

DECOMMISSIONING PLAN

FOR

SV CSG MANKATO NORTH 1, LLC

Mankato, Minnesota

PREPARED BY:



PREPARED FOR:



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.



SARAH SMEDLEY, MINNESOTA LICENSE NO. 52904
DATE OF SIGNATURE: December 20, 2024

REV.	DATE	DESCRIPTION	AUTHOR	CHECKER	APPROVER
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1. INTRODUCTION

The purpose of this report is to describe the decommissioning process for the Mankato North 1 solar photovoltaic (PV) generation facility (“the project”) located at 23759 Third Avenue, Mankato, Minnesota, 56001. The project consists of (2,346) Hanwha 630W solar modules mounted to a driven pile, single axis tracker system. Both direct current (DC) and alternating current (AC) conductors will be trenched in conduit. After final circuit consolidation at the PV system pad mounted switchboard, the system’s voltage will be stepped-up to distribution level at the Xcel owned transformer and interconnected, onto an existing utility distribution circuit. Construction includes elevated solar modules mounted on driven steel piles, concrete inverter/transformer pads, and gravel access roads.

2. SUMMARY STATEMENT OF EXPECTED RESIDUAL VALUE

The expected residual value of the solar facility is the difference between the removal/restoration cost and the salvage value. The decommissioning cost to remove the solar PV facility and reestablish the property back to a grassy field is not expected to exceed an expenditure of \$143,513 at the end of the project’s expected service life.

3. BASIS OF PLAN NARRATIVE

The following is a list of assumptions and clarifications to further define the methodology used to establish the scope and values of the removal costs and salvage values.

3.1 GENERAL

- The intent of the decommissioning work will be to fully remove the solar facility, dispose of any components, and restore the site to a permanently stabilized grass field.
- The service life of the facility is assumed to be 35 years. All dollar amounts are in net- present-value. It is assumed that all values will inflate/deflate consistently with baseline inflation, therefore, the net-present-value comparison of removal cost to salvage value will remain relevant at the end of the service life.
- Costs associated with this plan represent a “turnkey” operation for a general contractor to be hired for this work, including permits, mobilization, contingency, etc.
- Haul costs assume a maximum distance of 60 miles between the project and nearest disposal or recycling facility.
- No maximum duration has been assigned for this work. It has been assumed that this work would be handled by a single crew without full-time site personnel.

3.2 CIVIL INFRASTRUCTURE

- Topsoil used to backfill excavations will be borrowed from onsite locations. No topsoil import is included.
- Remove rip rap at stormwater basins.
- Aggregate removal will be the full depth of the aggregate section for roads, equipment pads, and other areas utilizing aggregate. No aggregate will be buried. Includes subgrade scarification prior to backfilling with topsoil.

- Turf establishment includes mulch, fertilizer, and water as necessary to achieve 70% ground cover as required to satisfy the NPDES Construction General Permit.
- Sediment control cost consists of silt fence but could also be fiber logs. Location of sediment control will be downslope from exposed soils only in areas where sedimentation offsite or into onsite water bodies can reasonably be expected.
- Trees and shrubs shall be protected and shall remain in place.

3.3 STRUCTURAL INFRASTRUCTURE

- Steel pile foundation removal is estimated at 25% the effort and cost as pile installation.
- Steel racking removal is estimated at 50% the effort and cost of racking installation.

3.4 ELECTRICAL INFRASTRUCTURE

- PV modules to be recycled. Assumption is that the modules are 156 cell polysilicon modules, having an approximate dimension of 8' x 4' in dimension.
- Switchgear including transformers will be removed from their respective concrete pads and recycled or returned to the manufacturer.
- Copper wiring will be dug up (if required) and recycled.
- Aluminum wiring will be dug up (if required) and recycled.
- On site riser or interconnection poles shall be removed.
- String inverters/combiner boxes are no more than 172 lbs. in weight and not more than 28.3" x 27.5" x 17.7" in dimension. A two-person crew can dismantle a string inverter and recycle the components.
- Transformers are pad mounted and weigh approximately 8,500 pounds.
- Underground power and communication cables can be removed by excavating with a power trencher or excavator.

3.5 RECYCLED PV MODULES

- Recycling solar modules has environmental benefits such as:
 - Creating a useful and sustainable method of disposal.
 - Providing raw materials for repurposing and reprocessing.
 - Recovering up to 90% of the photovoltaic glass and up to 95% of the semiconductor material necessary for further production.
 - Recycling rare earth metals.

4. SCHEDULE OF REMOVAL AND RESTORATION COSTS

Mankato North 1 CSG						
ENGINEER'S ESTIMATE						
Schedule of Removal and Restoration Costs						
		QUANTITY	UNITS	\$/UNIT	COST	NOTES
CIVIL INFRASTRUCTURE						
1	Road Aggregate, Rip Rap, and Geotextile	7074	CF	\$ 100	\$ 7,074.00	Remove full section of aggregate road, rip rap, and geotextile fabrics
2	Road Aggregate, Rip Rap, and Geotextile Haul and Offsite Disposal	7074	CF	\$ 3.66	\$ 25,890.84	Hauling offsite
3	Topsoil Backfill	5424	CF	\$ 100	\$ 5,424.00	Onsite relocation of topsoil to backfill road and equipment pad excavations
4	Fence Removal	2,354	FT	\$ 100	\$ 2,354.00	Includes fence mesh, post framing, concrete foundations, gates, etc.
5	Fence Haul and Offsite Disposal	18,832	LBS	\$ 0.05	\$ 941.60	assume 8lbs per LF
6	Concrete Equipment Pad Removal	1	EA	\$ 5,000.00	\$ 5,000.00	
7	Concrete Waste Haul and Offsite Disposal	1	EA	\$ 2,500.00	\$ 2,500.00	
8	Site Grading	1	ACRES	\$ 5,000.00	\$ 5,000.00	Grading smooth all areas disturbed by removals, excavations, etc, assumed (0.1x project area) + Road Area + Equipment Pad Area
9	Turf Establishment	6	ACRES	\$ 1500.00	\$ 9,000.00	Hydroseed all areas disturbed by removals, excavations, etc
10	Sediment Control	1855	FT	\$ 10.00	\$ 18,550.00	Silt fence installation
11	Concrete Waste Haul and Offsite Disposal	1	EA	\$ 500.00	\$ 500.00	
Structural Infrastructure						
15	Foundation Removal	510	EA	\$ 18.50	\$ 9,435.00	
16	Foundation Haul and Offsite Disposal	510	EA	\$ 150	\$ 765.00	Assumed [20] post of or 100 mod tables and [15] post of or 75 mod tables
17	Steel Racking Removal	93840	LBS	\$ 0.34	\$ 31905.60	Assumed 10 lbs per LF of array
18	Steel Racking Haul and Offsite Recycling	93840	LBS	\$ 0.03	\$ 2,815.20	
Electrical Infrastructure						
19	Removal of Solar Modules	2,346	EA	\$ 3.00	\$ 7,038.00	
20	Removal of String Inverters	8	EA	\$ 40.00	\$ 320.00	
21	Removal of Switchgear/Xfmr	2	EA	\$ 1200.00	\$ 2,400.00	
22	Removal of Riser and Interconnection Poles	6	EA	\$ 800.00	\$ 4,800.00	
23	Removal of SCADA/Aux Panel/Weather Station	1	EA	\$ 350.00	\$ 350.00	
24	Removal of Medium Voltage AL Cables	1	MW	\$ 1200.00	\$ 1200.00	
25	Removal of Fiber Optic Cables	1	MW	\$ 250.00	\$ 250.00	
Total Cost					\$143,513.24	

5. SCHEDULE OF SALVAGE VALUES

Mankato North 1 CSG						
ENGINEER'S ESTIMATE						
Schedule of Salvage Value						
		QUANTITY	UNITS	\$/UNIT	Value	NOTES
Structural Infrastructure						
1	Steel Pile	20.4	TONS	\$200.00	\$4,080.00	Assuming 80lbs. per pile
2	Steel Racking	46.92	TONS	\$200.00	\$9,384.00	
3	Fence	2,400	LF	\$0.50	\$1,200.00	
Electrical Infrastructure						
4	PV Modules	2,346	EA	\$25.00	\$58,650.00	
5	String Inverters	8	EA	\$500.00	\$4,000.00	
6	Equipment Switchgear in Xfmrs	2	EA	\$1,200.00	\$2,400.00	
7	SCADA/Aux/Weather Station Equipment	1	EA	\$350.00	\$350.00	
8	MV AL Collection Lines	400	LBS	\$0.20	\$80.00	
9	DC Copper Wires	5,130	LBS	\$1.00	\$5,130.00	
10	AC Aluminum Wires	1,630	LBS	\$0.40	\$652.00	
Total Value					\$85,926.00	