

DEPARTMENT OF INDUSTRIAL RELATIONS  
Occupational Safety and Health Standards Board  
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NOTICE OF PROPOSED EMERGENCY ACTION  
BY THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD  
REGARDING PROPOSED CHANGES TO  
CALIFORNIA CODE OF REGULATIONS, TITLE 8, NEW SECTION 5141.1

PROTECTION FROM WILDFIRE SMOKE

NOTICE IS HEREBY GIVEN that the Occupational Safety and Health Standards Board (Board) is proposing to take the action described in the Informative Digest as included in the Finding of Emergency. The emergency filing will adopt new section 5141.1, Protection from Wildfire Smoke under the California Code of Regulations, Title 8, Division 1, Chapter 4, of the General Industry Safety Orders (GISO).

Government Code Section 11346.1(a)(2) requires that, at least five (5) working days prior to submission of the proposed emergency action to the Office of Administrative Law (OAL), the adopting agency provide a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After submission of the proposed emergency to OAL, OAL shall allow interested persons five (5) calendar days to submit comments on the proposed emergency regulation as set forth in Government Code Section 11349.6. For further information on the emergency rulemaking process, access the OAL website at: [www.oal.ca.gov](http://www.oal.ca.gov) or contact the OAL reference attorney: (916) 323-6815 / [staff@oal.ca.gov](mailto:staff@oal.ca.gov).

This proposed emergency action to adopt new section 5141.1 of the GISO has been placed on the agenda of the July 2019 Board Meeting:

July 18, 2019 at 10:00 a.m.  
County Administration Center  
1600 Pacific Highway  
Room 358  
San Diego, California

Prior to any action by the Board to adopt the proposal, the public will be given an opportunity to comment on the proposal. **You are advised, however, that comments made at this Board meeting or submitted to the Board in writing regarding this proposal will NOT be forwarded to OAL; and therefore, such comments directed to the Board are NOT comments submitted to OAL in accordance with Government Code Section 11349.6.**

If this emergency proposal is adopted by the Board, the proposal will be submitted to OAL. Upon submission, OAL will have ten (10) calendar days within which to review and make a

decision on the proposed emergency regulation. If approved, OAL will file the emergency regulation with the Secretary of State, and the emergency regulation will become effective for 180 days, with possibly extensions. Within the 180-day effective period, the Board may proceed with a regular rulemaking action, including a public comment period.

Attached to this Notice are: (1) the specific new language proposed to be adopted, and (2) the Finding of Emergency required by Government Code Section 11346.1(b). You may also review the proposed regulatory language and the Finding of Emergency on the Board's website: [www.dir.ca.gov/oshsb/emergencyregulations.html](http://www.dir.ca.gov/oshsb/emergencyregulations.html).

If you have any questions regarding this proposed emergency action, please contact Christina Shupe, Executive Officer, at (916) 274-5721.

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD



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DAVE THOMAS, Chairman

**STANDARDS PRESENTATION**  
**TO**  
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Subchapter 7. General Industry Safety Orders  
Group 16. Control of Hazardous Substances  
Article 107. Dusts, Fumes, Mists, Vapors and Gases

Add new Section 5141.1 to read:

§5141.1. Protection from Wildfire Smoke.

(a) Scope.

(1) This section applies to workplaces where:

- (A) The current Air Quality Index (current AQI) for PM<sub>2.5</sub> is 151 or greater, regardless of the AQI for other pollutants; and
- (B) The employer should reasonably anticipate that employees may be exposed to wildfire smoke.

(2) The following workplaces and operations are exempt from this section:

- (A) 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 to minimize contamination by outdoor or unfiltered air.
- (B) 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 to minimize contamination by outdoor or unfiltered air.
- (C) The employer demonstrates that the concentration of PM<sub>2.5</sub> in the air does not exceed a concentration that corresponds to a current AQI of 151 or greater by measuring PM<sub>2.5</sub> levels at the worksite in accordance with Appendix A.
- (D) Employees exposed to a current AQI for PM<sub>2.5</sub> of 151 or greater for a total of one hour or less during a shift.
- (E) Firefighters engaged in wildland firefighting.

(3) For workplaces covered by this section, an employer that complies with this section will be considered compliant with sections 5141 and 5155 for the limited purpose of exposures to a current AQI for PM<sub>2.5</sub> of 151 or greater from wildfire smoke.

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(b) Definitions.

Current Air Quality Index (Current AQI). The method used by the U.S. Environmental Protection Agency (U.S. EPA) to report air quality on a real-time basis. Current AQI is also referred to as the “NowCast,” and represents data collected over time periods of varying length in order to reflect present conditions as accurately as possible.

The current AQI is divided into six categories as shown in the table below, adapted from Table 2 of Title 40 Code of Federal Regulations, Part 58, Appendix G.

<u><b>Air Quality Index (AQI) Categories for PM2.5</b></u>	<u><b>Levels of Health Concern</b></u>
<u>0 to 50</u>	<u>Good</u>
<u>51 to 100</u>	<u>Moderate</u>
<u>101 to 150</u>	<u>Unhealthy for Sensitive Groups</u>
<u>151 to 200</u>	<u>Unhealthy</u>
<u>201 to 300</u>	<u>Very Unhealthy</u>
<u>301 to 500</u>	<u>Hazardous</u>

NIOSH. The National Institute for Occupational Safety and Health of the U.S. Centers for Disease Control and Prevention. NIOSH tests and approves respirators for use in the workplace.

PM2.5. Solid particles and liquid droplets suspended in air, known as particulate matter, with an aerodynamic diameter of 2.5 micrometers or smaller.

Wildfire Smoke. Emissions from fires in “wildlands,” as defined in Title 8, section 3402, or in adjacent developed areas.

(c) Identification of harmful exposures. The employer shall determine employee exposure to PM2.5 for worksites covered by this section before each shift and periodically thereafter, as needed, by any of the following methods:

(1) Check AQI forecasts and the current AQI for PM2.5 from any of the following: U.S. EPA AirNow website, U.S. Forest Service Wildland Air Quality Response Program website, California Air Resources Board website, local air pollution control district website, or local air quality management district website; or

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(2) Obtain AQI forecasts and the current AQI for PM2.5 directly from the EPA, California Air Resources Board, local air pollution control district, or local air quality management district by telephone, email, text, or other effective method; or

(3) Measure PM2.5 levels at the worksite and convert the PM2.5 levels to the corresponding AQI in accordance with Appendix A.

EXCEPTION: Subsection (c) does not apply where an employer assumes the current AQI for PM2.5 is greater than 500 and uses that assumption to comply with subsection (f)(4)(B).

(d) Communication. As required by section 3203, the employer shall establish and implement a system for communicating wildfire smoke hazards in a form readily understandable by all affected employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of reprisal. The system shall include effective procedures for:

(1) Informing employees of:

(A) The current AQI for PM2.5 as identified in subsection (c); and

(B) Protective measures available to employees to reduce their wildfire smoke exposures.

(2) Encouraging employees to inform the employer of:

(A) Worsening air quality; and

(B) Any adverse symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(e) Training and instruction. As required by section 3203, the employer shall provide employees with effective training and instruction. At a minimum, this shall contain the information in Appendix B.

(f) Control of harmful exposures to employees.

(1) In emergencies, including rescue and evacuation, subsections (f)(2) and (f)(3) do not apply, and employers shall comply with subsection (f)(4). Emergencies include utilities, communications, and medical operations, when such operations are directly aiding firefighting or emergency response.

(2) Engineering Controls. The employer shall reduce employee exposure to PM2.5 to less than a current AQI of 151 by engineering controls whenever feasible, for instance by providing enclosed buildings, structures, or vehicles where the air is filtered. If engineering controls are

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not sufficient to reduce exposure to PM2.5 to less than a current AQI of 151, then the employer shall reduce employee exposures as much as feasible.

(3) Administrative Controls. Whenever engineering controls are not feasible or do not reduce employee exposures to PM2.5 to less than a current AQI of 151, the employer shall implement administrative controls, if practicable, such as relocating work to a location where the current AQI for PM2.5 is lower, changing work schedules, reducing work intensity, or providing additional rest periods.

(4) Control by Respiratory Protective Equipment.

(A) Where the current AQI for PM2.5 is equal to or greater than 151, but does not exceed 500, the employer shall provide respirators to all employees for voluntary use in accordance with section 5144 and encourage employees to use respirators. Respirators shall be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece respirators. Respirators shall be cleaned, stored, maintained, and replaced so that they do not present a health hazard to users. Employers shall use Appendix B to this section in lieu of Appendix D to section 5144 for training regarding voluntary use of respirators.

NOTE: For voluntary use of filtering facepieces, such as N95 respirators, some of the requirements of section 5144 do not apply, such as fit testing and medical evaluations.

(B) Where the current AQI for PM2.5 exceeds 500, respirator use is required in accordance with section 5144. The employer shall provide respirators with an assigned protection factor, as listed in section 5144, such that the PM2.5 levels inside the respirator correspond to an AQI less than 151.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Sections 142.3 and 1446, Labor Code.

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Add new Appendix A to new Section 5141.1 to read:

**Appendix A to Section 5141.1. Protection from Wildfire Smoke**  
**Measuring PM2.5 Levels at the Worksite**  
**(Mandatory if an Employer Monitors with a Direct Reading Instrument)**

- (a) An employer may use a direct-reading particulate monitor to determine PM2.5 levels for section 5141.1, if the employer can demonstrate that it has complied with this appendix and selected a monitor that:
- (1) Does not underestimate employee exposures to wildfire smoke; or
  - (2) May underestimate wildfire smoke exposures, but the employer has obtained information on the possible error of the monitor from the manufacturer or other published literature and has accounted for the error of the monitor when determining exposures to PM2.5 to ensure that employee exposure levels are not underestimated.
- (b) The monitor shall be designed and manufactured to measure the concentration of airborne particle sizes ranging from an aerodynamic diameter of 0.1 micrometers up to and including 2.5 micrometers. The employer may use a monitor that measures a particle size range beyond these limits, if the employer treats the results as the PM2.5 levels.
- (c) The employer shall ensure that the monitor it uses is calibrated, maintained, and used, including the use of necessary accessories, in accordance with the manufacturer's instructions for accurately measuring PM2.5 concentrations.
- (d) The employer shall use the following table to convert the PM2.5 concentration to the AQI for PM2.5.

<b><u>PM2.5 in Micrograms per Cubic Meter (<math>\mu\text{g}/\text{m}^3</math>)</u></b>	<b><u>Air Quality Index (AQI) Categories for PM2.5</u></b>
<u>0 to 12.0</u>	<u>0 to 50</u>
<u>12.1 to 35.4</u>	<u>51 to 100</u>
<u>35.5 to 55.4</u>	<u>101 to 150</u>
<u>55.5 to 150.4</u>	<u>151 to 200</u>
<u>150.5 to 250.4</u>	<u>201 to 300</u>
<u>250.5 to 500.4</u>	<u>301 to 500</u>

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(e) The person supervising, directing, or evaluating workplace monitoring for PM<sub>2.5</sub> shall have the training or experience necessary to apply this section and to ensure the correct use of the monitor and the interpretation of the results, so that exposures are not underestimated.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Sections 142.3 and 144.6, Labor Code.



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Add new Appendix B to new Section 5141.1 to read:

**Appendix B to Section 5141.1. Protection from Wildfire Smoke**  
**Information to Be Provided to Employees (Mandatory)**

**CONTENTS**

- (a) The health effects of wildfire smoke.
- (b) The right to obtain medical treatment without fear of reprisal.
- (c) How employees can obtain the current Air Quality Index (AQI) for PM2.5.
- (d) The requirements in Title 8, section 5141.1 about wildfire smoke.
- (e) The employer's two-way communication system.
- (f) The employer's methods to protect employees from wildfire smoke.
- (g) The importance, limitations, and benefits of using a respirator when exposed to wildfire smoke.
- (h) How to properly put on, use, and maintain the respirators provided by the employer.

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- (a) The health effects of wildfire smoke.

Although there are many hazardous chemicals in wildfire smoke, the main harmful pollutant for people who are not very close to the fire is "particulate matter," the tiny particles suspended in the air.

Particulate matter can irritate the lungs and cause persistent coughing, phlegm, wheezing, or difficulty breathing. Particulate matter can also cause more serious problems, such as reduced lung function, bronchitis, worsening of asthma, heart failure, and early death.

People over 65 and people who already have heart and lung problems are the most likely to suffer from serious health effects.

The smallest—and usually the most harmful—particulate matter is called PM2.5 because it has a diameter of 2.5 micrometers or smaller.

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(b) The right to obtain medical treatment without fear of reprisal.

Employers shall allow employees who show signs of injury or illness due to wildfire smoke exposure to seek medical treatment, and may not punish affected employees for seeking such treatment. Employers shall also have effective provisions made in advance for prompt medical treatment of employees in the event of serious injury or illness caused by wildfire smoke exposure.

(c) How employees can obtain the current Air Quality Index (AQI) for PM2.5.

Various government agencies monitor the air at locations throughout California and report the current AQI for those places. The AQI is a measurement of how polluted the air is. An AQI over 100 is unhealthy for sensitive people and an AQI over 150 is unhealthy for everyone.

Although there are AQIs for several pollutants, Title 8, section 5141.1 about wildfire smoke only uses the AQI for PM2.5.

The easiest way to find the current and forecasted AQI for PM2.5 is to go to [www.AirNow.gov](http://www.AirNow.gov) and enter the zip code of the location where you will be working. The current AQI is also available from the U.S. Forest Service at <https://tools.airfire.org/> or a local air district, which can be located at [www.arb.ca.gov/capcoa/dismap.htm](http://www.arb.ca.gov/capcoa/dismap.htm). Employees who do not have access to the internet can contact their employer for the current AQI. The EPA website [www.enviroflash.info](http://www.enviroflash.info) can transmit daily and forecasted AQIs by text or email for particular cities or zip codes.

(d) The requirements in Title 8, section 5141.1 about wildfire smoke.

If employees may be exposed to wildfire smoke, then the employer is required to find out the current AQI applicable to the worksite. If the current AQI for PM2.5 is 151 or more, the employer is required to:

- (1) Check the current AQI before and periodically during each shift.
- (2) Provide training to employees.
- (3) Lower employee exposures.
- (4) Provide respirators and encourage their use.

(e) The employer's two-way communication system.

Employers shall alert employees when the air quality is harmful and what protective measures are available to employees.

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Employers shall encourage employees to inform their employers if they notice the air quality is getting worse, or if they are suffering from any symptoms due to the air quality, without fear of reprisal.

The employer's communication system is: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(f) The employer's methods to protect employees from wildfire smoke.

Employers shall take action to protect employees from PM<sub>2.5</sub> when the current AQI for PM<sub>2.5</sub> is 151 or greater. Examples of protective methods include:

- (1) Locating work in enclosed structures or vehicles where the air is filtered.
- (2) Changing procedures such as moving workers to a place with a lower current AQI for PM<sub>2.5</sub>.
- (3) Reducing work time in areas with unfiltered air.
- (4) Increasing rest time and frequency, and providing a rest area with filtered air.
- (5) Reducing the physical intensity of the work to help lower the breathing and heart rates.

The employer's control system at this worksite is: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(g) The importance, limitations, and benefits of using a respirator when exposed to wildfire smoke.

Respirators can be an effective way to protect employee health by reducing exposure to wildfire smoke, when they are properly selected and worn. Respirator use can be beneficial even when the AQI for PM<sub>2.5</sub> is less than 151, to provide additional protection.

When the current AQI for PM<sub>2.5</sub> is 151 or greater, employers shall provide their workers with proper respirators for voluntary use. If the current AQI is greater than 500, respirator use is required.

A respirator should be used properly and kept clean.

The following precautions shall be taken:

- (1) Employers shall select respirators certified for protection against the specific air contaminants at the workplace. NIOSH, the National Institute for Occupational Safety and

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Health of the U.S. Center for Disease Control and Prevention certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will list what the respirator is designed for (particulates, for example).

Surgical masks or items worn over the nose and mouth such as scarves, T-shirts, and bandannas will not provide protection against wildfire smoke. An N95 filtering facepiece respirator, shown in the image below, is the minimum level of protection for wildfire smoke.

- (2) Read and follow the manufacturer's instructions on the respirator's use, maintenance, cleaning and care, along with any warnings regarding the respirator's limitations. The manufacturer's instructions for medical evaluations, fit testing, and shaving should also be followed, although doing so is not required by Title 8, section 5141.1 for voluntary use of filtering facepiece respirators.
- (3) Do not wear respirators in areas where the air contains contaminants for which the respirator is not designed. A respirator designed to filter particles will not protect employees against gases or vapors, and it will not supply oxygen.
- (4) Employees should keep track of their respirator so that they do not mistakenly use someone else's respirator.
- (5) Employees who have a heart or lung problem should ask their doctor before using a respirator.

(h) How to properly put on, use, and maintain the respirators provided by the employer.

To get the most protection from a respirator, there must be a tight seal around the face. A respirator will provide much less protection if facial hair interferes with the seal. Loose-fitting powered air purifying respirators may be worn by people with facial hair since they do not have seals that are affected by facial hair.

The proper way to put on a respirator depends on the type and model of the respirator.

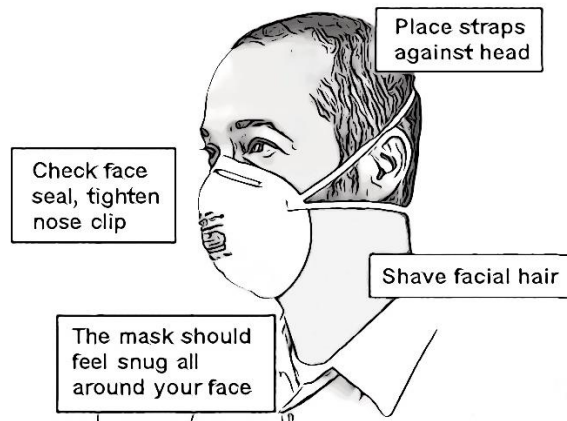
For those who use an N95 or other filtering facepiece respirator mask that is made of filter material:

- (1) Place the mask over the nose and under the chin, with one strap placed below the ears and one strap above.
- (2) Pinch the metal part (if there is one) of the respirator over the top of the nose so it fits securely.

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*Drawing Showing Proper Fitting of a Filtering Facepiece Respirator  
(shaving is not required for voluntary respirator use)*

For a respirator that relies on a tight seal to the face, check how well it seals to the face by following the manufacturer's instructions for user seal checks. Adjust the respirator if air leaks between the seal and the face. The more air leaks under the seal, the less protection the user receives.

Respirator filters should be replaced if they get damaged, deformed, dirty, or difficult to breathe through. Filtering facepiece respirators are disposable respirators that cannot be cleaned or disinfected. A best practice is to replace filtering facepiece respirators at the beginning of each shift.

If you have symptoms such as difficulty breathing, dizziness, or nausea, go to an area with cleaner air, take off the respirator, and get medical help.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Sections 142.3 and 144.6, Labor Code.

DEPARTMENT OF INDUSTRIAL RELATIONS  
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**FINDING OF EMERGENCY  
GOVERNMENT CODE SECTION 11346.1  
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD  
PROPOSED EMERGENCY STANDARD,  
TITLE 8, CALIFORNIA CODE OF REGULATIONS  
GENERAL INDUSTRY SAFETY ORDERS  
CHAPTER 4, SUBCHAPTER 7, NEW SECTION 5141.1**

**Protection from Wildfire Smoke**

Government Code section 11346.1(a)(2) requires that, at least five working days prior to submission of the proposed emergency action to the Office of Administrative Law, the adopting agency provides a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After submission of the proposed emergency to the Office of Administrative Law, the Office of Administrative Law shall allow interested persons five calendar days to submit comments on the proposed emergency regulations as set forth in Government Code section 11349.6.

The Occupational Safety and Health Standards Board (Board) hereby finds that the proposed emergency standard, described in the Informative Digest below, is necessary to address an emergency pursuant to Government Code section 11346.1(b)(1). The objective of the proposed emergency standard is to significantly reduce employee exposure to the harmful effects of wildfire smoke. The Board finds that immediate action must be taken to avoid serious harm to the public peace, health, safety, or general welfare, for the following reasons:

**FINDING OF EMERGENCY**

**Basis for the Finding of Emergency**

1. Wildfires in California became dramatically worse in 2018, causing deaths and economic damage that dwarfed previous years. The catastrophic Camp Fire was the deadliest and most destructive wildfire in state history, killing 86 people and destroying 18,804 structures. On January 8, 2019, Governor Gavin Newsom issued Executive Order N-05-19, declaring that 2018 was the most destructive fire season in California history, with over 7,600 wildfires burning across 1,846,445 acres. The Order states that "...the reality of climate change – persistent drought, warmer temperatures and more severe winds – has created conditions that will lead to more frequent and destructive wildfires."<sup>1</sup>

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<sup>1</sup> Gavin Newsom, Governor of California, Executive Order N-05-19. <https://www.gov.ca.gov/wp-content/uploads/2019/01/1.8.19-EO-N-05-19.pdf>

2. Consistent with the Governor's Order, research conducted by the U.S. Environmental Protection Agency (U.S. EPA) found that fires are increasing in frequency, size and intensity, creating the potential for greater smoke production and chronic smoke exposures in the United States, particularly in the West.<sup>2</sup> This suggests that the 2018 wildfires were not merely an aberration, and that state agencies should be prepared for a high likelihood of widespread exposure to wildfire smoke in 2019 and beyond.
3. During its March 21, 2019 meeting, the Board considered Petition 573, which requested an emergency rulemaking to address the potential harm posed to outdoor workers by wildfire smoke. The Petition sought an emergency standard which would apply to outdoor occupations including agriculture, construction, landscaping, maintenance, commercial delivery, and "other activities not considered to be 'first response'," such as work performed by "nurses, caregivers and school staff evacuating patients, residents and students."
4. The Board voted to grant the petition in part, stating that it found "specific grounds for considering exposure of outdoor workers to wildfire smoke events to constitute the basis for an emergency regulation." The Board requested that Cal/OSHA draft an emergency rulemaking proposal for consideration no later than the July 2019 Board meeting.<sup>3</sup> The following day, on March 22, 2019, Governor Newsom acknowledged the danger posed by the 2019 wildfire season, proclaiming a state of emergency in California "due to a vast tree die-off" which "has contributed to worsening forest conditions, creating extremely dangerous fire risk...."<sup>4</sup>
5. While thousands of chemical compounds are present in wildfire smoke, the principal harmful pollutant of concern for persons not in close proximity to the flames is particulate matter with an aerodynamic diameter of 2.5 micrometers or smaller, known as PM2.5. Airborne particle size is directly linked to the potential for causing health risks. Small particles less than 2.5 micrometers in diameter pose the greatest risk because they penetrate deep into the lungs and can enter the bloodstream.<sup>5</sup> Adding to the risk, toxic organic compounds and metals can be adsorbed by airborne PM2.5.<sup>6</sup> These particles pose the serious risk of additional adverse

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<sup>2</sup> United States Environment Protection Agency (U.S. EPA); Website Wildland Fire Research to Protect Health and the Environment. <https://www.epa.gov/air-research/wildland-fire-research-protect-health-and-environment>; and U.S. EPA. Website accessed 1-7-2019. Wildland Fire Research: Health Effects Research. <https://www.epa.gov/air-research/wildland-fire-research-health-effects-research>

<sup>3</sup> Occupational Safety and Health Standards Board; Petition 573; Adopted Decision; March 21, 2019. <https://www.dir.ca.gov/oshsb/documents/petition-573-adopteddecision.pdf>

<sup>4</sup> Gavin Newsom, Governor of California; Proclamation of a State of Emergency; March 22, 2019. <https://www.gov.ca.gov/wp-content/uploads/2019/03/03.22.19-State-of-Emergency-Attested.pdf>

<sup>5</sup> U.S. EPA; Health and Environmental Effects of Particulate Matter (PM). <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

<sup>6</sup> Zhang HH, Li Z, Liu Y, et al; Physical and chemical characteristics of PM2.5 and its toxicity to human bronchial cells BEAS-2B in the winter and summer; Journal of Zhejiang University-Science B (Biomedicine and Biotechnology); 2018;19(4):317–326; <https://doi.org/10.1631/jzus.B1700123>. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5964345/pdf/JZUSB19-0317.pdf>

health outcomes through multiple biological mechanisms. These health effects include increased local lung and systemic inflammation, acute and chronic cardiovascular effects, and acute and chronic respiratory effects.<sup>7</sup>

6. Numerous published scientific epidemiological studies have found an association between wildfire smoke and respiratory morbidity in general (for instance respiratory emergency visits, physicians visits, and declines in lung function among children), along with exacerbation of asthma and chronic obstructive pulmonary disease.<sup>8</sup> Epidemiological studies also show that short-term exposures to PM<sub>2.5</sub> can cause stroke, heart failure, and arrhythmias, as well as myocardial ischemia and infarction.<sup>9</sup> Emergency room admissions for respiratory, cardiovascular, and cerebrovascular illnesses increase during wildfire smoke incidents.<sup>10</sup>
7. The National Oceanic and Atmospheric Administration (NOAA) determined that wildfire smoke can spread thousands of miles from its source, affecting communities near and far.<sup>11</sup> Winds also alter the dispersion pattern of smoke.<sup>12</sup>
8. The risk posed by PM<sub>2.5</sub> emanating from wildfire smoke is distinct from the risk from elevated PM<sub>2.5</sub> from other causes generally, because air quality often worsens much more abruptly in the event of wildfire. The fire front, along with its smoke plume, is

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<sup>7</sup> Navarro KM; Assessment of Ambient and Occupational Exposures to Air Contaminants from Wildland Fire Smoke; Dissertation.; Fall 2016; University of California, Berkeley, California.  
[http://digitalassets.lib.berkeley.edu/etd/ucb/text/Navarro\\_berkeley\\_0028E\\_16683.pdf](http://digitalassets.lib.berkeley.edu/etd/ucb/text/Navarro_berkeley_0028E_16683.pdf)

<sup>8</sup> Reid CE, Brauer M, Johnston FH, Jerrett M, Balmes JR, Elliot CT; Critical Review of Health Impacts of Wildfire Smoke Exposure; Environmental Health Perspectives; September 2016; 124(9): 1334 - 1343.

<sup>9</sup> Wettstein Z, Hoshiko S, Fahimi J, Harrison R, Cascio W, Rappold A; Cardiovascular and Cerebrovascular Emergency Department Visits Associated With Wildfire Smoke Exposure in California in 2015; Journal of the American Heart Association; April 17, 2018; 7(8):e007492; Published online April 11, 2018; doi:10.1161/JAHA.117.007492.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6015400/>

<sup>10</sup> Delfino R, Brummel S, Wu J, et al; The relationship of respiratory and cardiovascular hospital admissions to the southern California wildfires of 2003; Occupational and Environmental Medicine; March 2009; 66(3): 189-197; Published online November 18, 2008; doi:10.1136/oem.2008.041376. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4176821/> and Hutchinson J.A, Vargo, J, Milet M, French N, Billmire M, Johnson J, Hoshiko S; The San Diego 2007 wildfires and Medi-Cal emergency department presentations, inpatient hospitalizations, and outpatient visits: An observational study of smoke exposure periods and a bidirectional case-crossover analysis; July 10, 2018; PLOS Medicine; 15(7): e1002601; Pages 1 – 14.  
<https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002601>

<sup>11</sup> National Oceanic and Atmospheric Administration Twitter.  
<https://twitter.com/noaasatellites/status/1032311533668319232?lang=en> and National Oceanic and Atmospheric Administration; Satellite and Information Service. Website accessed 1-9-2019.  
<https://www.nesdis.noaa.gov/content/amtrak-relies-new-noaa-satellite-smoke-data-protect-passengers-during-dangerous-california> and

Navarro KM; Assessment of Ambient and Occupational Exposures to Air Contaminants from Wildland Fire Smoke; Dissertation; Fall 2016; University of California, Berkeley, California.  
[http://digitalassets.lib.berkeley.edu/etd/ucb/text/Navarro\\_berkeley\\_0028E\\_16683.pdf](http://digitalassets.lib.berkeley.edu/etd/ucb/text/Navarro_berkeley_0028E_16683.pdf)

<sup>12</sup> Smoke Management Guidelines for Prescribed Burning in the Southeast, Smoke Dispersion.  
[http://www.auburn.edu/academic/forestry\\_wildlife/fire/smoke\\_guide/smoke\\_dispersion.htm](http://www.auburn.edu/academic/forestry_wildlife/fire/smoke_guide/smoke_dispersion.htm)



characteristically dynamic in changing direction, size, and intensity.<sup>13</sup> The proposed regulatory requirement that filtering facepiece respirators be made readily available under specified conditions, along with the requirement that employers take other precautions when feasible and provide training, will allow employers and employees to address these highly changeable conditions.

9. Occupational safety and health standards within Title 8 of the California Code of Regulations protect workers from harmful respiratory hazards in general, but there is currently no regulation that specifically addresses either PM2.5 or wildfire smoke. The primary measurement of air quality is the Air Quality Index (AQI),<sup>14</sup> but AQI standards are not mentioned anywhere in Title 8. Without a specific reference to either PM2.5 or wildfire smoke, the existing regulations rely on employers to determine whether a given exposure is “harmful” and whether respirators are “necessary to protect the health of the employee.” (Cal. Code Regs., tit. 8, §§ 5141, 5144.) Based on the calls received by Cal/OSHA regarding wildfire smoke, a significant number of employers are uncertain about what protective measures to use or when to use them. Many of these businesses had no previous experience with wildfire smoke until the last year or two. Without specific regulatory guidance, these employers were confused about how to evaluate and respond to this hazard.
10. Cal/OSHA noted incidents in which employees were working without respirators when wildfire smoke had caused unhealthy air quality, which could pose serious health risks. Cal/OSHA received reports indicating that some employers of outdoor workers did not provide appropriate respirators or take other precautions to reduce employee exposure to wildfire smoke. Many of these employees were low-wage, minority, and/or immigrant workers. Those populations have a disproportionate number of cases of asthma and other respiratory diseases that can be exacerbated by wildfire smoke, making respirator availability especially important.<sup>15</sup>

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<sup>13</sup> “The NowCast algorithm uses longer averages during periods of stable air quality and shorter averages when air quality is changing rapidly, such as during a fire.” Sac-Metro AQMD website, accessed 5-28-19.

<http://www.airquality.org/air-quality-health/climate-change/public-outreach/wildfire-smoke-information>

<sup>14</sup> Electronic Code of Federal Regulations; Title 40, Protection of Environment; Part 58, Ambient Air Quality Surveillance; Appendix G, Uniform Air Quality Index (AQI) and Daily Reporting; June 4, 2019.

<sup>15</sup> De Matteis S, Heederik D, Burdorf A, Colosio C, Cullinan P, Henneberger P, Olsson A, Raynal A, Rooijackers J, Santonen T, Sastre J, Schlünssen V, van Tongeren M, Sigsgaard T; European Respiratory Society Environment and Health Committee; Current and new challenges in occupational lung diseases; Department of Health and Human Services; Eur Respir Rev. December 31, 2017; 26(146); Pages 1 – 25; doi:10.1183/16000617.0080-2017.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6033059/> and

Holguin F, Moughrabieh MA, Ojeda V, Patel SR, Peyrani P, Pinedo M, Celedón JC, Douglas IS, Upson DJ, Roman J; Respiratory Health in Migrant Populations: A Crisis Overlooked; Ann Am Thorac Soc; Vol 14; No 2. Pages 153 – 159; February 2017.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5427732/> and

Celedón JC, Roman J, Schraufnagel DE, Thomas A, Samet J; Respiratory Health Equality in the United States. The American Thoracic Society Perspective; Ann Am Thorac Soc. Vol 11; No 4; Pages 473 – 479; May 2014.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4225793/#idm140216145368560title> and

U.S. EPA; U.S. Forest Service, U.S. Centers for Disease Control and Prevention, California Air Resources Board. Wildfire Smoke A Guide for Public Health Officials; Page 7; May 2016. [https://www3.epa.gov/airnow/wildfire\\_may2016.pdf](https://www3.epa.gov/airnow/wildfire_may2016.pdf)

11. Using the AQI for PM<sub>2.5</sub>—developed by the U.S. EPA and easily accessible online—would make it easier for employers to understand and comply with their existing obligation to protect workers from respiratory hazards caused by wildfire smoke. The AQI provides a simple, real-time method for determining when employers must implement protective measures to reduce the toxic and harmful effects of wildfire smoke. AQI values below 100 are characterized as acceptable. AQI values above 100 are categorized as unhealthy for certain sensitive groups, above 150 unhealthy for all, above 200 very unhealthy for all, and above 300 hazardous for all.<sup>16</sup> Information on AQI levels for PM<sub>2.5</sub> is freely available through the AirNow – U.S. EPA webpage and other state and local government websites. The proposed regulation uses the AQI values to establish when and what kind of controls an employer should implement in order to reduce the health effects of wildfire smoke.
12. The proposed regulation clarifies when employers must respond to a heightened risk of employee exposure to wildfire smoke—namely, when the AQI for PM<sub>2.5</sub> exceeds 150 (unhealthy for everyone). When employers cannot eliminate workers’ exposure through engineering controls (e.g. enclosed structures with air filtration), administrative controls (e.g. shifted time or location of work), or a combination of both, then, the proposal makes clear, employers must make effective, filtering facepiece respirators available to employees. N95 masks are identified as a commonly available type which provide effective protection, when used as directed, under suitable conditions. By specifying when such respirators should be provided for voluntary use, under simply quantified wildfire smoke conditions (AQI), the proposed regulation is intended to provide employers with readily understandable parameters for such respirators’ permissible use in accordance with existing Title 8 respiratory protection standards. The proposed regulation also identifies (per its Appendix B) the basic elements of employee training essential to the appropriate use of such respirators.
13. The proposed regulation also responds to the uniquely unpredictable nature of wildfire smoke, an issue which is not included in any existing regulations. Section 5144 of Title 8 primarily addresses mandatory respirator use requiring both medical evaluations and fit testing prior to use, which can be an unrealistic requirement in the context of wildfires, given the speed at which large areas can be covered with harmful smoke.
14. Adoption of an emergency standard is essential, before the height of the next wildfire season, to clarify how employers should protect California’s workers from the seriously toxic and harmful effects of wildfire smoke. The proposed emergency adoption of Title 8, section

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<sup>16</sup> U.S. EPA; Code of Federal Regulations; Title 40, Protection of Environment; Part 58, Ambient Air Quality Surveillance; Appendix G, Uniform Air Quality Index (AQI) and Daily Reporting; Pages 317 – 320.  
<https://www.govinfo.gov/content/pkg/CFR-2016-title40-vol6/pdf/CFR-2016-title40-vol6-part58-appG.pdf>

5141.1 would preserve worker safety and health by making existing general requirements specific and easily understandable.

### **AUTHORITY AND REFERENCE CITATIONS**

These regulations are submitted pursuant to the Occupational Safety and Health Standards Board's authority under Labor Code section 142.3.

California Labor Code section 142.3 establishes that the Board may adopt, amend, or repeal occupational safety and health standards or orders. Section 142.3 permits the Board to prescribe suitable protective equipment and control or technological procedures to be used in connection with occupational hazards and to provide for monitoring or measuring employee exposure for the protection of employees.

Additionally, California Labor Code section 144.6 requires the Board, when dealing with standards for toxic materials and harmful physical agents, to “adopt that standard which most adequately assures, to the extent feasible, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to a hazard regulated by such standard for the period of his working life.” Section 144.6 also requires that the Board base standards on research, demonstrations, experiments and other appropriate information, taking into consideration the latest scientific literature, the reasonableness of the standards, and the experience gained under the health and safety laws.

Authority: Labor Code section 142.3.

Reference: Labor Code sections 142.3 and 144.6.

### **INFORMATIVE DIGEST OF PROPOSED ACTION/ POLICY STATEMENT OVERVIEW**

#### **Summary of Existing Regulations and the Effect of the Proposed Regulation**

Existing law, Title 8, section 3203, “Injury and Illness Prevention Program (IIPP),” establishes a general framework for the identification, evaluation, and correction of unsafe or unhealthy work conditions; communication with employees; and employee safety and health training.

Existing law, Title 8, section 5140, “Definitions,” states that a “harmful exposure” is an “exposure to dusts, fumes, mists, vapors, or gases” which is either “(a) In excess of any permissible limit prescribed by section 5155; or (b) Of such a nature by inhalation as to result in, or have a probability to result in, injury, illness, disease, impairment, or loss of function.” No permissible limit for PM<sub>2.5</sub> is prescribed by section 5155, and no existing regulation specifies when wildfire smoke may result in injury, illness, disease, impairment or loss of function.

Existing law, Title 8, section 5141, “Control of Harmful Exposures to Employees,” lists the hierarchy of controls that employers must follow to address employee exposure to harmful air

contaminants. Employers must first rely on engineering controls whenever feasible, but if engineering controls are not feasible or do not achieve full compliance, administrative controls must be implemented “if practicable.” When engineering and administrative controls fail to achieve full compliance, then respiratory protective equipment shall be used.

Existing law, Title 8, section 5144, “Respiratory Protection,” establishes that respirators “applicable and suitable for the purpose intended” must be provided “when such equipment is necessary to protect the health of the employee.” To determine when respiratory equipment is necessary, section 5144 requires employers to “identify and evaluate the respiratory hazard(s) in the workplace” and “include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant’s chemical state and physical form.” Section 5144 sets forth the requirements for respiratory protection programs, how appropriate respirators should be selected, and related matters. This regulation does not expressly state the protection necessary for wildfire events, the concentration of PM<sub>2.5</sub> necessitating respiratory protection, nor does it identify a type of respirator providing at least minimally effective filtration of PM<sub>2.5</sub> from wildfire smoke exposure, or make specifically clear what circumstances and conditions in which voluntary use of such respirators could occur in permissible accord with existing Title 8 respiratory protection requirements.

Existing law, Title 8, section 5155, “Airborne Contaminants,” sets permissible exposure limits for particular substances. No permissible exposure limit is listed for either wildfire smoke or PM<sub>2.5</sub>.

### **New Section 5141.1. Protection from Wildfire Smoke.**

This proposed emergency standard, new section 5141.1, would be in Article 107, Dusts, Fumes, Mists, Vapors and Gases, directly after section 5141, Control of Harmful Exposure to Employees. The regulation would include the following specific requirements.

#### **New Section 5141.1(a). Scope.**

This proposed subsection (a)(1) establishes the application of the proposed regulation to all workplaces where the current Air Quality Index (AQI) for PM<sub>2.5</sub> is 151 or greater and the employer should reasonably anticipate that employees may be exposed to wildfire smoke.

The subsection is necessary to establish the conditions in which employers will be required to comply with the proposed regulation and to take action to protect employees from the harmful effects of wildfire smoke.

Proposed subsection (a)(2) sets forth exceptions to the application of the regulation. Petition 573 sought protection from wildfire smoke for outdoor workers in particular, and the scope of proposed regulation limits its application to workers with direct, immediate exposure to outdoor air. This is accomplished by exempting enclosed and mechanically ventilated buildings and structures, as long as any windows, doors, bays, or other openings are kept closed to minimize contamination by outdoor or unfiltered air. Likewise, enclosed vehicles are exempted when the

air is filtered by a cabin air filter and windows, doors, and other openings are kept closed to minimize contamination by outdoor or unfiltered air.

Workplaces are also exempt if the employer can demonstrate that the concentration of PM<sub>2.5</sub> in the air does not exceed a concentration that corresponds to a current AQI of 150. This is necessary to allow employers who choose to monitor the PM<sub>2.5</sub> level at their worksites rather than relying on the reported current AQI. Employers seeking this exemption would have to follow Appendix A, described below, to ensure the accuracy of their measurements.

This subsection also exempts employees exposed to a current AQI for PM<sub>2.5</sub> of 151 or greater for an hour or less during a shift, and firefighters engaged in wildland firefighting.

Proposed subsection (a)(3) makes it clear that employers within the scope of this regulation should comply with this section for the purpose of addressing the hazard of wildfire smoke resulting in a current AQI for PM 2.5 of 151 or higher, rather than referring to the more general requirements in the existing respiratory protections found in sections 5141 and 5155.

#### **New Section 5141.1(b). Definitions.**

This proposed subsection provides definitions for the terms “Current Air Quality Index (Current AQI),” “NIOSH,” “PM<sub>2.5</sub>,” and “Wildfire Smoke.”

The subsection is necessary to clarify the application and meanings of terms used in the proposed regulation.

#### **New Section 5141.1(c). Identification of harmful exposures.**

This proposed subsection requires employers to obtain the current AQI for PM<sub>2.5</sub> for their workplaces before each shift and periodically thereafter, as needed. An employer may acquire this information by checking specified government agency websites, obtaining the current AQI for PM<sub>2.5</sub> directly from listed government agencies, or by measuring the PM<sub>2.5</sub> levels at the worksite.

The subsection is necessary to ensure that employers regularly check the AQI levels during wildfire events so they will be able to determine when protective measures are needed.

An exception is provided for employers who *assume* the AQI is over 500 and complies with subsection (f)(4)(B), which addresses respirator use when the AQI for PM<sub>2.5</sub> is above 500. This exception is included because there is no need for an employer to monitor the current AQI for PM<sub>2.5</sub> if the employer is already complying with the maximum respiratory protection requirements of the regulation.

**New Section 5141.1(d). Communication.**

The proposed subsection refers to section 3203, Injury and Illness Protection Program (IIPP), which requires employers establish a system for communicating wildfire smoke hazards with employees in a form readily understandable by all affected employees. This includes the current AQI for PM<sub>2.5</sub> and related protective measures. The subsection also requires employers to encourage employees to inform their employer about worsening air quality or possible symptoms of wildfire smoke exposure.

The subsection is necessary both to ensure employees receive accurate and timely information and to ensure the employer receives necessary feedback from employees at their work location.

**New Section 5141.1(e). Training and instruction.**

The proposed subsection refers to section 3203, Injury and Illness Protection Program (IIPP), which requires employers to provide effective training and instruction to employees. The training shall contain, at a minimum, the information contained in Appendix B, described below.

The subsection is necessary to ensure that employees understand various topics necessary to protect their health during wildfire events, including the hazards posed by wildfire smoke and the appropriate use of respirators.

**New Section 5141.1(f). Control of harmful exposures to employees.**

The proposed subsection requires employers to protect employees using the hierarchy of controls set forth in Title 8, section 5141. In order of priority, these are: engineering controls, administrative controls, and control by respiratory protective equipment.

Proposed subsection (f)(1) states that only respiratory protection per subsection (f)(4) is required during emergencies, including rescue and evacuation. Emergencies include utilities, communications, and medical operations, when they are directly aiding firefighting or emergency response.

This is necessary to allow employers and workers during an emergency to act quickly, without evaluating the possible application of engineering or administrative controls. Respirators, however, can be provided in advance to emergency personnel and other employees directly assisting emergency response.

Proposed subsections (f)(2), (f)(3), and (f)(4) clarify the application the hierarchy of controls to the specific context of wildfire smoke exposure.

Subsections (f)(2) and (f)(3) give examples of engineering and administrative controls that may reduce employees' exposure to PM<sub>2.5</sub>. Engineering controls should be used whenever feasible and include providing enclosed structures or vehicles where the air is filtered. If engineering controls are not feasible, employers shall implement administrative controls, if practicable.

Administrative controls can include relocating work, changing work schedules, reducing work intensity, or providing additional breaks.

Subsection (f)(4)(A) mandates that employers provide respirators consistent with Title 8, section 5144 for employees' voluntary use when the current AQI for PM<sub>2.5</sub> 151 or greater, but not exceeding 500. Subsection (f)(4)(A) specifically states that N95s are appropriate respirators for these conditions and provides requirements for the selection and maintenance of the respirators. It also explains that employers shall provide training about respirator use in accordance with Appendix B rather than section 5144 Appendix D.

This is necessary because it provides clarity for those employers which may be uncertain about what type of respiratory protection addresses PM<sub>2.5</sub>.

Under section 5144(c)(2), if respirators are provided but not required, employers may give respirators to their workers without first completing medical evaluations or fit testing as required under section 5144(c)(1).

A Note to the proposed subsection (f)(4)(A) ensures that employees may be given respirators, such as N95s, in response to wildfire smoke without first waiting for medical evaluations or fit testing to be completed.

Under the proposed subsection (f)(4)(B), respirator use would be required when the AQI for PM<sub>2.5</sub> exceeds 500. AirNow has occasionally published AQI levels above 500 within California, but that occurs so rarely that the EPA's AQI categories, depicted in the chart in proposed subsection (b), only go up to 500.

This subsection is necessary to address conditions that are so infrequent, and pose so much potential health risk, that more protective measures are appropriate. Subsection (f)(4)(B) also states that respirators provided for mandatory use should have an assigned protection factor in accordance with section 5144. The existing section 5144 provides a method for employers to determine which respirators will reduce the current AQI for PM<sub>2.5</sub> within the respirator to 151 or less, based AQI for PM<sub>2.5</sub> that exists outside the respirator.

#### **Appendix A to Section 5141.1: Measuring PM<sub>2.5</sub> Levels at the Worksite (Mandatory if an Employer Monitors with a Direct Reading Instrument)**

This appendix sets forth the requirements for measuring the PM<sub>2.5</sub> levels using a direct-reading particulate monitor. The appendix also states how such measurements can be used to determine the equivalent current AQI for the purposes of proposed section 5141.1, using a table adapted from 40 Code of Federal Regulations, Part 58, Appendix G, Table 2. The appendix also states that the person supervising, directing, or evaluating the monitoring should have the necessary training or experience needed to use the monitor correctly.

This appendix is necessary to ensure that employers who elect to perform their own PM<sub>2.5</sub> monitoring do so using accurate equipment and methods.

## **Appendix B to Section 5141.1: Information to Be Provided to Employees (Mandatory)**

The appendix provides information about the health effects of wildfire smoke, medical treatment, how to obtain the current AQI for PM2.5, the requirements of the proposed regulation, the employer's two-way communication system, employer's methods to protect employees from wildfire smoke, the benefits and limitations of respirators when exposed to wildfire smoke, and how to properly use and maintain employer provided respirators.

This appendix is necessary in order to assist employers with training regarding wildfire smoke and to ensure that employees have information critical for protecting their health. Employers addressing the potential hazard of wildfire smoke for the first time may be uncertain about what training should be provided. This appendix provides a convenient method for ensuring that critical information is conveyed to employees, including the health effects of wildfire smoke, available protections, and the appropriate use of respirators. For ease of use, the appendix includes blank lines to allow employers to easily customize the information.

## **Policy Statement and Anticipated Benefits**

The Board is proposing this emergency regulation, Title 8, new section 5141.1, to preserve worker safety and health and to clarify employers' existing obligations, making compliance easier and more straightforward. As wildfire seasons worsen, the proposed regulation will avoid a potential increase in debilitating and sometimes life-threatening illnesses faced by workers exposed to wildfire smoke. This will reduce the financial costs caused by medical care and lost workdays, costs which may be borne by employees, their families, employers, insurers, and public benefits programs.

This emergency regulation is also proposed in response to the Board's March 21, 2019 Petition Decision to partially grant Petition 573, to protect outdoor employees from wildfire smoke.

It is the well-recognized reality of climate change that persistent drought, warmer temperatures, and severe winds have created conditions that will lead to wildfires that are more frequent and more destructive. In addition to the threat posed to life and property by wildfire itself, the huge volumes of smoke generated by large and increasingly common wildfire events pose a danger to workers who are exposed to unfiltered outdoor air contaminated with PM2.5. As described above, PM2.5 is the substance of greatest health concern to people who are not in close proximity to the fires but are nonetheless working in the path of wildfire smoke.

Current regulations are not sufficiently specific as to what employers are required to do during wildfire events. This results in confusion on behalf of both employers and employees, leaving many employees unprotected.

This confusion also causes Cal/OSHA to expend staff resources in order to respond to questions that would be answered by Title 8, new section 5141.1.



The emergency standard, Protection from Wildfire Smoke, Title 8, new section 5141.1 will provide clear and specific requirements to employers so that they may better protect employees from the toxic and harmful effects of wildfire smoke.

### **Federal Regulations and Statutes**

Code of Federal Regulations, Title 29, section 1910.134 is similar to the existing respiratory protection regulation with the California Code of Regulations, Title 8, section 5155.

No federal law or regulation exists or has been promulgated that specifically addresses occupational exposure to either wildfire smoke or PM2.5.

### **Evaluation of Inconsistency/Incompatibility with Existing State Regulations**

Under California Labor Code 142.3, the Occupational Safety and Health Standards Board is the only agency in the state authorized to adopt occupational safety and health standards. The Board has reviewed existing regulations on this topic and has concluded that these proposed amendments are not inconsistent or incompatible with existing state regulations.

To the extent that there may be any potential conflict between the proposed section 5141.1 and existing sections 5141 and 5155, that has been resolved by proposed section 5141.1(a)(3). This subsection expressly states that an employer following section 5141.1 will be considered compliant with sections 5141 and 5155 for the limited purpose of exposures to a current AQI for PM2.5 of 151 or greater for wildfire smoke.

### **DOCUMENTS INCORPORATED BY REFERENCE**

None.

### **TECHNICAL, THEORETICAL, OR EMPIRICAL STUDIES, REPORTS, OR DOCUMENTS RELIED UPON**

The Board has relied upon the following documents as part of this emergency action:

1. Gavin Newsom, Governor of California, Executive Order N-05-19.  
<https://www.gov.ca.gov/wp-content/uploads/2019/01/1.8.19-EO-N-05-19.pdf>
2. Gavin Newsom, Governor of California; Proclamation of a State of Emergency.; March 22, 2019.  
<https://www.gov.ca.gov/wp-content/uploads/2019/03/03.22.19-State-of-Emergency-Attested.pdf>
3. Occupational Safety and Health Standards Board; Petition 573; Adopted Decision; March 21, 2019.  
<https://www.dir.ca.gov/oshsb/documents/petition-573-adopteddecision.pdf>
4. Division of Occupational Safety and Health's Evaluation of Petition 573; February 8, 2019.  
<https://www.dir.ca.gov/oshsb/documents/petition-573-dosheval.pdf>

5. United States Environmental Protection Agency (U.S. EPA); Website Wildland Fire Research to Protect Health and the Environment.  
<https://www.epa.gov/air-research/wildland-fire-research-protect-health-and-environment>
6. U.S. EPA; Website accessed January 7, 2019; Wildland Fire Research: Health Effects Research; Last updated on June 4, 2019.  
<https://www.epa.gov/air-research/wildland-fire-research-health-effects-research>
7. U.S. EPA; U.S. Forest Service; U.S. Centers for Disease Control and Prevention; California Air Resources Board; Wildfire Smoke - A Guide for Public Health Officials; May 2016.  
[https://www3.epa.gov/airnow/wildfire\\_may2016.pdf](https://www3.epa.gov/airnow/wildfire_may2016.pdf)
8. National Oceanic and Atmospheric Administration Twitter.  
<https://twitter.com/noaasatellites/status/1032311533668319232?lang=en>
9. National Oceanic and Atmospheric Administration; Satellite and Information Service; AMTRAK Relies on New NOAA Satellite Smoke Data to Protect Passengers During Dangerous California Wildfires; Website accessed 1-9-2019.  
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11. U.S. Forest Service; Temperature Inversion and Smoke.  
[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5354046.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5354046.pdf)
12. Smoke Management Guidelines for Prescribed Burning in the Southeast, Smoke Dispersion.  
[http://www.auburn.edu/academic/forestry\\_wildlife/fire/](http://www.auburn.edu/academic/forestry_wildlife/fire/) and  
[http://www.auburn.edu/academic/forestry\\_wildlife/fire/smoke\\_guide/smoke\\_dispersion.htm](http://www.auburn.edu/academic/forestry_wildlife/fire/smoke_guide/smoke_dispersion.htm)
13. California Air Resources Board; Inhalable Particulate Matter and Health (PM2.5 and PM10) August 10, 2017.  
<https://ww3.arb.ca.gov/research/aqs/common-pollutants/pm/pm.htm>
14. U.S. EPA; Health and Environmental Effects of Particulate Matter (PM); June 20, 2018.  
<https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>
15. Reid CE, Brauer M, Johnston FH, Jerrett M, Balmes JR, Elliot CT; Critical Review of Health Impacts of Wildfire Smoke Exposure; Environmental Health Perspectives; September 2016; 124(9); Pages 1334 - 1343.
16. Wettstein Z, Hoshiko S, Fahimi J, Harrison R, Cascio W, Rappold A; Cardiovascular and Cerebrovascular Emergency Department Visits Associated With Wildfire Smoke Exposure in California in 2015; Journal of the American Heart Association; April 17, 2018;7(8):e007492; Published online April 11, 2018; doi:10.1161/JAHA.117.007492.  
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These documents are available for review Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board Office located at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

## **MANDATE ON LOCAL AGENCIES OR SCHOOL DISTRICTS**

The Board has determined that proposed section 5141.1 does not impose a mandate on local agencies or school districts requiring reimbursement by the State pursuant to Part 7 of Division 4 of the Government Code (commencing with section 17500).

## **COST ESTIMATES OF PROPOSED ACTION**

### **Costs or Savings to State Agencies**

State agencies, like other employers, are already required by existing Title 8 regulations to provide their employees with the protections in this proposal. All public employers should already be providing respirators to employees exposed to unhealthy levels of PM2.5 from wildfire smoke, under existing law. Likewise, under existing law, public employers should be using engineering and administrative controls when appropriate, for instance by moving tasks indoors or delaying non-critical tasks until the smoke clears, and should provide effective training and communication as required in the proposed regulation.

However, the proposed regulation includes some newly *prescriptive* elements that simplify and clarify existing performance standards, so the cost of these portions of the proposed regulation have been estimated below.

These calculations assume that *all* covered state entities unable to limit employee exposure to unhealthy PM2.5 from wildfire smoke through feasible administrative or engineering controls—i.e. those public employers which cannot readily postpone work during a wildfire or move work indoors to ventilated buildings—will incur *new* costs when complying with the requirements for respiratory protective equipment and training. In fact, Cal/OSHA believes that the majority of state entities with workers who may be exposed to wildfire smoke during the 2019 fire season are already compliant with the proposed section 5141.1. The numbers below have not been reduced to account for this, however, because of the difficulty in ascertaining the percentage of state entities which already provide N95s in response to wildfire smoke.

California Department of Forestry and Fire Protection (CalFire) employees have not been included in the estimates below. Although it is possible that a few CalFire employees may be covered by this regulation, among the CalFire employees who do not work in ventilated buildings, the rest are generally engaged in wildland firefighting. That activity is expressly excluded from proposed section 5141.1.

Among other large state agencies, the California Department of Transportation (CalTrans) and the California Highway Patrol (CHP) are the entities with the most workers subject to the proposed regulation. Although a large number of the individuals working on outdoor CalTrans projects are actually employed by private entities, Cal/OSHA has estimated that about half of CalTrans' own workforce could be covered during a wildfire smoke event. Cal/OSHA also estimates that about 70% of the CHP workforce would be covered during a wildfire event, even though employees in enclosed vehicles are exempt from the proposed regulation. For other state entities, Cal/OSHA has estimated that about 15% of employees could also be covered.

Using 2018 geographic and air quality data from the California Air Resources Board, Cal/OSHA has calculated that about  $\frac{1}{3}$  of the California population is exposed to unhealthy levels of PM2.5 from wildfire smoke for about 10 days per year, under a worst-case scenario. Because the worst-case level of wildfire smoke is unlikely to occur on an annual basis, however, Cal/OSHA has assumed that approximately half of that number of employers and employees will be affected in any given year.

	Employees <sup>[1]</sup>	Assumed percentage within scope (50% CalTrans, 70% CHP, 15% other)	Worst case wildfire scenario exposure ( $\frac{1}{3}$ of population) <sup>[2]</sup>	50% covered by the proposal in a typical year
# CalTrans employees	20,163	10,082	3,361	1,681
# CHP employees	10,865	7,606	2,536	1,268
# other employees, excluding CalFire	188,467	28,270	9,424	4,712
<b>Total # state employees</b>				<b>7,661</b>

[1] <http://www.ebudget.ca.gov/budget/2019-20/#/Agency/2500>

[2] CARB data from queries made at <https://www.arb.ca.gov/aqmis2/aqdselect.php>

Safety and Health Requirement in 5141.1	Total number of employees exposed	Cost per employee	Days of wildfire exposure	Total Cost
N-95 Respirator	7,661	\$0.75	10	\$57,458
Training	7,661	\$7.27		\$55,695
<b>Total Cost</b>				<b>up to \$113,153</b>

The costs of the training, which is expected to last 15 minutes, is based on average hourly wage data published by the California Employment Development Department. The cost per N95 mask was estimated by the Public Agency Safety Management Association (PASMA) in a written public comment.

The proposed regulation may result in marginal savings to state agencies in their capacity as employers, since improved regulatory clarity could save those entities staff time that would otherwise be spent trying to understand and apply the current regulations to the specific situation of wildfire smoke exposure. In particular, checking the current AQI, as required by the proposal, provides a faster, more efficient, and easier method for evaluating the risk posed by wildfire smoke than following the existing section 5144(d)(1)(C) to determine the respiratory hazards.

The fact that the proposed regulation allows public employers to provide N95s to workers without a medical evaluation or fit testing may also result in some savings. However, these savings only apply to organizations that do not already *require* their employees to wear respirators, and public employers with workers who are regularly exposed to smoke or other respiratory hazards, including public agencies involved in emergency response, already have fully developed respiratory protection plans with required respirator use, medical evaluations, and fit testing. Among the remaining public agencies, it is unknown how many will recognize this potential savings. Wildfires are unpredictable; the number, location, extent, and length of fires in 2019 and later years is unknown. Smoke adds another layer of uncertainty, since the people and entities affected by a given wildfire may be far from the event.

Cal/OSHA expects that it would receive fewer queries about wildfire smoke if proposed section 5141.1 is enacted. The proposed regulation would also make it easier and faster for Cal/OSHA staff to respond to questions. However, this is unlikely to lead to any fiscal savings. Those staff who have been diverted from their usual duties in response to wildfire smoke-related issues would simply be returned to their usual enforcement activities, since they had full schedules before the wildfire crisis occurred.

Cal/OSHA would need to train its enforcement staff about the new regulation, which would probably require a webinar lasting approximately 60 minutes for approximately 200 associate safety engineers (the equivalent of .1 associate safety engineer for one year) and other staff. However, Cal/OSHA believes this can be absorbed into the existing budget.

**Costs to Any Local Agency or School District Which Must be Reimbursed in Accordance with Government Code Sections 17500 through 17630:** None.

**Other Nondiscretionary Cost or Savings Imposed on Local Agencies:** The above analysis for state agencies' costs and savings applies to local agencies as well. Cal/OSHA has estimated costs for the prescription portions of the proposed regulation by assuming that these will be entirely new costs for local agency employers within the scope of the regulation, even though Cal/OSHA believes that the majority of local agencies are already in compliance with the proposed section 5141.1.

Cal/OSHA has calculated respirator and training costs in the same manner as the estimates for state agencies, above, and has estimated that approximately one quarter of local agency employees may fall within the scope of the proposed regulation. Affected local agency employees would include certain inspectors/code enforcement personnel and people working in parks/outdoor recreation, traffic control, public safety, some types of vehicle and building maintenance, and other fields. However, the majority of local agency employees work in buildings or vehicles that would not be covered by this proposed regulation.

	PASMA estimates	Assume 25% within scope	Worst case wildfire scenario exposure ( $\frac{1}{3}$ of population) <sup>[2]</sup>	50% covered by the proposal in a typical year
# employees estimated <sup>[1]</sup>	760,000	190,000	63,333	31,667

[1] Source: <https://www.dir.ca.gov/dosh/doshreg/Protection-from-Wildfire-Smoke/Comments-2/PASMA.pdf>

[2] CARB data from queries made at <https://www.arb.ca.gov/aqmis2/aqdselect.php>

Safety and Health Requirement in 5141.1	Total number of employees exposed	Cost per employee	Days of wildfire exposure	Total Cost
N-95 Respirator	31,667	\$0.75	10	\$237,503
Training	31,667	\$7.27		\$230,219
<b>Total Cost</b>				<b>Up to \$467,722</b>

**Costs or Savings in Federal Funding to the State:** None.