

# 11/20/18

## Generalized Development Plan Narrative

### 1.0 INTRODUCTION

The Generalized Development Plan (GDP) Narrative has been developed per the requirements of Spotsylvania County's Special Use Permit Application. The GDP Narrative provides a description of sPower Development Company, LLC's (sPower, or the Applicant) proposed Spotsylvania Solar Energy Center A project (the Project) located in western Spotsylvania County, Virginia; and demonstrates the Project's consistency with the County's Comprehensive Plan and compliance with the County's Zoning Code.

The Project is part of a composite of three separate projects proposed in Spotsylvania County, Virginia.

#### 1.1 The Project

The Project consists of a 400-megawatt (MW) solar energy facility located on an approximate 5,200-acre site, of which approximately 2,800 acres will be developed for the proposed use. The Project will utilize photovoltaic (PV) panels installed on single-axis trackers. Electricity will be delivered via transmission lines that will run from the Project to the adjacent Spotsylvania Switching Station owned by the Virginia Electric and Power Company.

The Project would benefit Spotsylvania County and the State of Virginia by:

- Meeting the increasing demand for electricity generated from clean, renewable technology;
- Diversifying the State's energy portfolio
- Reducing greenhouse gas emissions;
- Creating "green" jobs within the State;
- Increasing tax revenues; and
- Stimulating the local economy during construction and operation of the Project

sPower will use best management practices and coordinate with all relevant agencies to minimize and mitigate impacts to the environment and local community. All project facilities will comply with the recently approved code amendment (CA17-0009) and Ordinance No. 23-173, permitting solar energy facilities as a special use within Agricultural 3 (A-3) zoning districts.

### 2.0 PROJECT DESCRIPTION

The Project would consist of a 400-MW solar energy facility. PV modules will be mounted on racking systems supported by a pile-driven foundation design. The racking structure is expected to be a single-axis tracking configuration with north-south trending rows that will track the sun from east to west over the course of the day.

PV Modules will be electrically connected into strings that will be connected to combiner boxes located throughout the solar energy facility. The output power cables from the combiner boxes will be consolidated and feed the direct current (DC) electricity to inverters which convert the DC to alternating current (AC). Each inverter will be fully enclosed, pad mounted, and stand approximately 95 inches in height. The AC output from the inverters will be routed through an AC collection system and consolidated within the system switchgear. The final output from the solar energy facility will be processed through a step-up transformer to match the interconnection voltage.

The Project will be designed with a comprehensive Supervisory Control and Data Acquisition (“SCADA”) system for remote monitoring of facility operations and/or remote control of critical components. Within the Project Site, the fiber optic or other cabling required for the monitoring system will be installed throughout the solar energy facility leading to centrally located (or series of appropriately located) SCADA system cabinets. The telecommunications connections to the SCADA system cabinets may be wireless or hard wired.

The Project will include a meteorological (“met”) data collection system. The met station will have the following weather sensors: a pyranometer for measuring solar irradiance, a thermometer to measure air temperature, a barometric pressure sensor to measure atmospheric pressure, and two wind sensors to measure speed and direction. These sensors will be connected to a data logger to compile the data for transmission to the Data Collection Center.

All energy will be routed to Project switchgears, located adjacent to the Spotsylvania Switching Station, at which point all energy from the Project will be stepped up to 500 kilovolts (kV). The primary switchgears include the main circuit breakers and utility metering equipment, and would be enclosed separately and pad mounted together with the generator step-up (GSU) transformers.

An operations and maintenance (O&M) storage facility will be located on-site to store maintenance equipment and vehicles, safety equipment, replacement components, and other items deemed necessary for Project operations.

To summarize, the Project would consist of the following primary components:

- PV modules
- Single-axis tracker system
- Electrical inverters and transformers
- Electrical AC collection system, including switchgears
- Combiner boxes
- Electrical disconnects
- Data monitoring systems
- Transmission lines
- Meteorological station
- Telecommunications equipment
- O&M storage facility
- Access roads

- Security fencing, lighting, and cameras

## 2.1 Project Location

The Project will be located on approximately 5,200 acres (of which approximately 2,800 will be developed) of rural, cleared forest and timber land in western Spotsylvania County, Virginia. The surrounding land use is primarily silviculture with limited agriculture and rural residences that are generally buffered by forested lands. The Project Site is traversed by several logging roads and two transmission lines including an east-west 115 kV line and a north-south 500 kV line that bisect the Project Site. The Spotsylvania Switching Station is located adjacent to the northern boundary of the Project Site.

### 2.1.2 Site Access

Primary access to the Project Site will be provided via Orange Plank Road (State Route 621) on the north and West Catharpin Road on the south. Site access will be improved and maintained to accommodate Spotsylvania County Fire, Rescue, and Emergency Services during both construction and operation of the Project.

The Project is anticipated to have several site access locations, as the Project Site is not entirely accessible from a single site access location due to wetlands, streams, and topographical constraints. All site access locations and driveway entrances will be coordinated with Spotsylvania County and the Virginia Department of Transportation (VDOT). Permanent access roads taken from paved streets shall include a paved apron only if required by VDOT.

Refer to the Access Road Service Areas on the Generalized Development Plan for a depiction of potential site access locations.

### 2.1.3 Project Site Characteristics

#### 2.1.3.1 Biological Resources

sPower reviewed the Virginia Department of Game and Inland Fisheries (“VDGIF”) Virginia Fish and Wildlife Information Service (“VaFWIS”), VDGIF’s Wildlife Environmental Review Map Service (“WERMS”), VDGIF’s Northern Long-Eared Bat (“NLEB”) Winter Habitat and Roost Trees Application, VDGIF’s Little Brown Bat (“MYLU”) and Tri-colored Bat (“PESU”) Winter Habitat and Roosts Application, Department of Conservation and Recreation (“DCR”) Natural Heritage Data Explorer (“NHDE”), and US Fish and Wildlife Service (“USFWS”) Information for Planning and Conservation (“IPAC”) databases for an analysis of potential impacts to natural heritage resources and threatened and endangered species. The analysis concluded the existence of potential habitat at the Project Site for the dwarf wedgemussel (*Alasmidonta heterodon*), the northern long-eared bat (*Myotis septentrionalis*), the yellow lance (*Elliptio lanceolata*), and the small whorled pogonia (*Isotria medeoloides*). Additionally, the analysis concluded that no critical habitats exist within the Project Site.

The dwarf wedgemussel and yellow lance are limited to wetland habitats, which will not be encroached during construction and/or operation of the Project. Additionally, the Project will

implement erosion and sediment control measures during construction to further prevent potential impacts to the dwarf wedgemussel and yellow lance. Therefore, no impacts to the dwarf wedgemussel or yellow lance are anticipated as a result of the Project.

The small whorled pogonia is federally listed as threatened and state listed as endangered. This species is a perennial orchid that tends to favor mid-aged woodland habitats on north or northeast facing slopes. Additional coordination was conducted with DCR and a small whorled pogonia habitat survey was recommended. The results of the habitat survey indicate that no small whorled pogonia habitat exists in areas targeted for development of the Project.

VDGIF's NLEB Winter Habitat and Roost Trees Application was reviewed to identify winter habitat within 0.25 mile of the Project Site or known maternity roost trees within 150 feet of the Project Site (accessed August 22, 2017). No known NLEB winter hibernaculum or maternity roost trees were identified within the Project Site, referenced ranges, or a 2-mile radius. Therefore, no impacts to NLEB are anticipated as a result of the Project.

The Project will implement the following measures to further avoid and minimize potential impacts to threatened and endangered species:

- The Project Site has been configured to avoid impacts to wetlands and waters. A 100-ft Resource Protection Area ("RPA") buffer will be provided around all perennial streams. In addition, there will be minimized impacts to isolated wetlands, vernal pond features or bottomland hardwood wetland systems.
- Connection of the solar fields will be achieved via directional drill from upland to upland in wetland areas. All construction staging will be located in uplands.
- Erosion and sediment controls will be utilized and maintained throughout construction.
- Installation of wildlife-friendly fencing along the perimeter of the Project Site.
- Planting of native pollinators in buffer areas will be reviewed and implemented if practicable.
- An Invasive Species Management Plan will be developed as part of the Project.
- Habitat survey for small whorled pogonia for the area identified by DCR will be conducted and coordinated with DCR.

#### 2.1.3.2 Cultural and Historic Resources

The Project Site is partly surrounded by features and landscapes representing the American Civil War. These include the Spotsylvania Court House, Wilderness, and Mine Run Battlefields. No identified historical resources specifically related to the Civil War have been recorded within the Project Site and are most likely limited to troop movements during the battle of Spotsylvania Court House or ephemeral actions leaving little or no trace. In contrast, there are resources in and around the Project Site including standing structures and archaeological sites that reflect other important themes from the past including Native American and colonial settlements, and early mining activities.

sPower is currently conducting a Cultural and Historic Resources Study of the Project Site in coordination with the Virginia Department of Historic Resources and will submit the final report

to Spotsylvania County. The Cultural and Historic Resources Study scope was approved by the Virginia Department of Historic Resources on October 2, 2017 and includes, but is not limited to, database research, extensive sub-surface shovel testing and site surveys, and architectural assessments. The final report will document all identified cultural, historic, and archaeological resources found at the Project Site, and summarize all actions needed to mitigate and avoid impacts to these resources.

## **2.2 Planning and Zoning**

### *2.2.1 Zoning District and Ordinance*

All parcels within the Project boundary are zoned Agriculture 3 (A-3). Surrounding parcels are primarily zoned A-3 with the exception of the Fawn Lake Community, located to the northeast of the Project Site, that is zoned Planned Development Housing 3 (PDH-3). Per the County's recently approved code amendment (CA17-0009) to the Spotsylvania Zoning Ordinance, solar energy facilities are permitted as a special use in A-3 zoning districts. Therefore, the Project will adhere to the requirements of CA17-0009 as shown in Section 23-4.5.7 of the Spotsylvania County Zoning Ordinance.

### *2.2.2 Special Use Application*

Per Section 23-4.5.7 of the Spotsylvania County Zoning Ordinance and the requirements of the County's Special Use Permit Application, sPower will submit the following, as applicable, for the Project:

- Standard Application Form
- Special Power of Attorney
- Adjacent Property List
- Fees
- General Warranty Deed
- Accurate Plat
- Generalized Development Plan-Narrative
- Generalized Development Plan-Graphic
- Traffic Impact Study
- Conceptual Stormwater Management Plan
- Viewshed Analysis
- Decommissioning Plan

Architectural renderings are not included in the Special Use Permit Application as no buildings are proposed for the Project. A map analysis of airports is not included as no airports exist within five miles of the Project boundaries.

As part of the Special Use Permit Application process, sPower attended a Pre-Application meeting with Spotsylvania County Staff on December 21, 2017. Additionally, sPower hosted a Community Meeting for the Project on January 10, 2018 at the Fawn Lake Community located at 11300 Longstreet Drive, and a second Community Meeting on January 11, 2018 at Craigs Baptist Church

located at 14123 West Catharpin Road. Additionally, through the Fall of 2018, two additional community meetings were conducted and sPower met with county staff on a weekly basis.

### 2.2.3 Environmental Permitting

In addition to the requirements above, sPower has conducted biological, wetlands, cultural, and historic resources surveys at the Project Site in coordination with Virginia’s Department of Environmental Quality (DEQ), Marine Resources Commission (VMRC), Department of Historic Resources (DHR), and the United States Army Corps of Engineers. Prior to construction of the Project, all required permits, reports, and technical analyses will receive final approval from their respective governing agencies.

### 2.2.4 State Corporation Commission

In October 2017, sPower submitted an application to the State Corporation Commission (SCC) for a Certificate of Public Convenience and Necessity (CPCN) pursuant to § 56-46.1 and § 56-580 D of the Code of Virginia and 20 VAC 5-302, for the construction and operation of a 500 MW solar energy facility. sPower received approval of the CPCN in August 2018.

## 3.0 CONSTRUCTION

Project construction would consist of three major phases: (1) site preparation; (2) PV system installation; and (3) testing. sPower anticipates close collaboration with Spotsylvania County during the permitting process to identify and manage environmental conditions and design criteria specific to the Project. Through the permitting process, sPower will implement all required mitigation measures and Best Management Practices (BMPs) as determined by Spotsylvania County and regulatory agencies.

### 3.1 Development Phasing Plan

Spotsylvania Solar Energy Center A, B, and C are anticipated to take approximately two (2) years to develop from the Design and Permitting Phase through the Construction Phase. Approximate scheduling of each phase of development is as follows:

Development Phase		Timeline
Design & Permitting		January 2018 – February 2019
Procurement		January 2018 – December 2019
Construction	Civil Work, Foundations	February 2019 – June 2020
	Installation, Erection and Electrical Work	February 2019 – June 2020
	Utility Activities	December 2019 – June 2020
	Testing & Commissioning New Substation	December 2019 – December 2020
Start-Up & Commissioning		December 2019 – December 2020

## 3.2 Civil Work

Construction of the Project would begin with initial clearing and grading (if required) of the staging areas. Access to the Project Site would be improved to appropriate construction standards. The staging areas would typically include temporary construction trailers, worker parking, truck loading and unloading facilities, and an area for assembly. Road corridors would be surveyed, cleared, and graded to bring equipment, materials, and workers to the areas under construction. Buried electrical lines, PV array locations, and the locations of other facilities may be flagged and staked to guide construction activities. BMPs for stormwater and erosion control would be installed during the site preparation phase and prior to significant grading activities.

### 3.2.1 Civil Phasing Plan

sPower will construct the entire Project (Sites A, B, and C) in phases and limit construction to approximately 400 acres for excavation, grading and contouring. 400 acres is the target size, but actual disturbance limits will be defined in the Site Plan to balance cut and fill across the individual zones. Furthermore, the Project Site has been divided into five (5) separate watersheds and work will be limited to zones within that watershed until temporary or permanent stabilization measures are in place and have been signed off by the County's authorized stormwater representative. As portions of the zones in each watershed are temporarily or permanently stabilized, other zones within that watershed can be disturbed provided the sum of the acres in the zones does not exceed 400 acres in their respective watershed. Temporary and permanent stabilization measures may include, but are not limited to, the use of drill seeding, mulch, fiber matting, super silt fencing, swales, retention basins, and other erosion control BMPs as determined necessary and appropriate in the Virginia Stormwater Management Program (VSMP).

sPower will provide immediate response for all VSMP and erosion control requirements and will be in contact with County procured third-party engineering firms. Project representatives will be in place for each watershed and shall be responsible for teams that can respond during rainfall and erosion events. Standard responsibilities will include maintenance of temporary and established erosion control devices and BMPs. The teams shall also be responsible for addressing any erosion control failure and for immediate remediation if necessary. If such remediation is not taken immediately as directed then civil penalties shall be imposed according to the Spotsylvania County violation penalty matrix, and work shall be stopped until compliance is achieved.

## 3.3 PV System Installation

PV system installation will include earthwork, grading, and erosion control, as well as erection of the PV modules, supports, and associated electrical equipment. System installation will begin with teams installing the mounting and steel pier support structures. The exact design will be finalized pending specific soil conditions, but will likely include pneumatically driven H-pile steel beams attached to a tracker racking system. This will be followed by panel installation and electrical work.

Concrete may be required for the footings, foundations, and will be required for pads for the inverters and transformers. Concrete will be produced at an off-site location by a local provider and transported to the Project Site by truck. Final concrete specifications will be determined during detailed design engineering and will meet applicable building codes.

The PV modules require a moderately flat surface for installation. Some earthwork, including grading, fill, compaction, and erosion control cultivation may be required to accommodate the placement of PV arrays, foundations or footings, access roads, and drainage features. A Virginia Pollutant Discharge Elimination System (VPDES) permit will be obtained by sPower. Construction of the PV arrays will include installation of support beams, module rail assemblies, PV modules, inverters, transformers, and buried electrical cables.

Wastes that will be generated during construction may include the following: cardboard, wood pallets, copper wire, scrap steel, common trash, and wood wire spools. sPower does not expect to generate hazardous waste during construction of the proposed Project. However, field equipment used during construction will contain various hazardous materials such as hydraulic oil, diesel fuel, grease, lubricants, solvents, adhesives, paints, and other petroleum-based products contained in construction vehicles.

### **3.4 Construction Workforce**

Construction is anticipated to begin in February 2019 and be completed by June 2020. The on-site workforce will consist of laborers, various skilled trades, supervisory personnel, support personnel, and construction management personnel. Construction will generally occur during daylight hours, Monday through Friday. Construction activities will be conducted consistent with Spotsylvania County regulations regarding hours of construction.

The Project (including Spotsylvania Solar Energy Center B and C) will generate an estimated 700 new jobs during the construction phase and will provide approximately 20-25 full time positions over the life of the facility for O&M activities. sPower and its Engineering, Procurement, and Construction (EPC) contractor will host local career fairs to recruit a local workforce for the Project to the extent possible.

### **3.5 Emergency and Shutdown Procedures**

To ensure the safety of all employees working on the Project during construction, sPower will develop and implement an Emergency Response Plan for the Project in accordance with Code of Federal Regulation 1910.38 established by the Occupational Safety and Health Administration (OSHA). Key personnel will be designated to train all employees working on the Project, and will be responsible for administering emergency and shutdown procedures in the event of an emergency. Emergency and shutdown procedures will be clearly displayed in all construction trailers, along with contact information for emergency service providers and treatment facilities. Appropriate warning signage will be placed on all towers, electrical equipment, and Project Site ingress and egress points. Prior to construction, sPower will notify all emergency service providers



of construction activities occurring at the Project Site and inform them of all emergency and shutdown procedures, including who needs to be contacted in case of an emergency.

sPower will coordinate its development of the Emergency Response Plan with the Spotsylvania County Fire Chief to ensure satisfactory safety measures are in place in the event of a wildfire. Safety measures shall include fire suppression methods that can be immediately deployed during both construction and operation of the Project. Two 50,000-gallon water tanks are proposed to be constructed on the Project Site to supply water to emergency service providers and regularly maintained with the guidance of the Spotsylvania County Fire Chief.

### **3.6 Transportation**

As part of the Special Use Permit Application, Kimley-Horn and Associates, Inc. developed a Traffic Impact Study that will be submitted to both Spotsylvania County and VDOT. The Traffic Impact Study identifies the trip generation estimates for the Project and potential impacts to the local circulation network, as well as proposes traffic calming measures during construction.

Equipment, permanent materials, and commodities for the Project will be transported to the Project Site via rail and state and/or interstate highways. Heavy hauls will be shipped via rail to nearest active railroad spur for offloading and transported by truck to the Project Site. Heavy haul trucks with multiple axles will be employed to distribute loads, as required. All equipment and material deliveries will utilize the Project Site access.

Truck deliveries of equipment and materials will occur beginning with the initial construction notice to proceed and continuing through the duration of the Project construction process. Initial truck deliveries will include heavy haul trucks for importing panels, project materials, followed by concrete trucks for installation of the solar field and major foundations, and deliveries of reinforcing steel. Electrical cabling and piping materials for buried piping will be delivered to the Project Site early in the construction period corresponding to approximately the time frame for foundation installation. Deliveries of large major equipment will commence at about midpoint of the construction period.

In some circumstances, sPower will need to use private access easements for ingress and egress. Private access easements will be treated with the utmost of care during construction. When construction access must be taken through private access easements, strict 15 mph speed limits will be enforced, and all appropriate flagging and signage will be in place for constant reminders. Health and safety inspectors will monitor and enforce site rules and speed limits throughout the Project Site and access easements. sPower will notify all nearby neighbors of construction activities and provide contact numbers for any issues with traffic and construction activities.

### **3.7 Parking and Staging Areas**

sPower will ensure adequate parking is provided for construction workers at the Project Site. In addition to parking, the Project will require a temporary staging area for storing materials, assembling components, refueling equipment, and installing construction trailers. Parking and staging signs will be clearly placed at ingress and egress points to direct traffic to the proper location.

### **3.8 Waste and Recycling**

Construction waste would be generated from installation of the solar arrays and related facilities. Construction waste generation is expected to be minimal and consist of mostly recyclable materials such as cardboard, steel, and electrical wiring. sPower's EPC contractor that will be responsible for construction of the Project will carefully disassemble and recycle shipping containers and solar panel packaging to minimize solid waste impacts. The EPC contractor will contract with a waste and recycling service provider to ensure all waste generated from construction of the Project is disposed of in accordance with federal and State regulations. The EPC contractor will store, collect, and dispose of solid waste in such a manner as to prevent fire and health hazards, rodent harborage, insect breeding, accidents, and odor. The EPC contractor will ensure that no littering on the Project Site or neighboring properties will occur during construction.

A copy of the Solar Waste Stream Calculations worksheets have been provided to the County and included on the Generalized Development Plan.

### **3.9 Sanitation Services**

No wastewater facilities exist at the Project Site and no such facilities would be constructed for the Project. Portable restroom facilities would be provided and maintained by sPower's EPC contractor during construction.

### **3.10 Water Supply**

It is anticipated that average water usage for all three project sites combined will be approximately 100,000 gallons per day during the 18-month construction process. During construction, water will primarily be used for dust suppression (40%) and soil compaction (60%). The process of soil compaction consists of grading and moving soil along slopes to level the ground that will support the solar arrays, inverters, transformers, internal access roads, and ancillary facilities. Once graded, the soil must be compacted through application of water to prevent soil erosion and reinforce the structural integrity of the ground.

sPower will buy water from the local municipal water system and will use no more than 100,000 gallons per day. sPower will not utilize groundwater during construction except in emergency scenarios should the municipal system fail to meet the need described above due to a system failure.

Prior to initiation of construction, sPower will secure water rights from local sources to the approval of the Spotsylvania County. Additionally, as stated above, water tanks will be constructed on the Project Site to supply water to emergency service providers and regularly maintained with the guidance of the Spotsylvania County Fire Chief.

### **3.11 Construction Noise**

The Project is anticipated to result in temporary noise impacts during construction. Noise impacts associated with construction include increased traffic, pile driving, and general construction activities. Pile driving will result in the loudest noise impacts and thus a noise analysis was conducted for pile driving and submitted to the County. The analysis assumed a worst-case scenario of 15 pile drivers operating simultaneously in a solar array section that consists of approximately 50 acres. The results indicate that the loudest noise levels that would occur at a neighboring residence would be as high as 80.3 dBA, and may last as long as four days.

To reduce the impact of construction noise on neighboring residents, the following measures are proposed:

- Place all stationary construction equipment so that emitted noise is directed away from sensitive receptors.
- The construction contractor shall locate equipment staging in areas that will create the greatest possible distance between construction-related noise sources and noise-sensitive receptors nearest the Project Site during all project construction.
- Ensure proper maintenance and working order of equipment and vehicles, and that all construction equipment is equipped with manufacturer's approved mufflers and baffles.

### **3.12 Site Stabilization**

Upon completion of the Project, sPower will stabilize the Project Site through use of a native seed mix to the satisfaction of Spotsylvania County. Furthermore, site stabilization will be maintained by sPower operations and maintenance staff throughout the life of the Project to the specifications of Spotsylvania County. Site stabilization with a native seed mix will prevent erosion at the Project Site, while reestablishing native pollinators at the Project Site once construction is complete.

## **4.0 OPERATIONS AND MAINTENANCE**

Upon commissioning, the Project would enter the operational phase. For the duration of the operational phase, the Project would be operated remotely and monitored by on-site staff for security and maintenance purposes. As the Project's PV arrays produce electricity passively with minimal moving parts, maintenance requirements would be limited. Any required planned maintenance would be scheduled to avoid peak load periods, and unplanned maintenance would be typically responded to as needed depending on the event. An inventory of spare components would be readily available in an O&M facility located on the Project Site. Refer to the Generalized Development Plan for the location of the O&M facility.

Other operational details are summarized in the following sections.

### **4.1 Operations**

sPower will ensure consistent and effective facility operations by:

- Responding to automated alarms based on monitored data, including actual versus expected tolerances for system output and other key performance metrics;
- Communicating with customers, transmission system operators and other entities involved in facility operations; and
- Designating a site supervisor to monitor and implement emergency and normal shutdown procedures

## 4.2 Maintenance

Project maintenance performed on the site would consist of equipment inspection and replacement. Maintenance would occur during daylight hours, when possible. However, maintenance activities on the PV modules and DC systems would be typically performed at night. Maintenance program elements include:

- Managing a group of prequalified maintenance and repair firms who can meet the O&M needs of the facility throughout its life;
- Implementing a responsive, optimized cleaning schedule;
- Responding to plant emergencies and failures in a timely manner;
- Maintaining an inventory of spare parts to ensure timely repairs and consistent plant output;
- Maintaining a log to effectively record and track all maintenance problems; and
- Performing maintenance on the site as required to clear obstructive ground cover

## 4.3 Remote Monitoring of the Project

The Project will be monitored 365 days a year from a remote location utilizing a Supervisory Control and Data Acquisition (SCADA) system. Safe, effective and efficient operation of the Project is dependent on the operator receiving accurate information on all environmental measurements which affect production. These measurements include solar irradiation, ambient temperature, back of module temperature, and wind speed. These environmental characteristics are reported by various sensors—pyranometers for irradiance, thermometers for temperatures, and anemometers for wind speed. Other characteristics of the Project are also reported in real time such as current production, voltage, amperage, power quality, and the status of all circuit protection devices. Circuit protection devices include the ability to report the status of their protective relays continuously as are the meters which report the electrical characteristics of the Project.

Signals from all sensors, meters, and circuit protection devices are accumulated in to one or more data loggers which report via secure internet connections to sPower’s monitoring provider. The software that comprises the monitoring system is set up to send alarms when one or more conditions arise that compromise the safe and efficient operation of the plant. sPower has operators on duty in its control center during all hours when production is expected. If an emergency should arise in the off hours, personnel are assigned to take “on-call” messages in the case of emergencies.

## 4.4 Emergency and Shutdown Procedures

As stated above, sPower will develop and implement an Emergency Response Plan for the Project. All employees working on the Project during operations will be trained in emergency and

shutdown procedures. Signs will be clearly marked at the Project Site for emergency vehicle ingress and egress. sPower will facilitate training for emergency service providers related to the specific hazards of the Project.

#### **4.5 Transportation**

The Project will primarily be operated remotely and monitored by on-site staff for security and maintenance purposes. Therefore, transportation to and from the Project Site will be minimal and would not adversely affect existing traffic conditions. As stated above, signs will be clearly marked at the Project Site in the event that emergency vehicles need to access the Project Site. All access driveways from public roads will be paved (only if required by VDOT), and then transferred to unpaved, all weather access roads. Unpaved roads will be maintained during the life of the Project.

#### **4.6 Water Supply**

During operation of the Project, minimal water would be used for solar panel washing on an annual basis and periodically for landscaping. It is estimated that a maximum of 2 acre-feet of water per year would be needed during operations for all three project sites.

The panels are designed to perform with dust and pollen that can accumulate on panels for temporary periods of time. Spotsylvania County receives approximately 42 inches of rain per year at varying intensities, more than enough to satisfy the cleaning needs of the Project's panels. Today's PV solar panel technology continues to operate at high efficiencies when covered with varying amounts of dust, pollen, and other organic matter.

#### **4.7 Waste and Recycling**

Waste is not expected to be generated in significant quantity during operation of the Project.

#### **4.8 Operational Noise**

Solar energy facilities generate minimal noise during operations. Primary sources of operational noise would include the inverters and solar tracker system, and would be limited to daytime hours when the Project is generating electricity. Inverters and the solar tracker system would be located far enough from the property line so as not to increase ambient noise at adjacent residences.

#### **4.9 Light and Glare**

The Project would include inward facing, low-level motion detector security lighting at ingress and egress points at the Project Site. Project lighting would be directed onto the Project Site and would be shielded to illuminate intended areas only. The Project switchgear would be lit when staff are at the Project Site working, but would not be lit when the station is unstaffed. These lighting measures would reduce the amount of light trespass falling outside the Project Site boundaries.

The glare and reflectance levels from a given PV solar energy facility are decisively lower than the glare and reflectance generated by the standard glass and other common reflective surfaces found in urban environments. The PV panels used for the Project would be dark blue or black with minimal light reflection and contain a microscopically irregular surface designed to trap incident rays of sunlight.

As of June 2013, there were over 30 solar projects in operations at airports in 15 different states. Solar installations have been successfully located at or near US international airports in Boston, New York, San Francisco, and Denver, among others. Glint and glare will be minimal and would not impact aircraft flying near the Project Site.

#### **4.10 Viewsheds**

The Project is being designed with the goal of shielding the Project from neighboring properties. sPower is proposing to install vegetative buffers and/or berms within setbacks at locations that are adjacent to residences and roadways for screening purposes. Setbacks at locations that are not immediately adjacent to residences and roadways (areas adjacent to forested lands) will be preserved for natural regrowth. Refer to the Landscape and Buffer Area Plan on the Generalized Development Plan.

#### **4.11 Security**

The Project will be monitored by security staff during operations. An appropriate security fence with warning signs will be placed around the perimeter of the Project and all electrical equipment will be locked. sPower will coordinate with the Spotsylvania County Fire Chief to install an approved, electronically controlled security access gate at the Project Site. As stated above, the Project would include inward facing, low level security lighting and cameras at ingress and egress points.

#### **4.12 Electric and Magnetic Fields**

Potential health effects from exposure to electric fields from power lines is negligible because magnetic fields attenuate rapidly. The Project has relatively low voltage and amperage and electromagnetic fields attenuate to background levels in less than 20 to 30 feet, or within the setback from Project boundary. Even within the facility, voltage and amperage is similar to that in other neighborhoods that contain low and medium voltage distribution lines. Out of the Project Site, the highest potential for EMF is from transmission lines. Transmission lines that will be installed will be similar to existing transmission lines in the area. Induced currents and voltages on conducting objects near the proposed transmission lines represent a small potential hazard; but these transmission lines do not pose a threat if the conducting objects are properly grounded. As part of the siting and construction process for the Project, sPower will site all proposed transmission lines with nothing underneath them that would conflict with grounding.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has a recommended electric field level exposure limit of 4,200 Volts/meter (V/m) for the general public. Several studies have documented the non-risk associated with electric field exposure from utility

scale solar facilities and residential rooftop installations. One such study found that electric field levels along the fenced PV array boundary of a utility scale solar facility, and at locations set back 50 to 150 feet from the boundary, were not elevated above background levels ( $< 5$  V/m). Electric fields near the inverters were also not elevated above background levels ( $< 5$  V/m). At the residential installations, indoor electric fields in the rooms closest to the roof-mounted panels and at locations near the inverters were also not elevated above background levels ( $< 5$  V/m).

Therefore, potential health effects from exposure to electric fields from the Project would be negligible.

#### **4.13 Project Decommissioning**

sPower will decommission and remove the system and its components at the end of the life of the Project. The Project site could then be converted to other uses in accordance with applicable land use regulations in effect at that time. All decommissioning and restoration activities will adhere to the requirements of the appropriate governing authorities.

Per the County's recently approved code amendment (CA17-0009) to the Spotsylvania Zoning Ordinance, sPower will submit a decommissioning plan executed and notarized by the landowners, sPower, and any other responsible party. sPower will provide the County with a surety equivalent to the cost of the removal of the solar energy facility prior to issuance of building permits.