



RISK MANAGEMENT
SAFETY AND
LOSS CONTROL

Risky Business

SAFETY & LOSS CONTROL NEWS — MAY 2021

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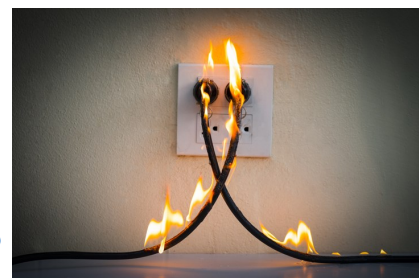
**THIS
MONTH'S
SAFETY
EMPHASIS IS
ELECTRICAL
SAFETY**

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The Shocking Truth

We rely on electricity in almost everything we do. As a source of energy, electricity is used without much thought to the hazards it can pose. Because it is a familiar part of our day to day lives, it is often treated without the proper precautions. A four-year study by the National Fire Protection Agency reported 9,760 electrical injuries in the United States, an average of 1,952 annually. When working with electrically-powered equipment, electrical hazards, such as shock and the potential for fire, are present. These hazards are found at home and at work. Electrical accidents at work usually occur as a result of faulty or defective equipment, unsafe installation, or misuse of equipment. All workers should treat electrical equipment and components with caution.



~Kayvan Vafa

A Step in the Wright Direction

by Norman Wright

In the early nineties, I spent time with the Bureau of Land Management and the Army Corps of Engineers in hydroelectric dams in northern California and the Great Northwest (Oregon, Washington,



Inside a penstock

Idaho, and Montana). I would later spend time in Arizona and Nevada at Hoover Dam. I was usually on-site when turbines were being refitted or replaced with a portion of the electrical plant down for service (usually only one turbine at a time). Turbines can vary in size from those that are too small for a person to enter to those several people can comfortably stand side by side. Penstocks are the tubes that bring the water from the reservoir or lake to the turbines. They vary in size from 18 inches to 18 feet, depending on the side of the turbine they service.

(SEE WRIGHT PAGE 2)

**Electric Shock:
As little as 24 volts can be fatal.**

Wright Direction *continued...*

When completed in 1949, Hoover Dam was the world's largest hydroelectric installation. There are two power plants at the dam's base, each *650 feet long*, with nine turbines on the Arizona side and eight on the dam's Nevada side. The original turbines were upgraded and replaced between 1986 and 1993. Each year, Hoover Dam generates 4.5 billion kilowatt-hours of hydroelectric power for 1.3 million users in Nevada, Arizona, and California.

So what exactly is a **kilowatt-hour**? A kilowatt-hour (kWh) is a unit of measurement that equals the amount of energy you would use if you kept a 1,000-watt appliance running for an hour:

- A 100 watt light bulb takes 10 hours to rack up 1 kWh of energy
- A 2,000 watt appliance uses 1 kWh in just half an hour, and
- A 50-watt item stays on for 20 hours before it uses 1 kWh.

Impressive as the power produced by Hoover Dam may be, it is important to recognize that a mere 42 volts with the right amperage can be deadly. There is an adage: “***It's not the volts that kill you, it's the amps.***” While this is a true statement, it isn't the whole story. So, what are **volts** and **amps**?

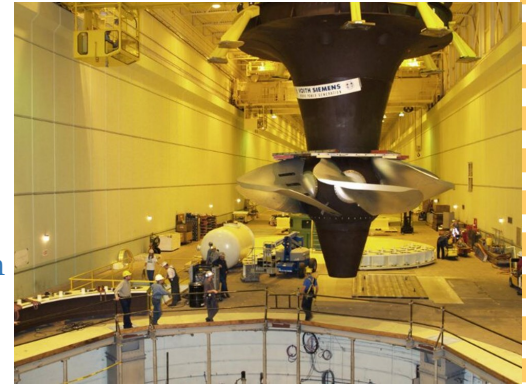
Amps (A) are units used to measure electric current, the flow of electrons passing a given place over a period of time. The current does not happen on its own; it needs energy. Voltage is an expression of electrical energy. Volts (V) are the units used to measure this energy. Watts (W) is a unit of power. It is derived by multiplying the number of volts by amps ($V \times A = W$). For example, if you have a current of 2A and a voltage of 10V, the power is $2A \times 10V = 20W$.

Watching the flow of water through a garden hose, sometimes it flows quickly, sometimes slowly. It depends on the water pressure or its *current*. Amps are like the volume of water and volts are like the water pressure. Amps measure the amount of electricity in a current and volts measure that electricity's strength. Given this information, which is more dangerous, volts or amps? The answer is both!

It is essential to handle all situations involving electricity with caution. Staying away from downed power lines may be obvious, but we may do many little unsafe things without thinking.

- **Plugs:** When unplugging an electrical cord, do not grab the cord and yank. Take the plug firmly in your hand

Replacing a turbine



(SEE WRIGHT' DIRECTION PAGE 4)

AVOID THE 3-C'S

Here are places where COVID-19 spreads more easily:

1

Crowded Places
with many people nearby

2

Close-Contact Settings
especially where people have close range conversations

3

Confined & Enclosed Spaces
with poor ventilation

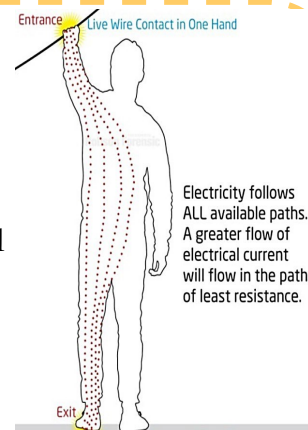
1
2
3

Even as restrictions are lifted, consider where you are going and stay safe by avoiding the 3-C's

Understanding Electrical Injuries

Humans are good conductors of electricity. People are injured by electricity when they become part of an electrical circuit (e.g., if a person comes into contact with an open electrical circuit, they will receive a shock). The electrical current will pass through the body from one point to another causing pain, burns, damage to the tissues, nerves and muscles. There are four main types of electrical injuries: electrocution (fatal), electric shock, burns, and falls.

These injuries can happen in various ways:



Direct contact with exposed energized conductors or circuit parts can interfere with the normal electrical signals between the brain and our muscles (e.g., heart may stop beating properly)

Electrical arcs from an exposed energized conductor or circuit part (e.g., overhead power lines) through a gas (such as air) to a person who is grounded

Thermal burns (e.g., from heat generated by an electric arc, flame burns from materials that catch fire by heating of electrical currents, electric arc flash)

Ultraviolet (UV) and infrared (IR) light emitted from an arc flash can cause damage to the eyes

An arc blast can include a pressure wave released from an arc flash. This wave can cause physical injuries, collapse the lungs, or cause hearing damage

Muscle contractions, or a startle reaction, can cause a person to fall from a ladder, scaffold or aerial bucket

Wright Direction *continued...*

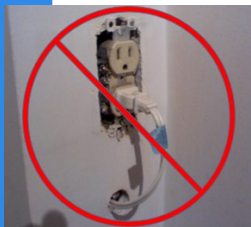
and pull it out of the outlet. Yanking the cable immediately or over time will cause the cord to separate from the plug and loosen connections in the plug. The exposed bare wires could shock the user or the wires inside the cord could touch each other, short out, and lead to an arc and fire.

- **Overloaded outlets and power strips:** It may be convenient to have all your technology plugged into a single power strip, but that convenience may be too good to be true. If there are too many devices plugged into one power strip, you could overload the power strip or outlet and cause a fire.



- **Covered Electrical Cords and Wires:** Heavy covering of wires with carpeting and rugs can make the cords overheat. While rare, the covered cords and wires can lead to electrical fires. Only approved cable bridges should be used to cover power cords.

- **Extension Cords:** Are only temporary solutions to electrical needs, not to be used as permanent wiring. Extension cords are responsible for approximately 3,300 structure fires every year. The best protection is:



- ◇ Do not plug extension cords or power strips into one another, known as “daisy-chaining.”
- ◇ Inspect cords for damage before use.
- ◇ Never run cords through walls or under doors.
- ◇ Do not use cords in place of installed wiring.
- ◇ Do not allow the cords to rest in water.

- **Damaged or missing cover plates on outlets:** Damaged cover plates expose wiring, leading to electrical shocks, burns, and electrocutions. They should be covered to prevent accidental contact.

- **Amateur handiwork:** Replacing electrical outlets and switches without ensuring that the lines have been de-energized has led to shocks, burns, and electrocutions. An amateur is often anxious to complete a small job without interfering with other electrical use in a home. They may attempt to repair without first turning off the power or the correct circuit to the fixture they are working on.

- **Wet Hands:** Electrical appliances and tools should never be handled with wet hands as this increases the chance of getting an electric shock. Too many of us tend to reach for a hairdryer with wet hands after leaving the bath or shower. Keep appliances a safe distance away from sinks, bathtubs, showers, and taps. Ensure that appliances operated around water use a ground-fault circuit interrupter (GFCI) to prevent electrocution. GFCI is a fast-acting circuit breaker designed to shut off electric power in the event of a ground-fault within as

(SEE WRIGHT DIRECTION PAGE 10)

Important Safety Training Dates for 2021

In-person training classes are still suspended, but there are plenty of safety training classes available online at Vector (formerly Target) Solutions and the County's Intranet! We are also excited to present a new offering of classes via ZOOM meetings. Consider these safety and compliance classes:

General Coronavirus Training in Vector Solutions:

- Courses - Coronavirus 101 - What You Need to Know (Newest Version)
- Courses - Coronavirus 102 - Preparing Your Household
- Courses - Coronavirus 103 - Managing Stress and Anxiety
- Courses - Coronavirus 104 - Transitioning to a Remote Workforce
- Courses - Coronavirus 105 - Cleaning and Disinfecting Your Workplace
- CCC - COVID-19 Safety Training
- COVID-19 - Reporting Positive Results to Public Health
- Tailgate - CCC Emergency Evacuation Procedures during COVID-19

COVID-19 Training webinars at [COVID-19 Resources](#) on the County Intranet:

- COVID-19 Training: AB 685 & Cal/OSHA Emergency Regulations
- COVID-19 Prevention Program - 03-23-2021
- COVID-19 Vaccination Webinar 02-02-2021

General Safety Training:

- CCC Injury and Illness Prevention Program (IIPP) Training
- CCC Wildfire Smoke Safety for Employees
- CCC Driver Safety Training
- CCC Office Ergonomics Awareness Training
- CCC Emergency Evacuation Procedures - All County

Log into the Vector Solutions website at www.targetsolutions.com/ccc for the full list of ONLINE and ZOOM classes available now!

TargetSolutions is Becoming
Featuring integrated learning and performance solutions for the public sector... so you're ready for what's next.



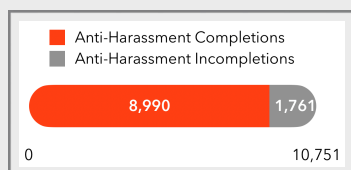


TRAINING TIME

...is *all* the time!

Compliance Trainings

- ✦ [Anti-Harassment for Non-Supervisory Personnel](#)
- ✦ [Anti-Harassment for Supervisors and Managers](#)



Upcoming Trainings for 2021

Implicit Bias Awareness (Zoom)

- Tuesday, May 11th
- Tuesday, May 18th
- Wednesday, May 19th

Implicit Bias for Supervisors and Managers (Zoom)

- Tuesday, May 25th
- Wednesday, May 26th

VSPOC Training (Coming Soon!)

- Dates will be on the Vector Solutions Bulletin Board.

Training Time Resources

- ✦ [A Powerful Lesson on Time Management](#)
- ✦ [Pomodoro Technique](#)

Target Solutions Becomes Vector Solutions

While the site may be operating under a new name, its functions remain the same. The e-learning platform, Vector Solutions—formerly known as “Target Solutions”—continues to provide compliance and professional development trainings for Contra Costa County’s workforce. At this time, the course library will remain the same, meaning that courses that are currently available will continue to be offered. You can assign required courses and courses of interest to yourself by logging into Vector Solutions and using the “Self-Assign” function, located in the column on the left-hand side of the screen. The link to the Vector Solutions website is also the same, and is displayed in the computer screen in the bottom right-hand corner of this page.

Delving briefly into the topic of Anti-Harassment training, the Training Unit would like to thank everyone who assisted in the assignment of the Anti-Harassment training to staff, and to every employee who took the Anti-Harassment training. We, especially, would like to recognize the Vector Solutions Point of Contacts (VSPOCs), previously known as “TSPOCs,” for their hard work and dedication to increasing the Anti-Harassment completions count. As a result of their due diligence, the County saw *significant* progress in our Anti-Harassment training completions. We appreciate you!

The next compliance training that will be cast in the spotlight is Workplace Diversity, which is also available on Vector Solutions. This training became mandatory with a 1991 Board Order that stated that employees must be trained on Workplace Diversity. Workplace Diversity must be completed by every Contra Costa County employee and contracted worker every three years. Contracted workers include, but are not limited to: employees who work for companies that are contracted by Contra Costa County,

individuals with whom Contra Costa County holds a contract, temporary employees, and retired annuitants. If you are unsure of your Workplace



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Diversity training status, you can check to see if you have completed the training by logging into Vector Solutions and clicking on “My History” in the left-hand column. If Workplace Diversity is listed with a completion date that is within the last three years, you are in compliance. If you are not in compliance, this training can be self-assigned and taken on Vector Solutions.

Running into issues with Vector Solutions? Ask your department’s Vector Solutions Point of Contact (VSPOC)—formerly titled a “Target Solutions Point of Contact (TSPOC)”—for assistance. Each VSPOC is equipped with the knowledge and resources to troubleshoot common Vector Solutions issues and answer frequently asked questions. If you continue to experience **access** difficulties, please contact our Vector Solutions Support Team at vectorsolutions@riskm.cccounty.us. If you experience **technical** difficulties (e.g., browser issues), please contact your department’s designated IT personnel.

Back to Basics: Electrical Cord Safety

Electrical cords, whether hardwired to equipment, extension cords, or power strips, are present in nearly every office environment. The Electrical Safety Foundation International reports that each year, approximately 4,000 injuries associated with electric extension cords are treated in hospital emergency rooms. Half of these injuries involve fractures, lacerations, contusions, or sprains from people tripping over extension cords. Improper use and damaged extension cords can also cause fires. It is important to never become complacent when using equipment with cords or extension cords. To use this type of equipment safely, follow these basic safe work practices:

Heavy reliance on extension cords may indicate there are too few outlets to address power supply needs. Have additional outlets installed where you need them

Verify the extension cord or temporary power strip is rated for the equipment to be plugged in and is marked for either indoor or outdoor use

The equipment being used with the cord will have a wattage rating on it. Match this to the extension cord and do not use a cord that has a lower rating

Buy only cords approved by an independent testing laboratory, such as Underwriters Laboratories (UL)

Multiple plug outlets must be plugged directly into mounted electrical receptacles; they cannot be chained together

Use extension cords with polarized and/or three-prong plugs

Do not overload extension cords or allow them to run through water.

Do not substitute extension cords for permanent wiring.

Do not run extension cords through walls, doorways, ceilings or floors. If a cord is covered, heat can't escape, which may result in a fire.

Never use three-prong plugs with outlets that only have two slots for the plug. Do not cut off the ground pin to force a fit.

Never use a cord that feels hot or is damaged. Touching even a single exposed strand can cause an electric shock or burn.

Electrical Safety and Portable Ladder Use



You would never hold a metal rod in your bare hand and purposely touch it to an energized power line, would you? Of course you wouldn't. And for the same reasons, you should never use a portable ladder with side rails made from aluminum or other conductive material near energized power lines. The same applies when performing work on or near electrically energized equipment. Contacting an energized line or equipment while standing on or touching a metal ladder provides electricity a path to ground, which can lead to shock and electrocution. Electricity can cause direct hazards, such as burns, as well as lead to falls from portable ladders. When using a portable ladder where electrical hazards are present, follow these safe work practices to avoid injury:

- The best choice when working with or near electrical hazards is a ladder made with fiberglass or fiber-reinforced plastic side rails; these materials do not normally conduct electricity. Wood ladders that are dry and well maintained are also considered to have non-conductive side rails. However, a wooden ladder could conduct electricity if it gets wet or lies in water for an extended period of time and becomes waterlogged.
- Always use a ladder manufactured with non-conductive side rails (e.g., fiberglass or wood) when working anywhere near overhead electrical lines. This helps prevent you from being electrocuted if your ladder (or you) makes accidental contact with an energized power line.
- Always use a ladder with non-conductive side rails any time you are performing work on or near potentially energized electrical equipment; for example, wiring a fixture, drilling a hole in a wall that contains electrical wiring, or even changing a light bulb.
- Set up the ladder far enough away from electrical lines so that contact between the ladder (or you) and the line is not possible if the ladder unintentionally falls to the side, towards the electrical line.
- Be mindful of the length of any materials you are handling when working from a ladder near energized lines or exposed conductors. If the material is long enough to make accidental contact with them (such as a semi-rigid metal cable), you should reposition the ladder further away to avoid unintentional contact.
- Remember that you do not have to make direct contact with an electrical line to be electrocuted. The electrical current from an electrical line can arc, or jump, several feet, so simply avoiding direct contact with a line when working on a ladder is not adequate protection in itself. You must also maintain a minimum safe distance of 10 feet away from power lines



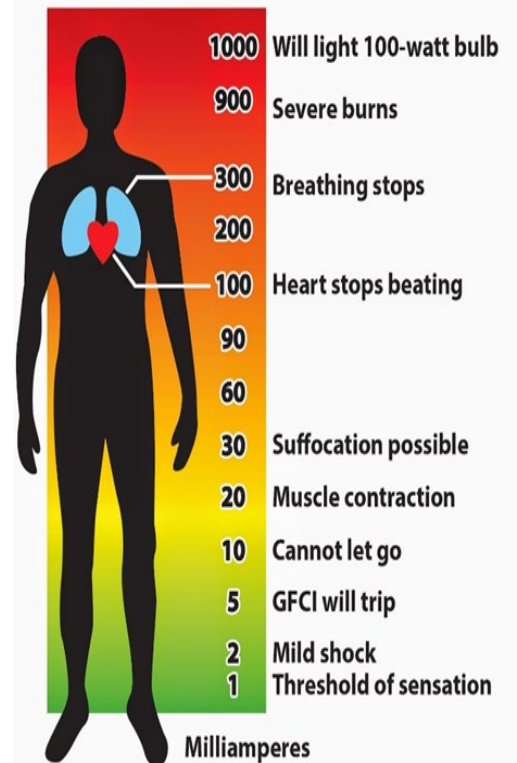
Wright Direction *continued...*

little as 0.025 seconds.

It would seem that a shock of 10,000 volts would be more deadly than 100 volts. This is not necessarily so. Household appliances using just 110 volts have electrocuted individuals. While any amount of current over 10 milliamperes (0.01 amp) can produce painful to severe shock, currents between 0.1 to 0.2 amps can be lethal. Currents above 0.2 amps produce severe burns and unconsciousness, but do not always cause death if the victim receives *cardiopulmonary resuscitation* immediately. As indicated above, with the right amperage, a low voltage of 24 volts can kill. In a like manner, high voltages are not always lethal. Harry F. McGrew from Huntington Canyon, Utah, came in contact with a 340,000-volt transmission line and survived; the highest known voltage received by an electrocution survivor.

Respect the amp and the volt. Don't be a shocking statistic; follow electrical safety practices at home and work. **

Electricity's Effects



Downed Power Lines

Power lines can become damaged or fall for many reasons. Severe weather events, such as high winds or heavy ice, can knock over supporting structures and cause trees to impact and break lines from excessive weight. Continued exposure to the elements, such as normal rainfall, ultraviolet light, and normal wind conditions, can deteriorate and damage supporting structures and power lines, causing them to fail and potentially fall. If you see a downed power line, follow these basic safe practices and procedures to keep yourself and others safe:

- ⇒ Always treat downed power lines as energized. Even if they don't hum, spark, or 'dance,' downed lines can still be energized
- ⇒ Keep a safe distance (as far as possible, but never closer than 30 feet)
- ⇒ Carefully shuffle away from the line, maintaining contact with the ground, and anything it may be in contact with. Instruct others in the area to do the same
- ⇒ Call 911 and the electric company to report the line
- ⇒ Downed lines are most common after storms and high winds. If you are outside after a storm, be alert for lines that may be obscured by streams or standing water
- ⇒ Never drive over a downed power line
- ⇒ Keep children and pets away from downed power lines



Lockout/Tagout - Zero Energy for Safety



Lockout/Tagout (LOTO) refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during cleaning, set-up, servicing, repair or adjusting activities. It is critical that employees are trained as authorized persons to perform LOTO, and that other employees that see locks and tags on equipment never, under any circumstance, attempt to remove or bypass these safeguards.

Hazardous Energy: Many employees may only think of electricity as a form of hazardous energy, but there are many others. When performing LOTO, all forms of hazardous energy for a piece of equipment or machinery must be identified, isolated, and where applicable, dissipated or blocked to protect employees. In addition to electricity, other examples of hazardous energy that may be present include:

- Mechanical
- Hydraulic
- Pneumatic
- Chemical
- Thermal

LOTO Hardware: When performing LOTO, all hazardous energy isolation points must be fully controlled to prevent accidental re-energization. This is accomplished by using specific LOTO hardware, locks, and tags. There are various types of hardware available to effectively protect hazardous energy isolation points, such as valves and circuit breakers, from being able to be re-energized when employees are working on equipment or machinery. Each isolation point and/or device must be secured using a lock and tag. Additional information on LOTO locks and tags includes:



- Each lock is individually keyed
- Locks are identified as being used for LOTO purposes only
- Keys are never to be shared by employees



- A tag must accompany each LOTO lock
- Must contain the employee's name and phone number, at minimum
- Tags can only be used for LOTO purposes

Start/Stop buttons, selector switches, interlocks, and software controls cannot be used as a means of energy isolation

Lockout/Tagout - Zero Energy for Safety *continued...*

Written LOTO Procedures: When performing LOTO, there is a sequence of steps that must be followed to ensure that all forms of hazardous energy have been identified, isolated, and when applicable, dissipated or blocked before work can begin. Each piece of equipment or machinery must have a specific, written procedure in place that employees must follow. Written procedures must be reviewed at least annually and include the following information:

- Scope (name of the specific equipment for which the procedure is written), Purpose (what the procedure is intended to do), Authorization (who is authorized to use the procedure)
- Steps and techniques to use to shut down, isolate, block, safe release, secure stored or residual hazardous energies, and verify zero energy state
- Steps for the safe placement, transfer, and removal of LOTO devices and responsibility for them, and requirements for testing to determine and verify zero-energy
- Steps for the authorized employee to notify affected employees before LOTO devices are applied and before they are removed from the machines or equipment

Training: Before an employee can perform LOTO, they must be adequately trained. California's Division of Occupational Safety and Health requires different levels of training for authorized and affected employees. Definitions and training requirements for authorized and affected employees is provided below:

- **Authorized Employee:** A qualified person who locks out or tags out specific machines or equipment. These employees must be trained on hazardous energy control procedures and on the hazards related to performing activities required for cleaning, repairing, servicing, setting-up and adjusting prime movers, machinery and equipment
- **Affected Employee:** An employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout or tagout, or whose job requires the employee to work in an area in which such activities are being performed under lockout or tagout. These employees must be instructed in the purpose and use of the energy control procedure **Affected employees are not allowed to perform LOTO.**

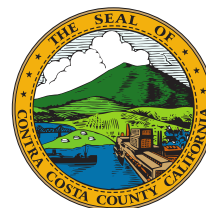


Even if an equipment-specific procedure is in place, that does not grant permission to Affected Employees to perform LOTO

Public Safety Power Shutoffs

Power outages are not only inconvenient, but they also pose safety risks to employees and visitors alike when they occur at the workplace. A public safety power shutoff, or PSPS, is a planned shutoff of power which occurs when severe weather events occur. These events are scheduled by Pacific Gas and Electric (PG&E) and typically occur during times of elevated temperatures and high winds. They are a safety measure aimed to prevent the start of large wildfire events.

Although not all County facilities may be in a high fire-threat area or an area experiencing high winds, power may be shut to your building if it relies on a line that runs through an area with severe weather. Power lines aren't always connected according to neighborhood, so power to your facility could stay on, while a nearby facility could be turned off. Here are some tips to help your facility minimize the impacts of these events.



RISK MANAGEMENT
SAFETY AND
LOSS CONTROL

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Dedicated to
preventing
injuries and
illnesses.

**CONTACT
US!**

PREPARE FOR A POWER OUTAGE



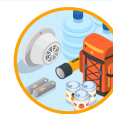
Establish a clear plan before an emergency.

Include step-by-step instructions for employees so there is no confusion about what they should do in different scenarios. Practice your plan to find problems and answer questions before it's too late.



Familiarize your employees with emergency equipment.

As you develop your emergency plan, check that emergency equipment, like fire extinguishers and backup generators, will be easily accessible in an emergency and your employees know how to operate them safely.



Keep your employees safe.

Make sure that smoke alarms, fire sprinklers, and other safety equipment are working properly. Put together an emergency kit with enough supplies (food, water, flashlights and batteries) for all employees and customers if an emergency occurs during peak business hours.

Additional Safety Precautions

The following are precautions that should be taken for protecting occupants and equipment when power outages occur in the workplace:

- ⇒ Shut off any electrically-powered equipment that was operating when the power went out
- ⇒ Turn off any heat-producing equipment to minimize fire hazards when the power returns
- ⇒ Stay clear of points of operation and other parts of machinery that could move or cycle unexpectedly when the power returns
- ⇒ When power returns, bring equipment back online in stages to avoid straining the building's systems

Learn more about PSPS events by visiting <https://www.pge.com>