW (STC) PV System

Site Assumptions

Modules

(1,615,762) - 427.5w FirstSolar S-6 & 360w Jinko

Inverters

(169) -Power Electronics FS3000MU

DAS & Extras

Inverter-level monitoring and (25) weather stations

Racking Systems

ATI v3

Foundations

W6 x 7 x 11'

W6 x 9 x 11.5'

W6 x 12 x 9'

W6 x 20 x 11'

W6 x 7 x 11'

Interconnection

Allowance for Substation decommissioning and demolition has been included.

Sitework

Demolish all fencing, foundations, housekeeping pads, structures of any kind.

Remove and salvage gravel access aisles.

Restoration after decommission and demolition:

Apply Manure Compost (@ 24 CY/AC)

Scarify & Blend ~40% of Site (Depth = 6")

Seed Mixture across ~40% of Site (@ 25 LB/AC)

General Requirements

Included are SWPPP/Erosion control, dust control, safety equipment, dumpsters, chemical toilets & hand / eye wash stations, and lift equipment.

General Conditions represent costs for job-site staff and direct support are calculated against project scope and duration.

N.B., General Requirements and Conditions have been captured in the Construction Management line.

Basis of Estimate
Assumptions ❖ Exclusions ❖ Qualifications
for Decommissioning a
647,735.1kW (STC) PV System

Labor Rate Assumptions

Fully burdened prevailing wages for demolition and electrical demolition crews based on www.wdol.gov rates from General Decision Number: VA180176 01/05/2018 VA176.

County Administration wage based on Spotsylvania, VA County Administrative Analyst.

Indirect Costs

Sales Tax

Sales Tax at the rate of 5.30% has been included for all material and equipment.

Building Permits, Inspection and Fees

Building or construction permits are documents that grant the holder approval to construct their project in accordance with the permit and construction documents approved by the appropriate government agency. One or more permits may be required depending the type of project and the government agency's established requirements. Fees may include testing & inspection (soils, etc). This Conceptual Cost Estimate includes 3.25% against labor, equipment & material costs for building permits, inspection and fees.

Subcontractor Bonding

This Opinion of Probable Cost includes Contractor Default Insurance against loss incurred as the direct result of a subcontractor or supplier default.

Public Liability and/or Property Damage:

This estimate includes Public Liability and Property Damage. This insurance provides protection against the financial risk of being found liable for death or injury, loss or damage of property or pure economic loss, and is factored against the non-residential portions of the project.

Contractor Contingency:

This Opinion of Probable Cost includes Contractor Contingency of 2.00% against labor, equipment & material costs.

Contractor's Overhead & Profit:

This Opinion of Probable Cost includes Contractor's Overhead & Profit Overhead of 4.75% against labor, equipment & material costs.

Exclusions

- 1 Premium for off-hours work or accelerated schedule.

Basis of Estimate
Assumptions ❖ Exclusions ❖ Qualifications
for Decommissioning a
647,735.1kW (STC) PV System

Qualifications

- 1 Costs for waste management/recycling verification programs are unknown at this time and may need to be added if required by the Authority Having Jurisdiction.
- 2 A direct cost allowance of \$3,410,488 has been included for E-waste handling, abatement and disposal (including escalation). Any costs incurred in excess of this allowance shall be deemed a compensable change order.
- 3 Production rates based on 8 hour shifts.
- 4 Timeline is based on a (5) day work week.
- 5 Recycle definition: material will be reconstituted into a new product.
- 6 Salvage definition: material will be reused in its current configuration or format.
- 7 Disposal definition: material will be disposed of at licensed waste dispose facility. Material still may be recycled or salvaged at the sole discretion of the waste disposal facility.
- 8 Estimate is based on a current recycled steel value of \$276.5 per ton.
- 9 Estimate is based on a current 'clean' recycled aluminum value of \$0.455 per pound.
Clean aluminum is free of fasteners, insulation, and other minor debris.
- 10 Estimate is based on a current 'dirty' recycled aluminum value of \$0.32 per pound.
Dirty aluminum includes fasteners, insulation, and other minor debris.
- 11 Estimate is based on a current recycled copper value of \$1.465 per pound.
- 12 Estimate is based on a recycled glass value of \$0.07 per pound.
- 13 Estimate is based on a electronic disposal waste fee of \$0.30 per pound.

Blended Crew Rates

Based on www.wdol.gov rates for Spotsylvania, VA

General Decision Number: VA180176 01/05/2018 VA176

DEMO, non-Electrical	Crew	Rate*	Total	Designation No.
Laborers	4	\$20.62	\$82.48	SUVA2013-050 01/11/2016
Operators	2	\$32.20	\$64.40	SUVA2013-050 01/11/2016
Foremen	1	\$40.25	\$40.25	RSMeans Metric
Weighted Average		\$26.73	\$187.13	

DEMO, Electrical	Crew	Rate*	Total	Designation No.
Electricians	4	\$47.52	\$190.07	SUVA2013-050 01/11/2016
Operators	2	\$32.20	\$64.40	SUVA2013-050 01/11/2016
Foremen	1	\$40.25	\$40.25	RSMeans
Weighted Average		\$42.10	\$294.72	

* Fully burdened