



*SOLAR LANDSCAPE LLC,*  
**ENVIRONMENTAL, HEALTH  
AND SAFETY POLICY  
FOR CONSTRUCTION**

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# CORPORATE ENVIRONMENTAL HEALTH AND SAFETY POLICY (EHS)

This Corporate Environmental Health and Safety (EHS) policy provides Solar Landscape LLC's overall view of safety and the associated safety programs for our various solar panel installation locations.

This EHS Policy summarizes the information regarding safety policies and Solar Landscape operations. The EHS Director is responsible for implementing, enforcing, and updating this policy to meet current conditions or applicable regulatory requirements.

## SAFETY PHILOSOPHY STATEMENT

Solar Landscape's safety philosophy has been developed to reflect and communicate the proactive safety attitude required for work performed or supervised by Solar Landscape.

Solar Landscape is committed to complying with all applicable EHS regulatory requirements and applicable industry codes and standards. We promote a culture where EHS is an integral part of our work and we require our employees, contractors, and suppliers to adhere to rules, regulations, and Solar Landscape safety policies/programs.

Solar Landscape will comply with appropriate safety and security laws and regulations such as those established by:

- The Occupational Safety and Health Administration (OSHA),
- The Environmental Protection Agency (EPA),
- The Department of Transportation (DOT),
- National Fire Protection Association (NFPA), and
- All other applicable federal, state, and local safety and health regulations.

At Solar Landscape we believe that the health and safety of our employees is of the utmost importance, along with Quality, Production, and Cost Control. Both construction and maintenance operations conducted on our solar systems require that employees and subcontractors follow our EHS Procedures.

The following principles support Solar Landscape's safety, and health philosophy:

- All injuries and accidents are preventable through the establishment and compliance with safe work force procedures,
- The prevention of bodily injury and safeguarding of health are the first consideration in all workplace actions and are the responsibility of every employee or sub-contractor at every level,
- Written safety plans describing the safe work practices and procedures to be practiced in all workplace actions are essential elements of the overall workplace safety program,
- All employees at every level are responsible for knowing and following, the safety practices described in the written plans.

## RESPONSIBILITIES

Solar Landscape's Management Team consists of Shaun Keegan (Founder and CEO), Corey Gross (Founder and COO), Mark Schottinger (President & Chief Legal Officer), Clayton Avent (Chief Financial Officer), and Sonny Protzman (EHS Director). Solar Landscape's management team's strong support of this program is critical to establishing and underscoring the importance of every employee's participation in preventing workplace incidents and injuries.

Solar Landscape's Management Team is responsible for supporting this program to help prevent workplace incidents and injuries, and for encouraging employees to actively suggest ideas, actions, and procedures aimed at achieving a safer and healthier workplace. No employee will be required to do a job that they consider unsafe. Management is accountable for developing engineering and administrative control processes and practices to prevent workplace injuries and illnesses. Solar Landscape's Management Team will consider all employee suggestions for achieving a safer, healthier workplace. Management's commitment is backed by strong organizational policies, procedures, and disciplinary action which ensures employee compliance with safe and healthful work practices.

## SAFETY AND HEALTH PROGRAM ADMINISTRATOR

Solar Landscape's EHS Director, in conjunction with the Executive Management Team has the responsibility to develop, and the authority to implement, the EHS Program and to ensure that all safety and health policies and procedures are clearly communicated to and understood by all employees and contractors.

The EHS Director responsibilities include but are not limited to:

- Generate pre-work Hazard Assessment or Pre-Task Plan (Appendix A),
- Annual Review of the program for necessary updates and changes,
- Oversight: oversee the development of written health and safety standards and provide guidance on new or proposed regulatory requirements, and
- Advise management and Solar Landscape management regarding safety policies and procedures, development needs, concerns, and progress.

Solar Landscape will provide resource allocation to assist in the identification of financial and physical resources necessary for the correction of substantiated safety deficiencies to present to Management.

The EHS Director will identify the required training materials required by federal and state agencies to ensure employees' safe working practices and will also stay current on workplace safety and health hazards and regulations. The EHS Director will audit Solar Landscape's overall Safety Program annually to ensure compliance.

## SUPERVISORS

Solar Landscape Supervisors are responsible for ensuring workers are trained in safe work practices and are made aware of Solar Landscape safety rules and procedures. Supervisors are required to lead safety efforts by example. Solar Landscape Supervisors must enforce safety and health rules and ensure that employees follow safe practices during their daily work. Supervisors along with the EHS Director will investigate accidents, incidents, near misses, damaged equipment, and etc. to determine the root cause, develop corrective and preventative action plans, and prevent similar accidents.

## EMPLOYEES

Employees are accountable for adherence to Solar Landscape's safety programs, policies, and training. Employees are also responsible for compliance with federal, state, and local laws- including OSHA regulations applicable to their work (e.g., wearing appropriate personal protective equipment (PPE), etc.). Employees are expected to participate in Safety and Health Program activities; perform their duties safely in accordance with Solar Landscape safety rules, policies, procedures, and training (including immediately reporting hazards, unsafe work practices, near misses, and accidents).

## CONTRACTORS, SUBCONTRACTORS

Contractors and subcontractors of all tiers must comply with applicable federal, state, and local codes and standards, including OSHA requirements. Contractors are directly responsible for compliance with federal or State OSHA standards for the safety and health of their employees, and for the protection of the public on and around work sites.

## ALL ESTABLISHMENTS AND ENTITIES

All entities and individuals shall be responsible for the development and performance of work in accordance with the safe work requirements of:

- OSHA Code of Federal Regulations (CFR) 29, Part 1926,
- OSHA Code of Federal Regulations (CFR) 29, Part 1910,
- NFPA,
- Applicable manufacturer's instructions, specifications, recommendations, and warranty requirements,
- Applicable solar energy related Laws,
- Any applicable requirements of each relevant Utility, as applicable,
- Current National Electric Code as adopted in the applicable jurisdiction, and
- Applicable Prudent Solar Practices.

## WRITTEN SAFETY PLANS

Because Solar Landscape cares about employees and subcontractors, Solar Landscape is committed to providing a safe and healthy workplace. Solar Landscape has developed written safety and health plans to provide guidance and direction for working safely at our solar installation facilities and includes the following plans:

1. PPE
2. Fall Protection
3. Powered Industrial Trucks (PIV)
4. Trenching and Excavation
5. Electrical Safety
6. Hazard Communications
7. Incident Investigation
8. Driver and Vehicle Safety
9. Recordkeeping
10. Respiratory Protection
11. Bloodborne Pathogens
12. Crane and Lift Plan
13. Hand and Power Tools
14. Welding and Hot Work
15. Emergency Action
16. Public Safety
17. Roof Access

**NOTE:** *Solar Landscape may develop new plans as the work scope changes.*

## EMPLOYER/EMPLOYEE RESPONSIBILITIES

It is Solar Landscape's responsibility to provide a safe work environment for all employees.

It is the policy of Solar Landscape to provide a place of employment reasonably free from hazards which may cause illness, injury, or death to its employees. It is Solar Landscape's policy to establish an effective and continuous safety program incorporating educational and monitoring procedures maintained to teach safety, correct deficiencies, and provide a safe working environment. All Solar Landscape Supervisors, managers, directors, and officers are responsible for the enforcement of our safety policies and practices and to ensure that:

- Solar Landscape employees are trained in appropriate safety procedures, including chemical-specific training as required,
- Individual safety files are to be maintained in Personnel for all employees,
- Employees notify the EHS Director and complete all necessary forms if an accident or work-related health event occurs,

- Operating equipment is maintained so that the equipment and work area is always a safe, hazard-free condition.

## HAZARD ASSESSMENT/PRE-TASK PLAN

It is the responsibility of the EHS Director, Project Managers, and Foremen to conduct routine formal hazard assessments throughout the entire term of a work project.

To assess the Safety needs for each solar project, the following steps will be performed:

The EHS Director, with other appropriate employees, Project Managers, and Foremen will identify job classifications where exposures or potential exposures occur or could occur. The EHS Director will examine the following records to identify and rank jobs according to exposure hazards:

- Injury/illness records
- First aid logs

A walk-through survey of the workplace will be conducted by management utilizing Solar Landscape's Pre-Task Plan (PTP) form to observe and record where potential safety and health hazards exist or may exist to identify sources of exposure to employees, based on the following potential hazard categories:

- Motion or impact,
- Employee trip and falls,
- Falls from heights,
- Protection from falling objects,
- Extreme temperatures,
- Nuisance dust,
- Sharp objects or projectiles,
- Areas subject to compressing, rolling, or pinching,
- Electrical, including static electricity discharge, AC and DC currents,
- Light (optical) radiation, and
- Chemical or biological.

Following the walk-through survey, the EHS Director will organize the data and information for use in the Pre-Panel Installation Site Assessment Form (Appendix B) to analyze the hazards and enable proper selection of PPE and methods for eliminating the hazards.

A Hazard Assessment of the potential for injuries is then determined for each hazard. Each of the basic hazards is reviewed and a determination made as to the injury type and the severity, probability, and overall risk of each potential injury for each hazard found, as well as the existence of any situations where multiple exposures could occur or potentially occur.

The Hazard Assessment or PTP will be documented as a written certification that identifies:

- Workplace evaluated,



- Person certifying that the evaluation has been performed,
- Date(s) of the Hazard Assessment, and
- Certification of a Hazard Assessment or the PTP

The PTP is reviewed with the affected employees and each Solar Landscape employee signs and dates the PTP demonstrating their concurrence to understand the associated hazards and follow the determined controls.

## MOTOR VEHICLE SAFETY

Solar Landscape is committed to safeguarding its employees and others through vehicle safety awareness, proper vehicle maintenance and responsible driving behavior from Solar Landscape employees. The goal of the Solar Landscape Motor Vehicle Safety Program is to take the proper steps to prevent loss of life, injury, or property damage to all employees and members of the general-public.

Employees are trained and expected to act and drive responsibly and in a safe, professional, and courteous manner while driving on Company business and to always comply with road rules when driving. Solar Landscape recognizes that the responsibilities for safety and loss prevention must be shared by everyone. Solar Landscape employees are expected to:

- Abide by and operate their vehicles within applicable federal (i.e., DOT), state, and local Department of Motor Vehicle (DMV) regulations, laws, and ordinances,
- Remain insurable under Solar Landscape liability insurance policy and guidelines and in accordance with Solar Landscape's Motor Vehicle Policy,
- Be responsible for ensuring that vehicles are maintained in safe driving condition and are held responsible for the safety and general conditions of their vehicle,
- Successfully inspect their vehicles prior to each use, and if any discrepancies are found, the hazard identified shall be remedied before its continued use.

Solar Landscape reviews employees' Motor Vehicle Records prior to employment and periodically thereafter to assess their current driving records and driving behaviors for insurability and safe driving. If Solar Landscape, at any time, reasonably determines an employee is not insurable or does not meet Solar Landscape's Driver Qualification requirements, driving privileges may be denied or revoked and/or disciplinary action may be taken.

## PERSONAL PROTECTIVE EQUIPMENT

In accordance with applicable OSHA standards, PPE, including PPE for eyes, face, head, and extremities, protective clothing, respiratory devices, protective shields, and barriers are provided, used, inspected, and maintained in a sanitary and reliable condition. Solar Landscape follows all OSHA regulations and the American National Safety Institute (ANSI) recognized standards regarding its handling of PPE.



All workers are required to follow:

- OSHA CFR 29 Part 1926 Safety & Health Regulations for Construction,
- OSHA CFR 29 Part 1910 Safety & Health Regulations for General Industry.

All workers, subcontractors, observers, and visitors are required to follow and adhere to applicable OSHA regulations while on-site.

Minimum PPE required to be worn by all Solar Landscape employees when on a work site includes:

- ANSI z87 approved Safety Glasses,
- ANSI approved steel leather work shoes,
- ANSI approved high visibility class 3 vests, and
- ANSI approved hardhat.

PPE MUST always be worn whenever on a worksite or performing “any” type of work or observations of work being performed, and employees are required to complete all PPE training in accordance with OSHA guidelines.

## FALL PROTECTION / WORKING AT HEIGHTS

Solar Landscape trains employees on Fall Protection in accordance with OSHA 29 CFR 1926.503. This process provides instructions on how to erect, maintain disassemble, and inspect the fall protection systems, as part of the roof access program.

Solar Landscape’s written Fall Protection defines requirements and training for authorized and Competent Person(s). It also provides requirements for employers regarding procedures and training and written procedures for an effective fall protection program.

Employees are not authorized to access and/or work at heights or on roofs until they attend and complete an in-person Solar Landscape Fall Protection Training Course.

New and replaced fall protection equipment will be inspected/installed by a Competent Person, designated by the EHS Director. Training or retraining will be provided on proper installation and operational requirements and documented accordingly.

Solar Landscape trains employees to:

- Inspect fall protection PPE prior to each use to ensure that defective equipment is not used,
- Dispose of damaged equipment properly according to Company’s standard operating procedures, and
- Replace damaged PPE prior to resuming job tasks associated with working at heights.

## LADDER SAFETY

Solar Landscape requires all field personnel receive ladder safety training in accordance with the American Ladder Institute's Ladder Safety Program and requires successful completion and documentation by the EHS Director, along with on-the-job training that outlines safe ladder practices.

## ELECTRICAL SAFETY

Electricity is recognized as a serious workplace hazard. Solar Landscape follows OSHA's electrical standards, National Electric Code (NEC) and the National Fire Protection Association (NFPA) standards that are designed to protect employees exposed to dangers such as electric shock, electrocution, fires, and explosions. Qualified employees must use proper work techniques, equipment, and PPE as required by applicable regulations.

Solar Landscape provides in-depth electrical and photovoltaic solar training for all new employees with opportunities to participate in refresher training modules throughout their employment with Solar Landscape. Each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to their work environment to control or eliminate any hazards or other exposure to illness or injury.

Solar Landscape requires electrical systems to be de-energized prior to performing any electrical maintenance and service.

## HAZARDOUS ENERGY CONTROL (LOCK OUT / TAG OUT)

During the servicing and maintenance of solar photovoltaic systems and equipment, the unexpected startup or release of stored energy can result in serious injury or death to workers. Solar Landscape requires proper lockout/tagout (LOTO) practices and procedures safeguarding workers from hazardous energy releases in accordance with OSHA regulations.

Solar Landscape trains technicians to understand applicable provisions of the hazardous energy control procedures designed to disable electrical supplied equipment and sources to prevent hazardous energy release while performing any service and maintenance.

## TOOLS (POWER & HAND TOOLS)

Modern power and hand tools are designed to operate safely when used as designed and according to all instructions in the tool's specific operations manual. The manufacturer's operations manual will provide the

proper information for the use and inspection of the tool. Solar Landscape trains its employees to recognize and avoid hazards related to hand and portable power tools and equipment through engineering controls, tool safeguards, communication of hazards and solutions, and PPE.

## RESPIRATORY PROTECTION

Solar Landscape trains employees in the proper use of face masks and respirators. When workers are required to wear approved dust masks or respirators to protect against contaminants, then all elements of the OSHA respiratory standard apply, including fit testing, medical evaluations, training, and program evaluations. Approved protocols for fit testing are included in the standard. However, these guidelines are taken into consideration for fit test requirements if the hazard is not in excess of OSHA's Permissible Exposure Limits.

## HAZARD COMMUNICATIONS

Solar Landscape trains and educates employees on the OSHA Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), which requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) for each hazardous chemical users may use or become in contact. This program establishes procedures concerning Hazard Communication which will enhance the safety and well-being of Solar Landscape employees.

## ACCIDENT, INCIDENT, AND INJURY REPORTING

Solar Landscape has established incident, accident, and injury reporting procedures which requires that all employees are accountable for filling out a "Notice of Injury Form" immediately after an injury occurs, even if medical treatment is not required. Employees are required to notify their supervisor immediately upon incident, accident, or injury as soon as it safe to and able to report, and in all instances within 24 hours.

Managers are expected to report all incidents, accidents, and injuries to the immediate supervisor and the Solar Landscape EHS Director.

Managers/Supervisors are required to conduct the accident investigation within 24 hours of receiving the incident report identifying potential root cause, preventability, and any corrective actions identified. All incidents, regardless of size or impact, must be reported and investigated focusing on discovering the root causes.

Investigating a worksite incident, fatality, injury, illness, or close call, provides Solar Landscape's Management Team and the employees the opportunity to identify hazards in their operations and any deficiencies in their safety and health programs. Most importantly, it enables both the Management Team and employees to identify and implement the corrective actions necessary to prevent future incidents.

Supervisors must complete the Report of Injury of Illness Investigation Form and list all contributing

circumstances to find the root cause of the incident. Information must be factual, accurate, and without opinion or speculation.

Upon completion of the investigation reports, the Management Team will assess the findings with a focus on identifying root causes, not establishing fault, to identify possible engineering, administrative and/or additional PPE controls to reduce or eliminate further risks.

Implementation of corrective actions will be monitored as part of the investigation and findings process.

## OSHA RECORDABLE INCIDENT

Solar Landscape strives to provide a safe and secure working environment for all employees. However, when a work-related injury or illness occurs (i.e., injuries and illnesses that arise out of, or are incurred during job-related activities on behalf of Solar Landscape), Solar Landscape will provide appropriate medical care and treatment to the injured worker through its Workers' Compensation program.

Coverage is provided for all paid non-exempt staff, exempt professionals, and contractors under direct Solar Landscape supervision who are injured or become ill while acting within the course and scope of their duties.

Solar Landscape complies with all state workers' compensation laws that govern work-related injuries and illnesses and follows all federal recording and reporting guidelines as required by the OSHA.

Solar Landscape manages and records all recordable incidents in accordance with OSHA Regulations and follows all required annual reporting (i.e., Form 300, Form 301, Form 300A). The EHS Director will maintain all incident and accident records and is responsible for all annual filings and posting requirements in accordance with OSHA regulations.

## OSHA REPORTABLE INCIDENT

OSHA defines work-related injuries, illnesses, and fatalities as those in which an event or exposure in the work environment either caused or contributed to the condition. If such an event or exposure significantly aggravated a pre-existing injury or illness, this is also considered work-related.

Reportable Incidents include: all work-related fatalities, in-patient hospitalizations of one or more employees, amputations, and losses of an eye.

Solar Landscape will report to OSHA any worker fatality within 8 hours by telephone and any amputation, loss of an eye, or hospitalization of a worker within 24.

## RECORDABLE - NON-REPORTABLE INCIDENT

Under OSHA record keeping standards, incidents that must be recorded include all work-related injuries and illnesses that result in days away from work, restricted work or transfer to another job, loss of consciousness, or medical treatment beyond first aid.

Incidents that only require first aid treatment are not considered serious by the agency and do not need to be reported to OSHA but will be recorded in the Solar Landscape First-Aid Log.

## NEAR MISS REPORTING

The purpose of this policy is to ensure that all near miss incidents (Including minor incidents) are reported, recorded, and investigated. Reporting and sharing information with relevant parties creates an opportunity to answer questions 'of what happened and why, and then to use this insight to determine how to prevent a reoccurrence.

Safety concerns may be reviewed during safety huddles or at any time there is a perceived and/or recognized hazard on the job. No reprisals will be taken against employees for reporting hazardous conditions or practices on the job.

Once it is determined an unsafe condition or work practice exists, Managers and the EHS Director will evaluate the seriousness of the hazard and decide on a plan to correct it.

## OSHA RECORDKEEPING

The Illness and Injury Prevention Program along with Incident/Injury Reports will be reviewed annually, and edits, changes, updates, removals will be tracked and remained in the document history.

## CONDITION OF EMPLOYMENT / DISCIPLINARY ACTION

As a condition of employment at Solar Landscape, every employee is encouraged to make a commitment to work safely and obey our safety rules. Employees are responsible for following Solar Landscape safety policies and safe work practices presented in job specific orientation and training. Employees for performing their work in a safe and healthy manner that does not jeopardize the employee or a contractor's own safety, or the safety of others.

Solar Landscape uses a progressive disciplinary procedure for employees who fail to follow or violate the required Safety Program. The policy is intended to ensure compliance by all Solar Landscape employees to follow safe and healthy work practices. Violations of any safety rule(s) may result in discipline and/or termination of employment.

These actions may include the following:

*FIRST OFFENSE:* Verbal notice,

*SECOND OFFENSE:* Written warning and may include up to 3 days off without pay,

*THIRD OFFENSE:* Suspension,

*TERMINATION:* When an employee places themselves or a co-worker(s) in a dangerous situation, Solar Landscape may immediately terminate the employee from employment, avoiding steps one, two, and three.




# APPENDIX A





# PRE-TASK PLAN

Date / Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Description of Activity: \_\_\_\_\_  
 Supervisor: \_\_\_\_\_ Location of Task: \_\_\_\_\_

Safety and Health Considerations			
<b>Hierarchy of Controls</b>	1. Elimination 2. Substitution 3. Engineering 4. Administration 5. Personal Protective Equip.	<b>Systems Approach</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>Environment (E):</b> Engineering Controls, Working Conditions</p> <p><b>Capability (C):</b> Training, Education, Physical Capabilities</p> <p><b>Motivation (M):</b> Worker Actions, Factors driving motivation</p> </div> <div style="width: 10%; text-align: center;">  </div> <div style="width: 45%; text-align: right;"> <p><b>Permits</b></p> <p>Hot Work: Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Energized Systems/LOTO: Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Ground Penetration/811: Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Confined Space: Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Shutdown Plan: Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> <p>Yes: <input type="checkbox"/> No: <input type="checkbox"/></p> </div> </div>
Note: Refer to Job Hazard Analysis (JHA) for this scope of work to ensure alignment of tasks and hazard identification		Note:	Note:
Sequence of Basic Job Steps	Hazards Associated with Each Step	E, C, M	Eliminate or Control the Hazard

List Materials, Tools, Other to be Handled or Moved	List Mechanical Aids to be Used for This	Or for Each Manual Handling Task List Safety Controls








# APPENDIX B





	<b>PRE-PANEL INSTALLATION SITE ASSESSMENT FORM</b>
<b>Date:</b>	<b>Prepared By:</b>
<b>Time:</b>	<b>GPS Coordinates:</b>
<b>Site Address:</b>	

**SITE PHOTOGRAPHS**

**NORTH SIDE OF BUILDING**

**SOUTH SIDE OF BUILDING**

**EAST SIDE OF BUILDING**

**WEST SIDE OF BUILDING**





**SITE PHOTOGRAPHS**

**ROOF OF BUILDING FACING NORTH**

**ROOF OF BUILDING FACING SOUTH**

**ROOF OF BUILDING FACING EAST**

**ROOF OF BUILDING FACING WEST**

**NOTES:**

SL Pre-Panel Installation Form v1.0



### SITE ACCESS

Site Security:

Site lighting:

Access area: Paved:  Gravel:  Grass:

Night Lighting:

Building Occupied: Days: \_\_\_\_\_ Hours: \_\_\_\_\_

Parking:

Site Contact Information:

Emergency Ambulatory Services: **911** Other: \_\_\_\_\_

Nearest Fire Department: \_\_\_\_\_ Non-emergency Phone: \_\_\_\_\_

### SITE CONDITIONS

Building façade material: Brick:  Vinyl:  Block:  Other: \_\_\_\_\_

Roofing condition: Good:  Moderate:  Poor:  Other: \_\_\_\_\_

Roofing material: Asphalt:  Metal:  Other: \_\_\_\_\_

Access to roof: None:  Interior:  Exterior:  Other: \_\_\_\_\_

Roof permit required: \_\_\_\_\_ Other: \_\_\_\_\_

Building dimensions: \_\_\_\_\_

On-site power available: \_\_\_\_\_

Overhead power line locations: \_\_\_\_\_

Location for crane: \_\_\_\_\_

Utilities Provider: \_\_\_\_\_ Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Access to main utility power: \_\_\_\_\_

Gas lines located: \_\_\_\_\_ Notes: \_\_\_\_\_

Water lines located: \_\_\_\_\_ Notes: \_\_\_\_\_

Drinking water provided onsite: \_\_\_\_\_

SL Pre-Panel Installation Form v1.0



### FALL PROTECTION

Fall Protection Required for Roof Conditions:

Height from ground to leading edge: \_\_\_\_\_ Feet

Height from ground to peak: \_\_\_\_\_ Feet

Type of tie-off required:

Hard rails to be installed: YES:  NO:  Other:

### OTHER SITE PHOTOGRAPHS



# INTRODUCTION

At Solar Landscape LLC we understand electricity is a serious workplace hazard, capable of causing both Solar Landscape employee(s) injury including shocks, electrocution, fires, and explosions as well as serious property damage. The solar industry involves constantly working on electrical equipment which is why electrical safety awareness is an integral part of our company.

All Solar Landscape employees and contractors, qualified and non-qualified, are considered in this program and must follow training and requirements as stated. Only employees who have the skills, knowledge, and required training including task specific training are considered “qualified” and may work on or near any circuit parts or equipment that have not been de-energized. Conductors and parts of electrical equipment that have been de-energized but have not been locked or tagged out must be treated as live parts.

This program is set up to establish work policies, practices, and procedures to train Solar Landscape employees in basic electrical hazard recognition and safe work practices. This program applies to qualified and non-qualified Solar Landscape employees who are exposed to electricity as part of their job.

This Solar Landscape Electrical Safety Program is based on the following regulatory guidance documents:

- National Fire Protection Association (NFPA) 70- National Electric Code,
- Article 690 - Identification of PV system Components in a Common Configuration,
- Article 691 - Large Scale Photovoltaic Power Production, and
- Article 705 - Interconnected Electrical Power Production Systems.
- NFPA 1 - National Fire Code,
- NFPA 70E - Standard for Electrical Safety in the Workplace,
- NFPA 70B - Recommended Practice for Electrical Equipment Maintenance,
- Occupational Safety and Health Administration (OSHA) 1910 and 1926, and
- ASTM (American Society for Testing and Materials) F1505 - Standard Specification for Insulated and Insulating Hand Tools.

Live parts will be de-energized in accordance with the specific procedure found in Appendix A before a Solar Landscape employee can perform work on or near the energized work unless one of the following conditions applies:

- De-energizing introduces additional hazards or increased risk,
- De-energizing is not possible due to equipment design or operational limitations, or
- Live parts operate at less than fifty (50) volts and there is no increased exposure to electrical burns or to explosions due to electrical arcs.

# PURPOSE

The purpose of this Solar Landscape Electrical Safety Program is to ensure that Solar Landscape employees understand the hazards associated with working with electric energy and are capable and understanding

of the necessary steps to protect themselves, their Solar Landscape employees, and subcontractors from electrical hazards while installing or conducting maintenance on solar panels.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for the following:

- Ensuring Solar Landscape employees are trained, qualified, and authorized to work on electrical equipment and receive appropriate levels of training,
- Conducting periodic hazard analysis of work areas,
- Identifying safety hazards,
- Reviewing electrical equipment operating procedures as necessary,
- Ensuring appropriate Personal Protective Equipment (PPE) is provided to authorized or qualified Solar Landscape employees who work with electrical equipment,
- Assisting in the investigation of all injuries and incidents involving electrical work,
- Correcting safety hazards, and
- Evaluating the overall effectiveness of the electrical safety program on a periodic basis.

### Employees

Solar Landscape employees are responsible for:

- Being aware of electrical safety issues,
- Complying with safe operating procedures when working with electrical equipment associated with solar panel installation or maintenance,
- Attending appropriate electrical safety training class(s) provided by Solar Landscape, and
- Reporting to the supervisor or EHS Director of any safety concerns or hazards related to electrical safety.

## WORKING ON OR NEAR LIVE PARTS

### Energized Electrical Work Permit

If live parts are not placed in an electrically safe condition, work to be performed must be considered energized electrical work and will be performed by written permit (Appendix B) and when:

- Working within the limited approach boundary,
- Interacting with equipment when conductors or circuit parts are not exposed but an increased likelihood of injury from exposure to an arc flash hazard exists.

The intent of the permit is to ensure that all appropriate safety precautions are taken prior to starting energized electrical work and The EHS Director must approve the permit prior to commencing work. The permit will not be required if the qualified Solar Landscape employee is provided with and uses appropriate safe work practices and PPE under the following conditions:

- Testing, troubleshooting, or voltage measuring,
- Visual inspections if the restricted approach boundary is not crossed,
- Access to and egress from an area with energized electrical equipment if no electrical work is performed and the restricted approach boundary is not crossed, and
- General housekeeping and miscellaneous non-electrical tasks if the restricted approach boundary is not crossed.

The permit is to be originated by the Solar Landscape employee requesting the energized work be completed. The requester is responsible for completing Section I of the permit in Appendix B. The Solar Landscape employee requesting the permit will normally be the supervisor of the Solar Landscape employees who will be completing the work but may also be an individual working at the solar panel work site.

A job briefing is required before the start of each job involving energized electrical work. Each qualified Solar Landscape employee must be briefed on the job and at a minimum the briefing must include the following:

- Associated electrical hazards,
- Work procedures,
- Special precautions,
- Isolation points and procedures,
- Emergency response,
- PPE requirements,
- Other work in the immediate area, and
- Details of the approved electrical permit.

Additional job briefings must be held if changes that might affect the safety of Solar Landscape employees occur during the site work.

The permit must be posted in the area where the energized work is taking place for the duration of the task. At least two (2) qualified Solar Landscape employees must be present for all energized work requiring a permit. If both qualified Solar Landscape employees are working on the circuit, an attendant is required to control any unqualified employee from entering the limited approach boundary. The attendant can be an unqualified employee if they remain outside the arc flash boundary.

Copies of all energized electrical work permits must be provided to the EHS Director and will be kept on file in the EHS Director's office.

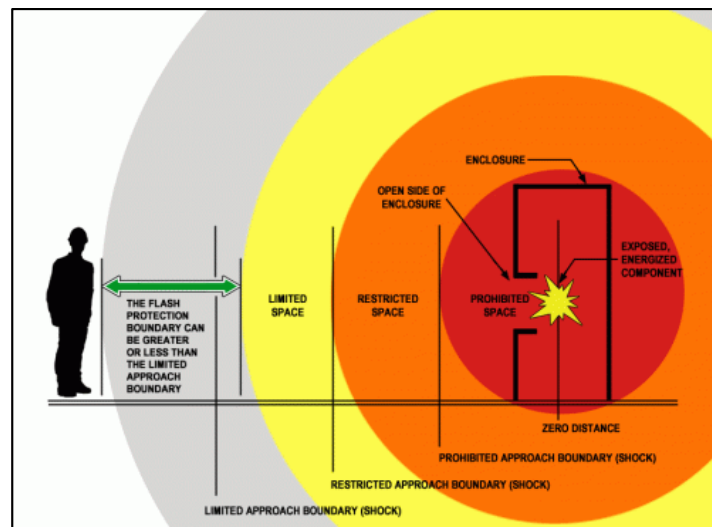
## Approach Boundaries to Live Parts

Observing a safe approach distance from exposed energized parts is an effective means of maintaining electrical safety. As the distance between an individual and live parts increases, the potential for an electrical injury decrease.

Table 1 shows the approach boundaries.

Safe approach distances will be determined for all tasks in which approaching employees are exposed to live parts. Safe approach distances to fixed live parts can be determined by referring to Shock Protection Approach Boundaries to Exposed Energized Electrical Conductors or Circuit Parts (Table 1). Table 1 can be used to identify the Limited and Restricted Approach Boundaries associated with various system voltages.

TABLE 1  
APPROACH BOUNDARIES



Unqualified Solar Landscape employees may only cross the Limited Approach Boundary into the Restricted Approach Boundary when they are under the direct supervision of a qualified Solar Landscape employee.

**NOTE:** Arc-rated PPE is required for any Solar Landscape employee crossing the arc flash boundary.

Qualified Solar Landscape employees may not cross or take any conductive object closer than the Restricted Approach Boundary unless one of the following conditions applies:

- The qualified employee is insulated or guarded from energized electrical conductors or circuit parts operating at fifty (50) volts or more.
- The energized electrical conductors or circuit parts are insulated from the qualified employee and from any other conductive object.

Crossing the Restricted Approach Boundary is considered the same as contacting energized parts. Qualified employees may only cross this boundary to perform work on energized parts when all the following precautions have been taken by the qualified Solar Landscape employee:

- Received specific training to work on energized parts,
- Has obtained an approved Solar Landscape Energized Electrical Work Permit, and
- Uses PPE appropriate for working on energized parts.

## ARC FLASH BOUNDARY

Appropriate employee PPE must be provided to and used by all Solar Landscape employees working within the arc flash boundary.

For Alternating Current (AC) systems that are six hundred (600) volts or less, the arc flash boundary must be a minimum of twenty (20) feet or the entire room.

For Direct Current (DC) systems refer to the Arc Flash Hazard PPE Categories for DC Equipment (Appendix C). If the equipment (AC or DC powered) has an NFPA 70E label attached, its stated arc flash boundary should be used.

## INSULATED TOOLS & EQUIPMENT

Solar Landscape employees must use insulated tools or handling equipment, or both, when working inside the restricted approach boundary of exposed energized electrical conductors or circuit parts.

The term “Insulated” means that the tool manufacturer has assigned a voltage rating to the insulating material. Only tools with a defined voltage rating are considered insulated. Tools with unmarked rubber grips and plastic handles must not be used for electrical work.

The following requirements concerning insulated tools apply:

- Must be rated for the voltages on which they are used,
- Must be designed and constructed for the environment to which they are exposed and the way they are used,
- Must be inspected prior to each use, and
- Must be checked for damage to the insulation or damage that can limit the tool from performing its intended function.

Solar Landscape employees must use portable ladders that have nonconductive side rails when used within the limited approach boundary or where the employee or ladder could contact exposed energized electrical conductors or circuit parts.

# ELECTRICAL SAFETY FOR TRANSMISSION, DISTRIBUTION AND METERING

A Job Briefing is required to be performed at the start or resumption of each work activity.

The Solar Landscape supervisor or designated Solar Landscape employee on the job site will hold a Job Briefing to review:

- Work procedures,
- Hazards associated with the job,
- Special precautions,
- Energy source controls, and
- Employee PPE.

Prior to working on electrical lines and equipment, Solar Landscape employees must determine existing conditions including:

- Nominal voltages of lines and equipment,
- Maximum switching transient voltages (transmission voltages),
- Presence of hazardous induced voltages,
- Presence of protective grounds and equipment grounding conductors,
- Location of circuits and equipment and fire-protective signaling circuits,
- Condition of protective grounds and equipment grounding conductors, and
- Environmental conditions relating to safety.

It is the responsibility of the Solar Landscape supervisor to ensure that briefings are conducted:

- At the beginning of each work shift,
- At the start of the job,
- After a job has been interrupted for any reason,
- When Solar Landscape employees are added to or removed from the job,
- When any conditions change that could affect Solar Landscape employee safety,
- Existing site work conditions,
- Work area protection setup,
- Individual responsibilities,
- Positioning of Powered Industrial Vehicles (PIV's),
- Underground utility locations,
- PPE and fall arrest devices required,
- Nominal voltage of circuit and identification of switches/protective devices if needed,
- Work procedures,
- Hazards associated with the job,
- Preventive measures, special precautions,
- Emergency plans,
- Protective devices, and

- At the conclusion of work to capture lessons learned.

A brief discussion is sufficient if the work is routine and Solar Landscape employees, through training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. A more detailed briefing is required, however, if the work is complicated or especially hazardous.

## PERSONAL AND ELECTRICAL PROTECTIVE EQUIPMENT

Solar Landscape employees working in areas where electrical hazards are present must be provided with, and must use, protective equipment that is designed and constructed for the specific body part to be protected and for the work to be performed.

Solar Landscape will provide electrical PPE required at no cost to Solar Landscape employees, such as arc rated apparel, eye protection, head protection, hand protection, and face shields.

Solar Landscape employee(s) are required to wear:

- Nonconductive protection for the face, neck, and chin whenever there is danger of injury from exposure to electric arcs or flashes or from flying objects resulting from an electrical explosion,
- PPE for the eyes whenever there is a danger of injury from electric arcs, flashes, or from flying objects resulting from an electrical explosion,
- Arc rated clothing whenever there is possible exposure to an electrical arc flash,
- Rubber insulating gloves and heavy-duty leather protectors where there is danger of hand injury from electric shock due to contact with exposed energized electrical conductors or circuit parts, and
- Rubber insulating gloves with heavy-duty leather protectors and rubber insulating sleeves where there is a danger of hand and arm injury from electric shock due to contact with exposed energized electrical conductors or circuit parts.

Visually inspect and conduct the following:

- Air-test rubber gloves before use.
- Check rubber blankets and sleeves for flaws before use.
- Wear leather protectors over rubber gloves. Do not use protectors for any other purpose.  
**Exception:** Class 0 rubber gloves can be used without protectors under limited-use conditions where small equipment and parts manipulation necessitate unusually high finger dexterity. Take extra care in the visual examination of each glove and in avoiding handling sharp objects. Visually inspect and air test gloves before and after use.
- When PPE selection depends on voltage levels, use the phase-to-phase voltage on multiphase circuits. Phase-to-ground voltage can be used if there is no multiphase exposure or if energized conductors have been covered with rubber protective equipment, eliminating any possible multiphase exposure.

Rubber insulating gloves must be used without heavy duty leather protectors, under the following conditions:



- There must be no activity performed that risks cutting or damaging the gloves,
- The rubber insulating gloves must be electrically retested before reuse (Third party testing), and
- The voltage rating of the rubber insulating gloves must be reduced by fifty (50) percent (%) for class 00 and by one whole class for classes zero (0) through four (4).

Below is a chart outlining the maximum use voltage for rubber insulating gloves and the testing standards for rubber insulating equipment:

## MAXIMUM USE VOLTAGE FOR RUBBER INSULATING GLOVES

<b>Class Designation of Glove or Sleeve</b>	<b>Maximum <i>ac</i> Use Voltage (volts)</b>	<b>Maximum <i>dc</i> Use Voltage (volts)</b>	<b>Distance Between Gauntlet and Cuff (minimum)</b>
<b>00</b>	<b>500</b>	<b>750</b>	<b>0.5 inch</b>
<b>0</b>	<b>1,000</b>	<b>1,500</b>	<b>0.5 inch</b>
<b>1</b>	<b>7,500</b>	<b>11,250</b>	<b>1 inch</b>
<b>2</b>	<b>17,000</b>	<b>25,500</b>	<b>2 inch</b>
<b>3</b>	<b>26,500</b>	<b>39,750</b>	<b>3 inch</b>
<b>4</b>	<b>36,000</b>	<b>54,000</b>	<b>4 inch</b>

<b>Testing Standards for Rubber Insulating Equipment</b>			
	<b>6 Months</b>	<b>1 Year</b>	<b>If Damage Suspected</b>
<b>Gloves</b>	Required	Required	Required
<b>Sleeves</b>	Recommended	Required	Required
<b>Blankets</b>	Recommended	Required	Required
<b>Line Hose</b>	Optional	Recommended	Required
<b>Hoods</b>	Optional	Recommended	Required
<b>Boots</b>	Optional	Recommended	Required

If a defect is found during inspection of employee PPE, electrical PPE or live-line tools, the equipment must be marked "Defective" and not used. Return rubber goods for retest if they are suspected to be defective. Solar Landscape employee shoes should have substantial uppers made of leather or the equivalent, cover the entire foot with no openings, provide ankle support, and have slip-resistant soles.

## PANEL DISCONNECT

Before the solar panel installation work begins, the local power authority must be contacted, and arrangements made to isolate the main utility power from the new solar panel distribution electrical control



box. Once the Solar Landscape panels have been installed, wired, and connected to the disconnect box, the local power authority and building owner/representative will be contacted and notified to start the power on/transfer procedure.

## PANEL DISCONNECT LOCKOUT/TAGOUT PROCEDURE

Solar Landscape will issue unique locks and tags to each Solar Landscape electrical Foreman and to each Operations and Maintenance (O&M) supervisor. Each lock will have only one (1) key associated with it and will be held and under the control of the Electrical foreman and O&M supervisor.

The Electrical foreman will complete the Shutdown Plan Form (Appendix A) for each solar panel installation site. The only electrical source that requires isolation at the worksite is the utility disconnect and therefore the only component that requires a specific lockout/tagout procedure.

Once the associated power authority has shut-off power, verified the zero-energy, and placed their unique key and locking device on the panel distribution electrical control box, The Electrical foreman will verify the zero-energy and then place their unique lock on the locking device along with a red and white colored tag identifying:

- Person applying the lock and tag,
- "DO NOT ENERGIZE" verbiage or similar hazard warning.

When works begins on the solar panel installations, the O&M supervisor will place their lock and tag, after verifying zero-energy, on the panel distribution electrical control box. The Electrical foreman will then remove their lock and tag. The panel distribution electrical control box is now under the control of the O&M supervisor.

When the solar panels have all been installed and are ready for activation, the local power authority will be contacted to return to the worksite and prepare for the power energization of the panel distribution electrical control box. The EHS Director must be notified with the date and time that power is to be reinstated at the worksite.

Before power is turned on to the Solar Panels, all Solar Landscape employees and onsite subcontractors are to be notified that power is being reinstated to the panels. Once all site personnel are aware, the associated power authority along with the O&M supervisor will remove their locks and tags and the associated power authority will operate the disconnect switch transferring power to the solar panels.

**NOTE:** *If the O&M supervisor is unable to be at the worksite at the time of the power restoration, the Absence Lock Out Tagout Removal procedure, also found in Appendix A, will be utilized.*

## MATERIALS HANDLING AND STORAGE

In areas not restricted to qualified Solar Landscape employees are not to store materials closer to energized lines or exposed energized parts than ten (10) feet for lines fifty (50) kilovolt (kV) and less. For lines over fifty (50) kV, the distance is ten (10) feet plus four (4) inches for every ten (10) kV over fifty (50) kV.

## WORKING ON OR NEAR EXPOSED ENERGIZED PARTS

Consider all electric lines and equipment energized unless they have been isolated, tested for voltage, and ground.

Only qualified Solar Landscape employees will be allowed to work on or with exposed energized lines or parts and in areas containing unguarded, uninsulated energized lines or parts of equipment at fifty (50) volts or more. When working around exposed energized parts, Solar Landscape employees must use PPE, arc flash gear and follow safe work practices and comply with the minimum approach distances.

- Solar Landscape employees must avoid positions where a shock or slip could expose the body to equipment at a potential different from the body and this also applies to work performed on exposed live parts involving either direct contact or by means of tools or materials or near enough to them for Solar Landscape employees to be exposed to.
- Solar Landscape employees may not enter spaces containing exposed energized parts unless the area is illuminated enough to enable the Solar Landscape employee(s) to work safely.

Solar Landscape employee(s) may work alone if they meet the following conditions:

- Work involving equipment energized at six hundred (600) volts or less,
- Routine switching of circuits, if conditions at the site allow the work to be done safely,
- Work done with live-line tools if the Solar Landscape employee is not within reach or otherwise exposed to contact with energized parts, and
- Emergency repairs such as power restoration to the extent necessary to safeguard the public.

## INSULATING SHIELDS/BARRIERS

If protective shields, protective barriers, or insulating materials are necessary they will be provided by Solar Landscape at no cost to the Solar Landscape employee.

## PORTABLE LADDERS

Refer to the Solar Landscape Fall Protection Program for further reference on the use of portable ladders. All portable ladders used around potential energized circuits or equipment must have non-conductive side rails.

## WORKING ON OR NEAR EXPOSED ENERGIZED PARTS

If connecting de-energized equipment or lines to an energized circuit using a conducting wire or device, attach the wire to the de-energized part first. If disconnecting, remove the source end first, and keep loose conductors away from exposed energized parts. When lines or equipment are connected to or disconnected from energized circuits, keep loose conductors away from exposed energized parts.

## MINIMUM APPROACH DISTANCES

No Solar Landscape employee must approach or take any conductive object closer to exposed energized parts than the minimum approach distances unless:

- The Solar Landscape employee is insulated from the energized part with rubber gloves, rubber gloves and sleeves, arc flash PPE AND the Solar Landscape employee has positive control of the energized part.
- The energized part is insulated from the Solar Landscape employee and from any other conductive object at a different potential, or
- The Solar Landscape employee is insulated from any other exposed conductive object.

For voltages of seventy-two point five 72.5 Kilovolt (kV) and less, utilize the minimum approach distances in Table 2 at elevations less than 3,000 feet. For voltages over 72.5 kV, utilize the minimum approach distances in Table 3 at elevations less than 3,000 feet.

**NOTE:** *Altitude correction is required over 3,000 feet elevation, and when a Solar Landscape employee uses rubber gloves, they must also use rubber sleeves.*

**NOTE:** *When installing insulation for purposes of isolation, the Solar Landscape employee must install insulation from a position that does not expose their upper arm to contact with other energized parts. Low-voltage gloves (Class 0) with protectors are allowed on secondary voltages with Solar Landscape management or EHS Director approval.*

TABLE 2

Minimum Approach Distances for Voltages of 72.5 kV and Less

NOMINAL VOLTAGE PHASE-TO-PHASE	DISTANCE	
	PHASE-TO-GROUND EXPOSURE	PHASE-TO-PHASE EXPOSURE
50 to 300 volts	Avoid contact	Avoid contact
301 to 750 volts	1 ft. 1 in.	1 ft. 1 in.
751 volts to 5.0 kV	2 ft. 1 in.	2 ft. 1 in.
5.1 to 15.0 kV	2 ft. 2 in.	2 ft. 3 in.
15.1 to 36.0 kV	2 ft. 7 in.	2 ft. 11 in.
36.1 to 46.0 kV	2 ft. 10 in.	3 ft. 3 in.
46.1 to 72.5 kV	3 ft. 4 in.	4 ft.

TABLE 3

Minimum Approach Distances for Voltages of More than 72.5 kV

VOLTAGE RANGE PHASE-TO-PHASE (KV)	DISTANCE	
	PHASE-TO-GROUND EXPOSURE	PHASE-TO-PHASE EXPOSURE
72.6 to 121.0 kV	3 ft. 4 in.	4 ft. 3 in.
121.1 to 145.0 kV	3 ft. 10 in.	4 ft. 10 in.
145.1 to 169.0 kV	4 ft. 4 in.	5 ft. 5 in.
169.1 to 242.0 kV	5 ft. 8 in.	8 ft. 5 in.
242.1 to 362.0 kV	9 ft. 2 in.	14 ft. 9 in.
362.1 to 420.0 kV	9 ft. 2 in.	14 ft. 9 in.
420.1 to 550.0 kV	11 ft. 11 in.	20 ft. 4 in.
550.1 to 800.0 kV	15 ft. 10 in.	27 ft. 10 in.

- Minimum Approach Distances based on worksites at elevations of three thousand (3,000) feet or less. Altitude correction is required over three thousand (3,000) feet,
- Phase-to-ground distances assume using live-line tools in the air gap, and
- Phase-to-phase distances assume no live-line tool spans the air gap and no large conductive object is in the air gap.



# ARC FLASH PROTECTION CLOTHING

Solar Landscape employees may be required to wear flame-resistant (FR) clothing for electrical work. If required, Solar Landscape employees must wear natural fiber garments under FR clothing. Do not wear undergarments made of acetate, nylon, polyester, rayon, or polypropylene.

Outer layers of clothing must be flame-resistant under any of these conditions:

- Solar Landscape employee is exposed to contact with circuits energized at more than six hundred (600) volts,
- Electric arc could ignite flammable material in the work area that could ignite the Solar Landscape employee’s clothing,
- Molten metal or electric arcs from faulted conductors in the work area could ignite the Solar Landscape employee’s clothing, or
- Estimated incident energy exceeds two (2) Calories per Centimeter Squared (cal/cm<sup>2</sup>).
  - Wear hand protection for electrical hazards as described in the Work Methods Manual.
  - Hand protection must consist of rubber gloves with leather protectors where there is a contact hazard or for work inside minimum approach distance. For work with an arc flash hazard but no contact hazard, heavy duty leather work gloves must be worn for exposures up to fourteen (14) calories per square centimeter cal/cm<sup>2</sup>. Over fourteen (14) calories per square centimeter cal/cm<sup>2</sup>, arc rated gloves are required.
  - Where flame retardant clothing is worn for exposures exceeding two (2) calories per square centimeter cal/ cm<sup>2</sup>, long sleeves are required.

Hand protection must consist of rubber gloves with leather protectors where there is hazard of electrical contact. Where there is flash hazard but not contact hazard, Solar Landscape employees must wear heavy-duty leather work gloves. The work gloves must be arc-rated for exposures over fourteen (14) calories per square centimeter calories per square centimeter (cal/cm<sup>2</sup>).

Wear heavy-duty work shoes or boots. Footwear does not have to be arc rated. In addition to a hard hat and safety glasses, arc-rated face and head protection is required for exposures found in Table 4.

**TABLE 4**

## EXPOSURES REQUIRING ARC-RELATED FACE AND HEAD PROTECTION

	NO HEAD OR FACE PROTECTION REQUIRED	ARC-RATED FACE SHIELD WITH MINIMUM RATING of 8 cal/cm <sup>2</sup>	ARC-RATED HOOD FACE SHIELD
Single-phase exposure in air*	< 8 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 cal/cm <sup>2</sup> or higher
Three-phase exposure	< 4 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 cal/cm <sup>2</sup> or higher



**NOTE:** Single-phase and three (3) phases to the exposure- not the system voltage.

The EHS Director will define the tasks with these exposures:

Where flame retardant clothing is worn for exposures exceeding two (2) calories per square centimeter (cal/cm<sup>2</sup>), long sleeves are required.

- When operating circuit breakers, switches, or disconnect devices locally (open or closed) on an energized bus that has an arc flash hazard, perform the following to minimize potential exposure to electrical fault blast energy when practical:
  - Stand clear to one side, hinge side preferred,
  - Stand with your side to the potential blast area (less surface area subject to the blast),
  - Stand outside an imaginary line set to forty-five (45) degrees from opening (outside probable blast area),
  - Increase working distance from the opening (decrease potential blast force), and
  - Wear ear plugs or earmuffs.

## JEWELRY AND CONDUCTIVE ARTICLES

No jewelry or conductive articles may be worn by Solar Landscape employees within the work zone while performing or observing electrical work. This includes loading and unloading material and any work at a job site or substation. This includes but is not limited to finger rings, necklaces, earrings, body piercings, chains, wrist bands, wrist watches, key rings/chains, metal or plastic bracelets, or studs. Conductive items of jewelry or clothing must not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means.

Eyeglasses and Medic-Alert necklaces and bracelets are not considered jewelry and are exempt from this requirement. However, Medic-Alert necklaces and bracelets must be worn under FR clothing or rubber protective gloves if working on energized conductors or circuits.

If there is a business need for a Bluetooth device to be worn on the work site, Solar Landscape employees must conduct a hazard assessment to ensure that wearing the device will not put the Solar Landscape employee(s) at risk for injury or cause distraction if a call is received. Bluetooth devices must never be worn within minimum approach distance, when working from an aerial lift or aloft, or in a flammable atmosphere.

## FACE PROTECTION

In addition to a hard hat and safety glasses, arc-rated face and head protection is required for tasks exceeding the exposures below:

- Single-phase arc: Arc-rated face
- Shields over nine (9) calories per square centimeter (cal/cm<sup>2</sup>).



- Arc-rated hood or face shield with balaclava over thirteen (13) calories per square centimeter (cal/cm<sup>2</sup>).
- Three-phase arc: Arc-rated face shield over five (5) calories per square centimeter (cal/cm<sup>2</sup>).
- Arc-rated hood or face shield with balaclava over nine (9) calories per square centimeter (cal/cm<sup>2</sup>).

Table 4 contains the required PPE based on the category levels one (1) through four (4).

TABLE 5  
ARC FLASH PPE CHART

PPE CATEGORY LEVEL CHART		
 <b>0</b>	<p><b>CATEGORY</b> What Personal Protection Equipment (PPE) You Shall Wear:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cotton Undergarments</li> <li><input checked="" type="checkbox"/> Long Sleeved Shirt (Natural Fiber)</li> <li><input checked="" type="checkbox"/> Long Pants (Natural Fiber)</li> <li><input checked="" type="checkbox"/> Safety Glasses or Goggles</li> <li><input checked="" type="checkbox"/> Hearing Protection (Inserts)</li> <li><input checked="" type="checkbox"/> Leather Gloves (as needed) or Insulating Gloves w/Protectors</li> </ul>	
 <b>1</b>	<p><b>CATEGORY</b> What Personal Protection Equipment (PPE) You Shall Wear:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cotton Undergarments</li> <li><input checked="" type="checkbox"/> Arc Rated Long Sleeved Shirt (or FR Coveralls)</li> <li><input checked="" type="checkbox"/> Arc Rated Long Pants (or FR Coveralls)</li> <li><input checked="" type="checkbox"/> Hard Hat with Arc Rated Face Shield</li> <li><input checked="" type="checkbox"/> Hearing Protection (Inserts)</li> <li><input checked="" type="checkbox"/> Safety Glasses or Goggles</li> <li><input checked="" type="checkbox"/> Leather Gloves or Insulating Gloves w/Protectors</li> <li><input checked="" type="checkbox"/> Leather Shoes (as needed)</li> </ul>	
 <b>2</b>	<p><b>CATEGORY</b> What Personal Protection Equipment (PPE) You Shall Wear:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cotton Undergarments</li> <li><input checked="" type="checkbox"/> Short Sleeved "T" Shirt (Natural Fiber)</li> <li><input checked="" type="checkbox"/> Arc Rated Long Sleeved Shirt and Long Pants or Arc Rated Coveralls instead</li> <li><input checked="" type="checkbox"/> Hard Hat with Arc Rated Face Shield w/Sock Balaclava</li> <li><input checked="" type="checkbox"/> Safety Glasses or Goggles</li> <li><input checked="" type="checkbox"/> Hearing Protection (Inserts)</li> <li><input checked="" type="checkbox"/> Leather Gloves or Insulating Gloves w/Protectors</li> <li><input checked="" type="checkbox"/> Leather Shoes (as needed)</li> </ul>	
 <b>3</b>	<p><b>CATEGORY</b> What Personal Protection Equipment (PPE) You Shall Wear:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cotton Underwear</li> <li><input checked="" type="checkbox"/> Short Sleeved "T" Shirt (Natural Fiber)</li> <li><input checked="" type="checkbox"/> Arc Rated Long Sleeved Shirt and Long Pants</li> <li><input checked="" type="checkbox"/> Arc Rated Coveralls (Over the above)</li> <li><input checked="" type="checkbox"/> Arc Rated (25 cal) Arc Flash Suite Jacket</li> <li><input checked="" type="checkbox"/> Arc Rated (25 cal) Arc Flash Suit Pants</li> <li><input checked="" type="checkbox"/> Arc Rated (25cal) Arc Flash Suite Hood</li> <li><input checked="" type="checkbox"/> Hard Hat</li> <li><input checked="" type="checkbox"/> Safety Glasses or Goggles</li> <li><input checked="" type="checkbox"/> Hearing Protection</li> <li><input checked="" type="checkbox"/> Arc Rated Leather Gloves or Insulating Gloves w/Protectors</li> <li><input checked="" type="checkbox"/> Leather Shoes</li> </ul>	
 <b>4</b>	<p><b>CATEGORY</b> What Personal Protection Equipment (PPE) You Shall Wear:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cotton Underwear</li> <li><input checked="" type="checkbox"/> Short Sleeved "T" Shirt (Natural Fiber)</li> <li><input checked="" type="checkbox"/> Arc Rated Long Sleeved Shirt and Long Pants</li> <li><input checked="" type="checkbox"/> Arc Rated Coveralls (Over the above)</li> <li><input checked="" type="checkbox"/> Arc Rated (40 cal) Arc Flash Suite Jacket</li> <li><input checked="" type="checkbox"/> Arc Rated (40 cal) Arc Flash Suit Pants</li> <li><input checked="" type="checkbox"/> Arc Rated (40 cal) Arc Flash Suite Hood</li> <li><input checked="" type="checkbox"/> Hard Hat</li> <li><input checked="" type="checkbox"/> Safety Glasses or Goggles</li> <li><input checked="" type="checkbox"/> Hearing Protection</li> <li><input checked="" type="checkbox"/> Arc Rated Leather Gloves or Insulating Gloves w/Protectors</li> <li><input checked="" type="checkbox"/> Leather Shoes</li> </ul>	

Always wear voltage rated rubber glove liners when working above 50 volts in all categories!



## INSULATED HAND TOOLS

If hand tools are used in, on, or near exposed energized circuits, conductors, or parts, and the hand tool could contact other differences of potential such as conductors, grounded cabinets, etc., the hand tool must be an approved insulated type.

General safety rules for using insulated tools include:

- Before using insulated tools, visually inspect them to ensure the insulating material is not damaged,
- Use insulated tools only for their designated purposes,
- Do not use insulated hand tools on circuits over one thousand (1,000) volts,
- Insulated tools must be marked with double triangles by the manufacturer to indicate they were manufactured and tested in compliance with ASTM F1505, Standard Specification for Insulating and Insulated Hand Tools,
- Coverings on the handles of tools not marked with double triangles must not be considered as insulation, and
- Wear rubber gloves with insulated hand tools if the work could cause the minimum approach distance to be violated.

## GROUNDING

Before considering lines and equipment to be worked on as being de-energized, ensure they are de-energized by testing for voltage and ground.

If installing a ground is impractical or would create greater hazards, treat the lines and equipment as de-energized if all the following conditions are met:

- The energized lines and equipment are de-energized as required,
- Contact with another energized source is not possible, and
- No hazard of induced voltage exists.

Before installing grounds on a supposedly de-energized circuit, visually inspect the grounding equipment. To verify that the circuit has been de-energized, use an approved voltage testing device to check for voltage on the conductors to be grounded.

Place temporary protective grounds at such locations and arrange in such a manner as to prevent each Solar Landscape employee from being exposed to hazardous differences in electrical potential and ensure protective grounding equipment:

- Can conduct the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault,
- Has an ampacity greater than or equal to that of No. two (2) AWG copper, and

- Has an impedance-to-ground low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment.

If there is no previously installed ground, test lines and equipment before installing any ground to ensure they are free of nominal voltage. If attaching grounds to lines or equipment, attach the ground-end connection first; then attach the other end using live-line tools.

Do not allow your body to contact the grounding cable. Do not hold a grounding cable or clamp in your hand while installing grounds with a live-line tool.

When a ground is to be removed, the grounding device must be removed from the line or equipment using a live-line tool before the ground-end connection is removed. If work is performed on a cable at a location remote from the cable terminal and the hazardous transfer of potential is possible should a fault occur, do not ground the cable at the cable terminal.

The ground may be removed temporarily during tests. During the test, use insulating equipment and other measures necessary to protect exposed Solar Landscape employees in case the lines and equipment become energized.

When attaching ground to and when removing ground from de-energized lines or equipment, and at a minimum, Solar Landscape employees should wear a hard hat, safety glasses, rubber gloves and FR clothing.

## UNDERGROUND ELECTRICAL INSTALLATIONS

Use PPE and follow work practices when working in underground solar electrical installations. When accessing manholes, trenches, or sub surfaces:

- Use ladders or other climbing devices to enter and exit manholes and sub surfaces more than four (4) feet deep,
- Do not step on cables or hangers to climb into or out of manholes or vaults.

When lowering equipment into manholes or trenches:

- Use equipment capable of supporting appropriate weight to lower materials and tools into manholes or vaults, and
- Check equipment used to lower materials for defects before use.

Ensure a Solar Landscape employee trained in first aid/CPR is available to render any necessary emergency assistance while work is performed in a manhole containing energized electric equipment. Allow the Solar Landscape employee trained in first aid/CPR to briefly enter a manhole to assist if there are no atmospheric or traffic hazards. If work can be performed safely in a manhole with energized cables or equipment, allow a Solar Landscape employee working alone to enter a manhole briefly to inspect, conduct housekeeping, take readings, etc. Maintain communications through two-way radios, cellular phones, or the equivalent, among

all Solar Landscape employees involved in the job.

Ensure the required clearance distances are maintained and:

- Inspect energized cables for defects.
- When working on multiple cables:
  - Identify the cable to be worked by electrical means, unless its identity is obvious by reasons of distinctive appearance or location, or by other readily apparent means of identification, and
  - Protect cables other than the one being worked on from damage.

Do not work in a manhole or trench where energized cables appear defective such as oil or compound leaking from cable joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, swollen joints where circumference exceeds three point five (3.5) times the sleeve diameter.

## MECHANIZED EQUIPMENT

Ensure the integrity of mechanized equipment by having systems in place for the inspection and maintenance of this equipment.

This includes equipment such as:

- Material handling equipment,
- Earthmoving equipment,
- Excavating equipment,
- Lifting equipment,
- PIV trucks,
- Aerial devices and,
- Elevating work platforms.

## GROUND FAULT PROTECTION

Use Ground Fault Circuit Interrupter (GFCI) on all one hundred twenty (120) volts, single-phase fifteen (15) twenty (20) and thirty (30) amp receptacles that are not part of the permanent wiring of a building or structure.

## TESTING FOR VOLTAGE

Consider lines and equipment as energized until they have been isolated, tested for voltage and grounded where applicable. When work requires direct contact with electrical circuits, use voltage testing devices to verify that the equipment is de-energized.

Be aware that equipment can be fed by more than one source or can be actuated from more than one location. If any unusual condition is encountered such as voltage present when it should not be immediately stopping work, place the equipment in a safe condition and contact your Field Service Manager.

Test for voltage initially, at shift change and after other work stoppage. If the circuit to be tested is over six hundred (600) volts, check the test equipment for proper operation immediately before use. Follow the manufacturer's instructions for the device.

If there is a possibility of the re-accumulation of stored energy to a hazardous level, verify safe work conditions periodically throughout the shift until work is completed or until the possibility of such accumulation no longer exists.

Before use:

- Visually inspect test instruments, leads, cables, power cords, probes, and connectors for external damage. If there is any doubt as to the equipment's integrity, do not use it,
- Verify that voltage testing devices are operating properly and that appropriate settings are used for the parameter and type of voltage to be checked,
- Verify that the testing device is being used for the correct application and in the proper configuration. Follow the instructions in the operator's manual for the specific make and model being used,
- Do not exceed the maximum safe voltage for the test equipment. Follow manufacturer's guidelines and/or group procedures for specific limitations of equipment used.

## WORKING POSITION

Solar Landscape employee(s) must work in a position from which a slip or shock will not bring the Solar Landscape employee's body into contact with exposed energized parts. For exposed energized parts over six hundred (600) volts, work from a position where you cannot reach into the minimum approach distance unless wearing rubber gloves or using live-line tools.

## TOOLS, EQUIPMENT AND FIXTURES

Portable electric equipment used in highly conductive work locations such as those inundated with water or other conductive liquids or in job locations where Solar Landscape employees are likely to contact water or conductive liquids must be approved for those locations.

In job locations where Solar Landscape employees are likely to contact or be drenched with water or conductive liquids, ground fault circuit interrupter protection for employees must also be used.

When working near energized circuits, use only flashlights with exposed parts made of nonconductive material.

The following general safety rules apply to tools, equipment, and fixtures:

- Before replacing fuses, verify that ratings and types are correct,
- Appropriate tools must be used for installing and removing fuses,
- Before working on energized equipment, try to dry wet floors. If floors cannot be dried, use rubber gloves, insulating blankets and a wooden foundation to elevate the blanket above the moisture,
- Secure or remove doors, hinged panels, etc., to prevent them from swinging into a Solar Landscape employee and causing contact with exposed energized parts,
- Do not obstruct access to electrical equipment.

## EXTENSION CORDS

Before using extension cords, inspect them for loose parts, damaged pins and defective insulation and replace damaged cords.

The following are general safety rules regarding the use of extension cords:

- Only use extension cords with grounding conductors,
- Do not raise and lower equipment with extension cords connected to the equipment,
- Do not fasten extension cords with staples, nails, etc., or hang them in a way that could damage the outer jacket, insulation, or conductors,
- Elevate extension cords passing through work areas to protect them from damage and to eliminate tripping hazards,
- Be sure your hands are dry when plugging or unplugging extension cords,
- Properly secure locking connectors after connection, if applicable,
- If an extension cord is wet from immersion, wear rubber gloves if it is still energized, and
- Protect extension cords from vehicular traffic including PIVs, manlifts, tractors, etc.

## BATTERIES

Do not smoke or create sparks, arcs, or flames in battery areas. Post signs accordingly. Take extreme caution when carrying or using conductive materials around batteries. To prevent shocks, avoid physical contact with exposed conductors on batteries.

Do not remove vent plugs from cells unless specific maintenance work is being performed. Immediately reinstall vent plugs after work is completed. Before performing battery-related tasks, check the location of the nearest eyewash or eyewash/shower. If the plumbed eyewash/shower has not been tested within the last week, test it before working on the batteries.

General safety rules when working or handling batteries include:

- Battery-related tasks may be performed by Solar Landscape employees working alone,

- Provide adequate ventilation in battery rooms,
- When charging, repairing, or servicing batteries, follow manufacturer's recommendations,
- Wear appropriate PPE for work on batteries,
- Eye protection, full-face shield, chemical resistant gloves, full-body apron and,
- Protective footwear to:
  - Add/remove electrolytes (acid),
  - Move lead acid cells,
  - Check specific gravity and,
  - Wash/clean battery cells.
- Eye protection to:
  - Read cell battery voltage, and
  - Adjust intercell connecting hardware.

## GROUND FAULT PROTECTION FOR PERSONNEL IN CONSTRUCTION

Solar Landscape employees must be protected from ground fault hazards as described below during activities involving construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities including:

*Temporary wiring* - Use a Ground Fault Circuit Interrupter (GFCI) on all one hundred twenty (120) volts, single phase fifteen (15), twenty (20), and thirty (30) amp receptacles that are not part of the permanent wiring of a building or structure.

*Portable generators* - Follow National Electric Code requirements. GFCI is not required on receptacles on two-wire, single-phase portable or vehicle-mounted generators rated not more than five (5) kW where the circuit conductors of the generators are insulated from the generator frame and all other grounded surfaces. For all other conditions, GFCI is required.

For cord sets, extension cords, and cord- and plug-connected tools, comply with one of the following options:

- *Option 1:* Use GFCI on all cord sets, extension cords, and cord- and plug-connected tools. When using portable GFCIs, install the GFCI between the receptacle and the cord set, not between the tool and the cord set, or
- *Option 2:* Implement an assured equipment grounding program.

Visually inspect cord sets, extension cords, and tools before each day's use for external defects. Test extension cords and grounded tools for continuity before first use, quarterly, and following repairs.

**NOTE:** Testing is not required for double-insulated tools or for cords with illuminated ground continuity monitors.

## DEFINITIONS

**Arc flash boundary:** When an arc flash hazard exists, an approach limit from an arc source at which incident energy equals 1.2 calories per square centimeter (cal/cm<sup>2</sup>). The onset of a second degree burn on unprotected skin is likely to occur at an exposure of 1.2 calories per square centimeter (cal/cm<sup>2</sup>) for one second.

**Arc resistant equipment:** Equipment designed to withstand the effects of an internal arcing fault and that directs the internally released energy away from the Solar Landscape employee.

**Arc flash hazard:** A source of possible injury or damage to health associated with the release of energy caused by an electric arc.

**Arc flash suit:** A complete arc-rated clothing and equipment system that covers the entire body, except for the hands and feet. (Such a suit may include pants or overalls, a jacket or a coverall, and a beekeeper-type hood fitted with a face shield).

**Arc rating:** The maximum incident energy resistance demonstrated by a material (or a layered system of materials) prior to “breaking open” or at the onset of a second-degree skin burn. This rating is expressed in calories per square centimeter (cal/cm<sup>2</sup>). Arc-rated clothing or equipment indicates that it has been tested for exposure to an electric arc. Flame-resistant (FR) clothing without an arc rating has not been tested for exposure to an electric arc. All arc-rated clothing is also flame resistant.

**Barricade:** A physical obstruction such as tapes, cones, or A-frame-type wood or metal structures intended to provide a warning and to limit access.

**Electrical Hazard:** A dangerous condition such that contact, or equipment failure can result in electric shock, arc flash burn, thermal burn, or arc blast injury.

**Electrically safe work condition:** A state in which the conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with Solar Landscape policy, tested to verify the absence of voltage, and, if necessary, temporarily grounded for employee protection.

**Energized:** Electrically connected to, or is, a source of voltage.

**Equipment:** A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like, used as a part of, or in connection with, an electrical installation.

**Exposed (as applied to energized electrical conductors or circuit parts):** Capable of being inadvertently touched or approached from closer than a safe distance by an employee. It is applied to parts that are not suitably guarded, isolated, or insulated.

**Fault Current:** The amount of current delivered at a point on the system during a short-circuit condition.

**Fault Current-Available:** The largest amount of current capable of being delivered at a point on the system

during a short-circuit condition.

**Guarded:** Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by employees or objects to a point of danger.

**Incident energy:** The amount of thermal energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. Incident energy is typically expressed in calories per square centimeter (cal/cm<sup>2</sup>).

**Incident Energy Analysis:** A component of an arc flash risk assessment used to predict the incident energy of an arc flash for a specific set of conditions.

**Limited Approach Boundary:** An approach limit at a distance from an exposed energized electrical conductor or circuit part live part within which a shock hazard exists.

**Live parts:** Energized conductive components.

**Luminaire:** A complete lighting unit consisting of a light source, such as a lamp or lamps, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light. A lamp holder itself is not a luminaire.

**Nominal Voltage:** A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class. (e.g., 120/240 volts, 480Y/277 volts, 600 volts).

**NOTE:** *Certain battery units are rated at nominal 48 volts dc but have a charging float voltage up to 58 volts. In dc applications, 60 volts is used to cover the entire range of float voltages.*

**Qualified employee:** One who has skills and knowledge related to the construction and safe operation of the electrical equipment and installations and has received safety training on the hazards involved. Examples of safety training include, but are not limited to, training in the use of special precautionary techniques, employee protective equipment, including arc flash, insulating, and shielding materials, and insulated tools and test equipment. An employee can be considered qualified with respect to certain equipment and methods but still be unqualified for others.

**Non-qualified employee:** Those with little or no training working on, near, or with electrical wiring or optical fiber cable (where such installations are made along with electrical conductors).

**NOTE:** *Whether an employee is a “qualified employee” will depend upon various circumstances in the workplace. It is possible and, in fact, likely for an individual to be considered “qualified” regarding certain equipment in the workplace, but “unqualified” as to other equipment.*

**NOTE:** *A Solar Landscape employee who is undergoing on-the-job training and who, during such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified employee is a qualified employee for the performance of those duties.*



**Current:** (measured in amps/ampere) Term used to describe electric flow. It is current that can cause electric shock.

**De-energized:** Electrical devices that are disconnected from all energy sources including direct electric connections, stored electric energy such as capacitors, and stored non-electrical energy in devices that could reenergize electric circuit parts.

**Energized Electrical Work:** Work conducted by a Solar Landscape employee on or near an exposed energized circuit greater than 50 volts and less than or equal to 600.

**Grounding:** Provides a safe path between electricity and the earth, preventing leakage of current. The creation of a conductive path for electricity between a circuit and the equipment to ground.

**High Voltage:** Electrical systems or equipment operating at or intended to operate at a sustained voltage of more than 600 volts.

**Low voltage:** Electrical systems or equipment operating at or intended to operate at a sustained voltage of 600 volts or less.


**Resistance:** The ease with which electricity flows through the material (conductor). Materials (conductors) with higher resistance properties can become hot. (Measured in ohms)

**Voltage:** Electric potential or potential difference assigned to a circuit or system expressed in volts.



# APPENDIX A



		<h2>Environmental, Health &amp; Safety</h2>		
EHS Program		Solar Landscape LLC Shutdown Plan		
EHS Program No:	EHS	Issue Date:		
Provided by:	EHS	Revision Date:		

Shutdown Plan for \_\_\_\_\_ Date \_\_\_\_\_

**Part I: Parties Involved** (To include fire and security alarm companies)

1.

All parties involved	Contact	Mobile

**Hospital:**

**Urgent Care:**

\_\_\_\_\_

2. Site IFC electrical plans available?  YES  NO Reference them, but confirm their accuracy. Attach at end.

3. Define the work area (WA) (description and photos of work area)

SL Shutdown Plan v4.0




4. One-line including the WA and the equipment needed to isolate WA based on as-builts available and first hand on-site experience. Attach at end.

**YES**

5. **Define power sources:** what sources are possibly connected to the WA

- a. Utility
- b. Backup / Emergency / Standby Generators
- c. Uninterruptible Power Supplies (UPS)
- d. Batteries
- e. PV
- f. Other parallel sources \_\_\_\_\_

6. Determine **equipment needed to isolate the WA** (add others as needed).

a. Check off isolation equipment present:

- i. Air-breaks / Cut-outs / Goabs
- ii. Breaker

SL Shutdown Plan v4.0





- iii. Bolted Pressure Switch (BPS)
- iv. Drawout breaker
- v. Removable fuses
- vii. Meter Pan
- viii. Relays
- ix. Automatic Transfer Switches (ATS)
  - 1. Listed equipment
  - 2. Custom engineered
- x. Other \_\_\_\_\_

7. **Make a plan** to isolate:

- i. Customer internal shutdown procedure if any (ie. computers, servers, machinery)
- ii. Confirm cut-in card is coordinated (Walk through with AHJ, Authority Having Jurisdictions)
- iii. Identity approach boundaries per NFPA 70E definitions
- iv. Lockout or disable customer owned power sources

1. Lock out Plan:

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2. Identify boundaries as required

3. Other notes: \_\_\_\_\_



v. Deenergize and lockout toward source following customer shutdown procedure if needed

*Note: shed loads so utility doesn't have to open under full load. Consider age of equipment and evaluate condition of equipment and risk of failure. Also identify breakers that are not load break. Make specific notes under each step.*

1. <customer specific plan>

2. SL Step One:

3. SL Step Two:

4. SL Step Three:

5. SL Step Four:

6. SL Step Five:

7. SL Step Six:

8. Other Notes:

vi. Start de-energizing building at:

vii. Utility shutdown planned for:

viii. Utility cut-in planned for:

## SL Shutdown Plan v4.0



8. **JHA:**

9. **Choose PPE and safety measures:**

- a. Voltage detector
- b. Multi-meter
- c. Ground cluster
- d. Insulated blanket
- e. Insulated gloves
- f. Insulated tools
- g. Hot stick
- h. Arc flash Suit
- i. Fire Extinguisher
- j. Boundry equipment
- k. Phase Rotation Meter
- l. Lighting (head lamp, portable lamps, etc...)
- m. Generator
- n. Other \_\_\_\_\_

SL Shutdown Plan v4.0

10. **Execute plan and test WA**

- a. Confirm work area is de-energized by testing voltage between all metal parts (*Neutral to each phase, Phase to phase, All other metal parts in the work area*)
- b. Apply ground cluster if needed
- c. Apply all other safety measures

11. **Work perform by:**

PRINT NAME:	SIGNATURE:

**Part II: Re-Energize**

1. Confirm **communication** between all parties
2. Confirm work is completed
3. Confirm WA is clear of tools, parts, debris, and people
4. Remove ground cluster and other safeties
5. Close up all the equipment
6. Confirm **approval to energize** by all parties

PRINT NAME:	SIGNATURE:





- 7. Energize toward loads as directed by the authorized qualified person
- 8. Utility re-energizing planned for:
- 9. Remove boundaries

After the shutdown:

- 12. Lessons learned, mistakes made, tools needed:

**Reviewed and signed by:**

TITLE	PRINT NAME	SIGNATURE





# APPENDIX B



## SOLAR LANDSCAPE ELECTRICAL WORK PERMIT

### SECTION 1 - To be completed by the requester or supervisor of the job

(1) Identify requester: Name: \_\_\_\_\_

(2) Job location:

(3) Description of work to be done:

(4) Explain why the circuit cannot be de-energized or the work delayed until the next scheduled outage:

(5) Signature of requester: \_\_\_\_\_ Title: \_\_\_\_\_

### Part II: To be completed by the qualified employee(s) completing the work

(6) Description of circuit and equipment:

(7) Detailed description of procedure to be used in performing the above work:

<b>(8) Safe work practices to be used: (Check all that apply)</b>	
Boundaries	Barriers - Non-conductive covers/blankets
Voltage rated tools	Attendant
PPE	OTHER – (Describe)
LOTO other circuits/tools	
<b>(9) Maximum Voltage that will be exposed:</b>	
<b>(10) What rating is the upstream protective device? (Amperage):</b>	
<b>(11) Limited and Restricted Boundaries for shock hazard: Refer to the arc flash label (if present), if not see Table 130.4(E)(a) or (b) in the NFPA 70E 2021 standard.</b> <ul style="list-style-type: none"> <li>• Limited boundary = _____</li> <li>• Restricted boundary = _____</li> </ul>	
<b>(12) Determination of flash protection boundaries:</b> Refer to the arc flash label (if present), if not see Appendix D of this program or if task is not listed in in the NFPA 70E 2021 standard.  Tasks not listed must be calculated by an Electrical Engineer. Calculation Results: _____Ft _____inches	
<b>(13) Arc flash PPE Category:</b>	



(14) PPE required to safely perform the task: (See Tables 130.7(C)(15)(c) in the NFPA 70E 2021 standard)

- **Check all that apply.**

- **Circle class of PPE and minimum calorie rating where applicable.**

Voltage rated gloves – class 00, 0, 1, 2, 3, 4	Long sleeve shirt (non-melting)
Voltage rated tools	Long pants (non-melting)
Safety glasses or goggles	Long sleeve Arc Rated shirt - Calorie rating 4, 8, 25, 40
Hearing protection	Long Arc Rated pants - Calorie rating 4, 8, 25, 40
Hardhat - (Class C up to 2,200 Volts / Class G up to 20,000 Volts)	Arc Rated coveralls- Calorie rating 4, 8, 25, 40
Hardhat with flame retardant liner - (Class C up to 2,200 Volts / Class G up to 20,000 Volts)	Arc Rated jacket or rainwear- Calorie rating 4, 8, 25, 40
Leather boots/shoes	Flash suit- Calorie rating 4, 8, 25, 40
Leather gloves (heavy duty)	Flash hood - Calorie rating 4, 8, 25, 40
Dielectric over-boots/shoes	Arc rated face shield & Balaclava – Arc flash PPE Category 2
	OTHER:

(15) Method used to restrict access to the work area:

Safety Signs and Tags (tape, barricade)

Attendant



(16) Will a job briefing be completed that covers all the following items? Yes

Hazards associated with the job	Energy source controls
Work procedures involved	PPE
Special precautions	Tools (Insulated fuse holder handling equipment, insulated hand tools, ETC).
Other	

Do you agree the above work can be done safely?  Yes (Forward to EHS Director)  No (Return to requester)

Qualified Person performing work: \_\_\_\_\_ Date: \_\_\_\_\_

Qualified Person performing work: \_\_\_\_\_ Date: \_\_\_\_\_

Attendant: \_\_\_\_\_ Date: \_\_\_\_\_

Qualified Person's Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**Part III:**

**Approvals:**

Electrical Engineer or Supervisor: Signature \_\_\_\_\_  
 Title \_\_\_\_\_ Date \_\_\_\_\_

EHS Director: Signature \_\_\_\_\_  
 Title \_\_\_\_\_ Date \_\_\_\_\_

**Permit Expiration Date:**

**Approved**      **NOT Approved**





# APPENDIX C



## ARC FLASH HAZARD PPE CATEGORIES FOR ALTERNATING CURRENT (AC) EQUIPMENT

Equipment	Arc Flash PPE Category
Panelboards or other equipment rated 240 V and below  <i>Parameters:</i> Maximum of 25 kA available fault current; maximum of 0.03 sec (2 cycle) fault clearing time; minimum working distance 18 in.	1
Panelboards or other equipment rated greater than 240 V and up to 600 V  <i>Parameters:</i> Maximum of 25 kA available fault current; maximum of 0.03 sec (2 cycle) fault clearing time; minimum working distance 18 in.	2
600-volt class motor control centers (MCCs)  <i>Parameters:</i> Maximum of 65 kA available fault current; maximum of 0.03 sec (2 cycles) fault clearing time; minimum working distance 18 in.	2
600-volt class motor control centers (MCCs)  <i>Parameters:</i> Maximum of 42 kA available fault current; maximum of 0.33 sec (20 cycles) fault clearing time; minimum working distance 18 in.	4
600-volt class switchgear (with power circuit fuses or fused switches) and 600-volt class switchboards  <i>Parameters:</i> Maximum of 35 kA available fault current; maximum of up to 0.5 sec (30 cycles) fault clearing time; minimum working distance 18 in.	4
Other 600-volt class equipment (277 volts through 600 volts nominal)  <i>Parameters:</i> Maximum of 65 kA available fault current; maximum of 0.03 sec (2 cycle) fault clearing time; minimum working distance 18 in.	2
Arc-resistant equipment up to 600-volt class  <i>Parameters:</i> DOORS CLOSED and SECURED; with an available fault current and a fault clearing time that does not exceed the arc-resistant rating of the equipment.	N/A





## ARC FLASH BOUNDARY

For AC systems that are 600 volts or less, the arc flash boundary must be a minimum of 20 feet or the entire room if a boundary of 20 feet cannot be obtained (i.e., room is smaller than 20 feet). If the equipment has an NFPA 70E label attached its stated arc flash boundary should be used.

### ARC FLASH HAZARD PPE CATEGORIES FOR DIRECT CURRENT (DC) EQUIPMENT

Equipment	Arc Flash PPE Category	Arc-Flash Boundary
Storage batteries, dc switchboards, and other dc supply sources <u>100 volt or greater but less than or equal to 250 volts.</u> <i>Parameters:</i> <i>Maximum arc duration and minimum working distance: 2 sec @ 18 in.</i>		
Available fault current less than 4 kA	2	3 feet
Available fault current greater than or equal to 4 kA and less than 7 kA	2	4 feet
Available fault current greater than or equal to 7 kA and less than 15 kA	3	6 feet
Storage batteries, dc switchboards, and other dc supply sources <u>greater than 250 volts and less than or equal to 600 volts.</u> <i>Parameters:</i> <i>Maximum arc duration and minimum working distance: 2 sec @ 18 in.</i>		
Available fault current less than 1.5 kA	2	3 feet
Available fault current greater than or equal to 1.5 kA and less than 3 kA	2	4 feet
Available fault current greater than or equal to 3 kA and less than 7 kA	3	6 feet
Available fault current greater than or equal to 7 kA and less than 10 kA	4	8 feet

The methods for estimating the dc arc flash incident energy that were used to determine the categories for this table are based on open-air incident energy calculations. Open-air calculations were used because many battery systems and other dc process systems are in open areas or rooms. If the specific task is within an enclosure, it would be prudent to consider additional PPE protection beyond the value shown in this table. Research with ac arc flash has shown a multiplier of as much as 3x for arc-in-a-box versus open air.



## PURPOSE

Solar Landscape LLC is committed to providing a safe and healthy work environment and to protect our employees from injury or death caused by uncontrolled hazards in the workplace. The Protection of the Public Safety Program has been implemented to ensure employees are informed of the hazards to the public associated with construction or demolition work.

## SCOPE

Solar Landscape has an obligation to provide a hazard-free environment for our employees. Each employee encountering hazardous conditions must be protected against the potential hazards. Solar Landscape's Protection of the Public Safety Program applies to all work operations. It is available for review by all employees.

Solar Landscape is committed to providing a safe and healthy work environment for their entire staff and the public. In pursuit of this, the Protection of the Public Safety Program has been developed to enhance the employee's safety and health as well as the general public.

## PROGRAM RESPONSIBILITIES

### Solar Landscape Management Team

The Solar Landscape Management Team will provide adequate and timely resources necessary to support the Protection of the Public Safety Program and provide for the following:

- Develop and maintain written procedures for public protection,
- Inform each Solar Landscape employee about any foreseeable hazards associated with public protection before an employee or the public are exposed to hazards,
- Provide the necessary personal protective equipment (PPE) for all authorized employees,
- Provide its employees with the knowledge and training necessary to evaluate, identify, and control their exposure to hazards associated with public protection, and
- Make available to all Solar Landscape employees a copy of this Public Safety Program.

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible, accountable and has the authority for the implementation, monitoring, and evaluation of the Safety Program as well as:

- Have a working knowledge of current public protection regulations, standards, design, and personal protective equipment,

- Determine the hazards associated with Protection of the Public,
- Advise and provide guidance to Solar Landscape managers, supervisors, employees, and other departments on all matters pertaining to Solar Landscape's Protection of the Public Safety Program,
- Establish and assign all duties and responsibilities outlined in this program to individuals who are trained and authorized to perform them; providing or verifying that these personnel are provided with the necessary resources to accomplish those duties and responsibilities,
- Provide or ensure provision of specific training for all authorized employees or verify that those employees are provided with specific training as it relates to safe operations and the public's protection,
- Participate in the investigation of all incidents related to public protection incidents, either personally or through persons qualified by reviewing incident reports; taking corrective action to eliminate causes; making necessary reports to management; and maintaining an incident report system, and
- Measure and evaluate the effectiveness of Solar Landscape Protection of the Public Safety Program by conducting periodic program evaluations and making improvements accordingly.

## Managers/Supervisors

Managers/Supervisors are responsible and accountable for establishing, communicating, and enforcing the requirements and procedures in this program and the following:

- Ensure the employees who are working on their projects have been trained and understand how to evaluate, identify, and control exposures of hazards to the general public,
- Have a working knowledge of current public protection regulations, standards, design, and personal protective equipment,
- Participate in the investigation of all incidents related to public protection,
- Ensure all hazards associated with public protection have been evaluated and identified before the commencement of work activities,
- Notify the Program Administrator/EHS Director of any unsafe or hazardous conditions or actions that may cause injury to either themselves or any other authorized employee before proceeding with their workplace activities,
- Establish and implement a procedure to identify and eliminate or control new and existing hazards to the general public.

## Employees

Employees must be properly trained to identify predictable hazards associated with public protection and have the following responsibilities:

- Have a working understanding of and follow Solar Landscape policy and procedures and the instructions of the Program Administrator/EHS Director regarding public protection,
- Notify the supervisor of any unsafe or hazardous conditions or actions that may cause injury to either themselves, any other authorized Solar Landscape employee, or the public before proceeding with their workplace activities,
- Be responsible and accountable for their own actions,
- Responsible and accountable for adhering to all site-specific guidelines and applicable safety

requirements posted at each site prior to performing any work. Failure to comply may result in disciplinary action up to and including possible termination of employment.

## GENERAL PUBLIC SAFETY

### Accident Investigations

A qualified Solar Landscape person or their designee must conduct and coordinate investigations at the worksite.

### Timeliness

The Project Coordinator has an obligation to evaluate each sub contractor's planned activity for its impact on the public. This evaluation must be undertaken at the time construction is being planned, when contracts are being finalized, and as necessary during construction projects.

### Noise

Construction activities that produce noise levels above the local jurisdiction's permissible levels must be identified and appropriate action to minimize public exposure must be taken.

Where sudden or loud impact noises may startle or present a hazard, appropriate actions to notify the public must be taken.

When sudden or continuous noise may interfere with other audible warnings, such as back-up alarms or horns, or where traffic control or emergency vehicle response is affected, appropriate actions must be taken to notify the public. These appropriate actions may include visual signals, warning signs, barricades and/or flag-persons, and must be deployed in addition to the audible warnings.

### Dust, Fumes, Mists, Smoke, Vapors

Operations which produce airborne contaminants that may present a hazard to the public must be controlled.

### Traffic Hazards

Construction operations interacting with the public or taking place above or adjacent to vehicular, pedestrian, maritime, rail, or air traffic (traffic) areas must be addressed.) \*

**NOTE:** Other Standards such as Uniform Manual of Traffic Control Devices, American National Standards Institute (ANSI) D6.1 may be useful in some traffic exposure situations.

When roadways or walkways are distributed by the Construction, and/or temporary covers or bridges are used to allow vehicular or pedestrian traffic to flow or be rerouted, such covers and bridges must be of sufficient size to support the loads that may be imposed and must be secured to prevent shifting or movement. Supporting structures or ground under and around temporary covers or bridges must be evaluated for ability to withstand the imposed loading by a Qualified Solar Landscape person. Shoring and/or reinforcement must be put in place prior to opening the area for public access, whenever shoring, reinforcement or other support is indicated. The condition of the temporary structures must be maintained to prevent Hazards.

Additional care is required in high speed or high congestion traffic areas including but not limited to additional and/or larger notices or warnings, signage, barricades, marker buoys, etc., use of flag persons, movement warnings further from the area involved to give enough advanced warning, or other means to give adequate notice of the Hazard.

Arrangements must be made for prompt cleanup of any debris on public ways.

## Pedestrian Hazards

During Construction those areas designated for public pedestrian traffic must be clearly delineated. They must be maintained so that Hazards that may cause slipping, tripping, or falling are minimized. Non-level surfaces, especially when not clearly observable, must be marked with high visibility marking, signs or notices. Stairs or ramps must have handrails on both sides. Elevated areas must have standard guardrails or equivalent.

Where pedestrian areas are closed, notice must be provided, and access provided to suitable and safe alternative areas. Where necessary, clear markings showing the expected path the public is to take must be installed.

Subcontractor(s) must monitor means of ingress and egress to be used by the public to make certain operations do not block stairways doors, entrances, exits, paths, hallways, etc.

Specific consideration must be given to emergency evacuation of buildings, structures, and jobsites and the effect that the Construction Project may have on such evacuation.

## Lighting

Lighting, including welding flash, on the jobsite that may illuminate of project to areas off the jobsite must be directed or shielded so that it will not create a Hazard to the public.

Walking surfaces and other public areas affected by the Construction Project must be adequately illuminated.

## Radiation

Operations producing possible radiation exposure Hazards to the public must be controlled and shielded, and the area must be barricaded sufficiently to preclude public access. Signage designating types of radiation exposure that may cause harm or injury to the public must be conspicuously displayed.

Ionizing and non-ionizing radiation Hazards to be considered include nuclear, x-ray, laser, microwaves, ultraviolet and infrared radiation, welding rays or high radiant heat sources and exposure.

## Machinery and Vehicles

Contractors utilizing cranes, vehicles, machinery, ships, vessels, barges, boats, aircraft or other mobile equipment or devices must conduct an initial and periodic inspection of the equipment. Adequate barricades, shields, guards, alarms, signs, markings, and safety systems must be provided and/or installed on all equipment.

Areas that have any mobile equipment that is accessible to the public must be properly barricaded or guarded prior to and during the operation of such machinery or equipment. Appropriate warning signs, fencing, barricading or personnel must be placed a sufficient distance from such area and in a timely fashion to ensure that the public cannot inadvertently enter the area.

Where loads are hoisted or where other overhead Hazards exist, a clear area below sufficient to prevent Hazards to the public must be barricaded to prevent inadvertent access by the public. The area should be periodically monitored during overhead work to ensure the area remains clear.

Where ambient noise or noise from construction operations makes it difficult to hear warnings or signals given by mobile equipment, ships, vessels, boats, and aircraft, such warnings or signals must be increased in decibels so they can be heard over other sounds. If this is inappropriate or impractical, visual signals must be maintained between the mobile equipment operators and the designated persons providing protection or signals.

## Falling Objects/Wind-born Objects

Barriers, catch platforms, enclosures, perimeter debris netting, vertical debris netting, or other administrative or engineering controls must be employed to prevent construction objects or debris from reaching or creating a Hazard to the public.

Public areas adjacent to jobsite must be protected by sheds, overhangs, perimeter netting systems, platforms, scaffolding, or similar structures with sufficient structural strength to reduce Hazards to pedestrians from falling objects.

Effort should be made to prevent construction material, tools, debris, waste, equipment, or other items from being propelled or otherwise entering public areas (such as by wind, water, or contact with other operations) by ensuring that they are contained, secured, tied-off, removed, braced, enclosed, restrained,

etc. in such a way as to prevent such objects from falling or being picked up by the wind.

## Security

Measures to restrict the public from access to the jobsite must be established. Where control of access is not practicable, locking, barricading, or removal of equipment, supplies, material, access ways, or other items that pose a Hazard must be undertaken.

The need for security systems or personnel during or after work hours to ensure that the public cannot gain access to the jobsite must be considered and included in the plan.

All security plans must be communicated to local enforcement Authorities including the list of personnel responsible to respond to assist such Authorities. Lists must be periodically updated or affirmed.

## Pollution

Construction operations that generate waste, debris, byproducts, or other contaminants that can be carried to adjacent areas which could result in pollution, degradation, or contamination must be evaluated and such activity process, procedure, or operation must be controlled to reduce or eliminate the problem.

Project waste must only be moved to the facilities that are licensed, certified, or otherwise qualified to accept the type of waste generated and process it in an approved manner.

Water-borne runoff or contaminants which can be carried to any municipal storm or sanitary sewer system must be evaluated. Where runoff may pose a pollution Hazard, actions to control the contaminants must be taken.

On-site sanitation facilities which are not linked to sanitary sewer systems must be provided in accordance with the requirements of this program.

## Utilities

The location of all utilities including but not limited to water, gas, electric, steam, sewer, fuel oil, air, and hydraulics must be established as soon as possible prior to the starting of construction by a Qualified Person.

The locating/marketing of utilities should be done regardless of whether a hazard to the public has been established. This information must be communicated in the project documents to all affected Contractors. Markings and other identifiers must be placed wherever possible as a visual warning to anyone who may inadvertently encounter utilities.

**NOTE:** Most localities have a "one call" utility locator service for public utilities. These services may not be able to locate all utilities, however, such as private steam lines, cables, fuel pipes, etc.

Markings, warnings, or drawings showing the location of utilities must be updated as conditions change, or new utilities are placed, or old utilities are deactivated during the project.

Installations of temporary utilities and exposure to the public must conform to applicable laws, codes, and ordinances. If no standards exist for a particular temporary utility, then such installation must be installed and protected in accordance with applicable standards, laws, codes, or ordinances for the permanent installation of that type of utility, or equivalent safe method.

## Hazardous Materials and Substances

Materials which are considered hazardous which are stored at a Project must be stored away from the public in approved, properly labeled containers. Storage buildings or facilities housing hazardous materials must be constructed and located away from the public as required by the Authority having jurisdiction. Storage buildings or facilities must be separated from each other by distances prescribed by the Authority having jurisdiction. Storage areas must be posted with warning signs. Emergency response personnel must be furnished with information regarding the location, quantity, and type of materials or substances which may be hazardous to the Public and are stored at the Project and provided with Safety Data Sheets (SDS) as requested or required by local jurisdiction.

## Injuries/Damage

Any Injury or damage to the public observed or brought to the attention of any member of the workforce must immediately be assessed for severity and appropriate action must be taken to minimize further injury or damage and to secure medical help for any injured person. Further, immediate notification must be made to the supervisory person designated in the public Hazard Control Plan.

The area where the injury or damage occurred must be secured to prevent intrusion or disruption by any member of the workforce or any member of the public until proper action investigation, and documentation has taken place.

## Vibrations and Subsidence

Construction operations that produce ground or air vibration or could result in damage, or subsidence of adjacent land, trenches, or structures must be analyzed and means taken to prevent damage or injury. Operations such as pile driving, dewatering, vibrating, blasting, drilling, hammering, trenching, excavating, pounding, wrecking/collapsing, placement or extraction or sheeting, heavy equipment traffic, rail traffic, and compressed air or steam releases are examples. Before the start of any construction activity in the proximity of building structures or land that could be affected by such operations, a pre-operations survey of the surrounding area, structures, and appurtenances must be completed. At a minimum, a visual survey with recorded findings must be completed of the outside of all structures and the inside where possible, with photographs taken whenever possible. Apparent weakness or deterioration in structures, utilities, or land must be conveyed to the Authority having jurisdiction prior to the start of construction.

The Contractor responsible for such operations must provide data delineating the maximum limits of



vibrations or subsidence expected by their operation. These limits must not exceed the limits prescribed by any Authority having jurisdiction. When required, seismographic recordings must be made of vibrations producing operations on seismographic equipment capable of producing permanent reproducible records.

When warranted by the survey called for above, structural and geological investigation must be made to ensure that operations will not cause subsidence to adjacent structures. Excavations must assure protection of adjacent public property.

When blasting on the jobsite, an audible blasting warning signal must be established, published, and posted. Signage adequate to warn the public must be posted. Blasting mats or administrative controls (such as evacuation or barricades) must be used wherever the Hazard of fly-rock to the public exists.

Periodic monitoring of adjacent roadways, waterways, airways, sidewalks, buildings, and utilities must be undertaken during construction operations.

Monitoring must be undertaken during construction operations by visual inspection, calibrated strain gauges, instrument survey, or other means acceptable to ensure that any changes, subsidence, or damage that may have resulted from the construction operations are detected.

In public areas all excavations, cuts, and trenches must be backfilled with approved material and properly tamped and compacted as soon as practicable.

All public areas or structures that are cracked, broken, or disturbed by the construction operations must be inspected and repaired and/or replaced as required.

## Emergency Action Plan

An emergency action plan(s) must be incorporated as part of the Public Hazard Control Plan to delineate actions to be taken and responsibilities in the event of an emergency such as flood, chemical spill or leak, fire, electrical outage, collapse, fatality or a multiple injury accident, serious inclement weather, or catastrophe.

Personnel on the jobsite must be instructed as to the emergency procedures that are to be undertaken in the event an emergency arises involving the public.

## Public Contempt or Protest

A plan for dealing with members of the public who purposely place themselves or others at risk by failing to observe or heed warnings or other directives or safety precautions must be established. This may require notification to agencies with authority to control public activity (such as police, Coast Guard, Federal Aviation Administration (FAA)) and cessation of any work that may cause a Hazard until the public is controlled.

## DEFINITIONS

**Agent:** A designated person or company who is assigned and accepts the specified or contractual responsibility of another party.

**Ambient Noise:** Any noise generated in the surroundings and is not a result of the construction operation.

**Authority:** Any administrative body or government division or agency that establishes or is authorized to establish regulations, procedures, laws, or other controls applicable to the jobsite or public.

**Enforcing Authority:** The entity with general oversight of the operation with day-to-day control of the site and with authority to enforce safety on the site. This may be a controlling contractor, company, owner, a government, or private agency that is conducting construction or maintenance, or the employer in the absence of one of these.

**NOTE:** In the absence of a law specifically incorporating this standard or a section of this standard, or a specific interpretation from the enforcement or consultative branch of a State or Federal Safety and Health enforcement agency, the task of determining applicability and exceptions to this program rests with the Enforcing Authority

**Competent Person:** One who can identify existing and predictable hazards to the public and has authorization to take prompt corrective measures to eliminate them.

**Construction Project:** All work performed by or for the Project Constructor as defined by the Project Documents.

**Contractor:** A subcontractor or other entity as designated in the project documents, responsible for part of the construction process on a construction project.

**Engineer:** A Licensed/Registered Professional Engineer with expertise in the discipline applicable to the scope of work.

**Hazard:** A condition that has the potential of causing injury (or illness) or death to an individual(s) or damage to or loss of equipment or property.

**Project Constructor:** A person, firm, or corporation, such as the Construction Manager General Contractor, Prime Contractor, or other entity, as designated in the project documents, responsible for oversight supervising, and/or controlling the work performed on the project.

**NOTE:** *If multiple clearly defined and distinct projects are described in the contract documents and take place at one common location, there may be more than one Project Constructor. Individual public protection plans may have to be developed for these separate projects, as the operations of one project may affect the adjacent projects.*

*Project Documents:* All contracts, documents, orders, permits, requisitions, agreements, and subsequent official communication applicable to the construction project.

*Public:* All persons and property not affiliated with the construction project who are not employed by the Project Constructor or Contractors.

**NOTE:** *Trespassers are excluded from the definition of public as the term is used in this program.*

*Public Hazard Control Plan:* An analysis conducted prior to start of work at the project that addresses potential hazards to the public.

## PURPOSE

The purpose of this Solar Landscape LLC Powered Industrial Vehicle (PIV) Program is to establish the requirements to ensure hazards associated with the use of powered industrial vehicles operated by Solar Landscape employees.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible to ensure that the requirements of this Solar Landscape Powered Industrial Vehicle Program. The EHS Director is responsible for:

- Providing Solar Landscape employee training and authorization,
- Vehicle meet safety requirements,
- New vehicle purchase criteria,
- Vehicle maintenance, and
- General safe operation of PIVs.

### Employees

Solar Landscape employees are responsible to:

- Understand and adhere to the procedures outlined in this Solar Landscape Powered Industrial Vehicle Program and recognize that failure to do so will result in disciplinary actions up to and including termination,
- Notify Solar Landscape management of any unsafe or hazardous conditions or practice(s) that may cause injury to either themselves or any other Solar Landscape employees or subcontractors,
- Report any incident to the EHS Director or supervisor that causes injury to a Solar Landscape employee, regardless of the nature or severity of the injury.

Only Solar Landscape employees assigned to operate a PIV will be trained and certified as competent to operate a PIV safely, as demonstrated by the successful completion of the Solar Landscape's training evaluation.

## PIV OPERATION GENERAL OPERATING RULES

- PIV's must never not be driven up to anyone standing in front of a bench or other fixed objects,
- Solar Landscape employees are not allowed to pass under the elevated portion of any PIV, whether loaded or empty,

- Solar Landscape employees are never allowed to ride as passengers on a PIV,
- Solar Landscape employees are allowed on the forks only when in an approved basket appropriately installed and certified by the manufacturer for the specific PIV,
- Operators must keep arms and legs inside the running lines of a PIV during operation.
- Never place arms or legs inside the uprights of the mast of a PIV,
- When a PIV is left unattended, the load must be fully lowered, controls in neutral, power must be shut off, and brakes set. Wheels are to be blocked if the PIV is parked on an incline,
- A safe distance must be maintained from the edge of ramps or platforms while on any elevated dock, or platform,
- All grades must be traversed slowly to maintain control of the PIV,
- Never leave PIVs idling unnecessarily inside buildings or outside near windows or ventilation intake ducts,
- Operators will observe all traffic regulations, including posted site speed limits,
- The PIV operator is responsible for looking out for pedestrians and will sound the horn when approaching pedestrians,
- A safe distance must be maintained of approximately three PIV lengths from other PIVs and pedestrians,
- Do not pass other PIVs traveling in the same direction at intersections, blind spots, or other dangerous locations,
- Slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver will travel with the load trailing,
- When ascending or descending grades more than ten (10) percent, loaded PIVs must be driven with the load upgrade,
- Dock board or bridge plates are to be properly secured before they are driven over, and their rated capacity not exceeded,
- Elevators must be approached slowly, and then entered squarely after the elevator car is properly leveled. Once on the elevator, the controls must be neutralized, power shut off, and the brakes set,
- When transporting material, the load is to be kept no more than six (6) to ten (10) inches off the floor and proper caution used when turning.

## LOADING

- Loads are to be stable or safely arranged prior to moving. Extreme caution will be taken when handling off-center loads which cannot be centered,
- Heavy, odd, shaped objects will be loaded with the center of gravity as low as possible,
- Loads will never be allowed to exceed the PIVs rated capacity,
- Extreme caution will be used when tilting the load forward or backward, particularly when high tiering of loads.

## PIV MAINTENANCE

A PIV not in safe operating condition must be removed from service until all repairs have been made by authorized personnel.

All repairs must be conducted with the engine shut off and the key under the direct control of the person performing the repair. All other appropriate controls of hazardous energy will be in place during the repair.

The following maintenance rules must be followed:

- No PIV will be operated with any obvious leak,
- Repairs to the fuel and ignition system which involve fire hazards must be conducted only in designated repair locations,
- When working on the electrical system the battery will be disconnected,
- All parts that are replaced must be replaced with parts equivalent with those used in the original design.

## TRAINING

Solar Landscape employees may operate a powered industrial PIV only under the direct supervision of designated persons who have the knowledge, training, and experience to train and evaluate operator competence. New employee operators with previous experience or training will undergo the same training as other employee operators.

Training will consist of a combination of formal instruction, practical training, and evaluation of the operator's performance in the workplace.

All training and evaluation will be conducted by an approved third-party training contractor who is qualified to provide certification or by someone who has the knowledge, training, and experience to train and evaluate powered industrial PIV operators as designated by the company.

Certified PIV operators will demonstrate their understanding of the following:

- Differences between the PIV and the automobile,
- Operating instructions, warnings, and precautions for the type of PIV the operator will be authorized to operate,
- PIV controls and instrumentation: where they are located, what they do, and how they work,
- Engine and motor operation,
- Steering and maneuvering,
- Visibility (including restrictions due to loading),
- Fork and attachment adaption, operation, and use limitations,
- Vehicle capacity and stability,
- Any vehicle inspection (Appendix A) and maintenance that the operator will be required to perform,
- Engine refueling and/or charging and recharging batteries,
- Operating limitations,
- Surface conditions concerns where the vehicle will be operated,
- Composition of loads to be carried and load stability,
- Load stacking and un-stacking,
- Pedestrian traffic in areas where the vehicle will be operated,
- Narrow aisles and other restricted places where the vehicle will be operated,

- Hazardous locations where the vehicle will be operated,
- The risks of ramps and other sloped surfaces that could affect the vehicle's stability,
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of engine exhaust components (e.g. carbon monoxide),
- Determining whether the load is safe to handle,
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation, and
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of PIV's that the employee is being trained to operate.

## REFRESHER TRAINING

Refresher training will be required when:

- Annually,
- The operator has been observed operating the vehicle in an unsafe manner,
- The operator has been involved in an accident or near-miss incident,
- The operator has received an evaluation that reveals that the operator is not operating the PIV safely,
- The operator is assigned to drive a different type of PIV,
- A condition in the workplace changes in a manner that could affect safe operation of the PIV, and

An evaluation of each powered industrial PIV operator's performance must be conducted at least once every three years.

## OPERATOR CERTIFICATION

Solar Landscape will certify that each operator has been trained and evaluated as required by this Solar Landscape Powered Industrial Vehicles program. The certification will include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training and evaluation.

Any Solar Landscape employee allowed to operate a PIV, even if only occasionally, will be required to be certified before operating this equipment.

## FUEL HANDLING AND STORAGE

The storage and handling of liquid fuels such as gasoline and diesel fuel must be in accordance with the following:

- Make sure the PIV is properly positioned and brakes applied before attempting to fuel the vehicle. Engines will be shut off and operators must be off PIVs before they are refilled,

- Fuel tanks will be filled at designated locations outside of any structure with the filling hose and equipment properly bonded and grounded. Propane cylinders will also be changed at designated locations outside of any structure,
- Smoking is not permitted within twenty feet of refueling operations, and
- Fire extinguishers will be readily available during the fueling operation. Only Solar Landscape employees trained in fire extinguisher use will utilize this equipment.

## BATTERY CHARGING

Battery charging will be performed in an area provided with adequate ventilation of gassing batteries as well as the capability for flushing and neutralizing spilled electrolyte. PIVs are to be properly positioned and brakes applied before attempting to change or charge batteries.

Other safety precautions concerning PIV batteries include:

- When charging batteries, acid must be poured into water instead of water poured into acid. Only approved containers will be used for dispensing electrolyte.
- Reinstalled batteries will be properly positioned and secured in the PIV.
- Assure battery vent caps are functioning, and the battery covers are open to dissipate heat.
- Tools and other metal objects are to be kept away from the top of uncovered batteries.
- Solar Landscape employees handling batteries will wear face shields, goggles, rubber gloves, aprons, and rubber boots, to protect against acid burns.
- If acid is spilled on clothing it will be removed immediately and any affected body parts flushed with water.





# APPENDIX A



### PIV CHECKLIST

Industrial PIVs will be examined daily before being placed in service and at the end of the day.

**NOTE:** If the PIV is used daily on more than one shift, it must be inspected before each shift.

PIV Manufacturer \_\_\_\_\_ Date \_\_\_\_\_

PIV Identifying Number \_\_\_\_\_ Inspected by \_\_\_\_\_

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#### ITEMS TO BE CHECKED

- | OK    | NOT<br>OK |   |
|-------|-----------|---|
| _____ | _____     | Tires   |
| _____ | _____     | Horn  |
| _____ | _____     | Back up alarm   |
| _____ | _____     | Lights  |
| _____ | _____     | Battery   |
| _____ | _____     | Controller  |
| _____ | _____     | Lift system, to include load limit switches, load engagement means, chains, cables, forks, etc. |
| _____ | _____     | Brakes (normal and emergency)   |
| _____ | _____     | Steering mechanism intact, no excess play in steering.  |
| _____ | _____     | Hydraulic system intact, no leaks or fluid puddle present.                                      |
| _____ | _____     | Hydraulic fluid level   |
| _____ | _____     | PIV clean, free of dirt, excess oil, and grease.  |
| _____ | _____     | Overhead guards intact, not broken, or damaged.   |
| _____ | _____     | All gauges working properly.  |
| _____ | _____     | Seat belts work properly.   |
| _____ | _____     | Fuel Level  |
| _____ | _____     | Fuel system intact, no smell of fuel, cap in place.   |
| _____ | _____     | Propane tank secured in saddle.   |
| _____ | _____     | Engine oil fluid level.   |
| _____ | _____     | Transmission fluid level.   |
| _____ | _____     | Exhaust system intact, no visible emissions.  |
| _____ | _____     | All name plates and markings are in place and maintained in legible condition.                  |

List any other problems found with the PIV.

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**Note:** Any items found to be defective will require the EHS Director or supervisor to be notified immediately and the PIV will be taken out of service until repaired.

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## PURPOSE

The purpose of this Solar Landscape LLC Illness, Injury and Recordkeeping Program is to comply with the Occupational Safety and Health Administration (OSHA) Part 29 Code of Federal Regulations (CFR) 1904 rules requiring companies like Solar Landscape to record and report work-related fatalities, injuries, and illnesses.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director, has the authority and responsibility for implementing the provisions of this Solar Landscape Injury, Illness, and Recordkeeping Program as well as:

- Maintain/review OSHA 300 logs and forms,
- Informing Solar Landscape employees of the provisions of this Solar Landscape Injury, Illness, and Recordkeeping Program,
- Evaluating the safety performance of all employees,
- Recognizing employees who perform safe and healthful work practices,
- Providing training to employees whose safety performance is deficient,
- Disciplining Solar Landscape employee for any failure to comply with a safe and healthy workplace,
- Directly reporting to OSHA any applicable illness, injury, or fatality.

### Managers and Supervisors

All Solar Landscape managers and supervisors are responsible for implementing and maintaining this Solar Landscape Injury, Illness, and Recordkeeping Program in their work site/areas and for responding to questions from employees regarding this Solar Landscape Injury, Illness, and Recordkeeping Program or any safety and health related concern when at the worksite.

All managers and supervisors are responsible for communicating with all employees about occupational safety and health in a form readily understandable by all Solar Landscape employees. Solar Landscape encourages all employees to inform their managers, supervisors, or the EHS Director directly concerning workplace hazards without fear of reprisal.

Managers and supervisors will also be responsible for:

- New employee orientation which includes a discussion of the Solar Landscape Illness, Injury, and Recordkeeping Program and all other safety and health policies programs and procedures,
- Review of this Solar Landscape Injury, Illness, and Recordkeeping Program for deficiencies or updates,
- Workplace safety and health training programs,
- Scheduling safety meetings with Solar Landscape employees,
- Posting or distributing safety information to employees, and

- Developing a worksite system for employees to anonymously inform management about workplace hazards.

## Employees

All Solar Landscape employees are responsible for complying with this Illness, Injury, and Recordkeeping Program and working with good safe and healthy work practices.

## HAZARD ASSESSMENT

Periodic inspections to identify and evaluate workplace hazards will be performed by the EHS Director, manager, supervisor, or a selected competent person.

Periodic inspections will be performed according to:

- When new substances, processes, procedures, or equipment that present potential new hazards are introduced into the Solar Landscape work site,
- New, previously unidentified hazards are recognized,
- When occupational injuries and illnesses occur, and
- Whenever workplace conditions warrant an inspection.

## ACCIDENT/EXPOSURE INVESTIGATIONS

Procedures for investigating workplace accidents and hazardous substance exposures include:

- Visiting the accident scene as soon as possible,
- Interviewing injured employees and witnesses,
- Examining the workplace for factors associated with accident/exposure,
- Determining the cause of the accident/exposure,
- Taking corrective action to prevent the accident/exposure from reoccurring,
- Recording the findings and corrective actions taken, and
- Following this Solar Landscape Illness, Injury, Recordkeeping Program.

## HAZARD CORRECTION

Unsafe or unhealthy work conditions, practices or procedures will be corrected in a timely manner based on the severity of the hazards. Hazards will be when observed or discovered or when an imminent hazard exists that cannot be immediately abated without endangering Solar Landscape employee(s) and/or property. Exposed employees will be removed from the area except those necessary to correct the existing hazardous condition. Solar Landscape employees who must conduct work in the work area of the hazardous condition(s) will be provided with the necessary PPE until the abatement has been completed and permission to proceed has been given by the EHS Director.

## TRAINING

All Solar Landscape employees, including managers and supervisors, will receive training and instruction on both the general safety and job-specific/site specific safety and health procedures.

Training will be conducted:

- To all new Solar Landscape employees,
- To all Solar Landscape employees given new job assignments for which training has not previously been provided,
- Whenever new substances, processes, procedures, or equipment are introduced to the workplace and present a new hazard,
- Whenever Solar Landscape personnel are aware of a new or previously unrecognized hazard,
- To supervisors to familiarize them with the safety and health hazards to which Solar Landscape employees, under their immediate direction and control, may be exposed,
- To all Solar Landscape employees to address hazards specific to their worksite.

General workplace safety and health practices includes, but is not limited to, the following:

- Implementation and revisions of this Solar Landscape Injury, Illness, and Recordkeeping Program,
- Emergency action and fire prevention plan,
- Provisions for medical services and first aid, including emergency procedures,
- Prevention of musculoskeletal disorders, including proper lifting techniques,
- Proper housekeeping, such as keeping stairways and aisles clear, work areas neat and orderly, and promptly cleaning up spills,
- Prohibiting horseplay, scuffling, or other acts that tend to adversely influence safety,
- Proper storage to prevent stacking equipment and supplies in an unstable manner,
- Proper reporting of hazards and accidents to managers, supervisors, or EHS Director,
- Solar Landscape Hazard communication (HAZCOM), and
- Proper storage and handling of toxic and hazardous substances, including prohibiting eating or storing food and beverages in areas where they could become contaminated.

## RECORDKEEPING

Solar Landscape is required to document all work-related injuries, illnesses, and fatalities following the guidelines of the OSHA Part 29 CFR, Part 1904.

Solar Landscape will maintain an OSHA 300 Log or equivalent forms.

Appendix A includes the OSHA flow chart for the determination of recording and injury or illness on the OSHA 300 log.

## OSHA 300 Log of Work-Related Injuries and Illnesses

The OSHA 300 log is used to classify work-related injuries and illnesses and notes the extent and severity of each case. The following work-related injuries and illnesses will be recorded by the EHS Director:

- Death,
- Loss of consciousness,
- Incidents that require days away from work,
- Incidents that require restricted work activity or job transfer,
- Incidents that require medical treatment beyond first aid,
- Injury or illness diagnosed by a physician or other licensed health professional,
- Any work-related case involving cancer, irreversible disease, fractured or cracked bone or punctured eardrum,
- Any needle-stick injury or cut from a sharp object that is contaminated with another person's blood or other potentially infectious material,
- A tuberculosis infection as evidenced by a positive skin test or diagnosis by a physician or other licensed health professional after an exposure to a known case of tuberculosis, and
- Incidents where basic first aid such as cleaning wounds on the skin surface, using wound covering such as bandages, using heat or cold therapy and others are not considered medical treatment and do not need to be recorded on the OSHA 300 Log.

## OSHA 300a Summary of Work-Related Injuries and Illnesses

At the end of each calendar year, the results of the Solar Landscape OSHA 300 Log will be reviewed by the EHS Director to see that they are complete and accurate. These results will be summarized in the OSHA 300A Summary. Once the summary has been completed, it will be posted in a conspicuous place by Feb. 1 of the following year covered by the form through April 30.

The OSHA 300 Log, the OSHA 300A Summary and the OSHA 301 Injury and Illness Report will be kept for five (5) years following the year to which they pertain.

**NOTE:** *The OSHA 300 Log will not be posted, just the OSHA 300A Summary.*

Solar Landscape will report to OSHA:

- Death of an employee from a work-related incident within eight (8) hours, and/or
- In-patient hospitalizations, amputations, and losses of an eye must be reported within twenty-four (24) hours.

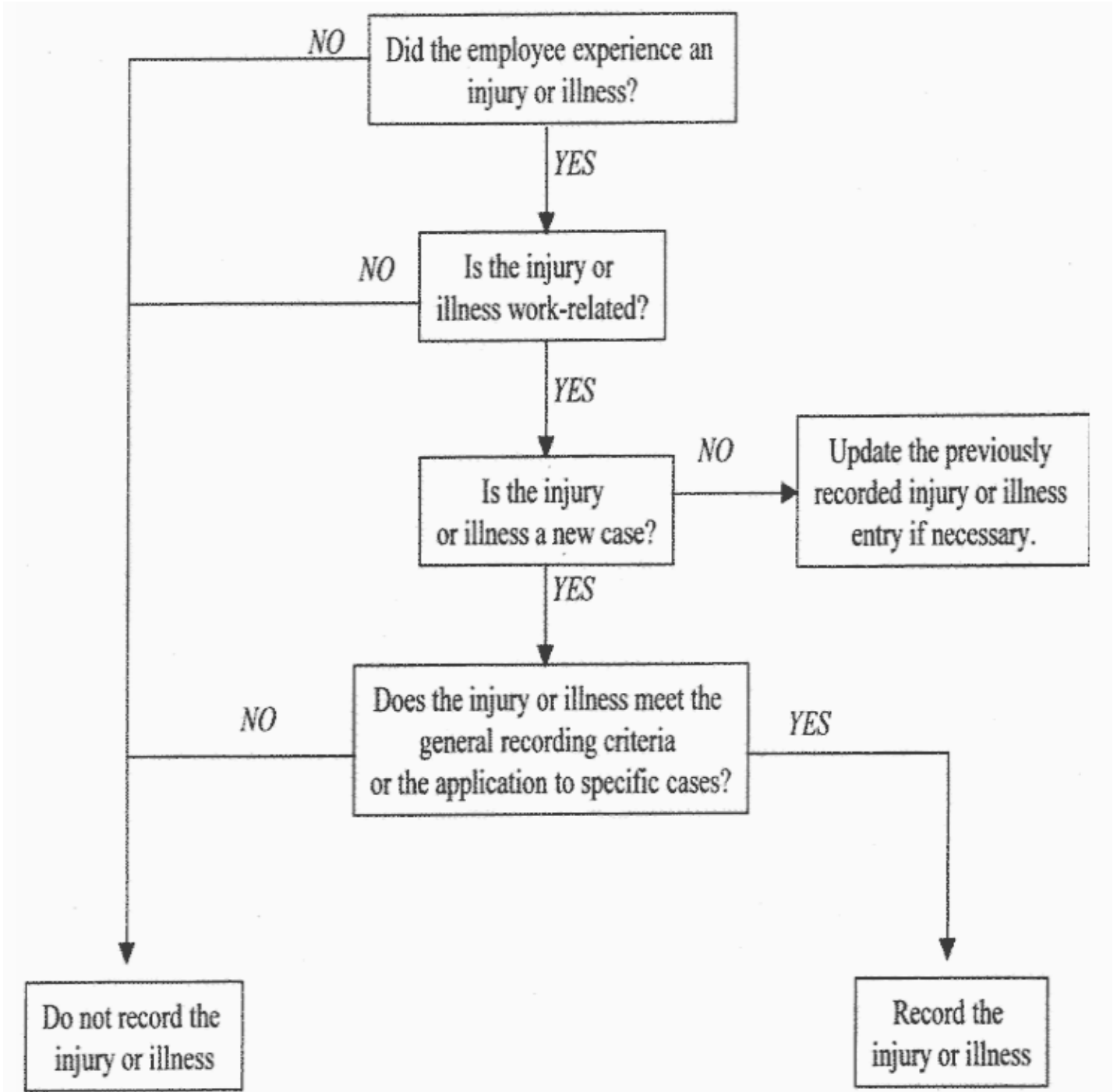
The EHS Director will contact OSHA and orally report via telephone or cell phone or in person to the area office of OSHA that is nearest to the incident. The EHS Director may also file a report by contacting OSHA's toll-free phone number **(800-321-6742)** or an online form at [www.osha.gov](http://www.osha.gov).



# APPENDIX A







## PURPOSE

The purpose of this Bloodborne Pathogens Exposure Control Plan is to eliminate or minimize Solar Landscape LLC employee(s) occupational exposure to blood or certain other body fluids by complying with the Occupational Safety and Health Administrations (OSHA) 29 Code of Federal Regulations (CFR) Part 1910.1030.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director oversees this Solar Landscape Bloodborne Pathogens Exposure Control Plan, and the Hepatitis B Virus (HBV) vaccination program.

The EHS Director will ensure that following employee(s) exposure to infectious materials, employees remove their personal protective gloves, wash their hands, and any other potentially contaminated skin area immediately or as soon as feasible with soap and water.

The EHS Director is also responsible for:

- Ensuring that equipment which has become contaminated with blood or other potentially infectious materials be examined prior to servicing or shipping and be decontaminated as necessary unless the decontamination of the equipment is not feasible,
- Ensuring employee(s) uses appropriate PPE and that appropriate PPE in the appropriate sizes is readily accessible at the work site or is issued **without cost** to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives will be readily accessible to those employees who are allergic to the gloves normally provided,
- Providing training at the time of initial assignment on this Bloodborne Pathogen Exposure Control Plan and the tasks or work site where occupational exposure may occur,
- Conduction of re-training every twelve (12) months of the previous training,
- Maintaining Solar Landscape employee confidential medical records, related to an employee(s) exposure, and
- Maintaining the employee training records on this Solar Landscape Bloodborne Pathogens Exposure Control Plan.

### Employees

Employees must immediately report exposure incidents to their supervisor or to the EHS Director to permit timely medical follow-up in accordance with this Bloodborne Pathogens Exposure Control Plan and according to the U.S. Public Health Service.

## EXPOSURE DETERMINATION

OSHA requires Solar Landscape to conduct an exposure determination concerning which employees may incur occupational exposure to blood or other potentially infectious materials. The exposure determination is made without regard to the use of personal protective equipment (PPE).

This exposure determination is required to list all job classifications in which employees may be expected to incur such occupational exposure, regardless of frequency. Appendix A contains a list of the Solar Landscape job classifications.

## COMPLIANCE METHODS

Universal precautions will be used at all Solar Landscape worksites to prevent contact with blood or other potentially infectious materials. All blood or other potentially infectious material will be considered infectious regardless of the perceived status of the source of the employee.

Engineering and work practice controls will be utilized to eliminate or minimize exposure to Solar Landscape employees at the solar panel installation work sites. Where occupational exposure remains after implementation of these controls, PPE will also be utilized.

Hand washing facilities will be made available to Solar Landscape employee(s) who incur exposure to blood or other potentially infectious materials. The hand washing facilities will be readily accessible after an employee(s) incur an exposure.

**NOTE:** *If hand washing facilities are not feasible at the worksite, Solar Landscape will provide either an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes.*

If these alternatives are used, then the hands are to be washed with soap and running water as soon as feasible. Solar Landscape will provide alternatives to readily accessible hand washing facilities and will list the location, tasks, and responsibilities in the Solar Landscape Site-Specific Plan to ensure maintenance and accessibility of these alternatives.

## WORK AREA RESTRICTIONS

In work areas where there is a reasonable likelihood of exposure to blood or other potentially infectious materials, Solar Landscape employees are not allowed to eat, drink, apply cosmetics or lip balm, smoke, or handle contact lenses.

## PPE

PPE will be chosen based on the anticipated exposure to blood or other potentially infectious materials. PPE will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach the employees' clothing, skin, eyes, mouth, or other mucous membranes under

normal conditions of use and for the duration of time which the PPE will be used.

PPE, except for gloves, will be cleaned, laundered, and disposed of by Solar Landscape at no cost to the employee(s). Clothing that is penetrated by blood or other infectious material, will be removed immediately from the worksite. All PPE will be removed prior to leaving the work area. When PPE is removed, it must be placed in an appropriately designated area or container for storage, washing, decontamination, or disposal.

## Gloves

Gloves must be worn where it is reasonably anticipated that employees will have hand contact with blood, other potentially infectious materials.

Disposable gloves used at the worksite are not to be washed or decontaminated for re-use and are to be replaced as soon as practical when they become contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

**NOTE:** *Work gloves may be decontaminated for re-use provided that the integrity of the glove is not compromised. Work gloves will be discarded if they are cracked, peeling, torn, punctured, or exhibit any signs of deterioration or when they have been compromised.*

## Eye and Face Protection

Masks in combination with eye protection devices, such as goggles or glasses with solid side shield, or chin length face shields, are required to be worn whenever splashes, splatters, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can reasonably be anticipated.

## WORK SITE HOUSEKEEPING

Contaminated work surfaces will be decontaminated as soon as feasible after any spill of blood or other potentially infectious materials.

## REGULATED WASTE

Regulated waste will be placed in closeable containers constructed to contain all contents and prevent leakage of fluids during handling, storage, transportation, or shipping.

The waste must be labeled or color-coded and closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

**NOTE:** *Disposal of all regulated waste must be in accordance with applicable United States, state, and local regulations.*

## LAUNDRY PROCEDURES

Laundry contaminated with blood or other potentially infectious materials will be handled as little as possible. Contaminated laundry will be placed in appropriately marked biohazard labeled or color-coded red bag.

## LABELS AND SIGNS

The EHS Director will ensure that biohazard labels are affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious materials, and other containers used to store, transport or ship blood or other potentially infectious materials.

The universal biohazard symbol will be used in accordance with the Solar Landscape HAZOM Program. The label must be fluorescent orange or orange red and red bags or containers may be substituted for labels.

## HEPATITIS B VACCINES

### General

Solar Landscape will make available the Hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post exposure follow-up to Solar Landscape employees who have had an exposure incident.

The EHS Director will ensure that all medical evaluations and procedures including the Hepatitis B vaccine and vaccination series and post exposure follow-up, including prophylaxis are:

- Made available at no cost to the employee,
- Made available to the employee at a reasonable time and place,
- Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional, and
- Provided according to the recommendations of the U.S. Public Health Service and,
- An accredited laboratory must conduct all laboratory tests.

If the exposed Solar Landscape employee initially declines Hepatitis B vaccination but later while still covered under the standard decides to accept the vaccination, the vaccination will then be made available. All Solar Landscape employees who decline the Hepatitis B vaccination offered are required to sign the OSHA required waiver or declination form (Appendix B) indicating their refusal.

### Exposure Evaluation and Follow-Up

All exposure incidents must be reported, investigated, and documented. When the employee incurs an exposure incident, it must be reported to the EHS Director.

Following a report of an exposure incident, the exposed Solar Landscape employee will immediately receive a confidential medical evaluation and follow-up, including the following elements:

- Documentation of the route of exposure, and the circumstances under which the exposure incident occurred,
- The source individual's blood will be tested as soon as feasible and after consent is obtained to determine HBV infectivity.
- When the source individual is already known to be infected with HBV, testing for the source individual's known HBV status does not need to be repeated.
- Results of the source individual's testing will be made available to the exposed employee, and the employee will be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

Collection and testing of blood for HBV status will comply with the following:

The exposed employee's blood will be collected as soon as feasible and tested. After consent is obtained the employee will be offered the option of having their blood collected for testing of the employee's HBV status.

All employee(s) who incur an exposure incident will be offered post-exposure evaluation and follow-up.

## Healthcare Professional

The EHS Director will ensure that the Solar Landscape designated/contracted healthcare professional responsible for the employee's Hepatitis B vaccination is provided with the following:

- A copy of OSHA 29 CFR 1910.1030 standard,
- Written description of the exposed employee's duties as they relate to the exposure incident,
- Written documentation of the route of exposure and circumstances under which exposure occurred,
- Results of the source individuals blood testing, if available, and
- All medical records relevant to the appropriate treatment of the employee must including vaccination status.

The EHS Director will obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within fifteen (15) days of the completion of the evaluation.

The healthcare professionals written opinion for HBV vaccination will be limited to whether HBV vaccination is indicated for an employee, and if the employee has received such vaccination. The healthcare professional's written opinion for post exposure follow-up will be limited to the following information:

- A statement that the employee has been informed of the results of the evaluation; and
- A statement that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

**NOTE:** *All other findings or diagnosis will remain confidential and will not be included in the written report.*

# TRAINING

Training for Bloodborne Pathogens will be provided to Solar Landscape employees to the education and language level of the employee(s) and offered during their normal work shift.

Training will be interactive and cover the following:

- A copy of the OSHA 1910.130 standard and an explanation of its contents,
- A discussion of the epidemiology and symptoms of bloodborne diseases,
- An explanation of the modes of transmission of bloodborne pathogens,
- An explanation of this Solar Landscape Bloodborne Pathogens Exposure Control Plan and how an employee may obtain a copy,
- The recognition of tasks that may involve exposure,
- An explanation of the use and limitations of methods to reduce exposure, for example engineering controls, work practices and PPE,
- Information on the types, use, location, removal, handling, decontamination, and disposal of PPE,
- An explanation of the basis of selection of PPE,
- Information on the Hepatitis B vaccination, including efficacy, safety, method of administration, benefits, and that it will be offered free of charge,
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials,
- An explanation of the procedures to follow if an exposure incident occurs, including the method of reporting and medical follow-up,
- Information on the evaluation and follow-up required after an employee exposure incident, and
- An explanation of the signs, labels, and color-coding systems.

Solar Landscape employees who have received training on bloodborne pathogens in the twelve (12) months preceding the effective date of this policy will only receive training in provisions of the policy that were not covered.

Solar Landscape will conduct additional training for employees when there is a change(s) to tasks or procedures affecting the employee's occupational exposure.

# RECORDKEEPING

## Medical Records

Solar Landscape employee medical records will be maintained and kept confidential. The medical records will be maintained for at least the duration of employment plus thirty (30) years.

The medical records will include the following:

- The name and social security number of the Solar Landscape employee.
- Copy of the employee's HBV vaccination status, including the dates of vaccination.

- Copy of all results of examinations, medical testing, and follow-up procedures.
- Copy of the information provided to the healthcare professional, including a description of the employee's duties as they relate to the exposure incident, and documentation of the routes of exposure and circumstances of the exposure.

## Training Records

Training records on this Solar Landscape Bloodborne Pathogens Exposure Control Plane will be maintained for three (3) years from the date of employee(s) training and will contain the following information:

- Dates of the training sessions,
- Outline describing the material presented,
- Names and qualifications of persons conducting the training, and
- Names and job titles of all Solar Landscape employees attending the training sessions.

Employee records will be made available if requested by:

- Solar Landscape employee(s),
- Workers' Safety and Compensation Administrator, and

**NOTE:** *Based on the location of work at the time of the exposure*

- Director of the National Institute for Occupational Safety and Health (NIOSH) upon request.

## TRANSFER OF RECORDS

If Solar Landscape discontinues business or there is no successor employer to receive and retain the Solar Landscape employee records for the prescribed period, the Director of NIOSH will be contacted for final disposition.





# APPENDIX A







# APPENDIX B





### HEPATITIS B VACCINE DECLINATION

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring the hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with the hepatitis B vaccine, at no charge to myself. However, I decline the hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

\_\_\_\_\_  
EMPLOYEE NAME

\_\_\_\_\_  
SIGNATURE

\_\_\_/\_\_\_/\_\_\_  
DATE



## PURPOSE

The purpose of the Solar Landscape LLC Hand and Power Tools Program is to ensure the safe use of hand or power tools, and to reduce the likelihood of injuries involving their use while working at Solar Landscape work sites.

## SCOPE

This Solar Landscape Hand and Power Tools Program applies to all Solar Landscape employees where the use of hand or power tools are in use or will be used including work sites where employees are involved in solar panel installation or maintenance operations.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for the implementation of this Solar Landscape Hand and Power Tools Program and for reviewing hazards associated with the use of hand and portable power tools.

During work site inspections tools will be inspected to ensure they are:

- In good working condition,
- Suitable for the job(s) they are being used for, and
- Do not pose a hazard to the employee.

The EHS Director and Solar Landscape supervisors may work together in the development of the Site-Specific Job Hazard Analysis (JHA) for hand tools that present a unique hazard to the employee(s).

The EHS Director is responsible for reviewing and updating this Solar Landscape Hand and Power Tools Program.

### Supervisors

The Solar Landscape Supervisor(s) will establish a regular tool inspection procedure and ensure that tools are being maintained in a safe working condition. The supervisor(s) will also be responsible for:

- Establishing a work site procedure for the control of tools such as a check-in and check-out system.
- Providing a proper storage area for tools to be stored at the worksite,
- Conducting a complete check of the work site operations to determine the need for any special tools that could perform the work more safely than ordinary tools,
- Ensuring that any special tools are maintained and readily available in a centralized tool storage area at the worksite if possible. Ensuring that any dull or damaged tools are not returned to the stock inventory,
- Work with the EHS Director in conducting JHAs involving power tools.

## Employees

Employees are responsible for:

- Selecting the right tool for the job based on the work being performed and the site-specific JHA,
- Maintaining tools in a good working condition,
- Removing from service any wrenches with cracked work jaws, screw drivers with broken points or broken handles, hammers with loose heads, dull saws, and extension cords or electric tools with broken plugs, improper or removed grounding prongs, or split tools in poor conditions,
- Use of tools based on the manufacturer's directions for use, and
- Not continuing use of damaged tools during the job once the damaged tool is identified and notifying the supervisor or EHS Director of a defective or broken tool.

## CARRYING TOOLS

Solar Landscape employees are prohibited from carrying tools, which in any way could interfere with using both hands freely on a ladder or while climbing on a structure. A strong bag, bucket, or similar container is to be used to hoist tools from the ground to upper roof or work area. Tools are to be lowered back to the ground using the same procedure.

Solar Landscape employees are not allowed to:

- Carry tools down ladders from the roof of a warehouse,
- Carry tools in their clothing or shirt pockets, or
- Drop tools down to the ground from the roof or an elevated surface.

Tools placed inappropriately may cause a substantial portion of hand tool injuries. Tools must not be left above where other Solar Landscape employees or subcontractors are moving or walking. This could present a falling object hazard.

Chisels, screwdrivers, and pointed tools must not be carried in an employee's pocket but are to be carried in a toolbox, tool cart, or a tool belt with the sharp/pointed end down.

Tools must be handled so that they will not strike other employee(s) or subcontractor(s).

## PERSONAL PROTECTIVE EQUIPMENT

Appropriate Personal Protective Equipment (PPE) such as safety glasses, face shield, safety goggles, gloves, etc. are required to be worn to protect Solar Landscape employee from hazards that may be encountered while using portable power tools and hand tools.

Solar Landscape employees that use hand and power tools and are exposed to the hazards of falling, flying, abrasive, and splashing materials, or exposed to harmful dusts, fumes, vapors, or gases will be provided with the specified personal PPE necessary to protect them from the hazard.

Required PPE will be designated in the JHA for the specific tool

# HAND TOOLS

Hand tools are non-powered tools such as axes, wrenches, screw drivers, hammers, etc. The greatest hazards posed by hand tools result from misuse and improper maintenance.

Solar Landscape employee(s) will receive training on the proper use of hand tools for the specific work site or specific operations in which they will be working on. The training will include information on the specific tool selection, tool use, and proper PPE that are required to be used when operating the specific tool, and the requirements of the JHA.

## GENERAL SAFETY OPERATIONS FOR HAND AND POWER TOOLS

### Metal-Cutting Hand Tools

#### Chisels

- Chisels should be made heavy enough so that it will not buckle or spring when struck,
- A chisel no larger than the material should be selected so that the blade is used rather than the point or corner, and
- Solar Landscape employees are required to wear safety goggles when using a chisel and should set up a shield or screen to prevent injury to other employees from flying chips.

**NOTE:** *If a shield does not give protection to all exposed employees, the employees in the work area may be required to wear glasses with side protection.*

#### Tap and Die Work

- Tap and die work should be firmly mounted in a vise,
- Only a T-handle wrench or adjustable tap wrench should be used, and
- When threads are being cut with a hand die, hands and arms should be kept clear of the sharp threads coming through the die, and metal cuttings should be cleared away with a brush.

#### Hacksaws

- Hacksaws should be adjusted in the frame to prevent buckling and breaking but should not be tight enough to break off the pins that support the blade.
- Install blade with teeth pointing forward.
- Pressure should be applied on the forward stroke not on the back stroke.
- If the blade is twisted or too much pressure is applied, the blade may break and cause injury to the hands or arms of the user.

#### Metal Files

Selection of the correct type of file for the job will prevent injuries and lengthen the life of a file.

A file should never be cleaned by being struck against a vise or other metal object due to file chips becoming possible flying debris.

Other safety requirements when using files include:

- A file-cleaning card or brush should be used,
- A file is not to be hammered or used as a pry. Use of a file in this manner frequently results in the file chipping or breaking causing injury to the employee,
- A file should not be made into a center punch, chisel, or any other type of tool because the hardened steel may fracture in use,
- A file is never to be used without a smooth, crack-free handle; if the file were to get hung up, the tang may puncture the palm of the hand, the wrist, or other part of the body, and
- Under some conditions, a clamp-on raised offset handle may be useful to give extra clearance for the hands.

## Tin/Sheet Metal Snips

- Tin snips should be heavy enough to cut the material so easily that the employee needs only one hand on the snips and can use the other to hold the material,
- The material is to be well supported before the last cut is made so that the cut edges do not press against the hands,
- Jaws of snips are to be kept tight and well lubricated,
- Solar Landscape employees are required to wear safety goggles when trimming corners or slivers of metal because small particles often fly with considerable force,
- Solar Landscape employees are also required to wear gloves when making cuts.

## Wire Cutters

- Wire cutters used on wire, reinforcing rods, or bolts should have ample capacity for the stock, otherwise the jaws may spring or spread,
- Frequently lubricate wire cutters,
- To keep cutting edges from becoming nicked or chipped, cutters are not to be used as nail pullers or pry bars,
- Cutter jaws should have the hardness specified by the manufacturer for the specific type of material to be cut,
- Adjustment of the bumper stop behind the jaws, cutting edges are to be set to have a clearance of three thousandths of an (0.003) inch when closed.

## Metal Bending

- Always wear appropriate and designated PPE before approaching and operating bending equipment. This includes, but is not limited to, safety goggles, safety gloves, and work boots to prevent contact and possible injury caused by sharp metal edges,
- Before operating the tool for bending, Solar Landscape employees are required to read and understand the manufacturer's operation manual before operating equipment,
- Each operator of the metal bending equipment must be appropriately trained before using the machine



- for the first time,
- Metal burrs must be filed properly, and employees must avoid touching metal edges or cuts, even while wearing gloves,
  - Wet metal sheets require extra attention and must be handled carefully. Moisture, mixed with oils and dirt, can result in very slippery surfaces, making them difficult to grip and dangerous to work with,
  - Sheet metal should be placed parallel to the bending machine before starting operation. This correct placement will prevent contact with the sheet with the operator, avoiding injury,
  - When working in cold weather, warm up the machine before use to ensure efficiency and reduce the risk of stressing the machines,
  - Work surface should be clean and free of any scrap metal,
  - Bending machines will be inspected regularly before each operation, especially before the initial startup.

## Wood-Cutting Hand Tools

### Wood Chisels

- Solar Landscape employees will be instructed on the proper method of holding and using wood chisels. Handles are to be free of cracks and splinters,
- The wood handle of a chisel struck by a mallet is to be protected by a metal or leather cap to prevent it from splitting, and
- Material to be cut must be free of nails to avoid damage to the blade or chips flying into the employee's face or eye.

### Wood Cutting Saws

- Saws must be carefully selected for the type of work they are to be used for,
- For crosscut work on green wood, a coarse saw four (4) to five (5) points per inch) is to be used,
- A fine-tooth saw should be used for smoother, more accurate cutting when using dry wood, and
- Saws are to be kept sharp.

## Miscellaneous Cutting Hand Tools

### Scrapers, Knives, Scalpels/X-ACTO Knives, & Box Cutters

- Cutting tools are to be used only by experienced Solar Landscape employees,
- These tools are to be kept sharp and in good condition,
- Solar Landscape employees who are required to carry knives on the work site must keep them in sheaths or holders,
- Never carry a sheathed knife on the front part of a belt,
- Knives are to be carried over the right or left hip, toward the back,
- Knives are to be stored safely and must never be left lying on benches or in other places such as being hidden under a piece of equipment, under scrap paper, or rags, or among other tools in work boxes or drawers where they may cause hand a hand injury,
- Knives are to be kept separate from other tools to protect the cutting edge of the knife as well as to

- protect the employee,
- Solar Landscape employees who participate in horseplay such as throwing knives, and other similar unsafe practices are prohibited around any knife operations and will be disciplined accordingly, and
- Knives are not used as a substitute for can openers, screwdrivers, or ice picks.

## Maintenance-Hand Tools

### Open-End Wrenches

- Open-end or box wrenches must be inspected before use to ensure sure that they fit properly and that the jaws are not sprung or cracked,
- When defective, a wrench is required to be taken out of service and replaced.

### Adjustable Wrenches

- Adjustable wrenches are used for many purposes but are not intended to take the place of standard open-end, box or socket wrenches,
- May be used for nuts and bolts that do not fit a standard wrench, and
- Constant pressure must be applied to the fixed jaw.

### Pipe Wrenches

- Pipe wrenches, both straight and chain tong, must have sharp jaws and be kept clean to prevent slipping,
- The adjusting nut of the wrench is to be inspected frequently and taken out of service if cracked. A cracked nut may break under strain,
- The handle of a wrench is designed to be long enough for the maximum allowable safe pressure,
- A pipe wrench should never be used on nuts or bolts, the corners of which could break the teeth of the wrench and may also damages the nuts/bolts, and
- Never use a pipe wrench on valves, strike with a hammer, or use a hammer on a pipe wrench.

### Pliers

When using pliers:

- Use a guard over the cutting edge and wear safety glasses to help prevent eye injuries,
- Handles of electricians' pliers must be insulated, and
- Never use pliers as a substitute for a wrench.

### Pipe Tongs

- Solar Landscape employees must neither stand or jump on the tongs or place an extension on the handles to obtain more leverage. Larger tongs should be used if necessary.

## Screwdrivers

- Using screwdrivers for punches, wedges, pinch bars, or pry-bars will not be allowed.
- Cross-slot or Phillips head screwdrivers are safer than the square bit type because they have fewer tendencies to slip.

**NOTE:** *The tip must be kept clean and sharp, however, to permit a good grip on the head of the screw.*

- On metal surfaces the part to be worked on must never be held and should be laid on a bench or flat surface or held in a vise.
- A Screwdriver used for electrical work must have the blade or rivet extending through the handle. Both blade and handle are required to be insulated except at the tip.

## Hammers

- Hammers must have a securely wedged handle suited to the type of head that is used,
- The handle surface must be smooth, without cracks or splinters, free of oil, shaped to fit a hand, and of the specified size and length,
- Soft-head hammers must be used with heads made of plastic, wood, or rawhide, and
- Safety goggles or safety glasses must always be worn to protect against flying chips, nails, or scrap fragments.

## Spark-Resistant Hand Tools

When working in or around flammable substances, iron and steel hand tools can be a dangerous ignition source by creating sparks that could ignite the flammable substance(s). Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood must be used.

## Power Tools

There are several types of power tools used in construction and based on their power needs, may use one of the following energy source types:

- Electric,
- Pneumatic,
- Liquid fuel,
- Hydraulic, and
- Powder- actuated.

The following general safety guidelines must be followed operating power tools:

- Never carry a power tool by the cord or hose,
- Never pull the cord of a power tool or the hose to disconnect it from the electrical receptacle,
- Keep cords and hoses away from heat, oil, and sharp edge,
- Cords are required to be free of frays and or cuts. If the cord is damaged, the equipment must be

- removed from service immediately and discarded,
- Always disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits, and cutters,
- Other Solar Landscape employees must be kept at a safe distance away from the work area,
- Secure work with clamps or a vise, freeing both hands to operate the tool when feasible,
- Avoid accidental starting by ensuring your finger is not on the switch button while carrying a power tool that is connected to an electrical outlet,
- Power tools must be maintained according to the manufacturer's requirements and must be kept in good working order and clean for the best performance.
- Follow instructions in the user's manual for lubricating and changing accessories.
- Proper PPE, based on the JHA should be worn,
- Loose clothing, ties, or jewelry can become caught in moving parts, and
- Portable electric tools that are damaged must be removed from use and tagged "Do Not Use".

## Guards

Moving parts of a power tool must be safeguarded. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if these parts are exposed to contact by Solar Landscape employees.

Guards, as necessary, must be provided to protect the operator and others from the following:

- Contact at the point of operation,
- In-running nip points,
- Rotating parts, and
- Flying chips and sparks.

**NOTE:** *Guards must never be removed when a tool is being used. Solar Landscape employees who remove a guard from a power tool will be subject to disciplinary action up to and including termination.*

## Safety Switches

The following tools are required to be equipped with a constant pressure switch or control that will shut off the power to the tool when the pressure is released or if they do not have a positive accessory holding means:

- All hand-held powered circular saws having a blade diameter greater than two (2) inches,
- Electric, hydraulic, or pneumatic chain saws, and
- Percussion tools.

All hand-held gasoline powered chain saws must be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

The following tools are required to be equipped with a constant pressure switch or control, and may have a lock-on control if the machine cannot be turned off by a single motion of the same finger or fingers that turn it on:

- All hand-held powered drills,
- Tappers,
- Fastener drivers,
- Horizontal, vertical, and angle grinders with wheels greater than two (2) inches in diameter,
- Disc sanders with discs greater than two (2) inches in diameter, and
- Belt sanders, reciprocating saws, saber, scroll, and jig saws with blade shanks greater than a nominal one-fourth inch (1/4"), and.

Other hand-held powered tools such as circular saws having a blade diameter greater than two (2) inches, chain saws, and percussion tools without positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when the pressure is released.

## Electric Tools

Solar Landscape employees using electric tools must be aware of the danger of electrocution when operating electric power tools. The main hazard associated with the use of electric-powered tools are burns and slight shocks which can lead to serious injuries or even heart failure. Even a small amount of current can result in fibrillation of the heart and eventual death. A shock also could cause an employee to suddenly fall off a ladder, scaffold, or other elevated work surface.

Electric powered tools must have a three (3) wire cord with a ground prong and be grounded, double insulated, or powered by a low-voltage isolation transformer.

Three (3) wire cords contain two current-carrying conductors and a grounding conductor. One end of the grounding conductor connects to the tool's metal housing. The other end is grounded through a prong on the plug.

Double insulation is a more convenient method of safeguarding an electric tool. The user and the tools are protected in two (2) ways:

1. Normal insulation on the wires inside, and
2. A housing that cannot conduct electricity to the operator in the event of a malfunction.

The following general safety guidelines must be followed when using electric tools:

- Electric tools can only be operated within their design limitations,
- Gloves and safety footwear are recommended during use of electric tools,
- When not in use, tool(s) must be stored in a dry place,
- Electric tools should not be used in damp or wet locations,
- Work areas should be well lit,
- Frayed cords are required to be taken "Out of Service" and discarded,
- Electric cords will be inspected periodically and kept in good condition, and
- Heavy-duty plugs that clamp to the cord should be used to prevent strain on the current-carrying parts.

## Electric Drills

Although no guards are available for drill bits, some protection is afforded if drill bits are carefully chosen for the work to be done, such as being no longer than necessary. Where the operator must guide the drill by hand, the drill is required to be equipped with a sleeve that fits over the drill bit. Oversized bits are not to be ground down to fit small electric drills instead, an adapter should be used that will fit the large bit and provide extra power through a speed reduction gear. When drills are used, the work pieces should be clamped or anchored to prevent whipping when feasible.

## Electric Saws

Electric saws are designed to be well-guarded by the manufacturer, but Solar Landscape employees must be trained to use the guard as intended. The guard must be checked frequently to be sure that it operates freely and encloses the teeth completely when in use.

## Powered Abrasive Wheel Tools

Powered abrasive grinding, cutting, polishing, and wire buffing wheels may suddenly discharge fragments. Before an abrasive wheel is mounted, it should be inspected closely and sound- or ring-tested to be sure that it is free from cracks or defects. Wheels need to be tapped gently with a light non-metallic instrument. If they sound cracked or dead, they could explode in operation and must not be used. A solid and undamaged wheel will make a clear metallic tone or "Ring" tone.

To prevent the wheel from cracking ensure the wheel fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place, without distorting the flange and assure that the spindle wheel will not exceed the abrasive wheel specifications.

Due to the possibility of a wheel disintegrating or exploding during start-up, the Solar Landscape employee should not stand directly in front of the wheel as it accelerates to full operating speed.

Portable grinding tools need to be equipped with safety guards to protect Solar Landscape employees not only from the moving wheel surface, but also from flying fragments in case the wheel explodes.

When using a powered grinder:

- Always use eye protection,
- Follow the requirements found in the JHA,
- Turn off the power when not in use, and
- Never clamp a hand-held grinder in a vise.

Floor stand and bench mounted abrasive wheels, used for external grinding must be provided with safety guards. The maximum regular exposure of the grinding wheel periphery and sides must not be more than ninety (90) degrees except when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure must not exceed one hundred and twenty-five (125) degrees.

Floor and bench-mounted grinders must be provided with work rests which are rigidly supported and readily adjustable. Work rests must be adjusted not to exceed one-eighth (1/8) inch from the surface of the wheel and the top of the guard that covers the abrasive wheel should not exceed one-quarter (1/4) inch from the abrasive wheel.

Cup type wheels used for external grinding must be protected by either a revolving cup guard or a band type guard. All other portable abrasive wheels used for external grinding must be provided with safety guards, except as follows:

- When the work location makes it impossible, a wheel equipped with safety flanges must be used,
- When wheels two (2) inches or less in diameter are securely mounted on the end of a steel mandrel are used.

Portable abrasive wheels used for internal grinding must be provided with safety flanges except as follows:

- When wheels two (2) inches or less in diameter which are securely mounted on the end of a steel mandrel are used.
- If the wheel is entirely within the work being ground while in use.

When safety guards are required, they must be mounted to maintain proper alignment with the wheel, and the guard and its fastenings must be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides must not exceed one hundred and eighty (180) degrees.

When safety flanges are required, they must be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled to ensure that the pieces of the wheel will be retained in case of accidental breakage and:

- Abrasive wheels must be closely inspected and ring-tested before mounting to ensure that they are free from cracks and defects.
- Grinding wheels must fit freely on the spindle and not be forced on. The spindle nut must be tightened only enough to hold the wheel in place.

## Sanders

Sanders should be dismantled periodically, as well as thoroughly cleaned every day by being cleaned out with low-pressure air. If compressed air is used the operator must wear safety goggles and follow the requirements of the JHA.

Because wood dust presents a fire and explosion hazard, dust must be kept to a minimum. Sanders can be equipped with a dust collection or vacuum bag.

A fire extinguisher approved for Class C (Electrical) fires should be available in the event of a fire.

## Pneumatic Tools

Pneumatic tools are powered by compressed air and include chippers, drills, nail guns, staple guns, screw guns, air hammers, and sanders. There are several dangers encountered in the use of pneumatic tools including being struck by one of the tool's attachments or by some type of fastener that is being used with the tool. Eye protection is always required and face protection when Solar Landscape employees are working with pneumatic tools.

Working with noisy or loud tools such as jackhammers requires proper, effective use of hearing protection and hearing assessment will be conducted by the EHS Director to determine necessary hearing protection and the hearing protection requirements will be found in the JHA for the operation of the tool.

When using pneumatic tools, Solar Landscape employees must check to see that they are fastened securely to the hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool will serve as an added safeguard.

A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.

All pneumatically driven chippers, drills, nail guns, staple guns, screw guns, air hammers, and sanders, and other similar equipment provided with automatic fastener feed, which operate at more than one hundred (100) pounds per square inch (psi) pressure at the tool must have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

Compressed air must never be used for cleaning purposes except with an air blow gun limited to thirty (30) psi static pressure at the outlet nozzle and then only with effective chip guard and personal protective equipment.

General safety guidelines for pneumatic tools also includes:

- Following the manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings,
- Hoisting or lowering tools by their cord will not be permitted,
- All hoses exceeding one half (1/2) inch inside diameter will have a safety device at the source of supply or branch line to reduce pressure in case of hose failure,
- Airless spray guns of the type that atomize paints and fluids at high pressures one thousand (1,000) psi or more must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.

## Liquid Fueled Powered Tools

Fuel powered tools are tools that may use gasoline, diesel, propane, etc. and required to be stopped while being refueled, serviced, or maintained, and fuel must only be transported, handled, and stored in approved red safety cans designed for the fuel type being stored. Leakage or spillage of flammable or combustible liquids will be disposed of promptly and safely, and fuel powered tools are never to be used in enclosed spaces.



## Hydraulic Power Tools

- Fluid used in hydraulic powered tools must be fire-resistant and must retain its operating characteristics at the most extreme temperatures,
- The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings must never be exceeded.

## Jacks

Jacks including lever and ratchet jacks, screw jacks, and hydraulic jacks must have a device that stops them from jacking too high. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack and must not be exceeded.

A jack must never be used to support a lifted load. Once a load has been lifted, it must immediately be blocked and supported by other means. If the lift surface is metal, place a one (1) inch-thick hardwood block or equivalent between it and the metal jack head to reduce the danger of slippage.

To set up a jack, make certain of the following:

- The base rests on a firm level surface,
- The jack is correctly centered,
- The jack head bears against a level surface, and
- The lift force is applied evenly.

Jacks must be inspected before each use and lubricated regularly. If a jack is subjected to an abnormal load or shock, it must be thoroughly examined to make sure it has not been damaged.

Hydraulic jacks exposed to freezing temperatures must be filled with adequate antifreeze liquid.

## USE AND MAINTENANCE OF POWDER-ACTUATED TOOLS

Powder Actuated Tools must never be used in an explosive or flammable atmosphere.

General Safety Guidelines to be followed include:

- Only Solar Landscape employees who have been trained in the operation of the tool will be allowed to operate a powder-actuated tool,
- The powder actuated tool must be tested each day before loading to ensure that safety devices are in proper working condition. The method of testing must be in accordance with the manufacturer's recommended procedure,
- Any powder actuated tool not in proper working order or one that has developed a defect during use will be removed from service immediately,

- Adequate eye, head, face and/or PPE as required by the JHA must be utilized by the operators and employees working in the area,
- The powder actuated tool must be designed so that it cannot be fired unless it is equipped with a standard protective shield, guard, or jib.

The firing mechanism must be designed so that the tool cannot fire during loading or in preparation to fire or if the tool is dropped while loading. Firing of the tools will be dependent upon at least two (2) separate and distinct operations of the operator with the final firing movement being separate from the operation of bringing the tool into the firing position.

The tool must be designed so it is inoperable until it is placed against a work surface and unless the operator is holding the tool against the work surface with force at least five (5) pounds greater than the weight of the tool.

The powder actuated tool must also be designed to:

- Not operate when equipped with the standard guard indexed to the center position if any bearing surface of the guard is tilted more than eight (8) degrees from contact with the work surface,
- So that positive means of varying the power is available or can be made available to the operator as part of the tool or as an auxiliary, to facilitate selection of a power level adequate to perform the desired work without excessive force,
- So that all breeching parts will be reasonably visible to allow a check for any foreign matter that may be present,
- It cannot be loaded until just prior to the intended firing time.

Hands must always be kept clear of the open barrel end and:

Loaded tools are never to be left unattended. Fasteners must not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.

Driving into materials easily penetrated must be avoided unless the materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying projectile hazard on the other side.

No fastener is to be driven into a cracked/deteriorated area caused by an unsatisfactory fastening.

**NOTE:** *If a powder actuated tool misfires, the Solar Landscape employee should wait at least thirty (30) seconds, then try firing again. If it still will not fire, the employee must wait another thirty (30) seconds so that the faulty cartridge is less likely to explode, than carefully remove the load. The bad or defective cartridge should be placed in water.*

## ELECTRICAL WOODWORKING TOOLS

- Solar Landscape employees that use woodworking tools are required to wear proper PPE which

includes eye protection equipment,

- Solar Landscape employee(s) must follow the JHA for the use of the specific woodworking tool,
- Disconnect Switches: All “fixed” power driven woodworking tools must be provided with a disconnect switch that can either be locked or tagged in the “off” position,
- Self-feeding automatic feeding devices must be installed on machines whenever possible. Feeder attachments must have feed rolls or other moving parts covered or guarded to protect the operator from hazardous pinch points,
- The operating speed should be etched or otherwise permanently marked on all circular saws over twenty (20) inches in diameter or operating at over ten thousand (10,000) peripheral feet per minute. When a marked saw is re-tensioned for a different speed, the marking must be corrected to show the new speed.

## PURPOSE

Solar Landscape LLC is committed to providing a safe and healthy work environment and to protect our employees from injury or death caused by uncontrolled hazards in the workplace. The purpose of this written Personal Protective Equipment (PPE) Program is to document the hazard assessment measures we have in place, as well as the eye, face, head, foot, hand, and/or personal fall protection systems we have in use, in accordance with OSHA 29 CFR 1926 Subpart E.

Establishing an overall written PPE Program detailing what PPE employees use in which work areas document our PPE efforts and makes it easier to ensure that they use PPE properly in the workplace. If, after reading this program, you find that improvements can be made, please contact the EHS Director. We encourage all suggestions because we are committed to the success of our PPE Program. We strive for clear understanding, safe behavior, and involvement in the program from every level of Solar Landscape.

## SCOPE

Solar Landscape has an obligation to provide a hazard-free safe environment for every employee. Each employee encountering hazardous conditions must be protected against the potential hazards. The purpose of PPE is to shield or isolate individuals from hazards that may be present in the workplace. However, PPE devices are not to be relied on as the only means to provide protection against hazards. Rather, PPE devices are used in conjunction with other feasible control measures and sound work practices. If possible, hazards will be abated first through engineering and administrative controls, with PPE to protect against hazards that cannot reasonably be abated otherwise.

## RESPONSIBILITIES

All aspects of this PPE Program must always be complied with when working for Solar Landscape with the understanding that failure to do so will result in disciplinary action at the discretion of the employer.

### Solar Landscape (SL) Management

SL is responsible for directing an aggressive Safety Program which includes providing safe equipment and the resources necessary to implement this program.

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for developing and implementing our Personal Protective Equipment (PPE) Program Safety Program, including:

- Annually reviewing and updating this written plan to maintain compliance,
- Documenting all training and evaluations, and
- Hazard Assessments.

Assessment of required PPE involves the following steps:

1. The EHS Director, along with other appropriate employees such as Operations, Project Managers, and Foremen identifies job classifications where exposures occur or could occur. The Director of Environmental Health and Safety or designees examines the following records to identify and rank jobs according to exposure hazards:

- Injury/illness records and
- First aid logs.

2. The EHS Director conducts a walk-through survey of workplace areas where hazards exist or may exist to identify sources of hazards to employees. This person considers these basic hazard categories:

- Motion or impact,
- Employee falls and falling/fallen objects,
- Extreme temperatures,
- Harmful dust,
- Sharp objects,
- Compressing, rolling, or pinching objects,
- Electrical, including static electricity discharge,
- Light (optical) radiation, and
- Chemical or biological.

During the walk-through survey the EHS Director observes and records the following hazards along with PPE currently in use (type and purpose):

- Sources of motion or impact,
- Sources of employee fall hazards or the potential for falling or dropping objects,
- Sources of extreme temperatures that could result in burns, eye injury, ignition of protective equipment, frostbite, etc.,
- Sources of harmful dust,
- Sources of sharp objects that might pierce the feet or cut the hands,
- Sources of compressing, rolling, or pinching objects that could crush the feet,
- Sources of electrical hazards such as electric shock or burns (from electric arcs, blasts, or heat), as well as static electricity discharge,
- Types of chemical and biological exposures,
- Sources of light (optical) radiation, e.g., welding, brazing, cutting, furnaces, heat treating, high-intensity lights, etc., and
- Layout of workplace and location of co-workers.

Following the walk-through survey, the EHS Director organizes the data and information for use in the assessment of hazards to analyze the hazards and enable proper selection of protective equipment.

An estimate of the potential for injuries is then determined for each hazard. Each of the basic hazards is reviewed by the EHS Director and a determination made as to the injury type and the severity, probability,

and overall risk of each potential injury for each hazard found. The existence of any situations where multiple exposures occur or could occur is considered.

The EHS Director documents the hazard assessment via a written certification that identifies:

- The workplace evaluated,
- The person certifying that the evaluation has been completed,
- The date(s) of the hazard assessment, and
- That the document is a certification of hazard assessment.

## PPE SELECTION GUIDELINES

Once a hazard has been identified and evaluated through hazard assessment, the general procedure for selecting appropriate PPE is to:

1. Become familiar with the potential hazards, the type of PPE that are available, and what they can do.
2. Compare types of PPE to:

- The hazards,
- The work conditions,
- The work environment (including seasonal weather changes), and
- The jobs impacted.

3. Review any PPE performance information from suppliers so that we know if the PPE meets OSHA requirements.
4. Select the PPE that meets selection requirements found in the OSHA regulations and ensures a level of protection equal to or greater than the minimum required to protect employees from the hazards. Outside consultation, manufacturers' assistance, and other recognized authorities may be consulted if there is any doubt regarding proper selection.
5. Fit the user with proper, comfortable, well-fitting protection and instruct each employee on care and use of the PPE. It is very important that the users are aware of all warning labels for and limitations of their PPE.

It is the responsibility of the EHS Director to reassess the workplace hazard situation as necessary, to identify and evaluate new equipment and processes, to review injury and illness records, and reevaluate the suitability of previously selected PPE. This reassessment will take place as needed, but at least every year and every new project.

Elements that should be considered in the reassessment include:

- Adequacy of PPE Program,
- Injury and illness experience,
- Levels of exposure (this implies appropriate exposure monitoring),
- Adequacy of equipment selection,
- Whether PPE or PPE components have been or will be modified or substituted (modified or substituted

- parts should be evaluated to determine if they meet OSHA regulations before they are put into use),
- Number of person-hours that workers wear various protective ensembles,
  - Adequacy of training/fitting of PPE,
  - PPE costs,
  - Adequacy of PPE Program records,
  - Recommendation for PPE Program improvement and modification, and
  - How PPE coordinates with overall safety and health efforts

## PPE PROVISIONS AND PAYMENT

Where PPE is required by OSHA regulations or by Solar Landscape, it will be provided to each employee required to use that PPE. The PPE is provided at no cost to each employee, unless provided by the exceptions listed in the OSHA regulations. We will also pay for PPE replacement, except when the employee has lost or intentionally damaged the equipment. Also, if an employee pays for and provides his or her own required PPE, and the EHS Director determines that that equipment is adequate, maintained, and in sanitary condition, then the employee may use the PPE, but, in that case, we are not required to reimburse the employee for the cost.

## EMPLOYEE TRAINING

The most thorough PPE program will not be effective if employees do not wear PPE, or if they wear the equipment, they do not do so appropriately. The only way to ensure that each of our employees is aware of the purpose of wearing PPE and how the equipment is to be worn is to train each employee. Employee training is an important part of the PPE Program and is essential for correct PPE use.

The EHS Director and/or supervisor provides training for each employee who is required to use PPE. Training includes:

- When PPE is necessary,
- What PPE is necessary,
- How to put on, take off, adjust, and wear assigned PPE,
- Limitations of PPE, and
- The proper care, maintenance, useful life, and disposal of assigned PPE,

In addition, if personal fall protection systems are used (such as personal fall arrest systems, positioning systems, and travel restraint systems), a qualified person must train the employee in:

- The nature of the fall hazards in the work area and how to recognize them,
- The procedures to be followed to minimize those fall hazards,
- The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the employee uses, and
- The correct use of personal fall protection systems and equipment, including, but not limited to, proper hook-up, anchoring, and tie-off techniques, and methods of equipment inspection and storage, as specified by the manufacturer.

Our information and training will be provided to each employee in a manner that the employee understands. In turn, each employee must demonstrate an understanding of the training and the ability to use the PPE properly before they are allowed to perform work requiring the use of the equipment.

Solar Landscape employees are prohibited from performing work without donning appropriate PPE to protect them from the hazards they will encounter in the course of that work.

If the EHS Director has reason to believe an employee does not have the understanding or skill required, the employer must retrain. Since an employee's supervisor is in the best position to observe any problems with PPE use by individual employees, the EHS Director will seek this person's input when making this determination. Circumstances where retraining may be required include:

- Changes in the workplace, which would render previous training obsolete,
- Changes in the types of PPE to be used, which would render previous training obsolete, and
- Inadequacies in an affected employee's knowledge or use of the assigned PPE, which indicates that the employee has not retained the necessary understanding or skill.

Because failure to comply with the Solar Landscape PPE Program concerning PPE can result in employee injury or illness, a Solar Landscape employee who does not comply with this PPE Program will be disciplined base on our Corporate EHS Safety Policy.

## CLEANING AND MAINTENANCE

It is important that all PPE be kept clean and properly maintained by the employee to whom it is assigned. PPE is to be inspected, cleaned, and maintained by employees at regular intervals as part of their normal job duties so that the PPE provides the requisite protection. Supervisors are responsible for ensuring compliance with cleaning responsibilities by employees. If PPE is for general use, the EHS Director has responsibility for cleaning and maintenance.

It is against Solar Landscape work rules to use PPE that is in disrepair or not able to perform its intended function. If a piece of PPE needs repair, adjustment, or replacement, it is the responsibility of the employee to bring it to the immediate attention of his or her supervisor or the EHS Director, who will remove it from service and have it properly discarded, repaired, or adjusted as necessary. The supervisor or EHS Director will ensure the employee is provided the proper PPE as necessary if his or her PPE is being serviced or new PPE is being ordered.

## PERSONAL PROTECTIVE EQUIPMENT

### Eye and Face Protection

To help prevent eye and face injuries, including those resulting from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or light radiation, for example, it is the PPE Program of Solar Landscape that as a condition of employment, all regular full-time, part-time, contract, and temporary employees working in designated work areas and/or job assignments are required to wear



either:

- Protective eye and face protection devices that comply with:
  1. The 1989 (R-1998) edition of ANSI Z87.1, "Practice for Occupational and Educational Eye and Face Protection," or
  2. The 2003 or 2010 editions of ANSI Z87.1, "Occupational and Educational Personal Eye and Face Protection Devices"; or
- Protective eye and face devices our company can demonstrate to be just as effective as the above.

Based on our hazard assessment, designated work areas and/or job assignments, their eye and face hazards, and selected protection include the following:

- Work Areas and/or Job Assignments Involving Eye and Face Hazards,
- Eye and Face Hazards, and
- Type of Eye and/or Face Protection Selected.

Solar Landscape employees, contractors, and temporary employees who work in or are assigned to designated work areas and/or job assignments:

- Are responsible for wearing eye and/or face protection as required by this PPE Program,
- May not alter or remove eye and/or face protection when eye and/or face hazards are present, even though an employee may find it cumbersome, and
- Must routinely inspect and properly care for their eye and face protection.

Failure to comply with this PPE Program will result in disciplinary action up to and including employment. All supervisors and managers are responsible for ensuring employees are in full compliance with this PPE Program.

## Foot Protection

Foot protection should not be used as a substitute for engineering and work practice controls. Protective footwear does not eliminate a hazard. For this reason, we use foot protection in conjunction with these controls to provide for employee safety and health in the workplace. Each affected employee must use protective footwear where there is a danger of foot injuries due to falling or rolling objects, objects piercing the sole, or electrical hazards like static discharge or electric shock.

Therefore, to prevent foot injuries, it is the PPE Program of Solar Landscape that as a condition of employment, all regular full-time, part-time, contract, and temporary employees working in designated work areas and/or job assignments are required to wear proper foot protection. Specifically, when performing general industry work, employees in the designated work areas and/or job assignments listed below are required to wear either:

- Foot protection that complies with:
  1. The 1991 or 1999 editions of ANSI Z41, "American National Standard for Personal Protection –

Protective Footwear”; or

2. Both ASTM F2412-2005, “Standard Test Methods for Foot Protection” and ASTM F2413-2005, “Standard Specification for Performance Requirements for Protective Footwear”; or

Based on our hazard assessment, designated work areas and/or job assignments, their foot hazards, and selected protection include the following:

- Work Areas and/or Job Assignments Involving Foot Hazards and
- Foot Hazards use of Foot Protection Selected.

Solar Landscape is responsible for informing new Solar Landscape employees who are assigned to the designated work areas and/or job assignments of the foot protection PPE Program and the procedures for obtaining foot protection. The new employee is responsible for reporting to his or her first day of work wearing approved foot protection.

Solar Landscape employees are responsible for the purchase of their footwear.

All Solar Landscape employees, contractors, and temporary employees who work in or are assigned to designated work areas and/or job assignments:

- Are responsible for wearing foot protection as required by this PPE Program,
- May not alter or remove foot protection when foot hazards are present, even though an employee may find it cumbersome, and
- Must routinely inspect and properly care for their foot protection.

Failure to comply with this PPE Program will result in disciplinary action up to and including discharge. All supervisors and managers are responsible for ensuring employees follow this Solar Landscape PPE Program.

## Hand Protection

Hand injuries are common in any workplace. Common hazards to the hands include:

- Mechanical injuries (cuts, punctures, crushing, and scrapes); extreme heat or cold; electrical shock or burns from electric arcs,
- Blasts, or heat, and
- Skin irritation from chemicals or germs.

Therefore, it is the PPE Program of Solar Landscape that as a condition of employment, all regular full-time, part-time, contract, and temporary employees working in designated work areas and/or job assignments are required to wear proper hand protection.

Based on our hazard assessment, designated work areas and/or job assignments, their hazards, and selected protection include the following:

- Work Areas and/or Job Assignments Involving Hand Hazards,
- Hand Hazards, and
- Type of Hand Protection Selected.

Solar Landscape employees, contractors, and temporary employees who work in or are assigned to designated work areas and/or job assignments:

- Are responsible for wearing hand protection as required by this PPE Program,
- May not alter or remove hand protection when hand hazards are present, even though an employee may find it cumbersome, and
- Must routinely inspect and properly care for their hand protection.

Failure to comply with this Solar Landscape PPE Program will result in disciplinary action up to and including discharge. All supervisors and managers are responsible for ensuring employees under their charge are following this PPE Program.

## Head Protection

To help prevent head injuries, including those resulting from falling objects, bumping the head against a fixed object, or electrical shock, it is the PPE Program of Solar Landscape that as a condition of employment, all regular full-time, part-time, contract, and temporary employees working in designated work areas and/or job assignments are required to wear either:

- Head protection that complies with:
  1. The 1997 edition of ANSI Z89.1, "American National Standard for Personnel Protection – Protective Headwear for Industrial Workers – Requirements," or
  2. The 2003 or 2009 editions of ANSI Z89.1, "American National Standard for Industrial Head Protection;" or
- Head protection devices Solar Landscape can prove to be as effective as the above.

Based on our hazard assessment, designated work areas and/or job assignments, their head hazards, and selected protection include the following:

- Work Areas and/or Job Assignments Involving Head Hazards,
- Head Hazards, and
- Type of Head Protection Selected.

Solar Landscape employees, contractors, and temporary employees who work in or are assigned to designated work areas and/or job assignments:

- Are responsible for wearing head protection as required by this PPE Program,
- May not alter or remove head protection when head hazards are present, even though an employee may find it cumbersome, and

- Must routinely inspect and properly care for their head protection.
- Failure to comply with this PPE Program will result in disciplinary action up to and including discharge. All supervisors and managers are responsible for ensuring employees are following this PPE Program.

## PERSONAL FALL PROTECTION SYSTEMS

Personal fall protection system means a system (including all components) used to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems. While guardrail systems and safety net systems also protect employees from falls, they are not considered personal fall protection systems.

It is the PPE Program of Solar Landscape that as a condition of employment, all regular full-time, part-time, contract, and temporary employees working in certain work areas and/or job assignments are required to use the selected personal fall protection systems.

Based on our hazard assessment and OSHA regulations, the work areas and/or job assignments, their fall hazards, and selected personal fall protection systems include the following:

- Work Areas and/or Job Assignments Involving Fall Hazards,
- Fall Hazards, and
- Type of Personal Fall Protection System(s) Selected.

Solar Landscape employees, contractors, and temporary employees who work in areas and/or job assignments listed above:

- Are responsible for using company-provided personal fall protection systems to comply with this PPE Program,
- May not alter or remove a personal fall protection system when fall hazards are present, even though an employee may find it cumbersome, and
- Must routinely inspect and properly care for their personal fall protection systems.

Failure to comply with this PPE Program will result in disciplinary action up to and including discharge. All supervisors and managers are responsible for ensuring employees under their charge are in compliance with this Solar Landscape PPE Program.

## EQUIPMENT SAFE WORK PRACTICES

The following equipment work procedures must always be followed:

### Equipment Inspection

- Each shift the equipment will be inspected before operation. If any inspection item is determined to be damaged, broken, or inoperable, the employee will notify their supervisor. If possible, the equipment will be immediately removed from service,

- Employees may not use any unsafe equipment at any time,
- Equipment will be kept in a clean condition.

## Periodic Program Review

The Personal Protective Equipment (PPE) Program and procedures are reviewed annually or when circumstances change.



# APPENDIX A



**PERSONAL PROTECTIVE EQUIPMENT (PPE)  
HAZARD ASSESSMENT**

This PPE checklist covers the use of PPE, including safety glasses, goggles, hard hats, gloves, safety shoes, and heat or electrically resistant clothing, electrical protective equipment, respiratory protection, and hearing protection.

Engineering controls will be the primary method of establishing a safe workplace at Solar Landscape LLC work sites and PPE should only be used where engineering controls are not feasible.

**Date of Assessment:** \_\_\_/\_\_\_/\_\_\_\_\_

**Location:** \_\_\_\_\_

**Job Classification/Panel Installation Information:** \_\_\_\_\_

**Operation/Process:** \_\_\_\_\_

**Person performing assessment:** \_\_\_\_\_ **Title:** \_\_\_\_\_

Hazard	Required PPE	Notes
<input type="checkbox"/> Penetration-sharp objects <input type="checkbox"/> Penetration-animal bites <input type="checkbox"/> Penetration-rough objects <input type="checkbox"/> Chemical(s) _____ _____ <input type="checkbox"/> Extreme cold <input type="checkbox"/> Extreme heat <input type="checkbox"/> Blood <input type="checkbox"/> Electrical shock  <input type="checkbox"/> Vibration-power tools  <input type="checkbox"/> Other _____	<input type="checkbox"/> Leather/cut resistant gloves, <input type="checkbox"/> Leather/cut resistant gloves, <input type="checkbox"/> General purpose work gloves, <input type="checkbox"/> Chemical resistant gloves, <input type="checkbox"/> Type _____ <input type="checkbox"/> Insulated gloves <input type="checkbox"/> Heat/flame resistant gloves <input type="checkbox"/> Latex or nitrile gloves <input type="checkbox"/> Insulated rubber gloves, <input type="checkbox"/> Type _____ <input type="checkbox"/> Cotton, leather, or anti-vibration gloves, etc. <input type="checkbox"/> Other _____	
<input type="checkbox"/> Impact-flying objects, Chips, sand, or dirt <input type="checkbox"/> Nuisance dust <input type="checkbox"/> UV light-welding, cutting, torch brazing or soldering. <input type="checkbox"/> Chemical-splashing liquid	<input type="checkbox"/> Safety glasses w/side shields <input type="checkbox"/> Glasses/goggles w/face shield <input type="checkbox"/> Impact goggles <input type="checkbox"/> Welding goggles <input type="checkbox"/> Welding helmet/shield w/safety glasses & side shields	



<input type="checkbox"/> Chemical-irritating mists <input type="checkbox"/> Hot sparks-grinding  <input type="checkbox"/> Splashing molten metal <input type="checkbox"/> Glare/High Intensity lights <input type="checkbox"/> Laser operations <input type="checkbox"/> Other _____	<input type="checkbox"/> Chemical goggles/ face shield <input type="checkbox"/> Chemical splash goggles <input type="checkbox"/> Safety glasses w/side shields <input type="checkbox"/> Glasses/goggles w/face shield <input type="checkbox"/> Safety goggles w/face shield <input type="checkbox"/> Shaded safety glasses <input type="checkbox"/> Laser spectacles or goggles <input type="checkbox"/> Other _____	
<input type="checkbox"/> Exposure to noise levels (> 85 dBA 8-hour TWA) <input type="checkbox"/> Exposure to sparks <input type="checkbox"/> Other _____	<input type="checkbox"/> Earmuffs, plugs, or ear caps <input type="checkbox"/> Leather welding hood <input type="checkbox"/> Other _____	

Hazard	Required PPE	Notes
<input type="checkbox"/> Nuisance dust/mist <input type="checkbox"/> Welding fumes <input type="checkbox"/> Asbestos <input type="checkbox"/> Pesticides  <input type="checkbox"/> Paint spray  <input type="checkbox"/> Organic vapors <input type="checkbox"/> Acid gases  <input type="checkbox"/> Oxygen deficient/toxic or IDLH atmosphere <input type="checkbox"/> Other _____	<input type="checkbox"/> Disposable dust/mist mask <input type="checkbox"/> Welding respirator <input type="checkbox"/> Respirator w/HEPA filter <input type="checkbox"/> Respirator w/pesticide cartridges <input type="checkbox"/> Respirator w/paint spray cartridges <input type="checkbox"/> Respirator w/organic cartridges <input type="checkbox"/> Respirator w/acid gas cartridges <input type="checkbox"/> Other _____	
<input type="checkbox"/> Impact-heavy objects <input type="checkbox"/> Compression-rolling or pinching objects/vehicles <input type="checkbox"/> Slippery or wet surface <input type="checkbox"/> Penetration-sharp objects <input type="checkbox"/> Penetration-chemical <input type="checkbox"/> Splashing-chemical <input type="checkbox"/> Exposure to extreme cold <input type="checkbox"/> Other _____	<input type="checkbox"/> Steel toe safety shoes <input type="checkbox"/> Leather boots or safety shoes w/metatarsal guards <input type="checkbox"/> Slip resistant shoe soles. <input type="checkbox"/> Puncture resistant soles <input type="checkbox"/> Chemical resistant boots/covers. <input type="checkbox"/> Rubber boots/closed top shoes <input type="checkbox"/> Insulated boots or shoes <input type="checkbox"/> Other _____	





<input type="checkbox"/> Struck by falling object. <input type="checkbox"/> Struck against fixed object. <input type="checkbox"/> Electrical contact with exposed wires/conductors <input type="checkbox"/> Other _____	<input type="checkbox"/> Hard hat/cap <input type="checkbox"/> Class A <input type="checkbox"/> Class B <input type="checkbox"/> Class C <input type="checkbox"/> Other _____	
<input type="checkbox"/> Impact-flying objects <input type="checkbox"/> Moving vehicles <input type="checkbox"/> Penetration-sharp objects <input type="checkbox"/> Electrical-static discharge <input type="checkbox"/> Hot metal or sparks <input type="checkbox"/> Chemical(s) _____  <input type="checkbox"/> Exposure to extreme cold <input type="checkbox"/> Unprotected elevated walking/working surfaces. <input type="checkbox"/> Other _____	<input type="checkbox"/> Long sleeves/ apron/ coat <input type="checkbox"/> Traffic vest <input type="checkbox"/> Cut-resistant sleeves, wristlets. <input type="checkbox"/> Static control coats/coveralls <input type="checkbox"/> Flame-resistant jacket/ pants <input type="checkbox"/> Lab coat or apron/sleeves  <input type="checkbox"/> Insulated jacket, hood <input type="checkbox"/> Body harness and lanyard <input type="checkbox"/> Other _____	

**OSHA PPE QUESTIONNAIRE/REGULATORY REFERENCE**

- Has a hazard assessment been conducted in the workplace to identify possible hazards that would require the use of PPE? [29 CFR 1910.132(d)(1)] Y N N/A
  
- Is there a written certification of hazard assessment which identifies the workplace evaluated, the person certifying that the evaluation has been performed, and the date(s) of the hazard assessment? [29 CFR 1910.132(d)(2)] Y N N/A
  
- Based on the hazards identified, has PPE been selected for all appropriate individuals? [29 CFR 1910.132(d)(1)(i)] Y N N/A
  
- Have individuals involved been informed of the PPE selection decisions? [29 CFR 1910.132(d)(1)(ii)] Y N N/A
  
- If PPE is necessary to prevent injury or impairment by exposure to chemical hazards, radiological hazards, or mechanical irritants through absorption, inhalation, or physical contact, is it provided? [29 CFR 1910.132(a) and 1926.95(a)] Y N N/A



- Has the selected PPE been fitted to appropriate individuals? Y N N/A  
[29 CFR 1910.132(d)(1)(iii)]
- Is PPE maintained in a sanitary and reliable condition? Y N N/A  
[29 CFR 1910.132(a) and 1926.95(a) and (b)]
- Do appropriate individuals use the PPE selected? Y N N/A  
[29 CFR 1910.132(d)(1)(i)]
- Is defective or damaged PPE removed from service immediately? (Shall not be used) [29 CFR 1910.132(e)] Y N N/A

#### TRAINING

- Has each Solar Landscape LLC employee who is required to use PPE been provided with training? [29 CFR 1910.132(f)(1)] Y N N/A
- Has training on PPE included the following elements: Y N N/A
  - when PPE is necessary,
  - what PPE is necessary,
  - how to properly don, doff, adjust, and wear PPE,
  - Limitations of the PPE,
  - Proper care, maintenance, useful life, and
  - Disposal of the PPE.  
[29 CFR 1910.132(f)(1)(i)-(iv)]
- Have the trained individuals demonstrated an understanding of the training and the ability to use PPE properly before being allowed to perform work requiring the use of PPE? [29 CFR 1910.132(f)(2)] Y N N/A
- Are individuals retrained when there is reason to believe that they do not have the understanding or skill to use PPE properly? [29 CFR 1910.132(f)(3)] Y N N/A
- Is retraining conducted whenever changes in the workplace or changes in types of PPE make previous training obsolete? [29 CFR 1910.132(f)(3)(i)-(iii)] Y N N/A
- Is there written certification for each person who has received PPE training that includes the following: a statement indicating the person understood the Y N N/A



training; the name of the person trained; the date(s) of the training; and the subject of the certification? [29 CFR 1910.132(f)(4)]

**HEAD, FOOT, AND HAND PROTECTION**

- Are protective helmets used wherever there is the possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns? [29 CFR 1910.132(a), 1910.135(a), 1926.95(a), and 1926.100(a)] **Y N N/A**
- Do protective helmets that are used in the workplace meet the American National Standard Safety Requirements for Industrial Head Protection, ANSI Z89.1-1969? [29 CFR 1910.135(b)(2) and 1926.100(b)] **Y N N/A**
- Do protective helmets that are used in the workplace meet the American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements, ANSI Z89.1-1986? [29 CFR 1910.135(b)(1)] **Y N N/A**
- Is protective footwear used wherever there is the danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where feet are exposed to electrical hazards? [29 CFR 1910.136(a)] **Y N N/A**
- Does protective footwear that is used in the workplace meet the requirements of the American National Standard for Men's Safety-Toe Footwear, ANSI Z41.1-1967? [29 CFR 1910.136(b)(2)] **Y N N/A**



- Are appropriate protective gloves used wherever there is the danger to hands of exposure to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes? [29 CFR 1910.138(a)] Y N N/A

#### EYE AND FACE PROTECTION

- Are individuals issued and required to wear appropriate eye protective devices while participating or observing activities which present a potential eye safety hazard? [29 CFR 1910.133(a) and 1926.102(a)] Y N N/A
  1. **Note:** Eye potential hazards include caustic or explosive chemicals or materials, hot liquids or solids, molten materials, welding operations of any type, repairing or servicing of vehicles, heat treatment or tempering of metals, the shaping of solid materials and laser device operation and experimentation.
  
- Do all protective eye and face devices comply with Z87.1-1989? [29 CFR 1910.133(b) and 1926.102(a)(2)] Y N N/A
  1. **Note:** Regular prescription eyeglasses do not meet this requirement. Goggles or other protective glasses meeting the American National Standard must be worn over-top prescription eyeglasses.

#### POSTING REQUIREMENTS

- 25. Are all work site entrances, areas and equipment requiring the use of PPE devices posted with a sign indicating this requirement? [29 CFR 1910.145(c)(3)] Y N N/A





**Comments/Corrective action:**

**CERTIFICATION:** I certify that I personally performed the above Hazard Assessment on the date indicated. *This document is a Certification of the Hazard Assessment.*

Print/Signed: \_\_\_\_\_ Date: \_\_/\_\_/\_\_



## PURPOSE

The purpose of this plan is to establish a program and procedures for the safe use and storage of hazardous chemical substances at Solar Landscape LLC work sites.

The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) Part 29 Code of Federal Regulation (CFR) 1910.1200 (General Industry) and 29 CFR 1926.59 (Construction Industry) require the development of a Hazard Communication (HAZCOM) Program when employees may be exposed to any chemical in the workplace under normal conditions of use or in a foreseeable emergency and will include the following information:

- List of all hazardous chemicals known to be present in the workplace or work site area,
- Methods used to ensure that all containers, including pipes and holding tanks, are labeled, tagged, or marked properly,
- Methods used to obtain and maintain Safety Data Sheets (SDSs),
- Methods used to provide Solar Landscape employees with information and training on hazardous chemicals in their work areas,
- Methods used to inform Solar Landscape employees of the hazards of non-routine work practices,
- Methods used to provide Solar Landscape employees of other employers such as consultants, construction subcontractors, on-site access to SDSs for each hazardous chemical that the other employer's employees may be exposed to while working in the workplace,
- Methods used to inform Solar Landscape employees of other employers of precautionary measures that need to be taken to protect themselves during the workplace's normal operating conditions and in foreseeable emergencies, and
- Methods used to inform Solar Landscape employees of other employers or subcontractors' labeling systems used at the worksite,

This HAZCOM program will identify the following:

- Personnel responsible for the program,
- Physical location of chemical inventory list and SDSs,
- Workplace labeling system,
- Good work practices and procedures to minimize exposures,
- How training will be conducted,
- Procedures to maintain the program and update the required information, and
- How records will be maintained.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for administering and enforcing this HAZCOM program as well as:

- Reviewing the potential hazards and safe use of chemicals,

- Maintaining a list of all hazardous chemicals and a master file of SDSs,
- Ensuring that all containers are labeled, tagged, or marked properly,
- Providing new-hire and annual training for employees,
- Maintaining training records,
- Monitoring the air concentrations of hazardous chemicals in the work environment,
- Properly selecting and caring for personal protective equipment (PPE),

**NOTE:** See Solar Landscape PPE Program.

- Directing the cleanup and disposal operations of the spill control team,
- Identifying hazardous chemicals used in nonroutine tasks and assessing their risks,
- Informing subcontractors who are performing work on the solar panel installation work site about potential hazards, and
- Reviewing the effectiveness of this HAZCOM program and making sure that the program satisfies the requirements of all applicable federal, state, or local HAZCOM requirements.

The EHS Director will also be responsible for contacting chemical manufacturers and/or distributors to obtain SDSs and secondary labels for hazardous chemicals used or stored in the workplace and reviewing newly purchased chemicals for correct labeling requirements.

## Employees

Employees are responsible for the following aspects of this HAZCOM program:

- Helping the EHS Director identify hazards before starting a job,
- Reading container labels and SDSs,
- Notifying the supervisor of torn, damaged, or illegible labels or of unlabeled containers,
- Using controls and/or personal protective equipment provided by the company to minimize exposure,
- Following Solar Landscape instructions and warnings pertaining to chemical handling and usage,
- Properly caring for PPE, including proper use, routine care and cleaning, storage, and replacement,
- Knowing and understanding the consequences associated with not following company policy concerning the safe handling and use of chemicals, and
- Participating in training.

## CHEMICAL INVENTORY LIST

Attached to this program (Appendix A) is a list of hazardous chemicals used and stored at Solar Landscape. Copies of the chemical inventory list are available from the EHS Director upon request.

The list of hazardous chemicals also contains the product identifier that is referenced on the appropriate SDS, the location or work area where the chemical is used, and the personal protective equipment and precautions for each chemical product. This list will be updated annually and whenever a new chemical is introduced to the workplace.

## LABELS AND OTHER FORMS OF WARNING

Each container of hazardous chemicals received from the chemical manufacturer, importer or distributor will be labeled with the following information:

- Product identifier,
- Signal word,
- Hazard statement(s),
- Pictogram(s),
- Precautionary statement(s), and
- Name, address and telephone number of the chemical manufacturer, importer or other responsible party.

Solar Landscape will use the Global Harmonized System (GHS) labeling system for secondary containers. When a chemical is transferred from the original container to a portable or secondary container, the container will be labeled, tagged, or marked with a GHS label containing the following information:

- Product identifier,
- Signal word,
- Hazard statement(s),
- Pictogram(s), and
- Precautionary statement(s).

Portable containers into which hazardous chemicals are transferred from labeled containers and that are intended for the immediate use of the Solar Landscape employee who performs the transfer do not require a label. If the portable container will be used by more than one employee or used over the course of more than one shift, the container must be labeled. Food and beverage containers should never be used for chemical storage.

Signs, placards, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of affixing labels to individual, stationary process containers if the alternative method identifies the containers to which it is applicable and conveys the information required for workplace labeling.

Where an area may have a hazardous chemical in the atmosphere such as where extensive welding may occur, the entire area will be labeled with a warning placard.

Workplace labels or other forms of warning will be legible, in English, and prominently displayed on the container or readily available in the work area throughout each work shift. If employees speak languages other than English, the information in the other language(s) may be added to the material presented if the information is presented in English as well.

## SAFETY DATA SHEETS

An SDS will be obtained and maintained for each hazardous chemical in the workplace. SDSs for each hazardous chemical will be readily accessible during each work shift to Solar Landscape employees when they are at the work site.



SDSs will be obtained from the chemical manufacturer, importer, or distributor. The name on the SDS will be the same as that listed on the chemical inventory list. SDSs for chemicals or process streams produced by the company will be developed and provided by the EHS Director.

The EHS Director will maintain the master file of all original SDSs. Hard copies of the master file will be in the EHS Directors' office.

SDSs for new products or updated SDSs for existing products will be obtained by the authorized employee purchasing agent and forwarded to the EHS Director. The EHS Director will then update the master file with new and/or updated SDSs.

If the SDS is not obtained at the time of purchase from the importer or distributor, a request to the manufacturer will be made to request an SDS and to verify that the SDS has been sent to Solar Landscape. Solar Landscape will maintain a written record of all efforts to obtain SDSs.

## FORMAT OF SDS'S AS PART OF GLOBAL HARMONIZATION SYSTEM

*Section 1, Identification* includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

*Section 2, Hazard(s) identification* includes all hazards regarding the chemical; required label elements.

*Section 3, Composition/information on ingredients* includes information on chemical ingredients, trade secret claims.

*Section 4, First-aid measures* includes important symptoms/effects, acute, delayed; required treatment.

*Section 5, Fire-fighting measures* lists suitable extinguishing techniques, equipment, chemical hazards from fire.

*Section 6, Accidental release measures* lists emergency procedures, protective equipment, proper methods of containment and cleanup.

*Section 7, Handling and storage* lists precautions for safe handling and storage, including incompatibilities.

*Section 8, Exposure controls/personal protection* lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; PPE.

*Section 9, Physical and chemical properties* list the chemical's physical and chemical characteristics.

*Section 10, Stability and reactivity* lists chemical stability and possibility of hazardous reactions.

*Section 11, Toxicological information* includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information

Section 13, Disposal considerations

Section 14, Transport information

Section 15, Regulatory information

Section 16, *Other information*, includes the date of preparation or last revision.

## PICTOGRAMS HEALTH HAZARDS

The OSHA Hazard Communication Standard (HCS) requires pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification. Below are the required label examples:

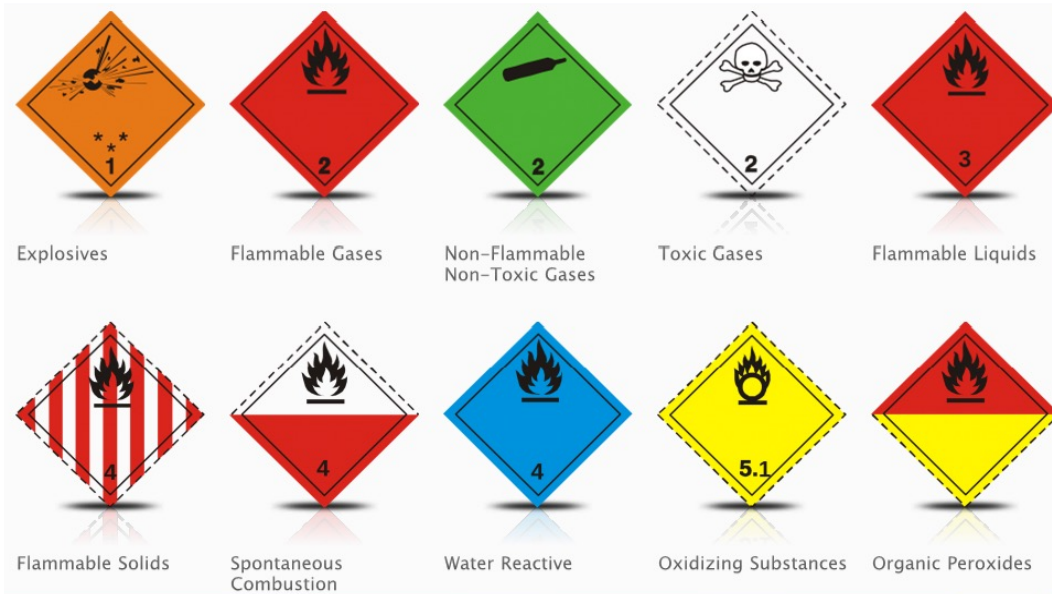
### Environmental Hazards



### Physical Hazards



## Transportation Hazards



## EMPLOYEE INFORMATION AND TRAINING

Solar Landscape employees who are included in this HAZCOM program will receive the following information and training prior to exposure to hazardous chemicals and when new chemical hazards are introduced to their work site area:

- Requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 (General Industry) or 29 CFR 1926.59 (Construction Industry),
- Operations in the work site where hazardous chemicals are present,
- Location and availability of the HAZCOM program, chemical inventory list and SDSs,
- Methods and observations used to detect the presence or release of a hazardous chemical in the work area, such as monitoring devices, visual appearance or odor of hazardous chemicals when being released,
- Physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified of the chemicals in the work area,
- Measures employees can take to protect themselves from hazards, such as appropriate controls, work practices, emergency and spill cleanup procedures, and personal protective equipment to be used,
- Explanation of the labels received on shipped containers,
- Explanation of the workplace labeling system, and
- Explanation of the SDS, including order of information and how employees can obtain and use the appropriate hazard information.

## NON-ROUTINE TASKS

The EHS Director and the immediate supervisor of a Solar Landscape employee performing a nonroutine task, such as cleaning machinery and other process equipment, is responsible for ensuring that adequate

training has been provided to the employee on any hazards associated with the non-routine task. Solar Landscape employees also share in this responsibility by ensuring that their immediate supervisor is alerted that the non-routine task will be performed.

Special work permits may be required, by the EHS Director, for the performance of certain non-routine tasks, such as entry to confined spaces, breaking and opening piping systems, and welding and burning. For some special tasks, Solar Landscape employees will be required to follow special lockout/tagout procedures to ensure that all machinery motion has stopped, and energy sources are isolated prior to and during the performance of such tasks.

## SUBCONTRACTORS

Prior to beginning work, the EHS Director will inform subcontractors with employees working on company property of any hazardous chemicals that the contractors' employees may be exposed to while performing their work. The EHS Director will also inform contractors of engineering or work practice control measures to be employed by the subcontractor, personal protective equipment to be worn by the contractors' employees, and any other precautionary measures that need to be taken to protect their employees during the workplace's normal operating conditions and in foreseeable emergencies.

The EHS Director will advise subcontractors that they must comply with all OSHA standards while working on company property. Appropriate controls will be established with the subcontractor to ensure that Solar Landscape employees are not exposed to safety and health hazards from work being performed by the contractor and that company operations do not expose contractors' employees to hazards.

The EHS Director will inform contractors of the workplace labeling system and the availability and location of SDSs for any chemical to which contractors' employees may be exposed while performing their work.

## RECORDKEEPING

Records pertaining to the HAZCOM program will be maintained by the EHS Director. The EHS Director will maintain the following records:

- Chemical inventory list,
- Hazardous material reviews,
- Copies of phone call logs and letters requesting SDSs,
- Employee training records, and
- Warnings issued to employees for not following the HAZCOM program.



# APPENDIX A





SOLAR LANDSCAPE LLC - CHEMICAL INVENTORY FORM			
			DATE
SUBSTANCE/CHEMICAL	LOCATION	QUANTITY	HAZAROUS CLASSIFICATION



## PURPOSE

There are several types of cranes, hoists, and rigging devices used at Solar Landscape LLC for lifting and moving materials for the installation of roof top solar panels. Solar Landscape's policy is to maintain a safe workplace for its Solar Landscape employees and approved subcontractors. Only qualified and licensed Solar Landscape approved subcontractors will operate these devices. The safety rules and guidance in this Crane and Lifting Safety Program apply to all operations at Solar Landscape that involve the use of cranes and hoists installed in or attached to buildings and to all Solar Landscape approved subcontractors, supplemental labor, and subcontractor Solar Landscape employees or subcontractors who are expected to use this equipment. Solar Landscape employees will not be operating any cranes and will only be conducting rigging or assistance operations during lifts.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

- Ensuring that annual maintenance and inspection of all Solar Landscape cranes and hoists that are not covered by a program with maintenance responsibility,
- Ensuring that periodic and special load tests of cranes and hoists have been performed when required,
- Maintaining written records of inspections and tests and providing copies of all inspections and test results to facility managers and building coordinators who have cranes and hoists on file,
- Inspecting and load-testing cranes and hoists following the modification or extensive repairs such as a replaced cable or hook, or structural modification,
- Scheduling a non-destructive test and inspection for crane and hoist hooks at the time of the periodic load test and testing and inspecting before using new replacement hooks and other hooks suspected of having been overloaded. The evaluation, inspection, and testing may include but is not limited to visual, dye penetrant, and magnetic particle techniques,
- Maintaining all manuals for cranes and hoists in a central file for reference,
- Conducting training for all Solar Landscape riggers,
- Issuing licenses (if applicable) to subcontractor crane and hoist operators,
- Periodically verifying monthly tests and inspection reports,
- Interpreting crane and hoist safety rules and standards, and
- Administration and enforcement of this Crane and Lift Plan.

### Supervisors

- Ensuring that Solar Landscape approved subcontractors under their supervision receive the required training and are certified and licensed to operate the cranes and hoists in their areas,
- Providing training for prospective crane and hoist operators. This training must be conducted by a qualified, designated instructor who is a licensed crane and hoist operator and a full-time Solar Landscape employee, or sub-contractor,
- Evaluating crane and hoist trainees using the Crane Safety Checklist and submitting the Qualification Request Form to the EHS Director to obtain the operator's license,
- Ensuring that hoisting equipment is inspected and tested monthly by a responsible individual and that

rigging equipment is inspected annually.

## Crane and Hoist Operators

To be qualified as a Crane and Hoist Operator, Solar Landscape must receive hands-on training from a licensed or qualified crane and hoist operator designated by the EHS Director. Upon successful completion of training the EHS Director will document the completed training and maintain a copy of the approved training at the work site. Retraining for the Crane and Hoist Operator will occur every three (3) years. The hands-on training will include:

- Operating hoisting equipment safely,
- Conducting functional tests prior to using the equipment,
- Selecting and using rigging equipment appropriately,
- Having a valid operator's license on their person while operating cranes or hoists, and
- Participating in the medical certification program, as required.

## CRANE AND HOIST SAFETY REQUIREMENTS

The following are the design requirements for cranes and hoists and their components used at Solar Landscape work sites:

- A personal protective equipment (PPE) hazard assessment must be performed for the task. PPE considerations should include a hardhat, safety glasses and safety shoes,
- Rated load capacities recommended operating speeds, special hazard warnings and/or instructions, must be conspicuously posted on all equipment. Instructions or warnings must be visible to operators while they are at their control stations,
- Do not exceed the rated load capacity of the crane, hoist, slings, or other components, (Keep in mind that the hoist may be higher rated than the rail/beam or vice versa)
- Persons operating the crane, hoist, or sling must inspect all machinery and equipment prior to each use to make sure it is in safe operating condition, (See Appendix A)
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or other moving parts or equipment must be guarded,
- No modifications or additions which affect the capacity or safe operation of the equipment must be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, must be changed accordingly. In no case must the original safety factor of the equipment be reduced,
- Disconnect power to a hoist or crane that is unsafe or in need of repair. Arrange to have the equipment locked out and tagged out,
- Never operate a hoist or crane that in your opinion is **UNSAFE TO OPERATE**.

## Engaging the Load

- The sling or other device must be properly seated and secured in the base of the hook,
- The load must not be applied to the point of the hook or the hook latch,



- Before moving the load, the operator must be sure chains and wire rope are not kinked or twisted and that multiple part chains or ropes are not twisted about each other,
- The rope or chain must be properly seated on the drum, sheaves, or sprockets before the lift takes place,
- Remove slack from the sling, chain, or cable before lifting a load,
- The hoist must be centered over the load,
- The operator must not pick up a load more than the rated load of the hoist or crane,
- Specific attention should be given to balancing the load to prevent slipping,
- Crane and hoist hooks must have safety latches,
- Hooks must not be painted or re-painted if the paint previously applied by the manufacturer is worn,
- Crane pendants must have an electrical disconnect switch or button to open the main-line control circuit,
- Cranes and hoists must have a main electrical disconnect switch. This switch must be in a separate box that is labeled with lockout capability,
- Crane bridges and hoist monorails must be labeled on both sides with the maximum capacity,
- Each hoist-hook block must be labeled with the maximum hook capacity,
- Directional signs indicating North (N), West (W), South (S), and East (E) must be displayed on the bridge underside, and a corresponding directional label must be placed on the pendant,
- A device such as an upper-limit switch or slip clutch must be installed on all building cranes and hoists. A lower-limit switch may be required when there is insufficient hoist rope on the drum to reach the lowest point,
- All cabs and remotely operated bridge cranes must have a motion alarm to signal bridge movement,
- Newly installed cranes and hoists, or those that have been extensively repaired or rebuilt structurally, must be load tested at one hundred and twenty-five (125) percent (%) capacity prior to being placed into service,
- If an overload device is installed, a load test to the adjusted setting is required, and
- Solar Landscape employees' or subcontractors' baskets and platforms suspended from any crane must be designed in accordance with the specifications in OSHA 29 CFR 1926.550(g).

## GENERAL SAFETY RULES

Operators must comply with the following rules while operating the cranes and hoists:

- Do not engage in any practice that will divert your attention while operating the crane,
- Respond to signals only from the person who is directing the lift, or any appointed signal person. Always obey a stop signal, no matter who gives it,
- Do not move a load over people. People must not be placed in jeopardy by being under a suspended load. Also, do not work under a suspended load unless the load is supported by blocks, jacks, or a solid footing that will safely support the entire weight. Have a crane or hoist operator remain at the controls or lock open and tag the main electrical disconnect switch,
- Ensure that the rated load capacity of a crane's bridge, individual hoist, or any sling or fitting is not exceeded. Know the weight of the object being lifted; use a dynamometer or load cell to determine the weight,
- Check that all controls are in the OFF position before closing the main line disconnect switch.
- If spring-loaded reels are provided to lift pendants clear off the work area, ease the pendant up into the stop to prevent damaging the wire,
- Avoid side pulls. These can cause the hoist rope to slip out of the drum groove, damaging the rope or

- destabilizing the crane or hoist,
- To prevent shock loading, avoid sudden stops or starts. Shock loading can occur when a suspended load is accelerated or decelerated and can overload the crane or hoist. When completing an upward or downward motion, ease the load slowly to a stop.

## OPERATION RULES

### Pre-operational Test

At the start of each work shift, operators must do the following steps before making lifts with any crane or hoist:

- Test the upper-limit switch. Slowly raise the unloaded hook block until the limit switch trips,
- Visually inspect the hook, load lines, trolley, and bridge as much as possible from the operator's station; in most instances, this will be the floor of the building,
- If provided, test the lower-limit switch,
- Test all direction and speed controls for both bridge and trolley travel,
- Test all bridge and trolley limit switches, where provided, if operation will bring the equipment near the limit switches,
- Test the pendant emergency stop,
- Test the hoist brake to verify there is no drift without a load,
- If provided, test the bridge movement alarm,
- Lock out and tag for repair any crane or hoist that fails any of the above tests.

### Moving a Load

- The operator must not engage in any activity that will divert their attention from the task,
- The operator must respond to signals from a designated person only. However, the operator must always obey a stop signal, no matter who gives it,
- The operator must make sure the load and hoist will clear all obstacles before moving or rotating the load,
- A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- The operator must inch powered hoists and cranes slowly in engagement with a load, but should avoid unnecessary inching and quick reversals of direction,
- A load must not be lifted more than a few inches until it is well balanced in the sling or lifting device.
- When lifting loads at or near capacity, brake action must be tested by lifting the load a few inches off the surface to verify that the brakes are holding,
- On rope hoists, the load must not be lowered below the point where less than two wraps of rope remain on each anchorage of the hoist drum, unless a lower limit device is provided. In this case, no less than one wrap may remain on each anchorage of the hoist drum,
- Loads must not be suspended over Solar Landscape employees or subcontractors,
- All Solar Landscape employees and approved subcontractors must be kept clear of loads about to be

- lifted and of suspended loads,
- Under no circumstances may anyone ride the hook or load,
- Directional movement should be made smoothly and deliberately to avoid swinging of the load.
- Never pull a hoist by the controller cable,
- Contact between trolleys (on two trolley cranes) or between trolleys and stops should be avoided,
- The operator must not use the upper or lower limit device(s) as a normal means of stopping the hoist. These are emergency devices only,
- Center the hook over the load to keep the cables from slipping out of the drum grooves and overlapping, and to prevent the load from swinging when it is lifted. Inspect the drum to verify that the cable is in the correct groove,
- Use a tag line for loads that must traverse long distances or must otherwise be controlled. Manila rope may be used for tag lines,
- Plan and check the travel path to avoid Solar Landscape employees or subcontractors and obstructions.
- Lift the load only high enough to clear the tallest obstruction in the travel path,
- Start and stop slowly,
- Land the load when the move is finished. Choose a safe landing, and
- Never leave suspended loads unattended. In an emergency where the crane or hoist has become inoperative, if a load must be left suspended, barricade and post signs in the surrounding area, under the load, and on all four sides. Lock open and tag the crane or hoist's main electrical disconnect switch.

## Parking a Crane or Hoist

- Remove all slings and accessories from the hook. Return the rigging device to the designated storage racks,
- Raise the hook at least seven (7) feet above the floor,
- Store the pendant away from aisles and work areas or raise it at least seven (7) feet above the floor,
- Place the emergency stop switch (or push button) in the OFF position.

## RIGGING

Solar Landscape employees will perform all rigging operations for the sub-contracted crane operations. Only select rigging equipment that is in good condition will be allowed for use at Solar Landscape worksites. Rigging equipment must be inspected annually and defective equipment is to be removed from service and destroyed to prevent inadvertent reuse.

The load capacity limits must be stamped or affixed to all rigging components.

## SLINGS

- Slings must be inspected prior to each use to make sure they are in safe operating condition, (See Appendix A for inspection forms)
- Slings that are damaged or defective must not be used,
- Slings must not be shortened with knots, bolts, or other makeshift devices,
- Sling legs must not be loaded more than their rated capacities,

- Slings used in a basket hitch must have the loads balanced to prevent slippage,
- Slings must be securely attached to their loads,
- Slings must be padded or protected from the sharp edges of their loads,
- Suspended loads must be kept clear of all obstructions,
- Hands and fingers must not be placed between the sling and its load while the sling is being tightened around the load,
- Shock loading is prohibited (Abrupt starting or stopping of the load),
- A sling must not be pulled from under a load when the load is resting on the sling, and
- Slings must be properly stored when not in use so that they are not subject to mechanical damage, moisture, corrosives, extreme temperature, or kinking.

Solar Landscape requires a minimum safety factor of five (5) to be maintained for wire rope slings.

**NOTE:** *The following type and condition of slings must be rejected or destroyed:*

#### *Nylon slings with*

- Abnormal wear,
- Torn stitching,
- Broken or cut fibers, or
- Discoloration or deterioration.

#### *Wire-rope slings with*

- Kinking, crushing, bird-caging, or other distortions,
- Evidence of heat damage,
- Cracks, deformation, or worn end attachments,
- Six randomly broken wires in a single rope lay,
- Three broken wires in one strand of rope,
- Hooks opened more than 15% at the throat, or
- Hooks twisted sideways more than 10 degrees from the plane of the unbent hook.

#### *Alloy steel chain slings with*

- Cracked, bent, or elongated links or components,
- Cracked hooks, or
- Shackles, eyebolts, turnbuckles, or other damaged or deformed components.

## **RIGGING A LOAD**

The following are requirements when rigging a load:

- Determine the weight of the load. **Do not guess**,
- Determine the proper size for slings and components,
- Do not use manila rope for rigging,
- Make sure that shackle pins and shouldered eyebolts are installed in accordance with the manufacturer's

- recommendations,
- Make sure that ordinary shoulder-less eyebolts are threaded in at least one and a half (1.5) times the bolt diameter,
  - Use safety hoist rings or swivel eyes as a preferred substitute for eyebolts wherever possible,
  - Pad sharp edges to protect slings. Machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding,
  - Do not use slings, eyebolts, shackles, or hooks that have been cut, welded, or brazed,
  - Install wire-rope clips with the base only on the live end and the U-bolt only on the dead end. Follow the manufacturer's recommendations for the spacing for each specific wire size,
  - Determine the center of gravity (CG) and balance the load before moving it,
  - Initially lift the load only a few inches to test the rigging and balance.

## CRANE OVERLOADING

Cranes or hoists must not be loaded beyond their rated capacity for normal operations. Any crane or hoist suspected of having been overloaded must be removed from service by locking open and tagging the main disconnect switch. Additionally, overloaded cranes must be inspected, repaired, load tested, and approved for use before being returned to service. An overloaded crane must also be reported to the EHS Director.

## WORKING AT HEIGHTS ON CRANES OR HOISTS

Anyone conducting maintenance or repair on cranes or hoists at heights greater than six (6) feet must use fall protection. Fall protection should also be considered for heights less than six (6) feet. Fall protection includes safety harnesses that are fitted with a lifeline and securely attached to a structural member of the crane or building or properly secured safety nets.


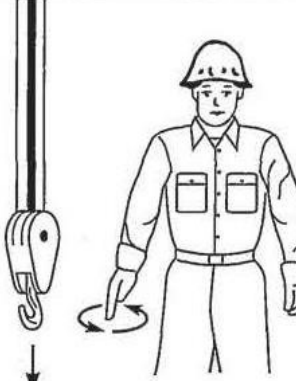
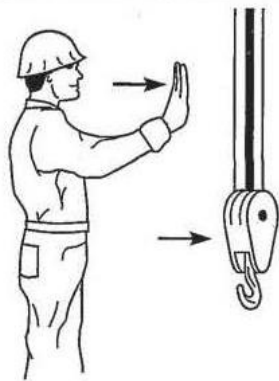
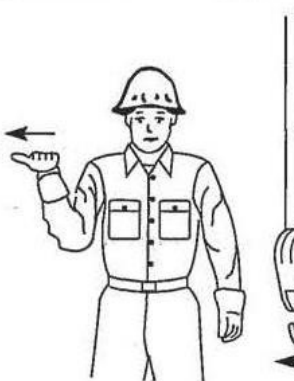
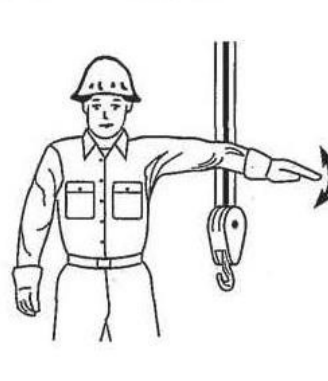
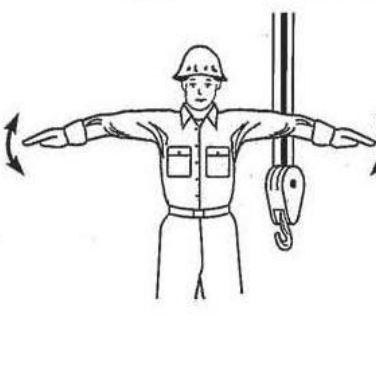
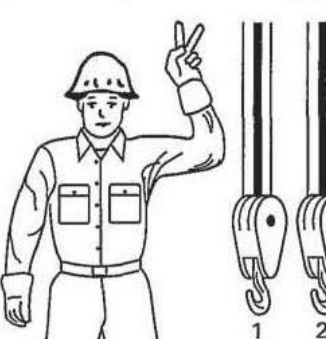

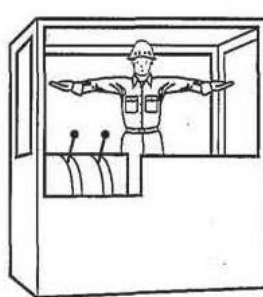
The use of a crane as a work platform should only be considered when conventional means of reaching an elevated worksite are hazardous or not possible. Solar Landscape approved subcontractors must not ride a moving bridge crane without approval from the EHS Director, which must specify the following as a minimum:

- Solar Landscape employees or subcontractors must not board any bridge crane unless the main disconnect switch is locked and tagged open,
- Solar Landscape employees or subcontractors must not use bridge cranes without a permanent platform or catwalk as work platforms. Bridge catwalks must have permanent ladder access,
- Solar Landscape employees or subcontractors must ride seated on the floor of a permanent platform with approved safety handrails, wear safety harnesses attached to designated anchors, and be always in clear view of the crane operator,
- Operators must lock and tag open the main or power disconnect switch on the bridge catwalk when the crane is parked.

## HAND SIGNALS

Signals to the operator must be in accordance with the standard hand signals unless voice communications equipment (telephone, radio, or equivalent) is used. Signals must be discernible or always audible. Some

special operations may require an addition to or modification of the basic signals. For all such cases, these special signals must be agreed upon and thoroughly understood by both the person giving the signals and the operator and must not conflict with the standard signals.

 <p><b>HOIST.</b> With forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	 <p><b>LOWER.</b> With arm extended downward, forefinger pointing down, move hand in small horizontal circle.</p>	 <p><b>BRIDGE TRAVEL.</b> Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.</p>
 <p><b>TROLLEY TRAVEL.</b> Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</p>	 <p><b>STOP.</b> Arm extended, palm down, move arm back and forth horizontally.</p>	 <p><b>EMERGENCY STOP.</b> Both arms extended, palms down, move arms back and forth horizontally.</p>
 <p><b>MULTIPLE TROLLEYS.</b> Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.</p>	 <p><b>MOVE SLOWLY.</b> Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)</p>	 <p><b>MAGNET IS DISCONNECTED.</b> Crane operator spreads both hands apart – palms up.</p>



# INSPECTION, MAINTENANCE, AND TESTING

All tests and inspections must be conducted in accordance with the manufacturer's recommendations.

## Daily Inspections

Daily inspections are to be supplemented with monthly and annual inspections.

## Monthly Tests and Inspections

All in-service cranes and hoists must be inspected monthly. Defective cranes and hoists must be locked and tagged "**Out of Service**" until all defects are corrected. The inspector must initiate corrective action by notifying the EHS Director.

## Annual Inspections

All cranes must have an annual Preventive Maintenance (PM) and annual inspection. The annual PM and inspection must include the following items:

- Hoisting and lowering mechanisms,
- Trolley travel or monorail travel,
- Bridge travel,
- Limit switches and locking and safety devices,
- Structural members,
- Bolts or rivets,
- Sheaves and drums,
- Parts such as pins, bearings, shafts, gears, rollers, locking devices, and clamping devices,
- Brake system parts, linings, pawls, and ratchets,
- Load, wind, and other indicators over their full range,
- Gasoline, diesel, electric, or other power plants,
- Chain-drive sprockets,
- Crane and hoist hooks,
- Electrical apparatus such as controller contractors, limit switches, and push button stations,
- Wire rope,
- Hoist chains.

## LOAD TESTING

- Newly installed cranes and hoists must be load tested at one hundred twenty-five (125) percent (%) of the rated capacity by designated Solar Landscape employees or subcontractors,
- Slings must have appropriate test data when purchased. It is the responsibility of the purchaser to ensure that the appropriate test data are obtained and maintained,
- Re-rated cranes and hoists must be load tested to one hundred twenty-five (125) percent (%) of the new

- capacity if the new rating is greater than the previously rated capacity,
- Fixed cranes or hoists that have had major modifications or repairs must be load tested to one hundred twenty-five (125) percent (%) of the rated capacity,
  - Cranes and hoists that have been overloaded must be inspected prior to being returned to service,
  - Solar Landscape employees or subcontractors' platforms, baskets, and rigging suspended from a crane or hoist hook must be load tested initially, then re-tested annually thereafter or at each new job site,
  - All cranes and hoists with a capacity greater than three (3) should be load tested every four years to one hundred twenty-five (125) percent (%) of the rated capacity. Cranes and hoists with a lesser capacity should be load tested every eight years to one hundred twenty-five (125) percent (%) of the rated capacity,
  - All mobile hoists must be load tested at intervals to be determined by the manufacturer.

## RECORDS

The EHS Director will maintain records for all cranes, hoist, and rigging equipment.





# APPENDIX A



**Wire Rope Inspection Number** \_\_\_\_\_

Make:	Model:
S /N:	Owner:
Machine type:	Mfg. breaking strength: _____ lbs
Applicable standards:	
Date:	Signature:

#	Application of Wire Rope	Type	Construction	Original Diameter	Actual Diameter	Condition of Wire Rope	Line Parts

Comments:

**Chain Sling Inspection Number** \_\_\_\_\_

Make:	Model:
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S /N:	Owner:
Machine type:	Mfg breaking strength _____ lbs
Applicable standards:	
Date:	Signature:

#	Inner Link Wear	Bent Link	Stretched Chain	Gouges	Heat Damage	Cuts or Nicks	End Fitting Condition

Comments:

Synthetic Sling Inspection Number \_\_\_\_\_

Make:	Model:
S /N:	Owner:
Machine type:	Mfg breaking strength _____ lbs
Applicable standards:	
Date:	Signature:

#	Inner Webbing Wear	Threads Showing	Stretched Webbing	Gouges	Heat Damage	Cuts or Nicks	End Fitting Condition





Comments:							



## PURPOSE

This Solar Landscape LLC Respiratory Protection Program was developed to protect Solar Landscape employees by establishing accepted practices for respirator use, providing guidelines for training and respirator selection, and determining proper storage, use and care of respirators. This program is based on compliance with the Occupational Safety and Health Administration (OSHA) respiratory protection requirements of 29 Code of Federal Regulations (CFR) 1910.134.

## RESPONSIBILITIES

### Solar Landscape Management Team

Solar Landscape management is responsible for providing respirators to employees when they are necessary for health protection. Solar Landscape will provide respirators that are applicable and suitable for the intended purpose at no charge to the affected Solar Landscape employee.

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for administering this Solar Landscape Respiratory Protection Program and includes:

- Identifying work areas, processes or tasks that require Solar Landscape employees to wear respirators.
- Evaluation of hazard(s),
- Selecting respiratory protection options,
- Monitoring the respirator use to ensure that respirators are used in accordance with the manufacturer's specifications,
- Arranging for and/or conducting training.
- Ensuring proper storage and maintenance of respiratory protection equipment.
- Conducting qualitative fit testing,
- Administering the Medical Surveillance program.
- Maintaining records required by this program.
- Evaluating this program.
- Updating this written program, as needed.

### Supervisors

Supervisors are responsible for ensuring that this Respiratory Protection Program is implemented at the work site and are responsible for the following:

- Ensuring that employees under their supervision (including new hires) receive appropriate training, fit testing, and annual medical evaluation,
- Ensuring the availability of appropriate respirators and accessories,
- Being aware of tasks requiring the use of respiratory protection,
- Enforcing the proper use of respiratory protection, when necessary,

- Ensuring that respirators are properly cleaned, maintained, and stored according to this program,
- Ensuring that respirators fit well and do not cause discomfort,
- Continually monitoring work areas and operations to identify respiratory hazards, and
- Coordinating with the EHS Director on how to address respiratory hazards or other concerns regarding this program.

## Employees

Each Solar Landscape employee is responsible for wearing their respirator when and where required and in the way they are trained.

Employees must also:

- Care for and maintain their respirators as instructed, guard it against damage, and store in a clean, sanitary location,
- Inform their supervisor if their respirator no longer fits well and request a new one that fits properly,
- Inform their supervisor or the EHS Director of any respiratory hazards that they feel are not adequately addressed in the workplace, and
- Use their respirator in accordance with the manufacturer's instructions and the training received.

## APPLICABILITY

This program applies to all employees who are required to wear respirators during normal work operations, as well as during some non-routine or emergency operations, such as a spill of a hazardous substance.

In addition, any Solar Landscape employee who voluntarily wears a respirator when one is not required (i.e., in certain maintenance and coating operations) is subject to the medical evaluation, cleaning, maintenance, and storage elements of this program, and will be provided with necessary training. Solar Landscape employees who voluntarily wear filtering face pieces (Dust masks) are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

## RESPIRATORY PROTECTION PROGRAM

### Hazard Assessment and Respirator Selection

The EHS Director will select respirators to be used on site, based on the hazards to which workers are exposed and in accordance with the OSHA Respiratory Protection Standard. The EHS Director will conduct a hazard evaluation for each operation, process, or work area where airborne contaminants may be present in routine operations or during an emergency.

The hazard evaluations shall include:

- Identification and development of a list of hazardous substances used in the workplace by department or work process,
- Review of work processes to determine where potential exposures to hazardous substances may occur.

This review shall be conducted by surveying the workplace, reviewing the process records, and talking with employees and supervisors,

- Exposure monitoring to quantify potential hazardous exposures.

The proper type of respirator for the specific hazard involved will be selected in accordance with the manufacturer's instructions. A list of Solar Landscape employees and appropriate respiratory protection will be maintained by the EHS Director.

## Updates to the Hazard Assessment

The EHS Director will revise and update the hazard assessment as needed (i.e., any time work process changes may potentially affect exposure). If a Solar Landscape employee feels that respiratory protection is needed during a particular activity, they need to contact their supervisor or the EHS Director.

The EHS Director will evaluate the potential hazard and arrange for outside assistance if necessary. The EHS Director will then communicate the results of that assessment to the Solar Landscape employee.

If it is determined that respiratory protection is necessary, all other elements of this Solar Landscape Respiratory Protection Program will be in effect for those tasks

## TRAINING

The EHS Director will provide training to Solar Landscape employees who will be required to use respirators. The training will include the contents of this Solar Landscape Respiratory Protection Program, and their responsibilities under it, and on the OSHA Respiratory Protection Standard. All affected Solar Landscape employees and their supervisors will be trained prior to using a respirator in the workplace.

Training will include the following topics:

- Elements of this Solar Landscape Respiratory Protection Program,
- OSHA Respiratory Protection Standard (29 CFR 1910.134),
- Respiratory hazards encountered at Solar Landscape and their health effects,
- Proper selection and use of respirators,
- Limitations of respirators,
- Respirator donning and user seal (Fit) checks,
- Respirator fit testing,
- Emergency use procedures,
- Maintenance and storage, and
- Medical signs and symptoms limiting the effective use of respirators.

Solar Landscape employees will receive the training annually or as needed. Solar Landscape employees must demonstrate their understanding of the topics covered in the training through hands-on exercises and a written test. Respirator training will be documented by the EHS Director, and the documentation will include the type, model, and size of respirator for which each employee has been trained and fit tested.

## NIOSH CERTIFICATION

All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of that certification. Also, all filters, cartridges, and canisters must be labeled with the appropriate NIOSH approval label. The label must not be removed or defaced while the respirator is in use.

## VOLUNTARY RESPIRATOR USE

The EHS Director will authorize voluntary use of respiratory protective equipment as requested by all other Solar Landscape employees on a case-by-case basis, depending on specific workplace conditions and the results of medical evaluations.

The EHS Director will provide all employees who voluntarily choose to wear the above respirators with a copy of Appendix D from the OSHA Respiratory Protection Standard. (Appendix D details the requirements for voluntary use of respirators by employees.) A copy is provided in this program in Appendix A. Employees who choose to wear a half face piece Air Purifying Respirator (APR) must comply with the procedures for Medical Evaluation, Respirator Use, Cleaning, Maintenance and Storage portions of this program.

## MEDICAL EVALUATION

Employees who are either required to wear respirators, or who choose to wear a half face piece APR voluntarily, must pass a medical exam provided by Solar Landscape before they are permitted to wear a respirator on the job. Solar Landscape employees are not permitted to wear respirators until a Physician has determined that they are medically able.

**NOTE:** A Solar Landscape employee who refuses the medical evaluation will not be allowed to work in an area requiring respirator use.

A licensed physician, determined by Solar Landscape, will provide the medical evaluations.

Medical evaluation procedures are as follows:

- The medical evaluation will be conducted using the questionnaire provided in Appendix C of the OSHA Respiratory Protection Standard. The EHS Director will provide a copy of this questionnaire to all Solar Landscape employees requiring medical evaluations,
- Solar Landscape will help employees who are unable to read the questionnaire, or they will be sent directly to the physician for medical evaluation,
- All affected Solar Landscape employees will be given a copy of the Medical Questionnaire to complete, along with a stamped and addressed envelope for mailing the questionnaire to the company physician. Employees will be permitted to complete the questionnaire during company time,
- Follow-up medical exams will be required by the OSHA Standard, or as deemed necessary by the evaluating Physician,
- All Solar Landscape employees will have the opportunity to discuss with the physician about their medical evaluation,
- The EHS Director will provide the evaluating Physician with a copy of this Program, a copy of the OSHA



Respiratory Protection Standard, the list of hazardous substances by work area, and the following information about each Solar Landscape employee requiring evaluation:

- Employee work area or job title,
  - Proposed respirator type and weight,
  - Length of time required to wear respirator,
  - Expected physical workload (light, moderate or heavy),
  - Potential temperature and humidity extremes, and
  - Any additional protective clothing required.
- Positive pressure air purifying respirators will be provided to employees as required by medical necessity.
  - After an employee has received clearance to wear his or her respirator, additional medical evaluations will be provided under the following circumstances:
    - The Solar Landscape employee reports signs and/or symptoms related to their ability to use the respirator, such as shortness of breath, dizziness, chest pains or wheezing,
    - The evaluating Physician or supervisor informs the EHS Director that the employee needs to be re-evaluated,
    - Information found during the implementation of this program, including observations made during the fit testing and program evaluation, indicates a need for reevaluation, or
    - A change occurs in workplace conditions that may result in an increased physiological burden on the Solar Landscape employee.

All examinations and questionnaires are to remain confidential between the Solar Landscape employee and the examining Physician. The EHS Director will only retain the physician's written recommendations regarding each employee's ability to wear a respirator.

## **FIT TESTING**

Employees who are required or who voluntarily wear half-face piece APRs are required to be fit tested for the specific APR assigned to them and will be conducted:

- Prior to being allowed to wear any respirator with a tight-fitting face piece,
- Annually, or
- When changes in the employee's physical condition could affect respiratory fit (e.g., obvious change in body weight, facial scarring, etc.).

Solar Landscape Employees will be fit tested with the make, model, and size of respirator that they will wear and will be provided with several models and sizes of respirators so that they may find an optimal fit. Fit testing of powered air purifying respirators will be conducted in the negative pressure mode.

The EHS Director will conduct fit tests in accordance with the OSHA Respiratory Protection Standard.

## **GENERAL RESPIRATOR USE PROCEDURES**

Employees will use their respirators under conditions specified in this program, and in accordance with the

training they receive in the use of each model. In addition, the respirator must not be used in a manner for which it is not certified by NIOSH or by its manufacturer.

All employees must conduct user seal checks each time they wear their respirators. Employees conduct a positive and negative pressure check as specified in the OSHA Respiratory Protection Standard.

- **Positive Pressure Test:** This test is performed by closing off the exhalation valve with your hand. Breathe air into the mask. The face fit is satisfactory if some pressure can be built up inside the mask without any air leaking out between the mask and the face of the wearer.
- **Negative Pressure Test:** This test is performed by closing the inlet openings of the cartridge with the palm of your hand. Some masks may require that the filter holder be removed to seal off the intake valve. Inhale gently so that a vacuum occurs within the face piece. Hold your breath for ten (10) seconds. If the vacuum remains, and no inward leakage is detected, the respirator fits properly.

All Solar Landscape employees will be permitted to leave the work area to maintain their respirator for the following reasons:

- Clean their respirator if it is impeding their ability to work,
- Change filters or cartridges,
- Replace parts, or
- Inspect respirator if it stops functioning as intended.

Solar Landscape Employees must notify their supervisor before leaving the work area.

Solar Landscape employees are not permitted to wear tight-fitting respirators if they have any condition, such as facial scars, facial hair, or missing dentures, that will prevent a proper seal. Employees are not permitted to wear headphones, jewelry, or other items that may interfere with the seal between the face and the face piece.

Before and after each use of a respirator, an employee or immediate supervisor must inspect tightness or connections and the condition of the face piece, headbands, valves, filter holders and filters. Questionable items must be addressed immediately by the supervisor and/or EHS Director.

## CARTRIDGES

Respirator cartridges will be replaced as determined by the EHS Director, supervisor(s), and based on the manufacturers' recommendations.

## RESPIRATOR CLEANING

Respirators are to be regularly cleaned and disinfected at the designated respirator cleaning station. Respirators issued for the exclusive use of Solar Landscape employees shall be cleaned as often as necessary.

The following procedure is to be used when cleaning and disinfecting reusable respirators:

- Disassemble respirator, removing any filters, canisters, or cartridges,

- Wash the face piece and all associated parts (except cartridges and elastic headbands) in an approved cleaner-disinfectant solution in warm water (about 120 degrees Fahrenheit). Do not use organic solvents. Use a hand brush to remove dirt,
- Rinse completely in clean, warm water,
- Disinfect all facial contact areas by spraying the respirator with an approved disinfectant,
- Air dry in a clean area,
- Reassemble the respirator and replace any defective parts. Insert new filters or cartridges and make sure the seal is tight, and
- Place the respirator in a clean, dry plastic bag or other airtight container.

The EHS Director will ensure an adequate supply of appropriate cleaning and disinfection materials at the cleaning station.

## RESPIRATOR MAINTENANCE

Respirators are to be properly maintained to ensure that they function properly and to protect Solar Landscape employees. Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use. No components will be replaced, or repairs made beyond those recommended by the manufacturer. Repairs to regulators or alarms of atmosphere-supplying respirators will be conducted by the manufacturer.

- All respirators shall be inspected routinely before and after each use,
- Respirators kept for emergency use shall be inspected after each use, and at least monthly by the EHS Director to ensure that they are in satisfactory working order,
- A Respirator Inspection checklist may be used when inspecting respirators,
- A record shall be kept of inspection dates and findings for respirators maintained for emergency use, and
- Solar Landscape employees are permitted to leave their work area to perform limited maintenance on their respirator in a designated area that is free of respiratory hazards. Situations when this is permitted include:
  - Washing face and respirator face piece to prevent any eye or skin irritation,
  - Replacing the filter, cartridge, or canister,
  - Detection of vapor or gas breakthrough or leakage in the face piece, or
  - Detection of any other damage to the respirator or its components.

## RESPIRATOR STORAGE

Following a thorough inspection, cleaning, and necessary repairs, respirators will be stored appropriately to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals and:

- Respirators must be stored in a clean, dry area, and in accordance with the manufacturer's recommendations. Each employee will clean and inspect their own air-purifying respirator in accordance with the provisions of this program and will store their respirator in a plastic bag in the designated area. Each employee will have his/her name on the bag and that bag will only be used to store that employee's respirator,

- Respirators must be packed or stored so that the face piece and exhalation valve will rest in a near normal position,
- Respirators must not be placed in places such as lockers or toolboxes unless they are in carrying cartons,
- The EHS Director will maintain a supply of respirators and respirator components in their original manufacturer's packaging.

## RESPIRATOR MALFUNCTIONS AND DEFECTS

For any malfunction of an APR such as breakthrough, face piece leakage, or improperly working valve, the Solar Landscape employee must inform their supervisor that the respirator no longer functions as intended and proceed to the designated safe area to maintain the respirator. The supervisor must ensure that the Solar Landscape employee receives the needed parts to repair the respirator or is provided with a new respirator.

When a respirator is taken out of service for an extended period of time, the respirator will be tagged out of service, and the employee will be given a replacement of a similar make, model, and size.

## EMERGENCY PROCEDURES

In emergency situations where an atmosphere exists in which the wearer of the respirator could be overcome by a toxic or oxygen-deficient atmosphere, the following procedure should be followed:

- Solar Landscape employees in the affected work area must immediately shut down their equipment, if convenient, and exit the work area.

All other Solar Landscape employees must immediately evacuate the building. Solar Landscape's Emergency Action Plan must be followed.

## PROGRAM EVALUATION

The EHS Director will conduct periodic evaluations of the panel work sites to ensure that the provisions of this program are being implemented. The evaluations will include regular consultations with the Solar Landscape employees who use respirators and their supervisors, site inspections, air monitoring and a review of records. Items to be considered will include:

- Comfort,
- Ability to breathe without objectionable effort,
- Adequate visibility under all conditions,
- Provisions for wearing prescription glasses,
- Ability to perform all tasks without undue interference, and
- Confidence in the face piece fit.

Identified problems will be noted in an inspection log and addressed by the EHS Director. The EHS Director determine how to correct deficiencies in the respirator program and dates for the implementation of those corrections.

The EHS Director will ensure that documentation and recordkeeping is maintained including:

- A written copy of this program and the OSHA Respiratory Protection Standard will be kept in the EHS Director's office and made available to all employees who wish to review it,
- Copies of training and fit test records shall be maintained by the EHS Director. These records will be updated as new employees are trained, as existing Solar Landscape employees receive refresher training, and as new fit tests are conducted, and
- For Solar Landscape employees covered under the Respiratory Protection Program, the EHS Director will maintain copies of the Physician's written recommendation regarding each employee's ability to wear a respirator. The completed medical questionnaires and evaluating Physician's documented findings will remain confidential in the employee's medical records at the location of the evaluating Physician's practice.



# APPENDIX A



**Appendix D to § 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Please complete the section below:

Name (print): \_\_\_\_\_ Job Title \_\_\_\_\_  
EHS Director: \_\_\_\_\_ Location of use: \_\_\_\_\_

Reason for use: (Describe nature of work, specific location, and type of dust):  
\_\_\_\_\_

I have read and understood the information provided above: \_\_\_\_\_

## PURPOSE

This Crystalline Silica Exposure Control Plan is designed to prevent health effects from respirable crystalline silica exposures. This plan follows the requirements of both the Occupational Safety and Health Administration (OSHA) General Industry Code of Federal Regulation (CFR) Part 29 1910.1053) and the OSHA Construction 1926.1153.

Solar Landscape LLC employees may be involved in activities that are covered under either rule relative to potential crystalline silica exposures. The requirements in this plan apply to all Solar Landscape employees and subcontractors who are exposed to respirable crystalline silica at or above the Action Level (AL) or Permissible Exposure Limit (PEL) or perform construction-related tasks which are identified in Table 1 of the OSHA standard and included in this plan.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

- Provide program oversight and consultation to Solar Landscape employees regarding potential risks, exposure prevention, and training relating to potential crystalline silica dust exposures,
- Implement a suitable respirable crystalline silica exposure monitoring program, or otherwise ensuring representative exposure monitoring results are available,
- Designate a “Competent Person” and define/assign their appropriate responsibilities,
- Ensure the project and/or task specific Exposure Control Plans (ECPs) are developed, communicated, and effectively implemented as appropriate,
- Ensure that all affected Solar Landscape employees and their managers or supervisors receive the necessary training related to this plan, as well as task specific ECPs,
- Maintain applicable records, such as exposure sampling, respirator fit tests, training, etc. in accordance with OSHA regulations,
- Conduct a review of this plan annually and update as necessary,
- Conduct medical surveillance in accordance with 1910.1053 and 1926.1153,
- Maintain records of the physical examinations, x-rays, and tests.

### Supervisors

#### Acting as the Competent Person

- Inspect job sites, materials, and equipment on a regular and frequent basis,
- Identify existing and foreseeable respirable crystalline silica hazards and take prompt corrective action to minimize or eliminate these hazards,
- Being familiar with this Solar Landscape Silica Exposure Control Plan,
- Notify the EHS Director when problems arise, change in engineering controls, and work practices, or in situations of uncontrolled releases of visible dust,
- Provide affected new Solar Landscape employees with informal on-the-job training about this plan,
- Notify the EHS Director about workplace conditions and potentially affected Solar Landscape employees,



- Provide information and training materials available to potentially affected Solar Landscape employees,
- Supply appropriate equipment and personal protective equipment (PPE) to affected employees,
- Require affected Solar Landscape employees to wear PPE as outlined in this plan,
- Ensure that affected Solar Landscape employees receive medical surveillance and attend required training.

## Employees

- Observe the procedures and requirements outlined in this plan,
- Attend training sessions,
- Comply with medical surveillance requirements,
- Wear respiratory protection, and other PPE, as required or directed, and
- Notify supervisors of changes in the workplace that could cause an increase in exposures to respirable crystalline silica.

## REQUIRED EXPOSURE CONTROL METHODS

Potential silica-containing substrates and materials encountered during Solar Landscape solar panel installation work includes potential exposure to brick, cement, concrete, concrete block, drywall, grout, mortar, paints containing silica, plasters, roof tile, and various types of tiles. Activities impacting these materials also vary, including cutting/sawing, demolishing/disturbing, drilling/coring, grinding, jackhammering, milling, mixing/pouring, sanding, scraping, and cleanup activities such as sweeping and vacuuming.

OSHA has published a list of typical equipment and tasks, and necessary engineering controls and respiratory protection (Table 1 of the standard). Exposure monitoring is not required when following the provisions of Table 1.

The table below identifies the tasks which are identified in the Respirable Crystalline Silica Standard's Table 1 that Solar Landscape employees may conduct and includes the methods of control applicable to that tool/task that Solar Landscape employees will follow to ensure their respirable crystalline silica exposures are minimized including integrated water delivery systems and shrouded power equipment with High-Efficient Particulate Air (HEPA) exhaust are the primary methods of control for all activities that disturb silica-containing materials.

TABLE 1

Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)		
		≤4 hours/shift	≥4 hours/shift	
Stationary Masonry Saws	<p>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p>	None	None	
Handheld power saws (any blade diameter)	<p>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p>			
		When used outdoors	None	APF 10
		When used indoors or in an enclosed area	APF 10	APF 10
Handheld power saws for cutting fiber-cement board (with blade diameter of 8” or less)	<p>For tasks performed outdoors only: Use saw equipped with commercially available dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.</p>	None	None	



Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	≥4 hours/shift
Handheld and stand-mounted drills (including impact and rotary hammer drills)	<p>Use drill equipped with commercially available shroud or cowl with dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</p> <p>Use a HEPA-filtered vacuum when cleaning holes.</p>	None	None
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.		
	When use outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
	<b>OR</b> Use tool equipped with a commercially available shroud and dust collections system.		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.		
When used outdoors	None	APF 10	
When used indoors or in an enclosed area	APF 10	APF 10	



Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	≥4 hours/shift
Handheld grinders for mortar removal (i.e., tuckpointing)	<p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25cfm or greater of airflow per incho of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p>	APF 10	APF 10
Handheld grinders for uses other than mortar removal	<p>For tasks performed outdoors only:</p> <p>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p>	None	None
	<p><b>OR</b></p> <p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25cfm or greater of airflow per incho of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p>		
	When used outdoors	None	None
	When used indoors or in an enclosed area	None	APF 10



The tasks that Solar Landscape employees may perform on silica-containing materials that are not represented in the Table 1 list include scraping of painted drywall and plasters, light demolition activities involving handheld tools and reciprocating saws, mixing, and pouring, and cleanup methods. Engineering and work practice controls will be used, employee exposure monitoring will be conducted, and respiratory protection will be employed, as necessary.

In addition to Solar Landscape employees, there may be Solar Landscape subcontractors who have the potential to be exposed to respirable crystalline silica above the action limit while performing various tasks. If these tasks fall outside the scope of Table 1, the EHS Director will perform an exposure assessment using either the "Performance Option" or the "Scheduled Monitoring Option", both of which are described below. If these operations exceed the AL or PEL, they will be identified in the plan along with the controls used to ensure employees are protected.

EHS will assess the eight (8) hour TWA exposure for each employee based on any combination of air monitoring data or objective data sufficient to accurately characterize the Solar Landscape employee exposures to respirable crystalline silica.

## EXPOSURE MONITORING

The initial Exposure Assessment/ Exposure monitoring will be conducted when a Solar Landscape employee is or may reasonably be expected to be exposed to respirable crystalline silica at or above the AL. Exposure monitoring is not required if the task is listed Specified Exposure Control Methods section of this plan and the engineering controls, work practices, and PPE are used as listed. Exposure monitoring is also not required if the EHS Director has either objective or historic data that shows a Solar Landscape employee will not be exposed above limits for the task being performed.

## PERIODIC EXPOSURE ASSESSMENT

Periodic exposure monitoring will take place under the following conditions:

- If the most recent results are at or above the AL but are below the PEL limit, exposure monitoring will be repeated every six (6) months,
- If the most recent results are at or above the PEL, exposure monitoring will be repeated within three (3) months.

Periodic exposure monitoring may be discontinued if results from two consecutive sampling periods taken at least seven (7) days apart show that employee exposure is below the action level.

Monitoring will be conducted whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level. Employees will be notified in writing of the results of the monitoring within fifteen (15) workdays of completing the exposure assessment.

If the results indicate exposures above the PEL, then the report will include actions that will be taken to reduce exposures. All affected Solar Landscape employees will be included in this notification. Alternatively, the results may be posted in an appropriate location accessible to all affected employees.

**NOTE:** Employees who fall under the scope of the Silica in Construction standard will be notified in writing of the results of the monitoring within five (5) workdays of completing the exposure assessment.

## HOUSEKEEPING

Dry sweeping or dry brushing of dust containing respirable crystalline silica is prohibited. Only use a HEPA filtered vacuum cleaner, followed by wet mopping, or wet sweeping as necessary. Wet sweeping compounds can be an acceptable dust suppression housekeeping method provided that the compounds are non-grit, oil, or wax based. If HEPA vacuuming or wet mopping/sweeping is not feasible, then the EHS Director must be contacted to discuss alternative cleaning methods.

Do not use compressed air to clean an employee's clothes that have become soiled with dust containing respirable crystalline silica or use compressed air to clean skin and clothing at any time. A HEPA filtered vacuum should be used to remove dust followed by laundering.

Coveralls can be used to minimize the transfer of dust to other areas such as an office, break room, vehicle, or home environment. Vacuum the coveralls with a HEPA filtered vacuum before removing them to launder or, if disposable, place in the normal trash. Vacuum filters can also be placed in the normal trash.

## REGULATED AND RESTRICTED AREAS

A regulated area will be established where work exposures at a fixed location are known to be at or above the PEL. A regulated area must be separated from other areas in a way that will minimize the number of Solar Landscape employees exposed.

The following sign will be posted at each entrance to the regulated area:

**DANGER, RESPIRABLE CRYSTALLINE SILICA, MAY CAUSE CANCER, CAUSES DAMAGE TO LUNGS, WEAR RESPIRATORY PROTECTION IN THIS AREA AUTHORIZED PERSONNEL ONLY**

Only Solar Landscape employees who have work to perform are allowed to enter a regulated area. All Solar Landscape employees entering the regulated area must wear a designated respirator, regardless of the amount of time spent in the area.

## RESPIRATORY PROTECTION

Respiratory protection is required during certain activities identified in Table 1 of this plan. It may also be required if other tasks are identified where employee exposures exceed the PEL and work practice or engineering controls are not feasible or effective enough to reduce exposures. All respirator use will comply with the OSHA Respirator Standard and the Solar Landscape Respiratory Protection Program.

## MEDICAL SURVEILLANCE

Medical surveillance will comply with all the requirements of 1910.1053 and 1926.1153 and will be required for any Solar Landscape employee who meets any of the following criteria:

- Exposure to respirable crystalline silica above the PEL,
- Exposure to respirable crystalline silica at/above the AL for thirty (30) or more days per year,
- Required to wear a respirator for thirty (30) or more days a year (Table 1),
- Work with crystalline silica and develop signs/symptoms of excessive exposure to respirable crystalline silica.

## TRAINING

Training is required upon initial assignment to a solar panel installation project where silica-containing materials will be impacted and may result in exposures above the AL or where tasks in Table 1 are performed. The Silica training will cover the following topics:

- Health hazards associated with respirable crystalline silica,
- Specific tasks in the workplace that could result in exposure to respirable crystalline silica,
- Specific measures the employer has implemented to protect employees from exposure, including engineering and work practice controls as well as respiratory protection,
- The contents and availability of the Construction and General Industry OSHA Silica Standards, as applicable,
- The identity of the Competent Person, and
- The purpose and description of the medical surveillance program.

## RECORD KEEPING

The EHS Director will maintain employee exposure information for at least thirty (30) years and will be kept on file for the duration of the employee's employment, plus thirty (30) years.



## PURPOSE

Ladders are effective tools to help Solar Landscape LLC employees work at heights. Employees who work on or around ladders risk permanent injury or death from falls, electrocutions, and ergonomic injuries while lifting, carrying, and handling ladders. Solar Landscape is dedicated to the protection of its employees, as well as contractors and temporary employees, from on-the-job injuries. This Ladder Safety Policy is based on compliance with the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.23 for General Industry and 1926.1053 for Construction activities.

This Ladder Safety Plan lists the current ladders that Solar Landscape uses at work sites and provides inspection procedures/Inspection Form. This Ladder Safety Policy also describes the safe practices for the care, use, and training requirements for Solar Landscape employees.

## ADMINISTRATIVE DUTIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for the administration of this Ladder Safety Policy and for developing, implementing, and maintaining the Policy in accordance with OSHA and Solar Landscape policies and procedures. The EHS Director will make necessary decisions to ensure the enforcement and success of this policy.

Copies of this Ladder Safety Policy may be obtained from the EHS Director. All employees, or their designated representatives, may obtain further information about this policy and/or OSHA requirements from the EHS Director.

### Employees

All Solar Landscape employees are responsible for ensuring that all ladders used meet OSHA regulations and are compliant with the American National Safety Institute (ANSI). Solar Landscape employees must comply with the manufacturer's instructions, reporting damaged ladders and tagging them out of service, conducting visual inspections of ladders before each use and assisting in documenting ladder inspections.

## LADDERS

OSHA defines a ladder as a device with rungs, steps, or cleats used to gain access to a different elevation. Ladders come in three general types:

1. Portable ladders,
2. Mobile ladder stands and stand platforms, and
3. Fixed ladders.



## Portable Ladders

Portable ladders can be readily moved or carried, and usually consist of side rails joined at intervals by steps, rungs, or cleats. Stepladders, straight ladders, and extension ladders are examples of portable ladders. Solar Landscape uses the following portable ladders:

Ladder Identifier	Ladder Type	Ladder Description
	A Frame	Height
	Extension	Height
	Platform Ladders	Height

## Mobile Ladder Stands - Platforms

Mobile ladder stands and mobile ladder stand platforms are also important. Mobile ladder stands or ladder stand means a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand also may have handrails and is designed for use by one employee at a time.

A mobile ladder stand platform means a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with a means of access or egress. Solar Landscape has the following mobile ladder stands and/or mobile ladder stand platforms:

Ladder Identifier	Ladder Type	Ladder Description

## Fixed Ladders

Fixed ladders cannot be readily moved or carried because they consist of rails or individual rungs that are permanently attached to a structure, building, or equipment. Fixed ladders include individual-rung ladders, but not ship stairs, step bolts, or manhole steps. Employees may need to step sideways from a fixed ladder or through the side rails at the top to reach a walking-working surface, such as a landing. Solar Landscape has the following fixed ladders:

Ladder Identifier	Ladder Type	Ladder Description
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

## LADDER CONSTRUCTION AND DESIGN

A safe ladder begins with proper construction and design. All ladders at Solar Landscape work sites, no matter the ladder type, must be constructed and designed according to ANSI ASC A14 and to the following specifications:

- Each self-supporting portable ladder must support at least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladder shall sustain at least three-point-three (3.3) times the maximum intended load,
- The ability of a ladder to sustain the loads indicated in this paragraph shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction,
- The minimum clear distance between the sides of individual-rung/step ladders and the minimum clear distance between the side rails of other fixed ladders must be sixteen (16) inches.

## LADDER SELECTION

The EHS Director must approve any ladder purchased, rented, or installed, for use at any Solar Landscape work site. The EHS Director will perform a tentative evaluation of ladder(s) to choose the type of ladder to use on the work site, which includes factors, such as:

- Height,
- Placement,
- Attachment to a structure, and
- Electrical work proximity to be conducted.

The EHS Director will select a ladder that has the proper attributes desired and that meets with the provisions of this plan. When the ladder arrives or is installed at the worksite, EHS Director will ensure that it meets the design criteria above.

## MAINTENANCE

To ensure the safety and continued working condition of Solar Landscape ladders, Solar Landscape invests time and effort into the proper maintenance of ladders, which results in day-to-day reliability. Maintaining the manufacturer's recommended maintenance schedules, as well as completing the proper inspection records (Form), increases the ladders' longevity.

The EHS Director complete(s) any recommended "Breaking-in" maintenance whenever Solar Landscape purchases ladders. The EHS Director will follow the manufacturers' safety instruction manuals for maintenance. Periodic maintenance is completed monthly or less frequently.

## INSPECTION

Solar Landscape seeks to prevent injuries and fatalities caused by ladders by establishing an inspection process that identifies and addresses ladder safety and compliance concerns. Solar Landscape provides three (3) types of ladder inspections Pre-Use, Periodic, and Daily Inspection inspections (See Ladder Inspection Form in Appendix A).

If a hazardous condition, defect, or noncompliant ladder is discovered by any employee during an inspection or at any other time, the problem must be reported immediately to the EHS Director. If a safety issue is discovered or not, all ladder inspection records are submitted and maintained as specified under the Recordkeeping section of this plan.

The EHS Director will conduct the ladder inspections to ensure that ladders are compliant and in a safe condition. These inspections are conducted:

- Before a ladder is originally put into service, (Pre-Use)
- If workplace conditions, circumstances, or events occur that warrant an additional check of ladders to ensure that they are safe for employees to use, (i.e., ladder does not increase the risk of a fall or electrocution)
- Inspections are conducted when situations arise or occur that necessitate conducting additional inspections of ladders to ensure that they continue to remain defect-free and safe for workers to use.

## Repair and Modification

Any ladder deficiencies discovered during ladder inspections, or at any other time, the problem will be brought to the attention of the EHS Director or supervisor, who will immediately ensure the ladder is:

1. Tagged or marked for service.
2. Removed from service until the hazard or defect is corrected or repaired. (A fixed ladder is considered removed from service if it is tagged as described above and guarded or blocked such as with a plywood attachment that spans several rungs.)
3. Examined for the extent of the reported damage, deficiency, or noncompliance to determine whether it, in fact, constitutes a safety hazard or compliance issue.
4. Put through an inspection after any major repair or design modification.
5. Put back into service if fully repaired and the ladder passes inspection.

No modifications or alterations that affect the capacity, stability, safe operation, intended use, or structural integrity of the ladder may be made without the manufacturer's written approval. If such modifications or alterations are made, the capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly. In no case may the original safety factor of the ladder be reduced.

## TRAINING

It is the policy of Solar Landscape to permit only trained and authorized employees to use, inspect, maintain, or repair ladders at any time. Under no circumstances shall employees perform work requiring a ladder or otherwise climb or use a ladder on the job until they have successfully completed our safety training program for ladders. This includes all new employees, regardless of claimed previous experience, and also includes:

- Project Manager(s),
- Construction Manager(s),
- Supervisor(s), and
- Assigned Field Employee(s).

The EHS Director will identify all current and new employees, including contract and temporary employees, who require training and then schedule training times for those employees.

Ladder training will be conducted by the EHS Director. Training will consist of both classroom and worksite, as appropriate. The ladder training program will include the following topics:

- A-frame ladder safety training,
- Extension Ladder safety training, and
- Solar Landscape Ladder Safety Policy

In addition, the EHS Director has the responsibility of determining whether an employee who has already been trained has the knowledge, understanding, and/or skill required under the training program. Retraining is required:

- When a Safety policy is repeatedly broken,
- After an incident, and
- Annual retraining.

## RECORDKEEPING

All records pertaining to this Ladder Safety Policy are submitted and maintained as follows:

Record Type	Record submitted to	Where the records are kept
Electronic and sign in Sheets	EHS Director	EHS Suite training records

## Plan Evaluation

This Ladder Safety Policy will be reviewed periodically by the EHS Director to determine if the plan is effective and if additional practices, procedures, or training should be implemented to control the hazards.

If a Solar Landscape employee suffers an injury related to a ladder or there is some other related, serious incident or near miss, this plan will be reviewed to determine if plan changes need to be implemented to prevent similar types of injuries or incidents from occurring. The EHS Director will make changes if necessary and Solar Landscape employees will be notified of the changes and trained, if necessary.





# APPENDIX A



## LADDER INSPECTION FORM

### Solar Landscape LLC

<b>Date of Inspection:</b>		<b>Inspector:</b>	
		<b>Signature:</b>	
<b>Ladder Identification:</b>			
<b>Ladder Style:</b> <input type="checkbox"/> Extension <input type="checkbox"/> Fixed <input type="checkbox"/> Step			
<b>Ladder Construction</b> <input type="checkbox"/> Wood <input type="checkbox"/> Steel <input type="checkbox"/> Aluminum			
<input type="checkbox"/> Fiberglass			
INSPECTION DETAIL	CONDITION	OUT OF SERVICE	COMMENTS
Loose steps or rungs	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Loose or missing nails, screws, bolts, etc. hardware	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Cracked, split, or broken uprights or braces	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Splinters or cracks (Wood ladders)	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Rungs or steps missing	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Free from grease, oil, or other slippery material	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Joints are tight	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Movable parts operate freely	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Damaged non-slip step covers	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>STEP LADDERS</b>			
Unstable or loose (General condition)	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Not greater than twenty (20) feet in length	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Loose or bent hinge spreaders	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input checked="" type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sharp edges present	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Loose hinges	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>EXTENSION LADDERS</b>			
Loose, broken, or missing extension lock mechanism	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Defective locks that do not seat properly	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	



Frayed or worn rope	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Single section ladders do not exceed thirty (30) feet	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Two (2) section extension ladders do not exceed forty-eight (48) feet in length for metal ladders and sixty (60) feet in length for wood ladders	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Ladders with more than two (2) sections do not exceed sixty (60) feet in length	<input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>ADDITIONAL COMMENTS</b>			



# PURPOSE

This Solar Landscape LLC Fall Protection Program was developed to help protect employees and sub-contractors during solar panel installation projects and is based on the guidelines provided by the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1926, Subpart M, Fall Protection, Appendix E and 1910.140. This fall protection program is provided as a resource and not designed to address all work site scenarios and fall hazards. It is a set of policies and procedures designed to help identify and reduce fall hazards associated with solar panel installations.

Solar Landscape is dedicated to protecting employees from on-the-job injuries and providing a safe working environment. All Solar Landscape employees have the responsibility to work safely on the job. The purpose of this program is to supplement our existing Environment Safety and Health Program and to ensure that each employee recognizes workplace fall hazards and acts appropriately to address those hazards.

A fall hazard is one associated with falls from heights greater than six (6) feet above a lower level. The general approach is based on a five (5) tiered hierarchy of fall protection controls, as outlined below:

PRIORITY	CONTROL	EXAMPLES
<b>FIRST</b>	<b>Eliminate the fall hazard</b>	<b>Bring work to ground level; Use tools to eliminate work above ground level</b>
<b>SECOND</b>	<b>Passive fall restraint</b>	<b>Install physical barriers, such as guardrails or parapets, to prevent falls</b>
<b>THIRD</b>	<b>Active fall restraint</b>	<b>Use a restraint system (e.g., full-body harness, <a href="#">lanyard</a> and anchor) to prevent falls</b>
<b>FOURTH</b>	<b>Fall arrest</b>	<b>Use a personal fall arrest system or safety net to minimize fall injuries</b>
<b>FIFTH</b>	<b>Controlled access zones (CAZ) a last resort</b>	<b>When fall protection is not feasible, provide adequate training, on-site supervision, signage, and visible barriers to preclude Solar Landscape employees from fall hazard zones</b>

Each Solar Landscape work site and job task can be unique and contain many potential fall hazards that will be addressed prior to the beginning of the solar panel installation work. Solar Landscape supervisors and employees are responsible for assessing these hazards and taking necessary corrective actions to reduce dangerous falls.

**NOTE:** A Site-Specific Fall Protection Plan will be created by Solar Landscape and will be evaluated on a site-by-site basis by the EHS Director. The template, found in Appendix A, is included in this program.





## SCOPE

This Solar Landscape Fall Protection Program consists of a set of general policies/guidelines and a Site-Specific Fall Protection template for work related to installation of solar panels on the roof of commercial buildings and/or installations to prevent injuries associated with falls.

## EMPLOYEE TRAINING AND RESPONSIBILITIES

Each Solar Landscape employee will be trained on this Fall Protection Program and will be required to follow these procedures except when doing so would expose the employee or contractor to a greater hazard. If, in the employee's or contractor's opinion, this is the case, they are required to notify the represented Competent Person or Mr. Sonny Protzman (EHS Director) of their concern(s) and evaluate the concern by conducting a Job Safety Analysis or Hazard Assessment before proceeding with the work.

## SOLAR LANDSCAPE, LLC RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for the designation of the Fall Protection Competent Person to implement the Solar Landscape Fall Protection Program. The EHS Director, when on the work site, will conduct continual observational safety checks of the work operations and conduct enforcement of the safety policy and procedures.

### Site Supervisor/Foreman

The site supervisor or foreman will be responsible for correcting any unsafe practices or conditions immediately. It is the responsibility of Solar Landscape to ensure that all employees understand and adhere to the procedures of this program and to follow the instructions of the crew supervisor. It is also the responsibility of the Solar Landscape employee to bring to management's attention any unsafe or hazardous conditions or practice that may cause injury to either themselves, other employees, or sub-contractor.

### Employee

Installation of solar roof frames, braces, and other photovoltaic related materials activities will be conducted by Solar Landscape employees who have been specifically trained to conduct this type of specialized work and are trained to recognize fall hazards related to the job site. Only Solar Landscape employees who have received formal training on this Fall Protection Program and its elements will be allowed to work on the solar panel installation work sites.

## SOLAR LANDSCAPE, LLC WORK ACTIVITIES

Below are some common work tasks/activities where Solar Landscape employees or sub-contractors may be at risk of fall hazards:

- Electrical connections/utilities,
- Machine and equipment installation,
- Roof sheathing work,
- Work from Aerial Lifts,
- Sheet metal work,
- Solar panel and framing/bracing installation, and
- Leading edge work.

This Solar Landscape Fall Protection Program addresses the use of conventional fall protection at several areas on the solar panel installation projects, as well as identifies specific activities that may require non-conventional means of fall protection.

During the installation of solar panels on top of commercial buildings, under forty-eight (48) feet in height, it may create a greater hazard to use conventional fall protection systems at specific areas or for specific tasks. These areas or tasks may include:

- Setting and bracing solar panel braces and supports,
- Installation of floor sheathing or insulation.

In these cases, conventional fall protection systems may not be the safest choice for the solar panel installations. This program is designed to enable Solar Landscape, employees, and Solar Landscape sub-contractors to recognize fall hazards associated with the job and to establish the safest procedures that are to be followed to prevent falls to lower levels or through holes and openings in walking/working surfaces.

## FALL PROTECTION REQUIREMENTS / GENERAL REQUIREMENTS

- Solar Landscape will provide fall protection for each employee working on a roof more than six (6) feet above a lower level,
- A Competent Person will determine the feasibility and safety of providing fall protection for all Solar Landscape employees,
- Fall protection may include guardrail or "Hard rail" systems and a Personal Fall Arrest System (PFAS).
- PFAS includes full-body harnesses, components of the harness/belt such as Dee-rings, snap hooks, lifelines, and anchorage point.
- Vertical or horizontal lifelines (if needed).
- Lifelines will be independent of support lines and suspension ropes and not attached to the same anchorage point as the support or suspension ropes.
- When Solar Landscape employees are working from an aerial lift, the fall arrest system must be attached to the manufacturers' designated attachment point located on the boom or basket of the aerial lift.

## ELIMINATING FALL HAZARDS

The top priority of this Fall Protection Program is to eliminate fall hazards whenever feasible. This includes moving tasks to ground level as much as possible, as well as changing the workflow and job design to allow work to be performed at ground level whenever possible.

## PASSIVE FALL RESTRAINTS / GUARDRAIL SYSTEMS

When it is not feasible to eliminate a fall hazard, then physical barriers, such as a guardrail system, will be installed to prevent falls. A guardrail system will be durably constructed and meet OSHA design specifications found in 29 CFR 1926.

Guardrail systems are barriers installed to prevent Solar Landscape employees from falling to lower levels. If Solar Landscape determines to use a guardrail system to protect Solar Landscape employees from falls, the following requirements will be followed:

- Top rails, or equivalent guardrail system members, will be forty-two (42) inches plus or minus three (3) inches above the walking or working level. If Solar Landscape employees are using stilts, the top edge of the top rail, or equivalent member, will be increased an amount equal to the height of the stilts,
- Screens, midrails, mesh, intermediate vertical members, or equivalent intermediate structural members will be installed between the top edge of the guardrail system and the walking or working surface when there are no walls or parapet walls at least twenty-one (21) inches high,
- When midrails are used, they will be installed at a height midway between the top edge of the guardrail system and the walking or working level,
- When screens and mesh are used, they will extend from the top rail to the walking or working level and along the entire opening between top rail supports,
- When necessary, screens and/or mesh will be installed in a manner to prevent Solar Landscape employees from falling underneath,
- When intermediate members (such as balusters) are used between posts, they will not be more than nineteen (19) inches apart,
- Other structural members (such as additional midrails and architectural panels) will be installed so that there are no openings in the guardrail system more than nineteen (19) inches wide,
- Guardrail systems will be capable of withstanding a force of at least two hundred (200) pounds applied within two (2) inches of the top edge, in any outward or downward direction, at any point along the top edge,
- Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members will be capable of withstanding a force of at least one hundred fifty (150) pounds applied in any downward or outward direction at any point along the midrail or other member,
- Guardrail systems will have a surface to protect Solar Landscape employees from punctures or lacerations and to prevent clothing from snagging,
- The ends of top rails and midrails will not overhang terminal posts, except where an overhang poses no projection hazard,
- Steel and plastic banding cannot be used as top rails or midrails,
- The top rails and midrails of guardrail systems will have a nominal diameter or thickness of at least one

- quarter (1/4) inch to prevent cuts and lacerations,
- If wire rope is used for top rails, it will be flagged at not more than six (6) foot intervals with high-visibility material,
- When guardrail systems are used at hoisting areas, a chain, gate, or removable guardrail section will be placed across the access opening between guardrail sections during those times when hoisting operations are not taking place,
- When guardrail systems are used at holes, they will be set up on all unprotected sides or edges. When a hole is used for the passage of materials, it will not have more than two sides with removable guardrail sections. When the hole is not in use, it will be covered or provided with a guardrail system along all unprotected sides or edges,
- If guardrail systems are used around holes being used as access points (such as ladderways), gates will be used. Alternatively, the point of access will be offset to prevent Solar Landscape employees from accidentally walking straight into the hole,
- If guardrails are used on ramps and runways, they will be installed on each unprotected side or edge,
- Manila, plastic, or synthetic rope used for top rails or midrails will be inspected as frequently as necessary to ensure its strength and stability.

## ACTIVE FALL RESTRAINTS

Solar Landscape recognizes a fall restraint system as a means of fall prevention. The system tethers a Solar Landscape employee in a manner that will not allow a fall of any distance. This system is comprised of a full body harness, an anchorage, connectors, and other necessary equipment. Other components typically include a lanyard, a lifeline, and other devices. For a restraint system to work, the anchorage will be strong enough to prevent the Solar Landscape employee from moving past the point where the system is fully extended, including an appropriate safety factor.

At a minimum, Solar Landscape requires a fall restraint system that has the capacity to withstand at least three thousand (3,000) pounds or twice the maximum expected force that is needed to restrain the person from exposure to the fall hazard.

## PERSONAL FALL ARREST SYSTEMS-PFAS

A PFAS is a system used to safely stop or arrest a Solar Landscape employee who is falling from a working level. It consists of an anchorage, connectors, and a full-body harness. It also will include a lanyard, deceleration device, lifeline, or suitable combinations of all of these.

**NOTE:** *Body belts (safety belts) are prohibited for use as part of a PFAS and may only be used for positioning and never to be used for fall arrest.*

When Solar Landscape determines it appropriate to use a PFAS as a means of employee fall protection they will be sure to:

- Limit the maximum arrest force on a Solar Landscape employee to eighteen hundred (1,800) pounds when used with a full body harness,

- Be rigged so that a Solar Landscape employee can neither free fall more than six (6) feet nor contact any lower level,
- Bring a Solar Landscape employee to a complete stop and limit the maximum deceleration distance a Solar Landscape employee travels to three and a half (3.5) feet,
- Inspect equipment prior to each use for wear, damage, and other deterioration,
- Remove defective components from service and destroy or discard.

## PERSONAL FALL ARREST SYSTEM COMPONENTS

### Snap Hooks

Snap hooks will be the locking type and designed and used to prevent disengagement from any component part of the PFAS. Unless the snap hook is a locking type and designed for the following connections, snaphooks will not be engaged:

- Directly to webbing, rope, or wire rope,
- To each other,
- To a Dee-ring to which another snaphook or other connector is attached,
- To a horizontal lifeline, or
- To any object which is incompatibly shaped or dimensioned in relation to the snaphook, such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

### Horizontal Lifelines

On suspended type work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline will be capable of locking in both directions on the lifeline.

Horizontal lifelines will be designed, installed, and used under the supervision of a Qualified Person, as part of a complete PFAS that maintains a safety factor of at least two (2).

### Vertical Lifelines and Lanyards

Vertical lifelines and lanyards will have a minimum breaking strength of five thousand (5,000) pounds. Lifelines will be protected against being cut or abraded.

### Self-Retracting Lifelines and Lanyards

Self-retracting lifelines and lanyards that automatically limit free fall distance to two (2) feet or less will be

capable of sustaining a minimum tensile load of three thousand (3,000) pounds applied to the device with the lifeline or lanyard in the fully extended position.

Self-retracting lifelines and lanyards which do not limit free fall distance to two (2) feet or less, rip-stitch lanyards, and tearing and deforming lanyards will be capable of sustaining a minimum tensile load of five thousand (5,000) pounds applied to the device with the lifeline or lanyard in the fully extended position.

## Ropes and Straps

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses will be made of synthetic fibers.

## Anchorage

During solar panel installation activities, Solar Landscape may install anchorages. These anchorages will be left in place so that Solar Landscape employees conducting future maintenance operations will be able to re-use the anchorage points. Anchorages used to attach PFASs will be designed, installed, and used under the supervision of a qualified person, as part of a complete PFAS which maintains a safety factor of at least two (2). Alternatively, the anchorages will be independent of any anchorage being used to support or suspend platforms and will be capable of supporting at least five thousand (5,000) pounds per Solar Landscape employee attached or be capable of supporting at least twice the expected impact load.

# EQUIPMENT INSPECTION

Solar Landscape employees must inspect the entire PFAS prior to every use. The Competent Person will inspect the entire system in use at the initial installation and weekly thereafter. The visual inspection of a PFAS must follow the manufacturer's recommendations. Any components of a personal fall arrest system noted to be damaged must be removed from service immediately.

## Webbing

Inspect the entire surface of webbing for damage. Beginning at one end, bend the webbing in an inverted "U". Holding the body side of the belt toward you, grasp the belt with your hands six to eight inches apart. This surface tension makes the damaged fibers or cuts easier to see. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.

## Dee-Rings/Back Pads

Check Dee-ring rings for distortion, cracks, breaks, and rough or sharp edges. The Dee-ring should pivot

freely. Dee-ring ring back pads should also be inspected for damage.

## Attachment of Buckles

Note any unusual wear, frayed, or cut fiber, or distortion of the buckles.

## Tongue/Grommet

The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted, or broken grommets. The webbing should not have any additional punched holes.

## Tongue Buckle

Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. The roller should turn freely on the frame. Check for distortion or sharp edges.

## Friction and Mating Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Corners and attachment points of the center bar typically wear much faster.

## Snaps

Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should sit into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.

## Thimbles

The thimble must be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.

## Web Lanyard

While bending the webbing over a curved surface such as a pipe, observe each side of the webbed

lanyard. This will reveal any cuts or breaks. Examine the webbing for swelling, discoloration, cracks, or burns. Observe for any breaks in the stitching.

## Rope Lanyard

Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Weakened areas from extreme loads will appear as a noticeable change from the original diameter. The rope diameter should be uniform throughout, following a short break-in period. Make sure the rope has no knots tied in it. Knots can reduce the strength of the rope by up to sixty percent (60%).

## Shock-Absorbing Lanyard

Shock-absorbing lanyards should be examined as web lanyards. However, look for signs of deployment. If the lanyard shows signs of having been put under load or stressed, remove it from service.

## Self-Retracting Lanyard/Lifeline

- The lanyard housing must be inspected to ensure that casing bolts are tight and that there are no loose fasteners, missing parts, cracks, or excessive wear or corrosion.
- Webbing must be inspected for cuts, nicks, or tears as well as for any broken fibers, stitching, or fraying.
- Steel lanyards should be inspected for cuts, fraying, broken wires, and overall deterioration and excessive wear.
- Fittings are to be inspected for wear or cracks and obvious damage.
- Follow manufacturer's recommendations for additional inspection tasks and for any requirements that would require the unit be sent to the manufacturer for periodic inspection.

## STORAGE OF FALL PROTECTION EQUIPMENT

Fall protection equipment must be appropriately stored to prevent damage or aging of material. Full body harnesses must be stored away from direct sunlight and heat, hanging, flat or neatly folded to prevent unnecessary wear and must be kept dry and away from temperature extremes. Dirty harnesses should be cleaned immediately and dried before storage, following the manufacturer's instructions.

## WARNING LINE SYSTEM

A warning line is erected around all sides of roof work areas, six (6) feet from the roof edge (with mechanical equipment use the perpendicular distance is ten (10) feet. The warning line is installed parallel to the leading edge.

Rope, wire, or chain is within thirty-four (34) to thirty-nine (39) inches from the walking surface and is flagged



at six (6) foot intervals with a highly visible material,

Rope, wire, or chain has a tensile strength of at least five hundred (500) pounds Stanchions that can resist sixteen (16) pounds horizontal, outward force at the to, and

The line is erected in such a way that pulling on one section will not result in slack being taken up in adjacent sections before the stanchion tips over.

## CONTROLLED ACCESS ZONES

Controlled Access Zones are an area at the work site where work may take place without the use of a guardrail system, PFAS, or safety net system, and access to the zone is controlled.

A controlled access zone will most typically be used for jobs requiring workers to be on a leading edge.

The Controlled Access Zone is an area of the work site that is only accessible to some Solar Landscape employees. Employees who are not approved by the supervisor to be in that area are prohibited from entering.

A Safety Monitor must be present to monitor the area and the Solar Landscape employee(s) going in and out and to ensure that proper safety precautions are being followed. One type of controlled access zone would be a guardrail system that has a gate. The guardrail is used to control the area and block non-essential employees from entering. A Safety Monitor supervises the area and controls who is allowed through the gate.

**NOTE:** *Because of the increased degree of danger posed to workers, a controlled access zone is only used as a last resort on very specific types of job sites.*

## Controlled Access Zone Checklist

Safety requirements for controlled access zones include:

- The Safety Monitor must be a competent individual who does not have conflicting responsibilities on the job site. The monitor must always have a clear line of vision of the Solar Landscape employees and be prepared to quickly identify hazards and warn an employee when a hazard presents itself, or if the employee is acting unsafely,
- Defining the area clearly and ensuring that appropriate signage is posted to prevent unauthorized personnel from entering,
- Ensure that only authorized Solar Landscape employees are allowed to enter the work area,
- Each employee working in a controlled access zone must be directed by a competent Safety Monitor,
- Solar Landscape employees working in a controlled access zone must respond quickly to any warnings or promptings by the Safety Monitor,
- Control lines must be erected at a minimum distance of six (6) feet and a maximum distance of twenty-five (25) feet from the leading edge,

- Control lines must be marked out clearly and made highly visible at intervals of six (6) feet or less,
- The lowest point (including sagging) must be at least thirty-nine (39) inches above the working area and no higher than forty-five (45) inches,
- Control lines are required to withstand at least two hundred (200) pounds of weight.

## Controlled Access Zone Vs Warning Line

A warning line system is any type of barrier set up on a rooftop that warns workers of an unprotected edge. This also designates a working area that does not require Solar Landscape employees to use guardrails, belts, or safety net systems.

Warning line systems are used differently from controlled access zones, including:

- Warning line systems are installed around all edges of a roof, where a controlled access zone is limited to one specific area of a job site,
- The rope, chain or wire used in the warning line system must have a minimum tensile strength of five hundred (500) pounds, as opposed to the three hundred (300) pounds required for controlled access zones, and
- Warning line systems are generally installed to protect all workers on a job site, where a controlled access zone is used to control which employees have access to specific areas on a work site.

## LADDERS

Both fixed and portable type ladders may be used at a Solar Landscape work site.

Ladders must be capable of supporting their maximum intended load, while mobile ladder stands and platforms must be capable of supporting four (4) times their maximum intended load.

### Fixed Ladders

Fixed ladders are permanently attached to a structure, building, or equipment. These include individual-rung ladders, but not ship stairs, step bolts, or manhole steps.

### Portable Ladders

Portable ladders usually consist of side rails joined at intervals by steps, rungs, or cleats. They can be self-supporting or lean against a supporting structure.

Warehouses that have walls higher than eight (8) feet and where the use of ladders would create a greater hazard, safe working procedures will be utilized when working on the leading edge and will be monitored by the Safety Monitor. During all stages of solar panel framing/bracing erection the Safety Monitor must

confirm the stability of the solar panel framing/bracing throughout the project.

Solar Landscape will take the following steps to protect Solar Landscape employees who are exposed to fall hazards while working from the leading edge installing solar panel framing/bracing. The following requirements will be followed:

- Only wooden ladders or ladders made of other synthetic materials must be used where an electrical hazard exists,
- All ladders must be inspected daily before use,
- Ladders must be stored in such a way as to prevent damage from sagging, weather conditions, excessive heat, etc.,
- If a ladder is found to be damaged and is deemed unsafe, it must be tagged "**Out of Service**", made inoperable, or removed from the jobsite,
- Ladders must not be left unattended in the upright position and should be removed once the worker has ascended the ladder,
- When setting up a portable ladder, be sure to set the ladder at the proper angle to the building (usually about twenty-five (25) percent (%) of the ladder's vertical height or a ratio of four (4) to one (1),
- Never lean a ladder against cables or wires of any type,
- Use the help of another worker to extend the ladder to the proper height and positioning,
- Ensure locks are secure,
- When a climber/employee is ascending the ladder, another worker should be used to stabilize the ladder by holding the sides and supporting the feet of the ladder,
- The climber/employee should use the three-point method when climbing a ladder. This means that two (2) hands and one foot or two (2) feet and one (1) hand should be always in contact with the ladder during the climb,
- Never carry tools up the ladder in one hand. Always use two hands to climb,
- Never climb a ladder from the side or underside, and
- Never walk or shift a ladder while standing on it.

## Ladder Inspection

To prevent injuries and fatalities caused by ladders Solar Landscape has established a specific Ladder Safety Policy that details the requirements for ladder selection, inspection, and use. This section outlines the Solar Landscape ladder inspection process that identifies and addresses ladder safety and regulatory compliance.

## Ladder Safety Inspections

Solar Landscape conducts two (2) types of ladder inspections:

- Routine, and
- Daily.

If a hazardous condition, defect, or noncompliant ladder is discovered by a Solar Landscape employee not

only during an inspection, but the problem also/issue must be reported immediately to the EHS Director, and the Repair and/or Modification section of the Solar Landscape Ladder Safety Plan will be followed. All ladder inspection records are submitted and maintained as specified under the Recordkeeping section of the Solar Landscape Ladder Safety Plan.

The EHS Director or designee will conduct the ladder inspections to ensure that Solar Landscape ladders are in a safe working condition. These inspections will be conducted:

- Before a ladder is placed into service,
- As necessary, based on amount of use and environmental conditions, and
- Circumstances, or events occur that warrant an additional check of the ladder(s) to ensure that they are safe for Solar Landscape employees to use.

An example of the Solar Landscape ladder inspection documentation found in the Solar Landscape Ladder Safety Policy:

### LADDER INSPECTION LOG

INSPECTION CATEGORY	LADDER TYPE	LADDER IDENTIFICATION	INSPECTION ITEMS:

## ROOF SHEATHING OPERATIONS

Solar Landscape employees typically install roof sheathing before the solar panel framing/bracing and any solar panel bracing is in place. Roof structures may be unstable until some sheathing is installed, so Solar Landscape employees installing roof sheathing cannot be protected from fall hazards by conventional methods until it is determined that the roofing system can be used as an anchorage point. At that point, employees will be protected by a PFAS.

All Solar Landscape employees will ensure that they have secure footing before they attempt to walk on the sheathing, including cleaning shoes/boots of mud or other slip hazards.

To minimize the time Solar Landscape employees will be exposed to a fall hazard, sheathing materials will be staged to allow for the quickest installation of sheathing.

Solar Landscape will take the following steps to protect Solar Landscape employees who are exposed to fall hazards while installing any type of roof sheathing material:



- Materials for the operations will be conveniently staged to allow for easy access to Solar Landscape employees,
- Once roof sheathing installation begins, Solar Landscape employees not involved in that activity will not stand or walk below or adjacent to the roof opening or exterior walls in any area where they could be struck by falling objects,
- The Competent Person will determine the limits of this area, which will be clearly communicated to Solar Landscape employees prior to placement of the first piece of roof sheathing,
- The Competent Person may order work on the roof to be suspended for brief periods as necessary to allow other Solar Landscape employees to pass through such areas when this would not create a greater hazard,
- Solar Landscape employees positioned on previously installed rows of sheathing may install additional rows of roof sheathing. A slide guard can be used to assist Solar Landscape employees in retaining their footing during successive sheathing operations,
- Additional slide guards will be securely attached to the roof at intervals not to exceed thirteen (13) feet as successive rows of sheathing are installed,
- When wet weather (rain, snow, or sleet) are present, roof-sheathing operations will be suspended unless safe footing can be assured for those Solar Landscape employees installing sheathing,
- When strong winds greater than forty (40) miles per hour are present, roof-sheathing operations are to be suspended unless windbreakers are installed.

## STAIRWAYS

The rules covering stairways and their components generally depend on how and when stairs are used. Specifically, there are rules for stairs used during solar panel installations and stairs used temporarily during the construction, as well as rules governing stair rails and handrails.

The following requirements apply to all stairways used during the solar panel installation operations:

- Stairways that will not be a permanent part of the building will have landings at least thirty (30) inches deep and twenty-two (22) inches wide at every twelve (12) feet or less of vertical rise,
- Stairways will be installed at least thirty (30) degrees and no more than fifty (50) degrees from the horizontal,
- Variations in riser height or stair tread depth will not exceed one-quarter (1/4) inch in any stairway system, including any foundation structure used as one or more treads of the stairs,
- Doors and gates opening directly onto a stairway will have a platform that extends at least twenty (20) inches beyond the swing of the door or gate,
- Metal pan landings and metal pan treads will be secured in place before filling,
- Stairway parts will be free of dangerous projections such as protruding nails,
- Slippery conditions on stairways will be corrected, and
- Solar Landscape employees will not use spiral stairways that are not a permanent part of the structure.

## TEMPORARY STAIRS

The following requirements apply to stairways used temporarily during construction.

- Solar Landscape employees will not be allowed to use stairways with metal pan landings and treads if the treads and/or landings have not been filled in with concrete or other materials unless the pans of the stairs and/or landings are temporarily filled in with wood or other materials. All treads and landings will be replaced when worn below the top edge of the pan.
- Solar Landscape employees will not be allowed to use skeleton metal frame structures and steps (where treads and/or landings will be installed later) unless the stairs are fitted with secured temporary treads and landings.

**NOTE:** *Temporary treads will be made of wood (or other solid material) and installed to the full width and depth of the step.*

## STAIR RAILS

The following general requirements apply to all stair rails:

- Stairways with four (4) or more risers or rising more than thirty (30) inches in height whichever is less will be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge will be no more than thirty-seven (37) inches or less than thirty-six (36) inches from the upper surface of the stair rail to the surface of the tread,
- The top edges of stair rail systems used as handrails will not be more than thirty-seven (37) inches high nor less than thirty-six (36) inches from the upper surface of the stair rail system to the surface of the tread,
- Stair rail systems and handrails will be surfaced to prevent injuries such as punctures or lacerations and to keep clothing from snagging,
- Ends of stair rail systems and handrails will be built to prevent dangerous projections, such as rails protruding beyond the end posts of the system. In addition,
- Unprotected sides and edges of stairway landings will have standard forty-two (42) inch guardrail systems,
- Intermediate vertical members, such as balusters used as guardrails, will not be more than nineteen (19) inches apart,
- Other intermediate structural members, when used, will be installed so that no openings are more than nineteen (19) inches wide,
- Screens or mesh, when used, will extend from the top rail to the stairway step and along the opening between top rail supports.

## HANDRAILS

Requirements for handrails are:

- Handrails and top rails of the stair rail systems must be able to withstand, without failure, at least two hundred (200) pounds of weight applied within two (2) inches of the top edge in any downward or outward direction, at any point along the top edge,
- Handrails will not be more than thirty-seven (37) inches high or less than thirty (30) inches from the upper surface of the handrail to the surface of the tread,

- Handrails will provide an adequate handhold for employees to grasp to prevent falls,
- Temporary handrails will have a minimum clearance of three (3) inches between the handrail and walls, stair rail systems and other objects,
- Stairways with four (4) or more risers or that rise more than thirty (30) inches in height– whichever is less– will have at least one handrail,
- Winding or spiral stairways will have a handrail to prevent use of areas where the tread width is less than six (6) inches.

## MIDRAILS

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members will be provided between the top rail and stairway steps to the stair rail system. When midrails are used, they will be located midway between the top of the stair rail system and the stairway steps.

## AERIAL LIFTS

Aerial Lifts are any powered, mobile, vehicle-mounted device that may elevate, telescopically extend, articulate that may or may not rotate around a substantial axis to raise and support Solar Landscape employees to elevated work locations. Aerial lifts include:

- Extendible boom platforms,
- Vehicle-mounted aerial ladders,
- Articulating, rotating boom platforms,
- Vertical self-elevating towers,
- Cherry pickers, and
- Bucket trucks.

Solar Landscape follows the OSHA fall protection requirements for aerial lift s that includes:

- *Fall protection or fall arrest systems:* Each employee more than ten (10) feet above a lower level will be protected from falls by guardrails or a PFAS.
- *Guardrail height:* The height of the toprail for aerial lifts manufactured and placed in service after January 1, 2000, will be between thirty-eight (38) inches and forty-five (45) inches. The height of the toprail for aerial lifts manufactured and placed in service before January 1, 2000, can be between thirty-six (36) inches and forty-five (45) inches.
- *Crossbracing:* When the crosspoint of crossbracing is used as a toprail, it will be between thirty-eight (38) inches and forty-eight (48) inches above the work platform.
- *Midrails:* Midrails will be installed approximately halfway between the toprail and the aerial lift platform surface. When a crosspoint of crossbracing is used as a midrail, it will be between twenty (20) inches and thirty (30) inches above the aerial lift work platform.

## Pre-Use Lift Inspection

- Every aerial lift must have a pre-use inspection prior to use on each shift. Aerial/scissor lifts not used during a shift do not have to undergo an inspection during that shift,
- Pre-use inspections must be documented using an appropriate checklist for the aerial lift,

**NOTE:** Refer to the manufacturer's inspection requirements for complete inspection details.

- Completed checklists will be kept on file for a period of one (1) year,
- The pre-use inspection will identify conditions that could affect the safe use of the aerial lifts. If any unsafe conditions exist, the aerial lift must be removed from service. To remove an aerial lift from service, the operator must remove the keys and place an "Out of Service" tag near the operator control panel,
- Operators must immediately report any unsafe aerial lift conditions to their supervisor or the EHS Director. When an aerial lift has been removed from service, the operator must give the keys to the supervisor for safekeeping. The supervisor is then responsible for ensuring the necessary arrangements are made for repair,
- Only authorized personnel are allowed to perform aerial lift repairs and adjustments. All replacement parts must be the same design as the original or an equivalent design as designated by the manufacturer.

## Aerial Lift Training

All Solar Landscape employees who operate aerial lifts are required to be trained before operating aerial lifts. The trained employees are qualified to only use lifts to the rated capacity of the equipment for which they are trained and evaluated. All operations must be done safely and in accordance with the work practices and lift manufacturer guidelines.

## FALLING OBJECT PROTECTION

To protect employees from falling hand tools, debris, and other small objects, toeboards, screens, guardrail systems, debris nets, catch platforms, canopy structures, or barricades will be installed or put in place. In addition, employees are required to wear American National Safety Institute (ANSI) approved hard hats, always, when working at a solar panel installation work site.

## WALKING WORKING SURFACES / HAZARDS

### Floor Holes

Employees must be protected from tripping or falling into holes by installing ridged hole covers over the open holes, and the covers must be used on holes greater than two (2) inches in diameter or greater.



The cover must be capable of supporting at least a two hundred (200) pound load, be larger than the opening, secured against displacement, and labeled "Floor Opening, Do Not Remove".

If the hole must be open, install permanent barricades around the perimeter. Like railings around the edge of a building or stairwell, these should be a minimum of forty-two (42) inches high, have a mid-rail and be capable of withstanding a two hundred (200) pound load.

## Skylights

Skylights are considered an opening when present on a roof. A standard guardrail or skylight screen capable of supporting at least two hundred (200) pounds must be provided around the opening to prevent Solar Landscape employees from falling through to the surface below.

## RESCUE PROGRAMS AND EQUIPMENT

An employee cannot stay suspended for long in a PFAS and are at risk of reduced blood flow, oxygen deprivation, brain damage, cardiac arrest, and death. The American National Standards Institute (ANSI) Standard Z359, requires that a rescue should be completed within six (6) minutes of a fall arrest. All Solar Landscape employees using PFAS will be monitored and promptly rescued in the event of a fall. In addition to rescue equipment available onsite, use of self-rescue devices may be used. Fall arrest rescue equipment that may be available onsite when a PFAS is in use will include:

- Ladders,
- Rescue poles, Carabiner clip
- Rescue ropes,
- Rescue winch,
- Cranes,
- Aerial lifts, and
- Lifting or lowering device.

## ENFORCEMENT

Constant awareness and respect for fall hazards, and compliance with all safety rules are considered conditions of employment at Solar Landscape. The crew supervisor or foreman, as well as individuals are responsible for safety and personnel, reserve the right to issue disciplinary warnings to Solar Landscape employees, up to and including termination, for failure to follow the guidelines of this program.

## INCIDENT INVESTIGATIONS

All incidents that result in injury to Solar Landscape employees, regardless of their nature, will be investigated and reported. It is an integral part of any safety program that documentation takes place as soon as possible so that the cause and means of prevention can be identified to prevent a reoccurrence.

A Worksite Incident Form is provided in the Solar Landscape Emergency Action Plan. The Incident form is to be completed and used to initiate an incident investigation with the goal of taking corrective actions to prevent future occurrences.

If a Solar Landscape employee falls or there is some other related, serious incident occurring, this Fall Protection program will be reviewed to determine if additional practices, procedures, or training need to be implemented to prevent similar types of falls or incidents from occurring.

## CHANGES TO FALL PROTECTION PROGRAM

The EHS Director reviews, makes any changes, and approves this Fall Protection Program. The EHS Director or designated Qualified Person may also assist in the review of this program as the job progresses to determine if the Competent Person must implement additional practices, procedures, or training to improve or provide additional fall protection. Solar Landscape employees will be notified and trained, if necessary, in the new procedures. A copy of this program and all approved changes will be always maintained at the jobsite along with a copy of the completed and approved Site-Specific Fall Protection Template.

## DEFINITIONS

The following definitions are related to fall protection:

**Anchorage:** a secure point of attachment for lifelines, lanyards, or deceleration devices.

**Body belt (safety belt):** a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

**NOTE:** OSHA prohibits the use of a body belt as part of a PFAS.

**EXCEPTION:** when used correctly, body belts are recognized by OSHA as an acceptable fall protection component when used as a part of a restraining device that prevents a fall or a positioning device that limits a free fall to two (2) feet.

**Body harness:** straps that may be secured about the Solar Landscape employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with means for attaching it to other components of a PFAS.

**Buckle:** any device for holding the body belt or full body harness closed around the Solar Landscape employee 's body.

**Carabiner:** a metal device that consists of a d-shaped metal frame, about the size of your palm, with one side that opens using a spring-loaded mechanism called a springlock. Carabiners are used to clip ropes or lanyards to harnesses or other certified hooks.

**Competent person:** one who can identify existing and predictable hazards in the surroundings or working

conditions which are unsanitary, hazardous, or dangerous to Solar Landscape employees, and who has authorization to take prompt corrective measures to eliminate them.

**Connector:** a device which is used to couple (connect) parts of the PFAS and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or “d” ring sewn into a body belt or full body harness, or a snaphook spliced or sewn to a lanyard or self-retracting lanyard).

**Controlled access zone (CAZ):** an area in which certain work (for example, overhand bricklaying) may take place without the use of guardrail systems, PFAS, or safety net systems; and where access to the zone is controlled.

**Deceleration device:** any mechanism (such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc.) which serves to dissipate a substantial amount of energy during fall arrest, or otherwise limit the energy imposed on a Solar Landscape employee during fall arrest.

**Deceleration distance:** the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of a Solar Landscape employee’s body belt or full body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the Solar Landscape employee comes to a full stop.

**Equivalent:** alternative designs, materials, or methods to protect against a hazard, which Solar Landscape can demonstrate will provide an equal or greater degree of safety for Solar Landscape employees than the methods, materials, or designs specified in the standard.

**Failure:** load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

**Free fall:** the act of falling before a PFAS begins to apply force to arrest the fall.

**Free fall distance:** the vertical displacement of the fall arrest attachment point(s) on the Solar Landscape employee’s body belt or full body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance and lifeline/lanyard elongation but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

**Guardrail system:** a barrier installed to prevent Solar Landscape employees from falling to lower levels.

**Hole:** a gap or void two (2) inches or more in its least dimension, in a floor, roof, or other walking or working surface.

**Infeasible:** impossible to perform the construction work using a conventional fall protection system (that is,

guardrail system, safety net system, or PFAS); or technologically impossible to use any one of these systems to provide fall protection.

**Lanyard:** a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or full body harness to a deceleration device, lifeline, or anchorage.

**Leading edge:** the edge of a floor, roof, or formwork for a floor or other walking or working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is an “unprotected side and edge” during periods when it is not actively and continuously under construction.

**Lifeline:** a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a pfas to the anchorage.

**Low-slope roof:** a roof having a slope less than or equal to a four (4) in twelve (12) (vertical to horizontal).

**Lower levels:** those areas or surfaces to which a Solar Landscape employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

**Mechanical equipment:** all motor- or human-propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

**Opening:** a gap or void thirty (30) inches or higher and eighteen (18) inches or wider, in a wall or partition, through which Solar Landscape employees can fall to a lower level.

**Personal fall arrest system (PFAS):** a system used to arrest a Solar Landscape employee in a fall from a working level. It consists of an anchorage, connectors, and a full body harness. It may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

**Positioning device system:** a body belt or full body harness system rigged to allow a Solar Landscape employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

**Qualified:** one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project.

**Roof:** the exterior surface on the top of a building. This does not include floors or formwork, which, because a building has not been completed, temporarily become the top surface of a building.

**Roofing work:** the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

**Safety-monitoring system:** a safety system in which a competent person is responsible for recognizing and warning Solar Landscape employees of fall hazards.

**Self-retracting lifeline/lanyard:** a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal Solar Landscape employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

**Snaphook:** a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap hooks are generally one of two types: the locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or the non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection.

**Steep roof:** a roof having a slope greater than four (4) in twelve (12) (vertical to horizontal).

**Toeboard:** a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide Solar Landscape employees protection from falls.

**Unprotected sides and edge:** any side or edge (except at entrances to points of access) of a walking or working surface (for example, floor, roof, ramp, or runway) where there is no wall or guardrail system at least thirty-nine (39) inches high.

**Walking or working surface:** any surface (whether horizontal or vertical) on which a Solar Landscape employee walks or works, including but not limited to floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel; but not including ladders, vehicles, or trailers, on which Solar Landscape employees will be located in order to perform their job duties.

**Warning line system:** a barrier installed on a roof to warn Solar Landscape employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, full body harness, or safety net systems to protect Solar Landscape employees in the area.

**Work area:** that portion of a walking or working surface where job duties are being performed.



# APPENDIX A



**SITE-SPECIFIC - FALL PROTECTION TEMPLATE**

<b>Site address:</b>		<b>Start date:</b>
<b>Site description:</b>	<b>Employer:</b>	
<b>Work area:</b>		
<b>Tasks:</b>		

**Site-specific Fall Protection**

<b>Max. height - Task 1:</b>	<b>Max. height - Task 2:</b>	<b>Max. height (other):</b>
<b>Roof slope(s), if applicable:</b>		
<b>Proximity to high voltage power lines:</b>		
<b>Ground hazards:</b>		
<b>Other/comments:</b>		

**Type of Fall Protection**

<b>Fall restraint</b> <input type="checkbox"/>	<b>Personal Fall Arrest System</b> <input type="checkbox"/>	<b>Temporary guardrail system</b> <input type="checkbox"/>
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**Other**





**Equipment Inspection and Personal Protective Equipment**

SAFETY ITEM	CONDITION / COMMENT
Full Body Harness	
Vertical lifelines	
Lanyards	
Rope grabs	
Anchors	
Ladder(s)	
Ladder hoist	
Toeboards	





Prior to accessing the Solar Landscape solar panel installation work Site, ensure the following items (Checked off) have been inspected and are ready for mobilization.

ITEMS	COMMENTS
<input type="checkbox"/> First Aid/CPR [AED] personnel onsite	
<input type="checkbox"/> Personal Protective Equipment (PPE)	
<input type="checkbox"/> Job Briefing Conducted	
<input type="checkbox"/> Rescue Process - Identified	
<input type="checkbox"/> Electric Shock Protocol - Reviewed	
<input type="checkbox"/> Grounding Protocol - Reviewed	

**Site Diagram**

**Ladder(s)**

- Ladders inspected daily and before use,
- Ladders set up on a firm, level base,
- Extension ladder(s) – Extends approximately three (3) feet past top edge of roof, and



- Follow Solar Landscape Ladder Safety Program

**Aerial Lifts**

- Aerial lift(s) has a pre-use inspection prior to use on each shift,
- Pre-use inspections are documented for each aerial lift using an appropriate checklist,

NOTE: Refer to the manufacture’s inspection requirements for complete inspection details.

- Completed checklists archived by the EHS Director,
- Any unsafe aerial lift condition reported to the supervisor or EHS Director, and
- Solar Landscape employees trained on each specific aerial lift.

**Personal Fall Arrest System Assembly/Installation Procedures**

**Rescue Procedures for a Fallen Worker**





**Solar Landscape LLC Employee Acknowledgement**

I acknowledge that I have reviewed the fall protection requirements and procedures for this site-specific solar panel installation work site with my supervisor and understand my responsibilities, specifically the requirements of this Site-Specific Fall Protection Template.

NAME (Please print)	Signature	Date
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

**Site Specific Fall Protection Template – Approvals**

Supervisor \_\_\_\_\_ EHS Director \_\_\_\_\_





Signature \_\_\_\_\_ Signature \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_



## PURPOSE

This program is intended to assist managers, supervisors and Solar Landscape LLC employees in the safe work practices associated with open trenches and excavations while installing electrical utilities and conduits to roof top solar panels.

## SCOPE

This program describes the practices required for trenches or excavations with a depth of four feet or greater along any portion of its length that will be entered by Solar Landscape or subcontractors. Solar Landscape excavations or trenches average a depth of two (2) feet for the installation of electrical conduit, however if a trench or excavation should reach four (4) feet or greater in depth, the trench or excavation will be appropriately benched, shored, or sloped according to the procedures and requirements of the Occupational Safety and Health Administration (OSHA) and this Solar Landscape Trench and Excavation Program.

## POLICY STATEMENT

Solar Landscape is committed to providing a safe and healthy environment in which its employees and subcontractors work. Solar Landscape has developed this program, which is intended to reduce jobsite injuries and losses associated with trenching and excavation activities.

## ROLES AND RESPONSIBILITIES

### Solar Landscape, LLC

The Solar Landscape management team is responsible for ensuring that trenching and excavation hazards are identified and eliminated or controlled every existing or new excavation and trenching hazard in the workplace environment. The management team must also:

- Develop and maintain written excavation and trenching procedures,
- Establish and implement a procedure to identify and eliminate or control new and existing excavation and trenching hazards,
- Inform each Solar Landscape employee about any excavation and trenching hazard before the employee is exposed to the hazard,
- Provide the necessary personal protective equipment (PPE) for all authorized employees when they are working in excavations and trenches,
- Provide all Solar Landscape employees with the knowledge and training necessary to evaluate, identify, and control their exposure to excavation and trenching hazards within the workplace environment, and
- Provide to all Solar Landscape employees, a copy of this Trench and Excavation Program so that they will have a reference of the requirements.

## Environmental Health and Safety (EHS) Director

The EHS Director is responsible for ensuring that this Trench and Excavation Safety Program is followed by all Solar Landscape employees and sub-contractors. The EHS Director will enforce the requirements of this program and review and evaluate the program as necessary to meet any regulatory or safety and health requirements to ensure the safety of Solar Landscape employees and sub-contractors including:

- The authority for the development, implementation, monitoring, and evaluation of this Excavation and Trenching Program,
- Working knowledge of current excavation and trenching regulations, standards, related personal protective equipment, inspection process, and soil classification,
- Advise and provide guidance to all Solar Landscape managers, employees, and sub-contractors on details pertaining to Solar Landscape's Trench and Excavation Safety Program,
- Establish and assign all duties and responsibilities outlined in this Program to individuals who are trained and authorized to perform them; and providing or verifying that these personnel are provided with the necessary resources to accomplish those duties and responsibilities,
- Provide or ensure provision of specific training for all employees and Competent Persons or verifying that those employees are provided with specific training as it relates to excavation and trenching,
- Participate in the investigation of all incidents related to excavation and trenching incidents, either personally or through persons qualified by reviewing incident reports; taking corrective action to eliminate causes; making necessary reports to management; and maintaining an incident report system,
- Measure and evaluate the effectiveness of this Trench and Excavation Program by conducting periodic program evaluations and making improvements accordingly.

## Managers

- Responsible and accountable for establishing, communicating, and enforcing the requirements and procedures in this program,
- Ensure the employees who are working on their projects have successfully completed the required training classes on excavation and trenching and the employees understand how to evaluate identify and control their exposures to the hazards associated with excavations and trenching.

## Supervisors

Solar Landscape supervisors have the primary responsibility for the implementation of this Trenching and Excavation Safety Program. Supervisors have the ultimate responsibility for the safety of Solar Landscape employees and the sub-contractors affected by the excavation. This includes:

- Evaluation of the work to be performed,
- Determination of the means of protection that will be used, and
- Adherence to the provisions of this policy as appropriate.

The supervisor must ensure daily, or more often as required, that site conditions are safe for Solar Landscape employees to work in excavations. The supervisor or EHS Director must designate a “Competent Person” as defined by OSHA and the following:

- Have a working knowledge of current excavation and trenching regulations, standards, related personal protective equipment, and inspection process and soil classification,
- Ensure all excavation and trenching hazards have been evaluated and identified before commencement of work activities,
- Establish and implement a procedure to identify and eliminate or control new and existing hazards as it applies to excavations and trenching,
- Inform the EHS Director of any unsafe or hazardous condition(s) or actions that may cause injury to either themselves or any sub-contractor before proceeding with their workplace activities,
- Participate in the investigation of all incidents related to excavation and trenching incidents,
- Ensure employees have successfully completed the required excavation and trenching training classes and understand how to evaluate, identify, and control their exposures to such hazards prior to the commencement of work,
- Ensure that a Job Safety Analysis (JSA) has been completed prior to the start of work and re-evaluate the JSA if work conditions deviate from the original scope of work.

## Employees

Solar Landscape employees have the primary responsibility for working in accordance with the provisions of this program. No Solar Landscape employee(s) will be allowed to enter an excavation meeting the scope of this Trench and excavation policy until authorized by the Competent Person and:

- Must attend a trenching and excavation training class provided by Solar Landscape and the employee must complete training before working in an excavation and/or trench,
- Have a working understanding of and follow Solar Landscape’s policies and procedures and the instructions of the EHS Director regarding trenches and excavations,
- Bring to the supervisor’s attention all unsafe or hazardous conditions or actions that may cause injury to either themselves, other employees, or any sub-contractor before proceeding with their workplace activities,
- Enter the trench or excavation only if it has been inspected as approved by the Competent Person.
- Must be responsible and accountable for their actions,
- Are responsible and accountable for adhering to all site-specific guidelines and applicable safety requirements posted at each site prior to performing any work. Failure to comply may result in disciplinary action up to and including possible termination of employment.

**NOTE: NEVER enter a trench or excavation in question.**

## TRAINING

Solar Landscape employee(s) that are required to dig or enter an excavation must attend, at a minimum, a trenching and excavation safety training. The training will be provided by the EHS Director and covers the

potential hazards encountered when working in and around excavations and the procedures that need to be followed to avoid these hazards.

Additional training is required for any Solar Landscape employee designated to be the Competent Person for a trenching and excavation job. The Competent person training covers the following areas in detail:

- Hazards related to excavation work,
- Work practices and selection of appropriate protective systems,
- Methods of evaluating soil and the work site,
- Inspection procedures,
- Specific requirements of the policy and of related policies, and
- Emergency procedures.

Both the designated Competent Person and any other employee involved in trenching and excavating activities shall attend relevant health and safety training at least every two years or more often if necessary due to an observed disregard of the noted safety procedures.

## PERMITS

A permit will be generated for each trench or excavation project/location and will be completed and approved by the EHS Director before digging operations are allowed to start. The purpose of the permit is to provide conditions/requirements that Solar Landscape will undertake as an effective means of ensuring that the work activity will be performed safely.

Solar Landscape must generate a permit, when construction of any trench or excavation 5 feet or deeper into which a person is required to descend. However, most work only requires Solar Landscape to excavate to a depth of approximately two (2) feet.

## Competent Person

OSHA defines an excavation competent person as someone who can identify existing or likely hazards in the work area and make sure working conditions are sanitary and safe. The competent person must:

- Be responsible for the immediate supervision, implementation, and monitoring of the excavation and trenching program. Physically be on site anytime an individual is in an excavation,
- Be knowledgeable through experience and training of applicable excavation and trenching regulations, standards,
- Be authorized by the EHS Director prior to the commencement of work,
- Conduct a JSA to identify all excavation and trenching hazards before authorized Solar Landscape employees are exposed to those hazards,
- Complete the daily trench and excavation inspection form before each work shift, and as needed,
- Have the authority to stop work immediately if it is determined that it is unsafe to proceed with the workplace activities.



## Frequency of Inspections

- Prior to start of work,
- As needed throughout shift,
- After rainstorms ,
- After other hazard increasing occurrences

Daily inspection conducted by the competent person will include the evaluation of:

- Evidence of possible cave-ins,
- Failure of protective systems,
- Hazardous atmospheres
- Other hazardous conditions

***NOTE: These inspections are only required when a Solar Landscape employee's exposure can be reasonably anticipated.***

The Competent Person must visually inspect the excavation according to the following guidelines:

- Samples of soil newly excavated and soil in sides of trench for range of particle size, relative amounts of particle size,
- Soil as it is being excavated for clumping and breaking,
- Sides of trench and adjacent areas for tension cracks,
- Adjacent areas for utility and other underground structures to identify previously disturbed soil.
- Sides of trench for layered soils,
- Sides and adjacent areas for evidence of water,
- Adjacent areas for sources of vibration,
- Inspect the excavations, adjacent areas, and protective systems daily, (prior to the start of work and before anyone goes in the excavation) as needed throughout the shift, and after every rainstorm or other hazard-increasing occurrence,
- Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees must be removed from the hazardous area until the necessary precautions have been taken to ensure their safety,
- Remove Solar Landscape employees from any noted hazard until necessary precautions or any corrective actions have been taken,
- Examine materials and equipment for continued use and remove from service if unusable or unsafe.
- Reduce soil slope below maximum allowable slope if surcharge loads (loads created by the weight of spoil pile, material storage and equipment close to the excavation) are present,
- Test for hazardous atmospheres when such atmospheres exist or are reasonably likely to exist,
- Inspect material or equipment if damaged to determine if it is usable,
- Monitor water removal equipment and operations,
- Review procedures as workplace activities change to determine if additional practices, procedures, or training need to be implemented before workplace activities continue.

## Initial Training

Training for Competent Person(s) will include demonstrations by the EHS Director on how to evaluate, identify, and control hazards associated with excavations and trenches, the proper use of protective systems, soil classification, as well as how to properly inspect trenches and excavations. Competent person training will include the following information:

- Hazard elimination and controls methods,
- Applicable excavation and trenching regulations,
- Hazard assessments and excavation and trenching procedures,
- Selection of protective systems,
- Soil classification,
- Determining when fall protection systems are needed.

## Retraining

- Retraining is required in at least the following situations if the Project Manager, Supervisor, or the EHS Director has reason to believe that a Solar Landscape employee lacks the skill or understanding needed for safe work in and among trenches and excavations,
- Where changes at the worksite present a hazard about which a Solar Landscape employee has not been previously trained,
- Where changes in the types of trenches and excavations, or other equipment present a hazard about which an employee has not been previously trained,
- Where inadequacies in the affected employee's work involving trenches and excavations indicate that the employee has not retained the requisite proficiency.

## Surface Encumbrance

All surface encumbrances that are located to create a hazard to employees must be removed or supported, as necessary, to safeguard employees.

## Subsurface Installation Identification

**CALL BEFORE YOU DIG! Underground utilities must be located and marked before trench or excavation work can begin.**

The approximate location of subsurface installations, such as sewer, telephone, fuel, etc. must be determined prior to excavation. Solar Landscape will contract a third-party surveillance company to conduct Ground Penetrating Radar (GPR) surveys prior to the start of any work.

The trench or excavation must not commence until the area has been marked and the excavator has received a positive response from all known owners of subsurface installations within the boundaries of the proposed project those responses must confirm that the owners have located their installations, and those responses either advise the excavator of those locations or advise the excavator that the owner does not operate a subsurface installation that would be affected by the proposed excavation.

When the excavation is proposed within ten (10) feet of a high priority subsurface installation, the excavator must be notified by the facility owner of the existence of the high priority subsurface installation before the legal excavation start date, and an onsite meeting involving the excavator and the subsurface installation owner's representative must be scheduled by the excavator and the owner at a mutually agreed on time to determine the action or activities required to verify the location of such installations. High priority subsurface installations are high pressure natural gas pipelines with normal operation pressures greater than four hundred fifteen (415) kilopascal (kPA) gauge sixty (60) pounds per inch gauge (PSIG) petroleum pipelines, pressurized sewage pipelines, conductors or cable that have a potential to ground of sixty thousand (60,000) volts or more, or hazardous materials pipelines that are potentially hazardous to Solar Landscape employees, or the sub-contractor, if damaged.

Only qualified persons may perform subsurface installation locating activities, and all such activities must be performed in accordance with this section.

Employees who are involved in the excavation operation and exposed to excavation operation hazards must be trained in the excavator notification and excavation procedures.

When excavation or boring operations approach the approximate location of subsurface installations, the exact location of the installations must be determined by safe and acceptable means that will prevent damage to the subsurface installation.

An excavator discovering or causing damage to a subsurface installation must immediately notify the facility owner to obtain subsurface installation operator contact information immediately after which the excavator must notify the facility operator. All breaks, leaks, nicks, dents, gouges, grooves, or other damage to an installation's lines, conduits, coatings, or cathodic protection must be reported to the subsurface installation operator. If damage to a high priority subsurface installation results in the escape of any flammable, toxic, or corrosive gas or liquid or endangers life, health, or property, the excavator responsible must immediately notify 911, or if 911 is unavailable, the appropriate emergency response personnel having jurisdiction. The facility owner must also be contacted.

## Utility Avoidance

Solar Landscape must contact the local underground utility identification service at least 3 days prior to excavation, (One Call, Dig Safe, Miss-utility, U-dig-it).

All known utilities must be marked prior to excavation by a third-party Ground Penetrating Radar (GPR) contractor. Record keeping of location requests is required to verify that the utility locating service or utility

has been involved in locating underground lines.

***NOTE: Not all utility companies subscribe to locating services. In these cases, each utility owner must be contacted, and its method of locating must be understood and followed.***

Utility companies generally will not locate on private property. The private property owner must be contacted, and arrangements must be made to locate all private utilities.

The following are color-coding and symbols for marking underground facilities:

<b>RED</b>	<b>ELECTRIC</b>
<b>YELLOW</b>	<b>GAS, OIL, STEAM</b>
<b>ORANGE</b>	<b>COMMUNICATIONS</b>
<b>BLUE</b>	<b>POTABLE WATER</b>
<b>PURPLE</b>	<b>RECLAIMED WATER</b>
<b>GREEN</b>	<b>SEWER / DRAINAGE</b>
<b>PINK</b>	<b>SURVEY MARKS</b>
<b>WHITE</b>	<b>PROPOSED EXCAVATION</b>

GPR or equivalent must be used to physically expose a marked utility to verify existence and determine its exact location. This method ensures that the existing utility will not be damaged by adjacent construction activities. Where utility markings run within five (5) feet of the proposed excavation/boring, the utility must be physically located by means of GPR. For proposed excavations/borings that run a continuous parallel route, the utility must be located every five hundred (500) feet.

All hand digging must be performed with nonconductive hand tools. If utility lines are discovered, mark them with the appropriate color and symbol written with a weather-resistant marker on an adequate stake or ribbon. Gas lines must be manually located, marked, and protected.

If a gas line cannot be found by GPR at the location marks, contact the utility owner, and request its assistance before equipment excavation begins in the area. Once exposed, utilities must be braced, sheeted, or shored to eliminate damage to underground utilities. Always support underground utilities in trenches to minimize strain on the system.

## ACCESS & EGRESS

### Structural Ramps

Structural ramps that are used solely by Solar Landscape and employees and/or equipment as a means of access or egress from excavations must be approved by a Competent person. Structural ramps used for access or egress of equipment must be designed by a Competent Person qualified in structural design and must be constructed in accordance with the design.

Ramps and runways constructed of two or more structural members must have the structural members connected to prevent displacement. Structural members used for ramps and runways must be of uniform thickness. Cleats or other appropriate means used to connect runway structural members must be attached to the bottom of the runway or must be attached in a manner to prevent tripping. Structural ramps used in lieu of steps must be provided with cleats or other surface treatments to the top surface to prevent slipping.

### Means of Egress from Trench Excavations

A stairway, ladder, ramp, or other safe means of egress must be located in trench excavations that are four (4) feet or more in depth so as to require no more than twenty-five (25) feet of lateral travel for employees.

If a ladder is used, it must extend from the floor of the excavation to three (3) feet above the top and be secured at the top. Shoring braces will not be used to exit the excavation; they are not suitable substitutes for a ladder.

## VEHICULAR TRAFFIC

Solar Landscape employees exposed to subcontractor vehicular traffic must be provided with, and must wear, Class I high-visibility warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

## EXPOSURE TO FALLING LOADS

No Solar Landscape employee will be permitted underneath loads handled by lifting or digging equipment. Solar Landscape employees must be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped to provide adequate protection for the operator during loading and unloading operations.

## WARNING SYSTEM FOR MOBILE EQUIPMENT

When mobile equipment is operated adjacent to an excavation, or when equipment is required to approach

the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system must be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

## HAZARDOUS ATMOSPHERES

Solar Landscape must test for oxygen deficient or hazardous, flammable, toxic atmospheres before any Solar Landscape employee enters an excavation deeper than four (4) feet or where these hazardous atmospheres may or could reasonably be expected to exist. These controls are used to protect the worker from a hazardous atmosphere.

### Testing and Controls

To prevent Solar Landscape employees from exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions exist, testing will be where oxygen deficiency (atmospheres containing less than nineteen and a half (19.5) percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation must be tested before employees enter excavations greater than four (4) feet in depth.

Adequate precautions will be taken to prevent employee exposure to atmospheres containing less than nineteen and a half (19.5) percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation.

Adequate precautions must be taken such as providing ventilation to prevent employee exposure to an atmosphere containing a concentration of a flammable gas more than twenty (20) percent of the lower flammable limit (LFL) of the gas.

When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing must be conducted as often as necessary to ensure that the atmosphere remains safe.

## HAZARDS ASSOCIATED WITH WATER ACCUMULATION

The precautions necessary to protect employees adequately vary with each situation but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating using water removal equipment, the water removal equipment and operations must be monitored by a Competent Person to ensure proper operation.

If excavation work interrupts the natural drainage of surface water, such as streams, diversion ditches, or dikes, other suitable means must be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.

Excavations subject to runoff from heavy rains will require an inspection by a Competent Person.

Employees must not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

## STABILITY OF ADJACENT STRUCTURES

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning must be provided by Solar Landscape to ensure the stability of such structures for the protection of employees.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees must not be permitted except when:

- A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure,
- The excavation is in stable rock,
- A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

Sidewalks, pavements, and structures must not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

All surface encumbrances that are located to create a hazard to Solar Landscape employees must be removed or supported, as necessary, to safeguard employees.

## SAFETY PROCEDURES FOR OPEN TRENCHES OR EXCAVATIONS

The following procedures must be followed by all affected Solar Landscape LLC employees when working in or around excavations or trenches:

- Plan to open and close the hole in one day. The hole becomes less stable and more dangerous the longer it is open,
- Excavations/trenches left open must be covered or properly barricaded.

## PROTECTION OF EMPLOYEES IN TRENCHES OR EXCAVATIONS

Each employee in an excavation must be protected from cave-ins by an adequate protective system except when:

- Excavations are made entirely in stable rock; or
- Excavations are less than five (5) feet in depth and examination of the ground by a Competent Person provides no indication of a potential cave-in,
- Any protective systems must have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

## Sloping and Benching

Solar Landscape employees are not permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

## Type A Soil

Type A soil is cohesive and has a high unconfined compressive strength; 1.5 tons per square foot or greater. Examples of Type A soil include clay, silty clay, sandy clay, and clay loam. Soil cannot be classified as Type A if it is fissured, if it has been previously disturbed, if it has water seeping through it, or if it is subject to vibration from sources such as heavy traffic or pile drivers.

All simple slope excavations twenty (20) feet or less in depth must have a maximum allowable slope of  $\frac{3}{4} : 1$ .

**EXCEPTION:** Simple slope excavations which are open twenty-four (24) hours or less (short term) and which are twelve (12) feet or less in depth must have a maximum allowable slope of  $1/2 : 1$ .

All excavations 8 feet or less in depth which have unsupported vertically sided lower portions must have a maximum vertical side of three and a half (3.5) feet.

All excavations twenty (20) feet or less in depth which have vertically sided lower portions that are supported or shielded must have a maximum allowable slope of  $3/4 : 1$ . The support or shield system must extend at least eighteen (18) inches above the top of the vertical side.

## Type B Soil

Type B soil is cohesive and has often been cracked or disturbed, with pieces that don't stick together as well as Type A soil. Type B soil has medium unconfined compressive strength; between 0.5 and 1.5 tons per square foot. Examples of Type B soil include angular gravel, silt, silt loam, and soils that are fissured or near sources of vibration, but could otherwise be Type A.

All simple slope excavations twenty (20) feet or less in depth must have a maximum allowable slope of  $1 : 1$ .

All excavations twenty (20) feet or less in depth which have vertically sided lower portions must be shielded or supported to a height at least eighteen (18) inches above the top of the vertical side. All such excavations



must have a maximum allowable slope of 1:1.

All excavations twenty (20) feet or less in depth which have vertically sided lower portions must be shielded or supported to a height at least eighteen (18) inches above the top of the vertical side. All such excavations must have a maximum allowable slope of 1 ½ : 1.

## Type C Soil

Type C soil is the least stable type of soil. Type C includes granular soils in which particles don't stick together and cohesive soils with a low unconfined compressive strength; 0.5 tons per square foot or less. Examples of Type C soil include gravel and sand. Because it is not stable, soil with water seeping through it is also automatically classified as Type C soil, regardless of its other characteristics.

## Loose Rock and Soil

Adequate protection must be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face.

Such protection must consist of scaling to remove loose material, installation of protective barricades at intervals as necessary on the face to stop and contain falling material, or other means that provide equivalent protection.

Employees must be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations.

Protection must be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or using retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

## Fall Protection

Solar Landscape employees are required to follow the requirements of fall protection in accordance with the Solar Landscape Fall Protection Program.

Specific to trenching and excavations where Solar Landscape employees or equipment are required or permitted to cross over excavations over six (6) feet in depth and wider than thirty (30) inches, walkways or bridges with standard guardrails must be provided.

Adequate physical barrier protection must be provided at all remotely located excavations. All wells, pits, shafts, etc., must be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., must be backfilled.

Any Solar Landscape employee who is subjected to an unprotected edge with a six (6) foot or greater fall distance must be protected from falling by either a personal fall restraint system, personal fall arrest system, or a guardrail system or equivalent. Please reference the Fall Protection Program.

## EMERGENCY RESCUE EQUIPMENT

Emergency rescue equipment, such as a breathing apparatus, a safety harness and line, or a basket stretcher, must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment must be attended to when in use.

## DEFINITIONS

**Aluminum Hydraulic Shoring:** A pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross-braces) used in conjunction with vertical rails or horizontal rails. Such a system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

**Benching (Benching System):** A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

**Cave-ins:** The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by failing or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and/or immobilize a person.

**Competent Person:** An individual who is trained and capable of recognizing identifiable and predictable hazards in the surroundings of working conditions that are unsanitary, hazardous, or dangerous to employees, and has the authority to take prompt action to correct identified hazards (i.e., authority to fix the problem on the spot or suspend work until the situation is corrected). In this situation, training must include identification of soil types, excavation hazards, and available trenching protection systems.

**Cross-braces:** The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either upright.

**Excavation:** Any man-made cut, cavity, trench, or depression in the ground formed by earth removal.

**Faces or Sides:** The vertical or inclined earth surfaces formed because of excavation work.

**Failure:** The breakage, displacement, or permanent deformation of a structural member or connection to reduce its structural integrity and its supportive capabilities.

**Ground Penetrating Radar (GPR):** Ground-penetrating radar is a technology that supports subsurface detection and mapping. Also known as GPR, this technology sends electromagnetic radar pulses into the ground. Those pulses interact with and bounce back from various substances in unique ways. The unit that

sends the pulses also measures the feedback of those interactions and returns pulses to map data about what's in the ground below.

**Hazardous Atmosphere:** An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

**Kick out:** The accidental release or failure of a cross brace.

**Ramp:** An inclined walking or working surface that is used to gain access to one point from another and is constructed from earth or from structural materials such as steel or wood.

**Registered Professional Engineer:** A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

**Sheeting:** The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

**Shield (Shield System):** A structure that can withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

**Shoring (Shoring System):** A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

**Sides:** See "Faces."

**Sloping (Sloping System):** A method of protecting employees from cave-ins by excavating to form sides of an excavation that is inclined away from the excavation to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

**Spoil:** The dirt, rocks, and other materials removed from an excavation and either temporarily or permanently put aside.

**Stable Rock:** A natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

**Structural Ramp:** A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock

are not considered structural ramps.

*Supporting System:* A structure such as underpinning, bracing, or shoring, that provides support to an adjacent structure, underground installation, or the sides of an excavation.

*Tabulated Data:* Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

*Trench (Trench excavation):* A narrow excavation (relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than fifteen (15) feet. If forms or other structures are installed or constructed in an excavation to reduce the dimension measured from the forms or structure to the side of the excavation to fifteen (15) feet or less, (measured at the bottom of the excavation), the excavation is also considered to be a trench.

*Trench Shield:* See "Shield."

*Uprights:* The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

*Wales:* Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

## OBJECTIVE

Solar Landscape LLC seeks to protect its employees and others when operating a motor vehicle on public roads while conducting company business.

## POLICY

A Department of Motor Vehicle (DMV) record check will be conducted on all final job candidates following a conditional offer of employment where driving a motor vehicle is a required job function. Employee DMV driving records will be checked and run manually for these Solar Landscape employees. DMV record checks will also be conducted on Solar Landscape employees who will be covered by company insurance to drive rental or company vehicles during business travel. Solar Landscape will review DMV records and decide the employee's status for applicants and Solar Landscape employees according to the classification system listed below:

### Satisfactory

- The Solar Landscape employee is eligible to drive while conducting company business if their driving record indicates not more than one moving violation in the past twelve (12) months.

### Probationary

- The Solar Landscape employee is eligible to drive while conducting company business with the stipulation that the Solar Landscape employee's DMV record will be checked periodically over a period of probation,
- Their driving record indicates more than one moving violation in the past twelve (12) months but no more than two moving violations in the past twenty-four (24) months,
- Any violations during the probationary period may result in termination of employment or other disciplinary action.

### Unacceptable

- An applicant for employment with Solar Landscape will not be hired or will not be eligible to drive while conducting company business due to an unsatisfactory driving record; some examples of unacceptable infractions include but are not limited to:
  - Suspended or revoked license,
  - Three (3) or more moving violations in the past 36 months,
  - Any violations involving drugs, alcohol, controlled substances, etc. within the past twenty-four (24) months,
  - Leaving the scene of an accident within the past twenty-four (24) months,
  - Reckless driving within the past thirty-six (36) months,
  - At fault in an accident resulting in fatality or serious injury within the past five (5) years,
  - DUI in the past five (5) years.

## SOLAR LANDSCAPE EMPLOYEES

Solar Landscape will check the DMV records annually for all current Solar Landscape employees with driving responsibilities or those who use rental cars or company vehicles such as trucks and trailers for business travel purposes. Any covered employee without a valid driver's license will not be allowed to operate a company vehicle or drive on Solar Landscape sites. If driving is an essential job function and the employee cannot be reasonably accommodated, employment may be terminated. If an existing Solar Landscape employee has a valid driver's license but the employee's driving record falls at or below probationary status criteria (defined above), the employee will be placed on probationary status and will be subject to the requirements of that status until the end of the probation. If a subsequent periodic DMV record check reveals further violations, Solar Landscape will review the specific circumstances surrounding the Solar Landscape employee and determine appropriate action.

## JOB APPLICANTS

Solar Landscape will check the DMV records of any job applicant when driving a company vehicle is an essential job function or when a rental car may be needed for business travel purposes. The applicant's job offer is contingent on eligibility under the company policy outlined above. The DMV record check will include a review of all states listed on the Solar Landscape employee's employment application and resume. If the applicant does not have a valid driver's license or has a driving record that falls at or below the criteria listed under the **Unacceptable Status**, the applicant will not be hired for positions where driving is an essential job function. If the applicant's driving record meets the probationary status criteria, he or she will be placed into that status upon hire with further periodic review.

## COMPANY CELL PHONE USE POLICY

- Solar Landscape employees must refrain from using cell phones, other electronic devices, or participating in any activity that may distract them from safely operating a motor vehicle,
- Using cell phones or electronic devices while driving leads to increased risk of accidents and liability to the company and to the employee,
- Solar Landscape employees are not permitted to read or respond to emails or text messages while operating a motor vehicle (in motion or stopped in traffic) on company business and/or on company time,
- Solar Landscape employees are not permitted to use the internet (including mobile applications and social media), while they are operating a motor vehicle (in motion or stopped) for any company business and/or on company time,
- This policy also applies to the use of all other electronic devices including but not limited to Personal Data Assistants (PDA), Moving Picture expert group layer 3 (MP3) audio players, internet watches, wearable electronics, tablets, and laptop computers,
- GPS devices are permitted in vehicles so long as the navigation is set up prior to driving. The GPS must also be secured in a safe place that does not obstruct the driver's view of the road,
- Solar Landscape employees should check messages before they start driving and respond to urgent messages BEFORE starting to drive.

## HANDS FREE DEVICE

**NOTE:** *This Hands-Free Driver Policy is based on the New Jersey Department Motor Vehicle Act 39:4-97.3.*

- Solar Landscape employees are permitted to use a hands-free device to talk on their cell phone. Hands free calls must be completely hands free, meaning that the device cannot be touched,
- Hands free systems must be fully functioning Bluetooth or equivalent technology systems,
- Solar Landscape employees are never permitted to use headphones while driving as that may greatly decrease driver alertness and awareness.

Solar Landscape employees must avoid activities that can take their hands off the steering wheel or eyes and attention from the road, including, but not limited to:

- Reading,
- Taking notes,
- Looking up phone numbers,
- Eating,
- Drinking,
- Loading and unloading cd's, and
- Changing radio stations.

## PURPOSE

The purpose of this Solar Landscape Site-Specific Fall Rescue Plan is to establish guidelines for responding to a fall from height while conducting solar panel installations. This rescue plan (Site-Specific Fall Rescue Plan form is in Appendix A) is intended to reduce risks to Solar Landscape employees and sub-contractors' health after a fall arrest event. This rescue plan will minimize the amount of at-risk behavior of the rescuer during the rescue attempt and will help to ensure that the rescue is conducted promptly and is in a safe and professional manner. The.

## HAZARDS OF A FALL

The Occupational Safety and Health Administration (OSHA) Part 1926.501 Code of Federal Regulation (CFR) requires workers to use a fall protection system where they could fall at least six (6) feet or where a fall from a lesser height may result in a serious injury.

- Potential fall hazards on the job,
- Types of fall protection systems to be used,
- Instructions/training for workers on how to safely use the equipment, and
- Instructions on how to rescue a worker who has fallen and cannot initiate a self-rescue,

Do not wait for or rely on emergency services to rescue a worker who has fallen. There should never be a delay in the rescue from a fall.

## RESPONSIBILITIES

### Environmental Health and Safety (EHS) Director

The EHS Director is responsible for ensuring that the requirements of this Solar Landscape Site-Specific Fall Rescue Plan are followed.

The EHS Director is responsible for:

- Providing Solar Landscape employee(s) training and training for the authorization of a competent rescuer,
- Completing the Site-Specific Form found in Appendix A,
- Updating this Solar Landscape Site-Specific Fall Rescue Plan as needed.

### Employees

Solar Landscape employees are required to:



- Be trained in and familiar with the EHS Solar Landscape Fall Protection Program,
- Understand and be able to evaluate the risks associated with working at heights,
- Be trained and competent in the use of fall protection equipment prior to conducting work at height,
- Report unsafe conditions or behaviors to the Supervisor or Competent Person, and
- Be familiar with and understand this Solar Landscape Site-Specific Fall Rescue Plan and follow the requirements of the Site-Specific Fall Rescue Plan Form (Appendix A) to provide prompt rescue in the event of an arrested fall.

## Qualified Person and Competent Rescuer

A Qualified Person means a person responsible for supporting the fall protection program. Areas of expertise may include system design, horizontal lifeline design, structural analysis, calculation of impact forces and clearances, testing, and great certification, methods of control, equipment selection, and compliance with applicable regulations and standards.

Both the Solar Landscape Qualified Person or Competent Rescuer may:

- Be trained by a competent rescuer trainer before exposed to a fall hazard or potential rescue application,
- Be re-trained when the work site or methods of control or rescue change to an extent that prior training is no longer adequate,
- Be trained on how to inspect, anchor, assemble and use the fall protection and rescue equipment,
- Training must include the following:
  - Fall hazard recognition,
  - Fall hazard elimination and control methods,
  - Applicable fall protection and rescue regulations,
  - How to use written fall protection and rescue procedures, and
  - Inspection of equipment components and systems before use.
- Refresher training must occur at least every two (2) years for the Competent Rescuer to stay current with fall protection and rescue educational requirements of the ANSI Standard Z359.
- Be evaluated by a competent rescuer or competent rescue trainer annually to ensure competency of the rescue equipment and procedures.

## SUSPENSION TRAUMA

Workers cannot stay suspended for long and are at risk of reduced blood flow, oxygen deprivation, brain damage, cardiac arrest, and death. According to the ANSI Standard Z359, rescue should be completed within six (6) minutes of a fall arrest. All workers using fall arrest systems must be monitored and promptly rescued in the event of a fall. In addition to rescue equipment available onsite, use of self-rescue devices may be used. Fall arrest rescue equipment that needs to be available onsite when fall arrest equipment are used include:

- Ladders,
- Rescue poles,
- Rescue ropes,
- Rescue wrench,
- Crane ,
- Aerial lift,
- Scaffold,
- Lifting or lowering device

The signs and symptoms of suspension trauma (orthostatic intolerance) can start in two (2) to three (3) minutes from being suspended in a full body harness and the employee may suffer the following health conditions from suspension trauma:

- Faintness,
- Nausea,
- Breathlessness,
- Dizziness,
- Sweating,
- Paleness,
- Skin tone may appear grey in color, and
- Loss of vision

Suspension trauma can be slowed significantly if the worker can stand in a suspension relief straps or loop on the end of a rope.

The rescue equipment location is vital in the rescue process and a trained, competent, and qualified person(s) must conduct the rescue(s) (Rescuer).

## RESCUE TYPES

### Self Rescue

These procedures are to be followed if the worker has selected the proper fall arrest equipment, installed it properly, is using it properly and has not been injured they should, in most cases, be able to self rescue as follows:

- Make verbal contact with the employee that has fallen to help them stay calm, establish whether they are injured and give them guidance during self rescue,
- Employee should climb back up to the work area from which they fell. (This would normally involve a fall of two (2) to three (3) feet,
- Rescue team assists the employee back on to the work area,
- Employee returns to ground or floor level. Rescue team stays with the employee in case they are unstable,
- Have the employee checked by a qualified first aider and provide first aid if required,

- Collect all the fall arrest equipment used by the employee and tag the equipment as **DO NOT USE**. Document all the items used as well as the employees name, the date and time of the fall and the job being performed when the fall occurred, and
- Give the fall arrest equipment and documentation to the employee's supervisor or manager to have inspected for defects and / or damage.

## Assisted Self Rescue

If self rescue is not possible an assisted self rescue will be performed by using a mechanical assist winching system. The following procedures are to be used during this type of rescue:

- If the self rescue is not possible an assisted self rescue will be performed by using a mechanical assist winching system. The following procedures are to be used during this type of rescue:
  - Make verbal contact with the employee to help them stay calm and determine whether they are injured, and
  - Maintain verbal contact during the rescue.
- While rescue preparations are being made do the following:
  - If the employees' harness has suspension relief straps and they are okay tell the employee to insert their feet in the straps to relieve the pressure exerted by the harness straps on their legs,
  - If the employees' harness is not equipped with suspension relief straps lower a rope with a loop at the end for the employee to use as a relief strap, and
  - Encourage the employee to keep moving their legs while their feet are in the suspension strap or rope loop.
- Attach the winching equipment to a securely installed properly rated anchoring point,
- Lower the winch line to the employee,
- Have the employee grab the hook on the end of the line and securely attach it to the proper "D" ring on their harness. (If necessary, provide verbal directions to assist the employee.),
- A member of the rescue team must verify that there is a positive / secure connection between the hook and the "D" ring,
- The rescue team must raise or lower the fall employee to the nearest safe work area or to the floor or ground level,
- Have the employee checked by a qualified first aider and provide first aid if required,
- Collect all the employees fall arrest equipment and tag it as **DO NOT USE**. Document the items used, the employee's name, the date and time of the fall and the job being performed when the fall occurred, and
- Give the fall arrest equipment and documentation to the employee's supervisor or manager to have inspected for defects or damage.

## Fully Assisted Rescue

These procedures are to be followed if the employee is injured and is unable to attach themselves to the rescue system:

- Make verbal contact with the employee to help them stay calm and determine whether they are injured,
- Maintain verbal contact during the rescue,
- Attach the winching equipment to a securely installed and properly rated anchoring point,
- Rig separate lines for rescuers to use while carrying out the rescue,
- If possible, use a rescue remote connection pole to attach the winching cable or rope to the employee's harness "D" ring,
- If the remote connection pole cannot be used lower a rescue team member to the suspended employee to attach the winch line to the "D" ring in the employee's harness,
- Raise or lower the employee to the nearest safe work area or lower the employee to the ground or floor,

**NOTE:** *Unless there is a hazard that prevents the rescue team from doing so, any employee that is injured or has been suspended in their harness for an unsafe period should be lowered to the floor or ground so that first aid and medical attention can be accessed as quickly as possible.*

- Provide first-aid and required medical attention, (Ensure that the possibility of suspension trauma is addressed.)
- Collect all the employees fall arrest equipment and tag it as DO NOT USE. Document the items used, the employee's name, the date and time of the fall and the job being performed when the fall occurred,
- Give the fall arrest equipment and documentation to the employee's supervisor or manager to have inspected for defects or damage.

## Ladder Rescue

If a ladder can be safely set up and the suspended person can be safely reached by a rescuer on the ladder, follow the procedures listed below:

- Set up the ladder so that the suspended employee can be reached by a rescuer on the ladder,
- Rig separate lifelines for the rescuer on the ladder,
- If the employee that has fallen is unconscious or due to injuries is unable to help during the rescue and a second rescuer is required consideration should be given to using an alternative rescue procedure,
- Securely attach a separate lowering / winch line to the employee,
- Rescuers on the ground, or closest safe surface, should raise the employee just enough to allow for their lanyard to be disconnected and then lower the employee to the ground or floor using the lowering line, and
- Once the fallen employee has been lowered to a safe surface provide any required first aid and determine if medical attention is required to deal with possible suspension trauma.

## Aerial Lift Rescue

If an aerial lift is readily available and can be safely used to reach the suspended employee, the procedures listed below are to be followed.


**NOTE:** *That this rescue procedure can only be used if one of the rescuers is qualified to operate the aerial lift or a qualified operator is available to work with the rescuer.*

- The aerial lift operator / qualified rescuer will ensure they are wearing proper fall protection equipment and that there is either an appropriate lanyard or self retracting lanyard available for the employee being rescued,
- Maneuver the aerial lift into position under, and within safe reach, of the employee to be rescued,
- Once the employee being rescued is safely on the area of the aerial lift attach the available lanyard or self retracting lanyard to the harness of the employee being rescued,
- Disconnect the lanyard or self retracting lifeline the employee was using when they fell.
- Lower the lift to the ground, remove the rescued employee from the lift and immediately provide required medical attention,
- When it is safe to do so, remove the fall protection equipment involved in the accident from service, bag it and attach a tag with the employee's name, the date and time of the fall and what activities were at the time of the fall, and
- The bagged equipment should be given to the Supervisor or EHS Director.



# APPENDIX A



	<h2 style="margin: 0;">Site-Specific Rescue Plan Form</h2>
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PROJECT INFORMATION	
<b>Location Name:</b>	<b>Address:</b>
<b>Site Contact Information:</b>	<b>Site Contact Cell:</b>
<b>Work Description:</b>   	
<b>Height of working area or roof:</b> _____ <b>Feet</b>	

COMPETENT RESCUE TEAM		
<b>Name:</b>	<b>Job Description:</b>	<b>Cell number:</b>
<b>Name:</b>	<b>Job Description:</b>	<b>Cell number:</b>
<b>Name:</b>	<b>Job Description:</b>	<b>Cell number:</b>

EMERGENCY CONTACTS
<b>Foreman:</b>
<b>EHS Director:</b>
<b>Employee in Charge of Rescue:</b>

METHODS OF COMMUNICATION
<input type="checkbox"/> Direct Voice <input style="margin-left: 100px;" type="checkbox"/> Cell Phone <input style="margin-left: 100px;" type="checkbox"/> Two-Way Radio

RESCUE EQUIPMENT REQUIRED FOR PROJECT	
<input type="checkbox"/> Ladder	<input type="checkbox"/> First Aid Kit
<input type="checkbox"/> Rescue Pole	<input type="checkbox"/> Rescue Positioning Device
<input type="checkbox"/> Rescue Rope	<input type="checkbox"/> Aerial Lift
<input type="checkbox"/> Alternate Lifting and Lowering Device	<input type="checkbox"/> Stretcher
<input type="checkbox"/> Other _____	<input type="checkbox"/> Rescue Kit
<input type="checkbox"/> Other _____	

SL Site-Specific Rescue Plan Form v1.0



**Describe Where Rescue Equipment Will be Stored:**

**CHECKLIST**

- What, if anything, will be used as an emergency alarm:  Horn  Other \_\_\_\_\_
- Is rescue equipment appropriate for the type of rescue?  Yes  No
- Has rescue equipment been inspected and found to be in good condition?  Yes  No
- Have anchor points for rescue equipment been identified and confirmed as safe for use?  Yes  No
- Have communication devices to be used by rescuers been tested and found to be operational?  Yes  No
- Have safe anchor points been identified for use by the rescue team?  Yes  No

**SAFE RESCUE PROCEDURES**

**HAZARDS:**

**CONTROL MEASURES:**

**PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

- |  |  |
|--|--|
| <input type="checkbox"/> Eye Protection          | <input type="checkbox"/> Full Body Harness         |
| <input type="checkbox"/> Footwear Type: _____    | <input type="checkbox"/> Other PPE Required: _____ |
| <input type="checkbox"/> Hard Hat                |  |
| <input type="checkbox"/> Work Gloves Type: _____ |  |

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**RESCUE TYPE**

- |  |   |
|--|---|
| <input type="checkbox"/> Self Rescue           | <input type="checkbox"/> Ladder Rescue      |
| <input type="checkbox"/> Assisted Self Rescue  | <input type="checkbox"/> Aerial Lift Rescue |
| <input type="checkbox"/> Fully Assisted Rescue |   |

**THIS DOCUMENTS MUST BE POSTED AT THE WORK SITE**

