



# Carbon Lighthouse Environmental Health and Safety Requirements



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## Introduction

Carbon Lighthouse is committed to ensuring a safe working environment for its employees, contractors, and subcontractors, and clients. Carbon Lighthouse expects contractor & subcontractor management, supervision, and workers to embrace environmental health and safety as a core value. Safe work practices enable every person to perform their job better and return home safely.

Safety requires a clear understanding of where one is in space and what the potential risk factors are. The protocols in this document are based on and comply with a combination of National Fire Protection Agency (NFPA) Code 70E regulations, Occupational Safety & Health Administration (OSHA) regulations, and guidance from the California Department of Industrial Relations (DIR).

This document represents one component of Carbon Lighthouse's Illness and Injury Prevention Program (IIPP). The DIR specifies that a comprehensive IIPP should include the following:

- Management commitment/assignment of responsibilities
- Safety communications system with employees
- System for assuring employee compliance with safe work practices
- Scheduled inspections/evaluation system
- Accident investigation
- Procedures for correcting unsafe/ unhealthy conditions
- Safety and health training and instruction
- Recordkeeping and documentation

Contractors and subcontractors performing work under Carbon Lighthouse are required to have in place and comply with their own Environmental Health and Safety (EHS) program. The herein Carbon Lighthouse EHS Requirements include guidance for external parties and shall not be considered a comprehensive EHS program for use by external contractors or subcontractors.

## Contractor and Subcontractor Environmental Health and Safety Requirements

### Regulatory Compliance

All work performed by Carbon Lighthouse employees, contractors, and subcontractors will be in compliance with all federal, state, county and municipal laws, rules, regulations, codes, standards and requirements concerning the health, safety and environmental aspects applicable to the work, including, among others, the Federal Occupational Safety and Health Act of 1970 ("OSHA") and the policies and guidelines set forth by the Environmental Protection Agency ("EPA"), as amended, and all standards, rules, regulations and orders which have been and shall be adopted or issued there under, and with EHS standards established by Carbon Lighthouse and Carbon Lighthouse's client (Host Customer). The most stringent of the applicable regulations and internal company requirements will be followed in the event of overlap.

Regulatory compliance is required of all contractors and subcontractors regardless of Host Customer location, scope of work, total cost, or contractor experience.

### Initial Safety Orientation and Ongoing Safety Management



All Carbon Lighthouse contractors undergo an initial evaluation for safety practices before they are qualified to perform any work with Carbon Lighthouse. The evaluation consists of document review (EHS documentation, IPPs, etc.), contractor license record review, and interview questions targeted at safety. Once evaluation and onboarding is complete, contractors discuss general safety expectations with an Implementation Engineer and/or the Supply Chain Management team before they may perform site work under Carbon Lighthouse. All contractors are evaluated against the same safety criteria.

A Carbon Lighthouse Implementation Engineer will participate in a general safety orientation for each Host Customer site and review pertinent contractor and subcontractor safety documentation prior to the beginning of a project. The (sub)contractor will then be responsible for ongoing safety management for the duration of work, and contractors and subcontractors performing work under Carbon Lighthouse are required to have in place and comply with their own Environmental Health and Safety (EHS) program.

### **Contractor Safety Management**

Each contractor and subcontractor employed by Carbon Lighthouse will have in place and comply with an internal policy that addresses the hazards and associated risks of the job site and work, which may include, but are not limited to:

- Working from Heights
- Electrical Work
- Hot Surfaces
- Caught-in/Between
- Loud Noises
- Pinches (Preventing hand injuries)
- Dust & Particulates
- Inclement Weather
- Heat Illness

Review of contractor safety protocols by Carbon Lighthouse will take place prior to commencing work as part of either a Request for Proposal (RFP) or Master Framework/Services Agreement process.

Carbon Lighthouse shall be notified in the event an incident or injury takes place involving an employee of the (sub)contractor. The (sub)contractor will invoke their own investigation protocol and submit a written incident investigation report to a Carbon Lighthouse Implementation Engineer within 24hrs of the incident taking place. A preliminary report may be submitted to meet the 24hr timeline and allow for additional time to determine the root cause(s), corrective and preventative actions to prevent similar incidents from occurring in the future.

Each (sub)contractor is responsible for training and ongoing certification of their employees. A trainee or short service employee of less than 6 months with the contractor will have an individual site mentor assigned. Amongst other responsibilities, the mentor will be responsible for on the job professional development and mentorship with respect to safety of the short service employee.

### **EHS Nonconformance and Stop Work Authority**

When ordered by Carbon Lighthouse or Host Client, the (sub)contractor shall stop any work that is deemed unsafe, unhealthy and/or may have an adverse environmental impact until corrective measures satisfactory to Carbon Lighthouse have been taken. Contractors and subcontractors shall not have or make any claim for damages growing out of such stoppages.

### **Prohibited Articles**



All contractors and subcontractors will, consistent with applicable law, prohibit the use, possession, control, sale, purchase, transportation, and distribution of the following on Carbon Lighthouse projects:

- Illegal and illicit drugs, including but not limited to marijuana, mood and mind-altering substances, “look-alike” substances, designer and synthetic drugs, and certain inhalants and over-the-counter drugs
- Prescription drugs not prescribed by a physician
- Drug paraphernalia, equipment, and literature related to illegal drugs and substance use
- Alcohol products and beverages
- Weapons, firearms, ammunition, explosives, and fireworks

## Carbon Lighthouse Employees: General Field Safety

### Safety Culture Norms

At Carbon Lighthouse, our most important asset is our employees. We believe that:

- All accidents are preventable. Nobody gets hurt.
- Achieving Health & Safety is about commitment and caring.
- Health & Safety are paramount and that no task is so important that it shall be performed at the risk of Health & Safety.
- Hazards are an inherent part of field work; their risk is managed by identifying hazards, assessing consequences, and implementing mitigation/prevention measures.
- Employees should be proactive with clients and ask them about their safety concerns.
- Safe companies are well-run companies.
- Safety starts and ends with leadership:
  - Carbon Lighthouse Leadership is expected to lead by example, and encourage open reporting of Health & Safety behaviors (good and bad).
  - Carbon Lighthouse Leadership will provide the necessary conditions for employees to work safely (equipment, controls, and time).

### Stop Work Authority and the Role of the Second

As is detailed in the hazard-specific sections of this handbook, most field work (and all electrical field work) is performed with a “Second” – a team member whose primary function is to ensure the safety of the person performing the work and provide support where needed. This is a **critical** role. The second is not merely an observer; rather, he/she is an active advocate of onsite safety.

When the person performing the work is in the presence of hazards (such as while performing electrical work in a disconnect or climbing a ladder), the Second is responsible for maintaining a safe work environment. This means being firm and direct with any facility staff, contractor, team member, or other person who questions our safety protocols, distracts the person performing the work, or tries to cross a working boundary.

**Intervention is very difficult to do.** Carbon Lighthouse Leadership gives Stop Work Authority to all employees. All employees are empowered and expected to stop the work of co-workers or contractors if any personal safety, environmental risk, or property damage are at risk. Likewise, employees are empowered to say “No” when given a task they feel is unsafe. If an employee witnesses someone conducting his/herself in an unsafe manner in the field, the employee is expected to tell them so immediately. If the person persists in that activity the employee shall report him/her immediately or whenever it is safe to do so, via phone or email, to a supervisor, job site leader, and/or Human Resources.



## Internal Field Safety Training

All Carbon Lighthouse team members who conduct and lead *physical work* on building systems shall participate in Carbon Lighthouse's mandatory Field Safety Training Program. For this purpose, *physical work* is defined as any work that involves physical interaction with building equipment, including logger deployment, logger pick-up, functional tests, spot measurements, contractor management, etc. The training program consists of safety requirement review, background reading of select text from NFPA 70E Electrical Safety Code, hands-on electrical safety training for working with electrical equipment and Lock-out Tag-out procedures, and guided field practice. Safety training is maintained through mandatory quarterly exams and annual re-training certification. In addition, field-facing team members are required to maintain CPR and First Aid certification, renewed every two years.

## Clothing on Site – General Site Visit

All Carbon Lighthouse employees, regardless of their role or team, shall adhere to the list below for personal attire during a field site visit. A "field site visit" is any visit that includes mechanical rooms, rooftops, ladders, and/or mechanical equipment.

- Cotton clothing only
- Closed-toed shoes only
- Long sleeves and pants
- No neckties
- No scarves
- No loose-fitting clothing
- Shirts tucked into pants
- No loose or dangling jewelry
- Long hair tied back, tucked underneath hat, or otherwise prevented from hanging out

In addition to the hazard-specific PPE identified in the other sections of this handbook, a summary of all hazard-specific PPE is provided in Appendix A.

Carbon Lighthouse contractors and subcontractors are required to provide to their employees task and project specific PPE while working for Carbon Lighthouse.

## Road Safety

All employees, contractors, and subcontractors shall recognize that driving to/from site carries significant risk, and shall abide by road safety norms:

- Always wear your seatbelt.
- No cell phone use while driving.
- Plan ahead for directions to site and other information.
- Have the passenger do any necessary cell phone use.
- Use a hands-free device if a phone call is absolutely necessary while driving.

## Miscellaneous

- Absolutely NO alcohol or drugs before or during work.
- Site-specific safety risks shall be discussed with the site/facility manager ahead of time.



- Plan the work before doing the work. This will contribute to having an organized workspace and good housekeeping on site which is a key method to reducing occupational hazards during the work and allow for safe egress should it be necessary.

## Carbon Lighthouse Employees: Field Safety Hazards and Risk Management

### Working from Heights

#### Hazards:

- Ladders (portable and fixed)
- Rooftops and roof hatches
- Lifts (aerial, man, boom, other)

#### Risk Management: Ladders

##### *General Ladder Safety*

- Any employee that is uncomfortable climbing or performing work from a ladder shall stop work and discuss with his/her supervisor.
- Employees shall not climb ladders alone. A spotter shall pay attention to ladder stability and clothing/gear/other items that might snag while moving on the ladder.
- Climbing ladders (portable and fixed):
  - Employees shall always have three limbs on the ladder while climbing.
  - Fall protection is not required as long as employee is continuously moving from point A to B on a ladder less than 24' in height.

##### *Portable Ladders*

- Working on portable ladders is permitted, with the highest foot placement less than 6 feet off the ground.
  - Working above the 6 foot step requires calling an engineering member of the Safety Team to state the need and review the JSA prior to working above the equivalent 6 foot step.
  - Three points of contact with the ladder shall be kept while ascending and descending; once stationary, the employee may use both hands to perform the work.
- Employee shall take note of the surroundings. If children are present or there is risk that someone may run into the ladder, do not leave the base unattended.
- Where possible:
  - Have someone hold the base of the ladder to steady it as others climb down.
  - Have someone wait at the base of the ladder while others complete work on the roof, etc.

##### *Fixed Ladders*

- Working from fixed ladders is permitted, with the highest foot placement less than 6 feet off the ground.
  - Working above the 6 foot rung requires calling an engineering member of the Safety Team to state the need and review the JSA prior to working above the equivalent 6 foot rung.
  - Three points of contact with the ladder shall be kept at all times: while ascending, descending, and performing work.

#### Risk Management: Rooftops and Roof Hatches

- The first person to reach the roof must stay at the hatch or top of ladder until other person reaches the top.
- Be wary of roof hatches that may close unexpectedly. When possible, have someone at the top brace the hatch while people are climbing the ladder.



- When possible, utilize ropes to raise/lower equipment.
- On rooftops with no guardrails or guardrails shorter than 42 inches, employees must stay back at least 6 feet from the edge at all times. If work within 6 feet of the edge is necessary, employees must be securely tied into a safety line with a personal fall arrest system.
- On rooftops with guardrails at least 42 inches high, employees may approach the edge only if necessary.
- Look out for any icy, wet, or slippery spots.
- Walk. Never run.

#### **Risk Management: Lifts**

- Carbon Lighthouse employees may work from a man lift / scissor lift only if the lift guardrails are at least 42 inches high.
- Employees shall inspect the guardrails prior to entering the lift and discuss any recent inspections with the facility. If an employee is not comfortable with the condition of the guardrails, he/she shall not use the lift.
- Carbon Lighthouse employees are not trained in the use of fall-protection equipment, and are thus not authorized to work in aerial lifts or boom lifts where there is a fall hazard of 6 feet or greater.

#### **Code References**

OSHA 1926.501(b)(1)  
OSHA 1926.502(b)(1)  
OSHA 1926.1053(a)(19)

#### **Electrical Work**

Employees must adhere strictly to the "Procedure for Electrical Access", included as an addendum in this section for reference. A physical copy is located in each company gear bag, to be reviewed prior to starting electrical work.

#### **Hazards:**

- Electrical disconnects
- Motor control centers
- Exposed electrical panels
- Short: Normal current bypasses load (e.g., short across conductor via screwdriver)
- Arc Blast: Flow of current through air (then plasma) that burns bus bars & causes explosion

#### **Risk Management:**

##### *Training*

- Employees must receive and pass Carbon Lighthouse's Electrical Safety Training before being allowed to enter the limited approach boundary of an electrical panel or disconnect.

##### *Required PPE*

- Electrical PPE as specified in the Procedure for Electrical Access. PPE shall be visually and verbally confirmed with a second employee prior to starting work.

##### *Best Practices*

- Formal practice specified in the Procedure for Electrical Access.
- Go slow. Safety is more important than 10 minutes or 10 hours or 10 days or 10 months or 10 years. Yes, 10 years. Be safe.
- Employees are not authorized to work in any panel with a rated voltage over 480V.
- Any employee working on electrical equipment must be accompanied by a second person ("Second"). The Second must stay outside of the arc blast boundary (approximately 4 feet from a



480V panel) and must pay full, undivided attention to the person working on the electrical equipment, ready to respond if the worker needs a tool or assistance, has a question, etc. The Second is wholly responsible for maintaining the arc blast boundary and preventing any facility staff, contractors, subcontractors, or other people from approaching closer to the person working in the panel.

- Make sure that no exposed metal is anywhere near hot leads. Pay particular attention to:
  - Equipment age: if old, visually inspect for uninsulated/worn/loose wires
  - Saw dust or any other substantive matter near the electrical equipment that could cause a short
  - Any metal components on your person or equipment
  - The metal end of electrically-insulated equipment/tools
  - Uninsulated/worn wires on loggers or other equipment

### Code References

NFPA 70E Standard for Electrical Safety in the Workplace.

### Caught-In/Between

#### Hazards:

- Confined spaces
- AHU chambers
- Rotating equipment: motor shafts, fan belts, etc. Fan belts, motor shafts, and other rotating equipment can cause severe injury or death, even from relatively small pieces of equipment.

#### Risk Management:

##### Required PPE

- No loose jewelry or clothing
- Hair tucked back or secured

##### Best Practices

- Employees shall not wear backpacks, straps, or fall protection near rotating equipment.
- Employees shall not reach around or between rotating equipment that is on or could turn on.
- Employees are not certified to enter anywhere labeled explicitly as a Confined Space.
- If possible, employees shall turn off rotating equipment before working near it. If disconnect is out of sight, lock out disconnect using the modified LOTO procedure detailed below. Electrical PPE is not required for the modified LOTO procedure if *all* of the following are true:
  - Employee is not performing any electrical work
  - Employee is only shutting down the equipment for physical isolation of the rotating equipment
  - Employee will not be accessing any electrical panels/disconnects

If employee *is* performing electrical work on the equipment, he/she *must* follow all regular electrical safety procedures and PPE requirements.

Modified LOTO procedure (no electrical work):

1. Prepare for shutdown (notify affected employees).
2. Shut down equipment (routine shut down).
3. Operate all isolation devices to de-energize equipment.
4. Apply LOTO devices.
5. Verify equipment energy isolation: Press the start button or otherwise try to turn on the rotating equipment. If the equipment turns on, it is not effectively locked out and the rotating equipment shall be considered live.
6. If successfully locked out, perform work.



## Hot Surfaces

### Hazards:

- Exposed hot water pipes
- Steam lines
- Motors
- Boilers & Furnaces

### Risk Management:

#### *Required PPE*

- Long sleeves
- Long pants
- Safety glasses
- Safety gloves

#### *Best Practices*

- When in doubt, employees shall use a temperature gun before touching a potentially hot surface.
- Employees shall use extension tools/equipment to reach around hot surfaces.
- Employees shall use a pocket mirror to see behind hot surfaces.

## Loud Noises

### Hazards:

- Chillers
- Motors
- Air compressors
- Boilers
- Cooling towers
- Industrial equipment

### Risk Management:

#### *Required PPE*

- Ear plugs

#### *Best Practices*

- Employees shall wear ear plugs anytime they have to raise their voice within 3 feet of another person.

## Pinches

### Hazards:

- Removing/replacing AHU chamber doors
- Setting up ladders
- Using hand tools

### Risk Management:

#### *Required PPE*

- Safety gloves

#### *Best Practices*



- Employees shall be aware of pressure differentials in AHU chambers to avoid catching fingers in the door (or being hit by a door blown open).
- Employees shall discuss with facility staff any known pressurized chambers to be aware of before starting work.
- Employees shall consider shutting off equipment before working if pressurization is strong.

## **Dust & Particulates**

Mechanical rooms, ductwork, and HVAC equipment in general can be very dusty. Pipe insulation may contain fiberglass. These irritants are damaging to the skin, eyes, and lungs.

### **Hazards:**

- Working around insulation
- AHU chambers
- Cooling towers
- Climbing up / down ladders

### **Risk Management:**

#### *Required PPE*

- Safety glasses
- Standard dust mask: when dust/particulate hazards are present (use best judgment for mechanical rooms, working with insulation, etc.)
- N95-rated face mask: when working around cooling towers, swamp coolers, or other equipment that sprays water (to protect against Legionnaire's disease)

## **Inclement Weather**

### **Hazards:**

- Rain / Hail
- Lightning
- Tornado
- Extreme cold or heat

### **Risk Management:**

#### *Best Practices*

- Employees shall use best judgment and stop work if inclement weather is hazardous.
- Employees shall not climb ladders with wet surfaces.
- Employees shall evacuate rooftop in the event of lightning.
- Employees shall discuss emergency shelter beforehand with facility if tornadoes are a hazard.
- Employees shall not perform electrical work in disconnects or panels exposed to rainy or wet conditions.
- Employees shall heed the symptoms of heat exhaustion or dehydration: nausea, headache, dizziness, disorientation, etc. If an employee experiences any of these, he/she shall stop working and tell someone immediately. Affected employee shall sit in a cool spot and drink lots of water.

## **Addendum: Summary of Field PPE**

| Protection             | PPE  | When to Use  |
|------------------------|--|--|
| Eye Protection         | (a) Safety glasses<br>(b) Chemical goggles   | (a) Required around mechanical equipment, boxcars, panels, or performing tasks that involve removing panels/ceiling tiles<br>(b) Not required unless site requires |
| Head Protection        | (a) Hard hat<br>(b) Hard hat w/ Arc Shield   | (a) Not required unless site under construction or site requires<br>(b) Required during panel work   |
| Hearing Protection     | Muffs or earplugs  | Required for panel work.<br>Use if a person has to raise their voice within 3 ft of another person to be heard.  |
| Clothing               | Long sleeve Flame-Resistant (FR) & Cotton pants/undergarments<br>Our work is Category 2, and requires Arc Rating (>8 cal/cm <sup>2</sup> ) | Required during field work that involves electrical work   |
| Footwear               | Leather and/or steel-toed lace-up boots<br>ASTM F241311 provides minimum standard for impact (steel-toe) and electric hazard (rubber sole) | Required during field work that involves roofs or equipment spaces   |
| Hand Protection        | (a) Work gloves<br>(b) Lineman gloves w/ leather over-protectors   | (a) Working with tools, lifting, etc<br>(b) Opening panel boxes  |
| Respiratory Protection | (a) Dust masks<br>(b) N95 rated face masks   | (a) Recommended near insulation, dusty spaces, fans, etc.<br>(b) Recommended near cooling towers   |

## Addendum: Procedure for Electrical Access

| Definitions and Procedures |  |
|----------------------------|--|
| Local Disconnect           | The disconnect located at the equipment. Typically the target location for a CT or Dent. It is recommended to stand to the side while operating a disconnect. PPE is not required for operating a disconnect, provided that the enclosure is secured.  |
| MCC                        | Motor Control Center. A common location for multiple panels/switches that control electricity flow to individual equipment disconnects.  |
| Second (Buddy)             | Either a second Carbon Lighthouse employee or a qualified person (such as facility staff or contractor) selected at the discretion of the Carbon Lighthouse employee performing the work.  |
| Remote Disconnect          | A disconnect located separately from the equipment. If present, typically located upstream of the local disconnect, in which case switching off should remove all hazardous energy from the local disconnect.  |
| Capacitors                 | Capacitors may be found in motor starter circuits or chillers. Capacitors store energy and present a hazard even after the circuit is isolated. If you encounter a capacitor, treat the panel as though it were live, even after the circuit is disconnected.  |
| Line Side                  | In a disconnect, the "source" side of the switch that conveys electricity into the disconnect. If no upstream isolation measures are taken, the line side will be live even when the disconnect is off.  |
| Load Side                  | In a disconnect, the "product" side of the switch that conveys electricity out of the disconnect. If the disconnect is switched off, the load side should not be live.   |
| Verify Isolation           | To assess whether the energy present in a panel is as expected, steps must be taken to verify isolation:<br>1) Full electrical PPE must be worn before opening panel.<br>2) Test the voltage probe against a known voltage source (electrical socket, live line side, etc.) to verify probe functionality. If testing a source which is out of reach from the panel, hand probe to second and have them check against the known voltage source.<br>3) Use the voltage probe to verify isolation (zero voltage) in the area of the electrical compartment where work will be performed.<br>4) Re-test the voltage probe against a known voltage source to re-verify probe functionality.<br>5) If voltage probe is not available or is malfunctioning, a voltage sniffer may be used in its place. Note that the voltage sniffer is not as precise in detecting live voltage.   |
| LOTO                       | <p>Lock Out Tag Out. OSHA's standard method for controlling hazardous energy during servicing and maintenance of machines and equipment. If LOTO is required at a project site, there should be standard operating procedures (SOPs) available (or trained personnel) that will show you exact steps.</p> <p><u>Shut down and LOTO Procedure:</u></p> <ol style="list-style-type: none"> <li>1) Prepare for shutdown (notify affected employees).</li> <li>2) Shut down equipment (routine shut down at the unit's HMI, On/Off, etc).</li> <li>3) Operate all isolation devices to de-energize equipment (local disconnect and MCC). If the facility has an order preference between local disconnect and MCC, follow their procedure. Else, if the load interrupting rating is available for both, operate the higher rated device first.</li> <li>4) Apply LOTO devices. Keep LOTO key on your person at all times.</li> <li>5) Verify equipment energy isolation (press start button, use voltage probe).</li> <li>6) Perform work.</li> </ol> <p><u>Start Up Procedure:</u></p> <ol style="list-style-type: none"> <li>1) Prepare for start up (notify affected employees)</li> <li>2) Remove LOTO devices</li> <li>3) Operate all isolation devices to re-energize equipment</li> <li>4) Perform routine start up procedures for equipment</li> </ol> |
| Full Electrical PPE        | <ul style="list-style-type: none"> <li>• Flame-Resistant long-sleeve shirt and pants (arc rating &gt; 8 cal/cm<sup>2</sup>)</li> <li>• Optional undershirt (must be 100% cotton)</li> <li>• Lineman gloves with leather over-protectors (inspect lineman gloves for wear prior to use). Be sure to secure the loose straps on the over-protectors.</li> <li>• Voltage Probe - must be category III or higher in rating (inspect leads and wires for damaged insulation prior to use)</li> <li>• Insulated (electric hazard rated) steel-toed boots (per ASTM F2413-11)</li> </ul> <ul style="list-style-type: none"> <li>• Ear plugs</li> <li>• Safety glasses</li> <li>• Hard hat with arc blast shield</li> <li>• Only belts with no metal components; otherwise, belt removed</li> <li>• Remove watches, rings, and all other jewelry from the hands and wrists.</li> </ul> <p>Remove cell phone, wallet, and all other items from pockets.</p>   |

| Access Scenario   | Process  | PPE Required  | Additional Notes   |
|---|--|---|--|
| <b>Local Disconnect Off and Upstream MCC or Disconnect Off (No Hazardous Energy Present)</b><br><br><b>Best</b> | 0) Onsite with a second (buddy)<br>1) Put on Full Electrical PPE<br>2) Inspect wires for hazards<br>3) LOTO: Yes<br>4) Verify Isolation<br>5) (Optional) Reduced PPE<br>6) Perform work<br>7) Close panel/disconnect<br>8) Re-energize equipment | <b>During LOTO procedure:</b> Full Electrical PPE<br><b>After isolation is verified:</b> You may remove lineman gloves with leather over-protectors and hard hat with arc blast shield, only if you and facility have verified no capacitors are present. | Even after performing LOTO, the second must continue to observe the work being performed.<br><b>Reasons why you may work in a LOTO situation without PPE:</b><br>Tight wires / need dexterity (no lineman gloves)<br>Visual impairment (can't see with blast helmet on)<br>Organize loose wires (from our dataloggers)   |
| <b>Disconnect Off, Line Power Present</b><br><br><b>Practical</b>   | 0) Onsite with a second (buddy)<br>1) Put on Full Electrical PPE<br>2) Inspect wires for hazards<br>3) LOTO: No<br>4) Verify Isolation<br>5) Perform work<br>6) Close panel/disconnect<br>7) Re-energize equipment                               | Full Electrical PPE   | Full Electrical PPE must be worn at all times if LOTO is not performed, regardless of whether hazardous energy is present.   |
| <b>Disconnect Off, Line Power Present</b><br><br><b>Practical</b>   | 0) Onsite with a second (buddy)<br>1) Put on Full Electrical PPE<br>2) Inspect wires for hazards<br>3) Verify Isolation<br>4) Perform work<br>5) Close panel/disconnect<br>6) Re-energize equipment  | Full Electrical PPE   | All efforts shall be made to install equipment on the <b>load side</b> of the switch.  |
| <b>Live Panel Work</b><br><br><b>Only If...</b>   | 0) Onsite with a second (buddy)<br>1) Put on Full Electrical PPE<br>2) Inspect wires for hazards<br>3) Perform work<br>4) Close panel/disconnect   | Full Electrical PPE   | <b>Reasons why a panel cannot be shut down:</b><br>Sensitive/critical equipment<br>Shutdown triggers unmanageable equipment alarms<br>Complicated restart of equipment<br>Facility person not willing to shut down<br>Shut down would cause life safety hazard<br><b>Questions to ask yourself before Live Panel Work:</b><br>Is this measurement critical to the project?<br>Can you come back at a later/earlier time and shut down? |
| <b>Never</b>  | Access a panel without a buddy<br>Access a panel without proper PPE<br>Perform work in a panel with loose wires  | N/A   |  |