Wildfire Smoke - A Particulate Problem

In response to the health threats from wildfires that have grown in intensity and frequency in California, California’s Division of Occupational Safety and Health (Cal/OSHA) created emergency regulation §5141.1 to protect employees from the hazardous effects of wildfire smoke. Smoke from wildfires contains chemicals, gases and fine particles that can impact the health of employees. The greatest hazard comes from breathing fine particles in the air, which can reduce lung function, worsen asthma and other existing heart and lung conditions, and cause coughing, wheezing and difficulty breathing. While outdoor workers are at higher risk, all employees should understand how to protect themselves by taking steps to learn about and prevent exposure to harmful smoke generated during wildfires.

~Kayvan Vafa

A Step in the Wright Direction

Traditionally, a Blue Moon refers to a second full moon in the same calendar month. The full moon cycle is approximately 29.5 days. Thus, there are 12 to 13 full moons every year, while a Blue Moon typically occurs every two to three years. In 2018, unusually, we had two blue moons in one year and only two months apart. The next year with two blue moons will be 2037.

In 1936, Richard Rodgers and Lorenz Hart penned the lyrics and melody to “Blue Moon.” It would be 14 years before people from British Columbia to Europe would view a moon that appeared to be blue. The Chinchaga Fire started by a human near Fort St. John, British Columbia, on June 1, 1950, burned out of control for five months until October 31, 1950. Approximately 3.5 to 4.2 million acres of boreal forest burned. The “1950 Great Smoke Pall,” as it came to be known, was observed across eastern North America and Europe. The massive wildfire was not well-publicized, as the smoke was mainly in the upper atmosphere and could not be smelled. Its atmospheric haze gave the sun and the
Wright Direction continued...

moons an unusual blue hue.

The smoke from wildfires usually gives a red or orange hue to the sun in the moon, as we have seen with past wildfires. Blue light is scattered by particles less than 1 micron (μm) in size. When the uniform particles in the smoke are greater than the wavelength of red light (0.7μm), red light is scattered, and a blue hue is cast. This atmospheric phenomenon more predominately occurs from volcano eruptions, such as Krakatoa, Mount St. Helens, or Mount Pinatubo, but also may happen with large wildfires. In the western United States and Canada, ash or oily smoke containing lots of 1μm particles may give the moon a blue appearance.

We are now in wildfire season. Winds, predominately from the north, feed wildfire with oxygen while driving the fire and the smoke in our direction. As a result, we may experience smoke from fires hundreds of miles away from us.

Wildfire smoke comprises a complex mixture of gases and fine particles produced when trees, plants, buildings, and other organic materials burn. Components of wildfire smoke include particulate matter, carbon dioxide, carbon monoxide, water vapor, hydrocarbons and other organic chemicals, nitrogen oxides, and trace minerals.

The smell associated with smoke is primarily from the particulate matter, not the gases. The smoke odor remains...
5 Ergo Tips for Comfort

1. Position your body. Use the ergonomic checklist on page 11 to correctly adjust your workstation and body posture for comfort.

2. Pace yourself. Consider how and when you take breaks. Take a body and eye microbreak for 20-30 seconds for every 20-30 minutes of work. This gets your heart pumping and sending refreshing, oxygenated blood throughout your body:
   - Look away from your monitor and focus at a point across the room.
   - Shake your arms and hands at your sides or over your head
   - Stand up and walk in place
   - Walk to get a print or copy across the room or walk to fill up your water bottle

2. Ask for help when you need it. Talk with your supervisor about the pace of work and ask about prioritizing items so you don’t get overwhelmed.

3. Get ergonomics training, through Vector Solutions or check out the Risk Management intranet site for ergonomics and lifting training tailgate topics.

4. Report concerns. If you’re feeling any pain or discomfort related to your job or workstation set-up, notify your supervisor or safety coordinator and request an ergonomic evaluation.

Wildfire Smoke Health Hazards

Wildfire smoke contains various gases and chemicals. Exposure to wildfire smoke can make anyone sick, but people with asthma, chronic obstructive pulmonary disease (COPD) or heart disease, and children and pregnant women are at higher risk. Exposure to wildfire smoke can cause various symptoms, including coughing, trouble breathing, wheezing, stinging/watering eyes, runny nose, headaches, and fatigue.

The greatest health hazard comes from the inhalation of very fine particulate matter (PM). As illustrated to the right, PM with a diameter of 2.5 microns in diameter (PM2.5) is smaller than dust, pollen, and mold. This enables the particles to be inhaled very deeply into the lungs, where they can become lodged within the lungs. The longer individuals are exposed to wildfire smoke, the greater the risk of illness.
after hazardous gas has been diluted or replaced. The primary health threat in smoke comes from fine particles. Fine particles can penetrate deep into the lungs, causing a range of health problems. Strategies to limit exposure include:

- Staying indoors
- Limiting physical activity
- Reducing indoor air pollution sources
- Effectively using air conditioners with high efficiency filters, and
- Using respiratory protection appropriately during outdoor activities

During a wildfire smoke event, the most common advice is to stay indoors, where you can control the environment. Whether at home, in public settings, or the workplace, indoor environments with filtered air and climate control can relieve smoke and heat. While the smoke odor may still be detectable, building high-efficiency heating, ventilation, and air-conditioning (HVAC) filters (rated MERV 13 or higher) will reduce indoor particle concentrations.

In September 1950, the Richmond Times-Dispatch reported, “For several days beginning on Sept. 24, the sun looked oddly dimmed with shades of blue, copper, amber, silver, orchid, pink, and purple. Just to our north, the light of that Sunday afternoon was snuffed entirely as if a solar eclipse came unannounced.”

“Millions from Michigan to Ontario to New York flicked on car headlights, streetlamps, and radios. Unbothered, afternoon ballgames carried on under stadium lights. Others were unnerved by fears of an atomic attack, a secret government test gone wrong, or the end of the world itself. But the phenomenon had nothing to do with Sovi-ets or flying saucers.” Instead, it was smoke from a wildfire in Canada. Though thousands of miles away, millions felt the impact of the Chinchaga Fire. They did not smell the smoke but were affected nonetheless.
Important Safety Training Dates for 2021

Most in-person training classes are still suspended, but there are plenty of safety training classes available online at Vector Solutions and the County’s Intranet! We are also excited to present a new offering of classes via ZOOM meetings and hybrid combinations of online/skills demonstrations. 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 (Annual requirement)
- CCC Driver Safety Training
- CCC Office Ergonomics Awareness Training
- CCC Emergency Evacuation Procedures - All County
- CCC HSD 2020 Workplace Violence Prevention
- TAILGATE - Workplace violence
- TAILGATE - Shelter in Place Procedures - Violence

Log into the Vector Solutions website at [www.targetsolutions.com/ccc](http://www.targetsolutions.com/ccc) for the full list of ONLINE, ZOOM, and HYBRID classes available now!
Into the Realm of Compliance Trainings

Trainings that are mandated by the Board of Supervisors or required due to a state or federal regulation qualify as compliance trainings. Helping organizations minimize risk, compliance trainings help create a safer workplace, increase productivity, reduce absenteeism, and protect the organization’s reputation. Common compliance trainings include: Anti-Harassment, Diversity, Data Protection and Privacy, Cybersecurity, Business Ethics, and Workplace Safety. In Contra Costa County, the frequently mentioned compliance trainings are Anti-Harassment, Workplace Diversity, and the General Mandated Child Abuse Reporting.

Sometimes, trainings only need to be taken by employees in specific job positions and, sometimes, non-management and management personnel have to take different versions of the same training. So, how do you know which compliance trainings you should be taking? Posted near the top of the Vector Solutions Bulletin Board is a document called “Compliance Trainings and Frequencies.” In the document, the titles of compliance trainings, the target audiences, and the frequency with which employees must complete the trainings are provided. All of this information can be accessed simply by logging into Vector Solutions and clicking on the “Compliance Trainings and Frequencies” link. Using this resource to stay in-the-know about which trainings must be completed is a great first-step towards ensuring that you remain in compliance with County trainings.

If, after visiting the Compliance Trainings and Frequencies page, you discover that you need to complete compliance training(s), you can assign Vector Solutions trainings to yourself and complete them by logging into Vector Solutions at http://www.targetsolutions.com/ccc. Type the name of the course that you wish to complete into the search bar and click on the course when it appears in the box below the search bar. Click on “Launch Course,” and the training will begin. Vector Solutions trainings are self-paced, meaning that your
progress will be saved if you choose to complete trainings in more than one sitting. If you need to navigate back to a training, log in to Vector Solutions and click on “My Assignments” in the left-hand column of the Home page. Click on the desired training, and you will be able to continue from your previous stopping point.

Running into issues with Vector Solutions? Ask your department’s Vector Solutions Point of Contact (VSPOC) for assistance. Each VSPOC is equipped with the 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.

1 Compliance Training: Definition, Theories, and Examples

Your Checklist of Nine Ergonomic Comfort Adjustments

What does “good” ergonomics look like in the office?

For the sake of simplicity, it really comes down to nine checklist items regarding the relationship of your body relative to the furniture and equipment you use.

Start at your feet and work toward your head to adjust your workstation for comfort.

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Wildfire Smoke Requirements & Exemptions

To help protect employees against harmful exposures to PM2.5 present in wildfire smoke, the California Division of Occupational Safety and Health created the Protection from Wildfire Smoke regulation (§5141.1). The requirements within this regulation apply to workplaces and operations where the current Air Quality Index (AQI) for PM2.5 is 151 or greater, which is classified as ‘unhealthy,’ and when the County should reasonably anticipate that employees may be exposed to wildfire smoke. It is important to understand that certain locations and activities are exempt from the regulations, which are listed below:

- **Enclosed buildings or structures in which the air is filtered by a mechanical ventilation system and the employer ensures that windows, doors, bays, and other openings are kept closed, except when it is necessary to open doors to enter or exit**

- **Enclosed vehicles in which the air is filtered by a cabin air filter and the employer ensures that windows, doors, and other openings are kept closed, except when it is necessary to open doors to enter or exit the vehicle**

- **The employer demonstrates that the concentration of PM2.5 in the air does not exceed a concentration that corresponds to a current AQI of 151 or greater by measuring PM2.5 levels at the worksite**

- **Employees exposed to a current AQI for PM2.5 of 151 or greater for a total of one hour or less during a shift**

- **Firefighters who are actively engaged in fighting wildland fires**

Having the right Minimum Efficiency Reporting Value (MERV) rating for heating, ventilation and air conditioning (HVAC) system air filters is important to help filter out wildfire smoke. MERV ratings range from 1 to 20. True high efficiency (MERV 13-16) filters can remove as much as 95% of the particulates that pass through it. Most furnaces and HVAC systems can accommodate a MERV 13 filter without creating equipment problems, provided that the filter is replaced frequently. Sometimes it can be difficult to tell whether a system can use a higher efficiency filter since HVAC systems are not commonly labeled with any filter recommendations. To be certain a filter will work with your system, consult a professional HVAC technician. MERV 17-20 filters are only used in special commercial applications, such as cleanrooms, and can not be used by most commercial HVAC systems.
Air Quality Index & AirNow

To understand when levels of PM2.5 are hazardous to health, use the U.S. Environmental Protection Agency’s (EPA) Air Quality Index (AQI). This information is based on real-time monitoring data and identifies concentrations of PM2.5 and associated levels of health concern, all of which are color-coded. The AQI is divided into six groups, as shown below:

<table>
<thead>
<tr>
<th>Air Quality Index (AQI) Values When the AQI is in this range:</th>
<th>Levels of Health Concern ...air quality conditions are:</th>
<th>Colors ...as symbolized by this color:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 50</td>
<td>Good</td>
<td>Green</td>
</tr>
<tr>
<td>51 to 100</td>
<td>Moderate</td>
<td>Yellow</td>
</tr>
<tr>
<td>101 to 150</td>
<td>Unhealthy for Sensitive Groups</td>
<td>Orange</td>
</tr>
<tr>
<td>151 to 200</td>
<td>Unhealthy</td>
<td>Red</td>
</tr>
<tr>
<td>201 to 300</td>
<td>Very Unhealthy</td>
<td>Purple</td>
</tr>
<tr>
<td>301 to 500</td>
<td>Hazardous</td>
<td>Maroon</td>
</tr>
</tbody>
</table>

How to Check the AQI

There are various ways to check the current AQI in your area. When the regulations are in effect, the County will check the AQI for PM2.5 before and periodically throughout the work shift. Employees can also check the AQI directly. One of the easiest and most-readily available sources of AQI information is found on the U.S. EPA’s AirNow website, also available as a free app. Simply visit the site, enter your location, and the current AQI for PM2.5 is provided. You can also see the forecast AQI for the following days. There is an interactive map that provides contours for PM2.5 and other useful information for your area. You can sign up for email alerts and updates from the site as well, using the EnviroFlash portal. These alerts will update employees to changing air quality in their area. This information can be especially helpful for Supervisors when planning outdoor work, but all employees are encouraged to sign-up for these alerts.
Blue Moon was a number one hit twice in 1949, recorded by Billy Eckstine and Mel Tormé. In 1961, it became an international number one hit recorded by The Marcels. It has been recorded 214 times by artists such as Frank Sinatra, Ray Stevens, Billie Holiday, Amália Rodrigues, Elvis Presley, Sam Cooke, The Platters, The Mavericks, Dean Martin, Yvonne De Carlo, The Supremes, Cyndi Lauper, Bob Dylan, the Beatles, Beck, and Rod Stewart.

The next Blue Moon (two full moons in the same month) will be August 31, 2023. According to Cal/Fire, there have been over 4,000 wildfire incidents so far in California in 2021, with more than 100 structures burnt.

Understanding N95 Requirements

As previously discussed, we rely on the Air Quality Index (AQI) to know when the regulatory requirements of §5141.1 apply. Depending upon the current AQI, the use of respirators may be enacted. Depending on the AQI value, respirator use may be either voluntary or required. When the AQI for PM2.5 is 151-500, the County will provide approved N95 respirators for voluntary use by employees. N95 respirators must be approved by the National Institute for Occupational Safety and Health. Employees will also be provided Appendix B of §5141.1 to serve as a basic training guide. Voluntary respirator use does not require a medical evaluation or fit test. When the AQI for PM2.5 exceeds 500, respirator use is required. When required to protect employees, medical evaluations and fit tests are required.

Many people have a misconception that the use of a surgical mask, t-shirt, or bandana worn over the nose and mouth will protect against wildfire smoke. This is not the case. An N95 filtering facepiece is the minimum rating needed to protect against the inhalation of PM2.5. In order to be effective, they must make a tight seal with the face. N95 respirators will only protect against particulates. They will not protect users from hazardous gasses or vapors.
Whether working indoors or outdoors, there are various methods to protect against the inhalation of harmful particulate matter in wildfire smoke. The most effective method is to eliminate exposure, which may not always be possible. When implementing protective measures, §5141.1 requires they be implemented based on the hierarchy of hazard controls. The order of these controls, including examples of each, is shown below:

1) Engineering Controls
   Considered and implemented as first controls
   Examples: Mechanical air filtration in buildings and vehicles
   Goal: Reduce PM2.5 levels to an AQI of 150 or lower, or as much as feasible

2) Administrative Controls
   Considered and implemented as second controls
   Examples: Task rotation, shift changes, reduced outdoor work time, increased break frequency and duration
   Goal: Reduce or eliminate exposures when PM2.5 levels are above AQI of 150

3) Personal Protective Equipment
   Considered and implemented as last controls
   Examples: NIOSH approved N95 respirators (or better)
   Goal: Provide a physical barrier against the inhalation of PM2.5

Outdoor Safety
- Monitor the AQI
- Alert your Supervisor to worsening conditions
- Monitor for signs of wildfire smoke exposure
- Use respiratory protection
- Avoid strenuous outdoor work
- If possible, cancel/stop outdoor work

Indoor Safety
- Keep indoor air as clean as possible
- Keep all windows and doors closed as much as possible
- The HVAC system will be operated to minimize the introduction of outside air
- HVAC MERV 13 filters will be inspected and changed quarterly
PG&E will not take any chances with customer safety. High winds can cause trees and debris to contact energized lines, damage our equipment and cause a wildfire. As a result, we may need to turn off power during severe weather conditions for public safety. This is called a Public Safety Power Shutoff (PSPS).

California continues to experience an increase in wildfire risk and a long wildfire season. Given this, PSPS events continue to be a necessary tool for the safety of our customers.

What factors determine when to turn off power?

As each weather situation is unique, we carefully review a combination of factors when deciding if power must be turned off. These factors include:

- **Low humidity levels**, generally 30% and below
- **A forecast of high winds**, above 20 miles per hour and gusts above 30-40 miles per hour
- **A Red Flag Warning** declared by the National Weather Service
- **Condition of dry material** on the ground and low moisture content of vegetation
- **Real-time ground observations** from across the service territory

We may also need to turn off power in areas where there are large amounts of trees tall enough to fall into electric lines during severe weather to help prevent major wildfires.

HOW WILL YOU FIND OUT ABOUT A PSPS?

When possible, you will be notified two days ahead, one day ahead and just prior to the shutoff by calls, texts or emails.

We will send notifications **daily until power is restored**.

Watch for notifications about potential PSPS events from:

- **CALLS** 1-800-743-5002
- **TEXTS** 976-33
- **EMAILS** PGECustomerService@notifications.pge.com

**Note:** It is important that Medical Baseline customers answer the phone and say “hello” or reply “1” to our texts. If you do not respond, we will attempt to notify you in person.

NEW FOR 2021 | ADDRESS ALERTS

Sign up for addresses you care about, such as:

- Your work or business
- Your child’s school or daycare
- The home of a friend or loved one

Visit [pge.com/addressalerts](http://pge.com/addressalerts)
Support for customers before, during and after PSPS events

To reduce the impact of PSPS events, we are listening to our customers and responding to feedback by providing more information and better resources. For the latest event information, visit pge.com/pspupdates.

BEFORE
OUTAGE NOTIFICATIONS
Receive event information up to two days before the shutoff
LOCAL RESOURCES
Find PSPS support organizations in your community
PORTABLE BATTERIES
See if you qualify for a free battery to power medical devices

DURING
COMMUNITY RESOURCE CENTERS
Find safe locations to charge your devices and get basic supplies
MEAL REPLACEMENTS
Find information about participating food banks and food resources
TRANSPORTATION/HOTEL ACCOMMODATIONS
Find support through local organizations if you have a critical power need

AFTER
RESTORATION UPDATES
Receive information about when to expect power to be back on
ONGOING FOOD SUPPORT
Find information about food resources for three days after restoration
PREPARE FOR THE NEXT EVENT
Restock your supply kit and update your emergency plan

ADDITIONAL HELP FOR THOSE WITH MEDICAL OR INDEPENDENT LIVING NEEDS

MEDICAL BASELINE PROGRAM
Apply online to receive additional outreach at pge.com/medicalbaseline

LOCAL SUPPORT
Make a plan with your local Disability Disaster Access and Resources center at disabilitydisasteraccess.org

ADDITIONAL RESOURCES
Find support and resources from local organizations for access and functional needs at pge.com/disabilityandaging

HOW CAN YOU PREPARE FOR A PSPS EVENT?
We know losing power disrupts lives. While we work nonstop to improve PSPS events, here are a few things you can do to help prepare:

☑️ Update your contact information at pge.com/mywildfirealerts
☐ Create an emergency action plan at safetyactioncenter.com
☑️ Find out about backup power options, tips and retailers at pge.com/backuppower
Heat Stress - A Real Risk

According to data from the Bureau of Labor Statistics, California and Texas had the highest number of heat-related injuries in the entire country. Heat-related illnesses can occur quickly and with little warning. To reduce these types of incidents from occurring, the California Division of Occupational Safety and Health (Cal/OSHA) requires that safety measures such as shade and water requirements are addressed in a written Heat Illness Prevention Plan (§3395).

Understanding Heat Stress

Heat stress is the overall heat burden/load on the body. Total heat load is influenced by three primary sources: body heat, environmental factors, and personal risk factors. Our bodies compensate for heat by sweating, but heat stress can occur when the amount of heat in the environment and our bodies cannot dissipate quickly enough. As heat stress approaches the limits of our bodies’ tolerances, the risk for heat-related illness and injury increases. Examples of environmental and personal risk factors that influence body heat load include:

<table>
<thead>
<tr>
<th>Environmental Factors</th>
<th>Personal Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Age, Weight</td>
</tr>
<tr>
<td>Humidity</td>
<td>Water Consumption</td>
</tr>
<tr>
<td>Work Intensity</td>
<td>Acclimatization</td>
</tr>
</tbody>
</table>

Preventing Heat Illnesses

To prevent heat illnesses such as heat exhaustion and heat stroke from occurring, it is important for employees and Supervisors to understand and follow water and shade requirements identified by Cal/OSHA, which are described below:

Water Requirements

Accessibility and availability of water for all employees working in outdoor conditions where they may be submitted to heat stress or illness is required. Staying hydrated is a crucial step in preventing heat-related injuries and illnesses from occurring. Employees should remember to drink water throughout the work shift, even when they are thirsty, to prevent dehydration. Additional water requirements include:

- Must be fresh
- Must be suitably cool (use ice to cool drinks in high temperatures)
- Provided free of charge
- Located near the work zone
- Each employee must have access to 1 quart/hour for the entire shift

Shade Requirements

When temperatures exceed 80°F, shade must be present for employees. Shade must be open to the air or air-cooled, and there must be enough to accommodate the number of employees on recovery/rest periods. Shade must be located as close to the work area as practical. When temperatures are greater than 80°F, shade must be available or provided upon request.