Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers who can reasonably expect employees to be exposed to wildfire smoke. Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

(2) The following workplaces and operations are exempt from these rules:

(a) Enclosed buildings and structures in which the air is filtered by a mechanical ventilation system and the employer ensures that windows, doors, bays, and other exterior openings are kept closed, ~~except when it is necessary to open doors to enter or exit.~~ except when it is necessary for employees to open doors to enter or exit the building. If the essential activity of the structure involves regular opening and closing of windows and doors (e.g. indoor/outdoor food service, sheds and packing houses or warehouse with continual entry and exit,) the exemption does not apply. Spaces with 50% or more of air cycled in from outdoor air are considered outdoor spaces and are therefore not exempt (i.e. retail shops and drive thrus).

(b) Enclosed vehicles in which the air is filtered by a working cabin air filter that is regularly maintained 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.

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

~~(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations, and when feasible, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m^3(equivalent to an AQI at or above 151) and are encouraged to use them.~~

~~(e) Agricultural Labor Housing.~~

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Employee- includes all temporary, seasonal, and permanent employees allowed or

permitted to perform labor at the worksite.

Hierarchy of Controls - A system of control methods in which the controls at the top of the system are potentially more effective and protective than those at the bottom. Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, colds or flu; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Wildfire – Any non-structure fire, other than prescribed fire, that occurs in the wildland. Wildfires may spread to urban areas.

Wildfire Smoke – Emissions from fires in "wildlands," as defined by the National Wildfire Coordinating Group. Wildlands are an area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

(4) Identification of harmful exposures. The employer, or their designee, must determine and monitor employee exposure to PM2.5 for each workplace when wildfire smoke is present, to comply with these rules, at the start of each shift, and as often as needed but no less often than three times during an 8-hour shift, including at the start of the shift, so that there is at least one testing every three hours, by one or more of the following methods:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or (b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air

Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or

(c) Measure PM2.5 concentrations in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any; for employees working in remote locations where weather data cannot be easily accessed, these testing devices must be provided to the employees unless a supervisor is present for the entirety of the shift; or

(d) If methods (a) through (c) are infeasible, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m^3(equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are projected to be exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The information and training must be provided on a rolling basis at least once a year to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback and questions from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;
(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system practice using the device for the

employees;

(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke;

(i) How the County or local jurisdiction communicates the levels of alarms about fire smoke hazards by texts, radio or television in Spanish and other indigenous languages; and

(j) Information regarding clinics or medical facilities that are available to the employees near the worksite.

(6) Employer two-way communication. The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:

(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;

(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and

(c) Encouraging employees to inform the employer if any of the following occurs:

- When air quality improves and worsen; and
- Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(7) Control of harmful exposures to employees.

(a) Engineering controls. The employer must eliminate employee exposure to ambient air concentrations of PM2.5 to less than 35.5 ug/m^3(equivalent to an AQI of less than 101) by engineering controls whenever feasible. If the employer can document it is not feasible to eliminate then they must reduce such exposure by engineering controls. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is adequately filtered.

(b) Administrative controls. Whenever engineering controls are not feasible or effective to reduce employee exposures to PM2.5 to less than 35.5 ug/m^3(equivalent to an AQI of less than 101), the employer must implement administrative controls, if ~~practicable~~ feasible. Such controls may include one or more of the following:

(A) Relocate work to an outdoor location where the current ambient air

concentration of PM2.5 is less than 35.5 ug/m^3(equivalent to an AQI of less than 101);

(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than 35.5 ug/m^3(equivalent to an AQI less than 101).

(C) Limit each employee's exposures, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m^3 (equivalent to an AQI between 101 and 151), to the following durations:

(i) 1 hour during an 8-hour shift;
(ii) 1 hour 15 min during a 10-hour shift; or
(iii) 1 hour 30 mins during a 12-hour or more shift.

(c) If an employee's working hours are reduced as a result of anything in this section or if any employee is too sick to work due to smoke exposure, employers are required to maintain any wages and benefits lost, as well as to return the employee to their former schedule as soon as conditions allow.

(1.) Traditional output quotas must be suspended when the AQI is over 101 in order to prevent employee overexertion.

(2.) When possible, employers must increase the number of employees per task to reduce strain when AQI is over 101.

NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m^3(equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.

(~~c~~d) Control by Respiratory Protective Equipment. Whenever administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 to less than 35.5 ug/m^3(equivalent to an AQI of less than 101), with the exception of section (7)(b)(C), the employer must provide a sufficient number of respirators to all affected employees for mandatory use in accordance with 29 CFR 1910.134 or Appendix A below. Respirators must be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece respirators. Respirators must be cleaned or replaced as appropriate, and stored and maintained so that they do not present a health hazard to users.

NOTE 1: For employees who do not wear respirators in the course of their normal job duties but will only wear respirators to protect them from wildfire smoke, when the ambient air concentration for PM2.5 is at or above 35.5 ug/m^3(equivalent to an AQI

at or above 101), medical evaluations and fit testing are required ~~if available~~. However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.

NOTE 2: For employees whose only use of respirators involves the voluntary use of filtering facepieces when the ambient air concentration for PM2.5 is less than 35.5 ug/m^3(equivalent to an AQI below 151), such as N95 respirators, fit testing and medical evaluations are not required.

NOTE 3: When PM2.5 is reasonably expected to remain above 151 ug/m^3 (equivalent to AQI 201) for longer than a single shift, and employees cannot feasibly be protected from smoke exposure by engineering or administrative controls, the employer shall implement a respiratory protection program as described in OAR 437-002-0134.

(8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored in a 24 hour period when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke, and be maintained until at least three years from the official end of fire season for the county the worksite is located.

Table for Protection from Wildfire Smoke

Rule requirement	**Ambient Air Concentration of PM2.5 and Equivalent AQI**		
	< 35.5 ug/m^3 (AQI: < 101)	35.5 – 55.5 ug/m^3 (AQI: 101 – 151)	> 55.5 ug/m^3 (AQI: > 151)
Identification of harmful exposure under section (4)	Yes	Yes	Yes
Employee information and training under section (5)	Yes	Yes	Yes
Employer two-way communication system under section (6)	Yes	Yes	Yes
Engineering controls under section (7)(a)	No	Yes, when feasible	Yes, when feasible

Administrative controls under section (7)(b)(A) & (B)	No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No	Yes, if practicable	No
*Control by Respiratory Protective Equipment under section (7)(c)	No	Yes	Yes
Recordkeeping under section (8)	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

TO: **Administrator Michael Wood, Oregon OSHA**
FROM: **Coalition of Employer Representatives**
Date: **June 7, 2021**
RE: **Rulemaking to Protect Employees from Wildfire Smoke Exposure**

Our coalition represents a diverse group of Oregon sectors engaged in outdoor work activities, and many of our organizations have attempted to participate in the RAC process for both the wildfire smoke and heat illness rules. Members of our coalition work in Oregon, Washington, as well as California, and

our experience in these states is clear—the best rules are practicable and enforceable and should not impose arbitrary costs or requirements on employers. While we fully support keeping our workplaces safe and having clear and objective rules, the agency must endeavor to craft workplace safety requirements that balance equities and take into consideration the cost of compliance, especially on our small businesses.

With these foundational principles in mind, we are concerned about the current state of the proposed rules and how the process is impacting our ability to create rules that are workable for Oregon's employers and beneficial for workplace safety. Specifically, given the sheer number of individuals who have been invited to participate on the committees (over 65 individuals per meeting) and the virtual environment, the last few meetings have proven to be unruly and difficult to develop fair, coherent, and meaningful draft rules. Moreover, the platform used at the last meetings have made it nearly impossible to engage in real-time conversation about the practical implications of the proposal. Because of our strong desire to make sure that our advocacy is effective in this process, we are sending this letter to ensure that our core positions on the specific rule drafts are made clear.

While we have outlined our concerns in more detail in the attached redline, we offer the following high-level concerns regarding the overall direction of the wildfire smoke rules. Foremost, there is a lack of a reasonable trigger for when these rules will come into effect. Oregon has a distinct wildfire season and there are numerous ways to monitor air quality to detect harmful levels of wildfire smoke. As currently drafted, the rules fail to include a clear trigger that is practicable for employers, and as written, could be interpreted to require wildfire smoke monitoring, training, and mitigation year-round before every shift. This is an unnecessary and overly burdensome requirement for employers when the risk of harm to employees from wildfire smoke is non-existent through most parts of the year. We believe the smoke rules should define the applicability of the rule during the June to September months to coincide with the established wildfire season definition.

Second, the rules contain a troublingly low AQI level for mandatory mask-wearing by employees. If the public push-back related to the current COVID-19 rules has taught us anything, it is that we must be judicious when mandating when employees wear masks. As we tried to make clear during the RAC meeting, there is always an opportunity for employees to voluntarily wear masks if they feel they need to do so, and employers take no issue with having PPE available for employees to wear if they want to. Unfortunately, the rules are drafted require employers to mandate all employees wear masks, when the AQI is just 101, which is a drastic departure from the legislation considered this year (attached) and California's rules that trigger mandatory masks when AQI is 500. The AQI trigger for mandatory mask wearing by employees must be 500, as consistent with California's rules, and we will not support a lower threshold. To be clear, this does not mean that employees cannot wear masks voluntarily or that employers should not be required to make them available if requested when AQI is at a lower threshold, but a mask mandate at 101 AQI is wholly unreasonable and is likely to cause tremendous angst at the worksite.

It is also inappropriate for OR-OSHA to assert as fact that CalOSHA is revisiting its wildfire smoke rules to revise the AQI thresholds to a level below 500 and 151 for mandatory and voluntary respirator use, respectively. Following the last RAC meeting, we learned from California stakeholders that no such

activity is underway at the agency. OR-OSHA should not state conjecture or staff leanings as fact, particularly without verification, as justification for an unreasonable policy proposal.

OR-OSHA has failed to listen to our comments around AQI monitoring duration. We strongly believe the only way for this smoke rule to be effectively managed is to utilize a 24-hour average to trigger required response actions by employers. It is not possible for all employers in the state to actively monitor AQI levels minute by minute 24 hours a day and impose response actions to constantly changing AQI levels. Some monitoring stations also utilize averages and do not update instantly. We believe a 24-hour AQI average is the only responsible method for monitoring and triggering action in a reasonable time frame.

As currently written, employers will be forced to enter an extreme number of Oregonians in to Medical Monitoring for N95 mask use at a level (AQI 101) that has no proven harmful health effect for an individual without specific preexisting conditions. This in itself will create a hazard to thousands of Oregonians now forced to wear a restrictive respirator when there is not a defined health hazard or diagnosable medical condition due to the exposure to smoke at this level. Oregon OSHA and OHA have recognized the hazards associated with respirator use, and forcing healthy individuals into a respirator when not clearly essential creates a hazard to Oregonians that we will not support.

Additionally, this mandatory use of respirators at a level below AQI of 500 will create a significant number of issues with Oregonians that cannot pass medical monitoring or fit testing requirements. Along with religious beliefs, facial shapes, facial hair, and true medical conditions, employers are going to have to deal with managing all these groups that cannot safely wear a respirator. OR-OSHA has no provisions in place to deal with these situations employers will face. Employers will be left with sending Oregonians home, so they will lose out on work and pay, only to still be exposed to the same wildfire smoke at home that they would have been exposed to in the course of performing their work. Many jobs across the state cannot be changed by engineering or administrative controls. Forcing tens of thousands of Oregonians into respirators due to an AQI of 101 is dangerous and irresponsible.

Further, we want to urge OR-OSHA not to move outside the scope of its authority within this rulemaking. It was concerning to our coalition that a prior meeting included a review of workers' compensation claims and SAIF data. Even more troubling was the notion from certain stakeholders that we should be drafting these rules to make it easier to bring workers' compensation claims, or that we should consider limiting work for employees during conditions well outside of an employer's control. Workers' compensation should be handled by the Oregon's Workers' Compensation Division, not OR-OSHA, and any issues with worker's compensation is best left to MLAC or the Workers' Compensation Board. Wage and hour rules should be considered by BOLI, and the agency should not entertain rules that will prohibit Oregonians from going to work if they want to do so. OR-OSHA should be drafting rules with its core task in mind – to reasonably ensure a safe and healthy workplace for every working person in Oregon when wildfire smoke could impact worker safety.

Last, any rules released by the agency must be easily understood by employers and employees. The current approach to these rules is unnecessarily complex and will be difficult for employers to implement. We urge the agency to take into consideration that because of the unique nature of outside work in Oregon, there are often worksites with little to no internet access, phone service, or the ability to monitor each employee's exposure to PM2.5 throughout the day. This does not mean that these

employees do not deserve protection, but it does mean that these rules must be feasible and realistic for employers to comply with. There are a number of professionals on the RAC who know what will work and will not work for their worksites. We strongly encourage OR-OSHA to trust the advice of the HR professionals and operations managers who are sitting on the RAC in good faith with the shared goal crafting workable and protective rules for wildfire smoke exposure.

Our coalition appreciates the opportunity to respond and share our thoughts to ensure that is practical across a diversity of outdoor work situations and provides adequate protections to employees during extreme wildfire smoke events. Please do not hesitate to reach out to any of us with questions or concerns.

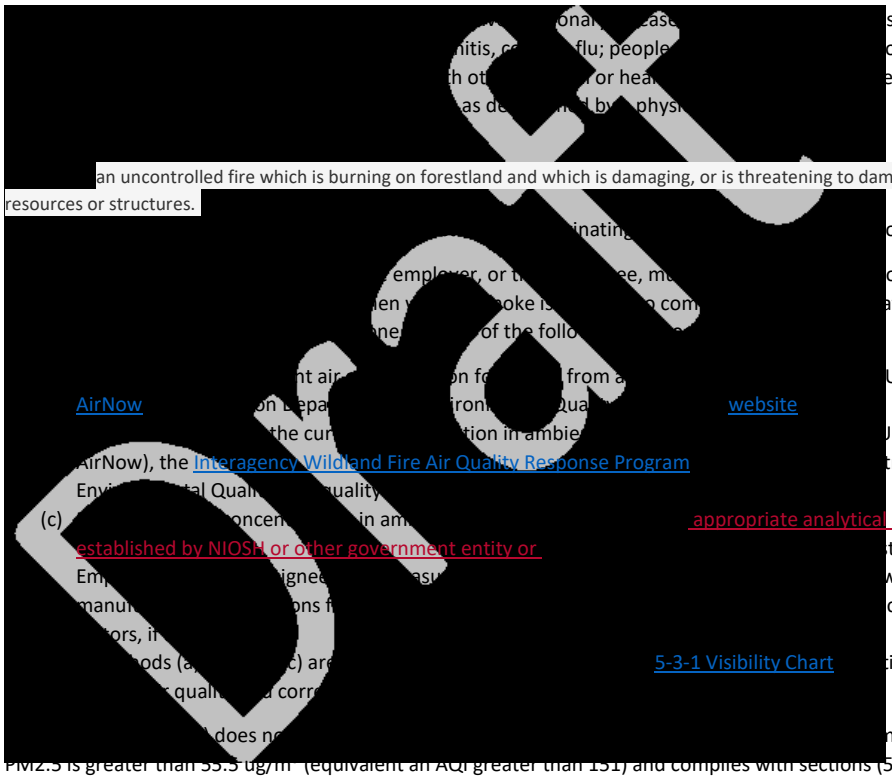
Quality Ind n indicator of
ct: ground-level ozone, particulate matter or PM 2.5 and PM10, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Forestland- any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in the judgment of the forester, a fire hazard, regardless of how the land is zoned or taxed. As used in this subsection, "clearing" means any grassland, improved area, lake, meadow, mechanically or manually cleared area, road, rocky area, stream or other similar forestland opening that is surrounded by or contiguous to forestland and that has been included in areas classified as forestland under ORS 526.305 to 526.370.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung



spiratory
ople with or
e

an uncontrolled fire which is burning on forestland and which is damaging, or is threatening to damage, forest resources or structures.

ove..

or employee
at the start

U.S. EPA

website

U.S. EPA (via
tment of

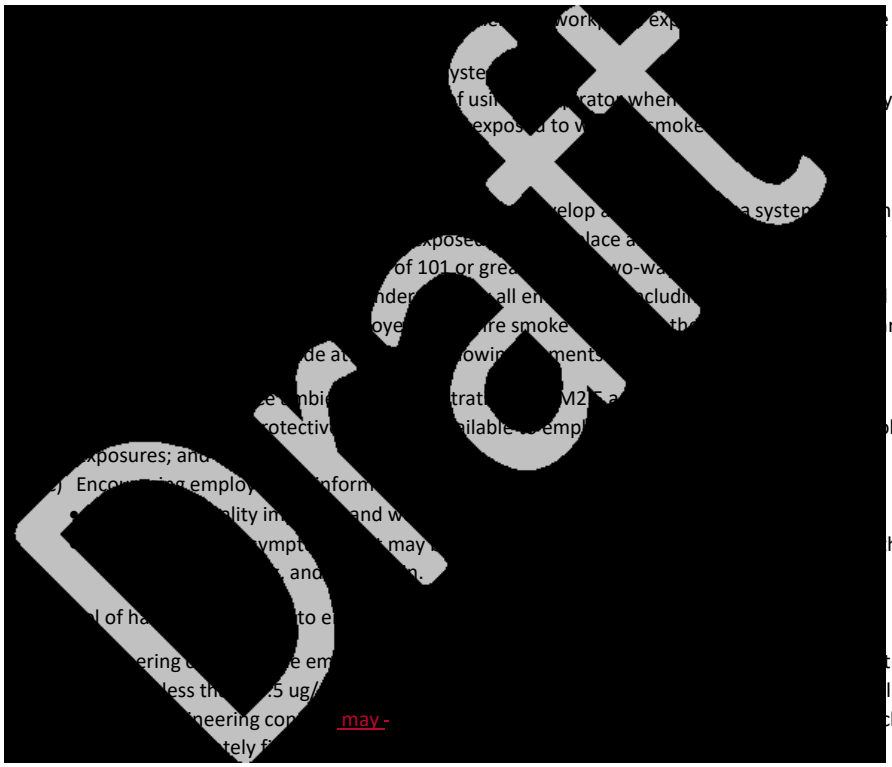
appropriate analytical method
established by NIOSH or other government entity or
ting device.
w the
ction

5-3-1 Visibility Chart
timate the

mbient air for
PM2.5 is greater than 35.5 ug/m³ (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The information and training must be provided at least once a year to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;
(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;



(b) Administrative controls. Whenever engineering controls are not feasible or effective to reduce employee exposures to PM2.5 to less than 35.5 ug/m^3 (equivalent to an AQI of less than 101), the employer must implement administrative controls, if practicable. Such controls may include one or more of the following:

(A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than 35.5 ug/m^3 (equivalent to an AQI of less than 101);

(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than 35.5 ug/m^3 (equivalent to an AQI less than 101); ~~and~~or

~~(C)~~ Limit each employee's exposures based on analysis of current air quality by using established analytical methods and devices. ~~, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m^3 (equivalent to an AQI between 101 and 151), to the following durations:~~

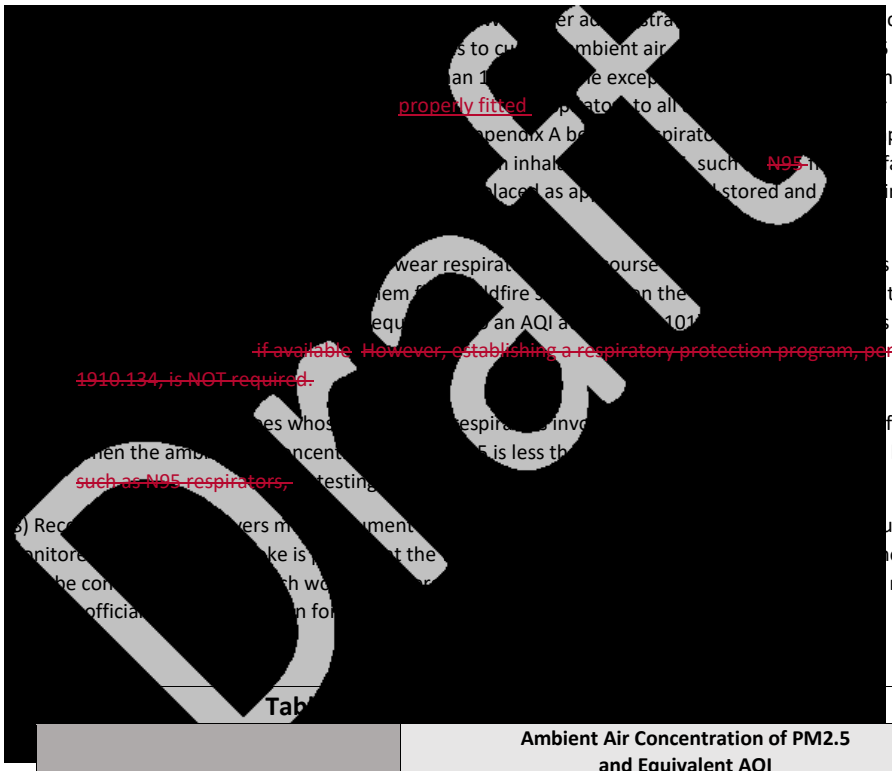
~~(i) 1 hour during an 8-hour shift;~~

~~(ii) 1 hour 15 min during a 10-hour shift; or~~

~~(iii)~~(C) ~~1 hour 30 mins during a 12-hour or more shift.~~

NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m^3 (equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.

Formatted: Indent: Left: 0.75", Hanging: 0.25", Tab stops: 1", Left + Not at 1.5"



cticable or
to less than
e employer
mandatory
pproved
facepiece
ined so that

but will
tion for
and fit
~~if available~~ ~~However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.~~

facepieces
below 151),
~~such as N95 respirators,~~

ured and
entation
maintained

Table

Rule requirement	Ambient Air Concentration of PM2.5 and Equivalent AQI		
	< 35.5 ug/m^3 (AQI: < 101)	35.5 – 55.5 ug/m^3 (AQI: 101 – 151)	> 55.5 ug/m^3 (AQI: > 151)
Identification of harmful exposure under section (4)	Yes	Yes	Yes
Employee information and training under section (5)	Yes	Yes	Yes
Employer two-way communication system under section (6)	Yes	Yes	Yes
Engineering controls under section (7)(a)	No	Yes, when feasible	Yes, when feasible
Administrative controls under section (7)(b)(A) & (B)	No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No	Yes, if practicable	No
*Control by Respiratory Protective Equipment under section (7)(c)	No	Yes	Yes
Recordkeeping under section (8)	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

BUNCH Theodore * DCBS

From: Kate Suisman <kate@nwjp.org>
Sent: Wednesday, June 23, 2021 4:27 PM
To: BUNCH Theodore * DCBS
Cc: WOOD Michael * DCBS; Jamie Pang; Ira Cuello-Martinez; Nora Apter; Carl Wilmsen
Subject: Wildland Firefighter exemption

Hello Ted, we write to support the June 18th comments of Carl Wilmsen regarding the exemption for wildland firefighters. We strongly believe these workers should be protected by the new rules and the exemption should be removed. In addition to Carl's suggestions re: training and provision of respirators, we add that not only should training be required on proper donning/doffing of PPE but also that each worker must be fit-tested for a respirator when they start work for that employer, and the employer must be required to have an adequate supply of the type of respirators that have been fit-tested. Thank you,

- Kate Suisman (NWJP), Nora Apter (OEC), Jamie Pang (OEC), and Ira Cuello Martinez (PCUN)

Kate Suisman (pronouns: she/her/hers)
Coordinator of Campaigns and Alliances
Attorney

Northwest Workers' Justice Project
812 SW Washington Street, Suite 225
Portland, Oregon 97205
503-525-8454, x13

Follow us on Facebook| Follow us on Twitter

ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON

PACIFIC NORTHWEST AGRICULTURAL SAFETY AND HEALTH CENTER
ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES

NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY
ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES

June 8, 2021

Tom Bozicevic and Theodore Bunch
Appeals and Technical Specialists
Oregon OSHA Rules Advisory Committees

Comments on Executive Order 20-04: Rulemaking to Protect Employees from Outdoor Workplace Exposures to Excessive Heat and Unhealthy Levels of Wildfire Smoke

Dear Rules Advisory Committee,

The Northwest Center for Occupational Health and Safety (NWCOHS) and the Pacific Northwest Agricultural Safety and Health (PNASH) Center, part of the University of Washington Department of Environmental & Occupational Health Sciences, recently received requests for input pertaining to the excessive heat and wildfire smoke rulemaking process for Oregon under Executive Order 20-04. Oregon is one of four Northwest states served by our centers, so we write to share a summary of our feedback and offer assistance should any additional questions arise.

EXCESSIVE HEAT CONSIDERATIONS

1. Wet-Bulb Globe Temperature (WBGT)

The methods Dr. Thomas Bernard of the University of South Florida used to help determine thresholds in Washington are described on pages 12 and 13 of the attached WA Concise Explanatory Statement for Outdoor Heat Exposure. In the statement, it is indicated that the Washington State Department of Labor & Industries "determined early on that [WBGT] was not feasible because of the complex calculations and specialized equipment." One consideration is whether employers and workers will have access to relevant and accurate data with sufficient spatiotemporal resolution to capture microclimates experienced by workers covered in the proposed rule (see also response to #4 below under Protective Measures regarding remote areas). Another consideration concerns limitations in the ability to forecast WBGT for work site planning.

If Oregon historical weather data do not indicate a relatively consistent dew point (as in Washington), then using dry air temperature for thresholds may not be appropriate, even though it may be more feasible than WBGT or Heat Index.

2. Heat Index

To guide decision-making, it may be useful to identify data on heat-related illness cases specifically in Oregon and characterize the corresponding weather conditions, as has been done in Washington (see Page 7 of the attached WA Concise Explanatory Statement).

Additional citations:

- https://pubmed.ncbi.nlm.nih.gov/17972253/
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5562230/
- https://onlinelibrary.wiley.com/doi/abs/10.1002/ajim.23092

Heat Index risk levels are used by OSHA and in the OSHA/NIOSH heat safety tool app.

However, note that in Tustin et al's evaluation of 25 outdoor occupational heat-related illnesses (14 fatal and 11 nonfatal) investigated by OSHA from 2011 to 2016, WBGT-based occupational exposure limits were exceeded for all 14 fatalities and for eight of 11 nonfatal illnesses. Six fatalities occurred when the Heat Index was < 91 degrees F, which OSHA designates as

a lower-risk category. Tustin et al suggest that "a Heat Index of 85°F (29.4°C) could be used as a screening threshold to prevent heat-related illness."

Though more practical than WBGT, Heat Index does have limitations (e.g., Heat Index makes assumptions about sun and wind). Bernard et al have examined the relationship between WBGT and Heat Index. The appropriateness of an approach that uses WBGT to produce Heat Index exposure limits (including an adjustment for sun exposure) and corresponding work/recovery recommendations based on the ACGIH heat stress Threshold Limit Value could be considered.

3. Clothing, Workload and Acclimatization

When reasonable assumptions can be made, these assumptions could be factored into exposure limits. For example, the Washington State Department of Labor & Industries assumed a constant work rate and that workers are unacclimatized in their heat rulemaking (page 12 of the attached WA Concise Explanatory Statement). Acclimatization can be lost after about one week away from working in heat. The assumption that workers are unacclimatized results in more health protective thresholds and an approach that is easier to implement.

For factors for which reasonable assumptions cannot be made, or for which different assumptions would significantly alter exposure limits, tiered exposure limits could be developed (e.g., for clothing in the Washington heat rule).

4. Protective Measures

Several factors should be considered for preventative measures:

- **Environmental monitoring and remote areas**: It would be useful to map out existing weather stations to determine coverage across areas of Oregon where workers are or will be working. It is also important to consider whether relevant data will be accessible to employers and workers from these stations. Options for alternative monitoring equipment could be provided if there are areas where data from stations in reasonable proximity are not available.

- **Water**: Access to 32oz per hour is consistent with existing recommendations. Consider further specification of other characteristics of water (e.g., potable, cool), based on existing health-based recommendations and consistency with relevant field sanitation and other requirements.

- **Shade**: The California heat rule has a shade provision; Washington does not. Consider contacting CalOSHA for additional information on shade implementation rationale in CA. Consider also including proximity to a toilet/port-a-potty, as this may be a risk factor for heat-related illness (see https://pubmed.ncbi.nlm.nih.gov/26237726/).

- **Rest**: If there are symptoms or signs of heat-related illness, the worker should be relieved from duty, provided with sufficient means to reduce body temperature and receive appropriate medical attention.

Because the draft regulation is applicable for both outdoor and indoor environments, in places where shade is recommended as a control, the language should also specify cool area for resting.

5. Written Heat Stress Management Plan

In addition to the topics already stated, consider also:

- **Health effects**: In addition to recognition of and self-monitoring for signs and symptoms of heat-related disorders (heat stroke, heat exhaustion, heat syncope, heat cramps, heat rash, rhabdomyolysis, etc.), consider incorporating recent science on:
    - Heat and traumatic injuries: https://pubmed.ncbi.nlm.nih.gov/31520291/ and https://pubmed.ncbi.nlm.nih.gov/30675732/

Hans Rosling Center for Population Health, 3980 15th Avenue NE, Seattle, WA 98195
deohs.washington.edu; deohs.washington.edu/nwcohs/; deohs.washington.edu/pnash/

- Heat and kidney injury: https://pubmed.ncbi.nlm.nih.gov/27058480/ and https://pubmed.ncbi.nlm.nih.gov/28093502/.

- **Risk factors for heat-related illness** (personal, workplace, environmental) and corresponding procedures for reducing risk. Consider established risk factors as well as recent science, including:
  - Piece-rate payment, distance to toilet
  - Recent administrative data studies: https://pubmed.ncbi.nlm.nih.gov/33075156/, https://pubmed.ncbi.nlm.nih.gov/31994776/
  - Recent field studies: https://pubmed.ncbi.nlm.nih.gov/31773783/; https://pubmed.ncbi.nlm.nih.gov/26237726/; https://pubmed.ncbi.nlm.nih.gov/31315538/.

- **Acclimatization**: The acclimatization protocol in the draft rule appears consistent with existing recommendations and should be done under supervision. Acclimatization can be lost after about one week away from working in heat (https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/2017-124.pdf).

- **Hydration and rest breaks**: Supervisors should monitor and encourage fluid intake and rest breaks. Note that there are considerations about implementation of hydration identified in research for certain working populations (e.g., https://pubmed.ncbi.nlm.nih.gov/24156496/).

- **Monitoring and responding to weather reports.**

Also, consider specifying at least annual training and that the training needs to occur in a language **and format** that workers understand.

6. Additional Notes

- Per the heat balance equation, increasing air velocity when the air temperature is greater than skin temperature may result in human heat gain. However, human heat loss can occur when the air temperature is lower than the skin temperature and air velocity is increased.

- Consider stating "personal cooling systems" rather than cooling vests specifically. Cooling vests may not be practical (and therefore not effective) in certain settings. However, other cooling systems are promising. See:
  - https://pubmed.ncbi.nlm.nih.gov/32886396/
  - https://pubmed.ncbi.nlm.nih.gov/33357122/
  - https://pubmed.ncbi.nlm.nih.gov/33601922/

- Consider heat stress recommendations established by CDC, which recommend reducing the metabolic demands of the job (changing work pace) and/or limiting time in the heat and/or increasing recovery time spent in a cool environment when heat stress increases, as well as ensuring and encouraging workers to take appropriate rest breaks to cool down and hydrate.

- For environmental surveillance, a key consideration is what will be done with the information to inform health and safety practice. Medical monitoring is particularly important for high-risk exposures. Updated guidance for physiological monitoring is being developed. Pre-placement evaluations by a health care provider can consider personal factors that increase risk (see literature cited above).

- First Aid emergency response: Both Washington and California heat rules require emergency response procedures to be included in written heat prevention plans. Considerations include:
  - Effective communication procedures so that employees at the work site can contact a supervisor when necessary.

Hans Rosling Center for Population Health, 3980 15th Avenue NE, Seattle, WA 98195
deohs.washington.edu; deohs.washington.edu/nwcohs/; deohs.washington.edu/pnash/

- Contacting emergency medical services (and identifying in advance who is designated to do so) and, if necessary, transporting employees to a place where they can be reached by an emergency medical provider.
- Ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

WILDFIRE SMOKE CONSIDERATIONS

1. Action Levels Based on Air Quality Index

Stakeholders have raised the issue that there is not enough health-effects evidence to inform work-specific exposure thresholds. This is something being addressed through ongoing research. The lack of existing studies makes it difficult to pick Air Quality Index (AQI) thresholds based on evidence in occupational settings. Extrapolating from population-based thresholds to an occupational standard should be approached with caution due to the lack of direct evidence. The intensity of labor impacts a person's inhalation rate and the volume of air inhaled in a given time interval, and thus, the amount of wildfire smoke particles inhaled, or exposed to, in that time frame. The US EPA (see source below) estimates that on average a sedentary person between the ages of 21 and 30 years will inhale approximately 4 liters of air every minute. If that same average person were engaged in a high-intensity activity, they would inhale about 50 liters of air every minute. This would increase the amount of air they inhale by a factor of more than 10 and increase their dose to the particles. See:

- Exposure Factors Handbook, Chapter 6: Inhalation Rates

Agriculture is among the workforces at highest risk of negative health effects from smoke exposure due to a combination of factors related to location, time and labor-intensive outdoor tasks. Factors at home and at work can work together to negatively to increase wildfire smoke exposure. Findings from recent Washington-based studies or similar studies in Oregon could inform efforts to protect workers in the highest-risk areas at the highest-risk times of year, and reveal data availability in rural areas. See:

- Health impact assessment of 2020 Washington State wildfire smoke episode
- Combined burden of heat and particulate matter air quality in Washington agriculture
- Mortality associated with wildfire smoke exposure in Washington state, 2006–2017

Understanding the spatiotemporal pattern of exposures is consistent with the precision agriculture framework and is foundational to addressing equity in rural settings.

2. Air Quality Measurement

Researchers have begun examining how general population measurements translate to worker protection in the case of wildfire smoke. The Oregon OSHA 8-hour time-weighted average limit for nuisance dust (a classification that includes wildfire smoke) is 10 mg/m^3 for total particulate and 5 mg/m^3 for respirable fraction (~PM with a diameter of 4 µm). These concentrations greatly exceed safe exposure levels for the general population that may be experienced in ambient outdoor conditions (e.g., $PM_{2.5}$ AQI of 500 = 0.5 mg/m^3). Some employers voluntarily use AQI classifications to inform decisions about outdoor work.

There are several reasons for the discrepancy between occupational and population exposure limits (PELs):

- PELs focus on the respirable cutpoint and use sampling devices designed specifically to match the respirable fraction. In contrast, $PM_{2.5}$ is used by the non-occupational community and is not directly applicable to occupational health regulations.
    - The public standards are supposed to be more protective because the public is exposed 24 hours/day.
    - The public has people who are more susceptible (i.e., opposite of the healthy worker effect).
    - AQI and PEL were developed in entirely different environments (e.g., PEL takes into account technological and fiscal feasibility, whereas AQI doesn't).
- PELs reflect the average exposure over an 8-hour workday. The assumption is that exposure is removed when the worker leaves work, which is not correct for wildfire smoke events.
- Particle size distribution for outdoor occupational aerosols would be expected to vary by source and by region. Given these conditions, the $PM_{2.5}$ to respirable PM ratio would also vary by source and region. One would need to define the relationship for each different aerosol, which would be an enormous amount of work. One scenario where this extra work might have value is for wildfire smoke, since smoke is a regional pollutant.

Considerations when establishing action levels for employers of outdoor workers:

- Establish if and how employers and workers will have access to relevant and accurate data with sufficient spatiotemporal resolution to capture microclimates experienced by workers covered in the proposed rule. Employers could take advantage of the existing regulatory network of $PM_{2.5}$ monitors to estimate respirable exposures for their outdoor workers. In addition to the regulatory $PM_{2.5}$ monitors, lower-cost monitoring may be useful for providing worksite-revelant data. For example, the California Air Resources Board and US Forest Service deploy temporary portable EBAM $PM_{2.5}$ monitors that communicate over satellite radio to improve data collection during wildfire episodes. Additionally, consumer-grade low-cost technologies may be useful. Most consumer-grade low-cost equipment currently available on the market is built with either Senserion or Plantower sensors. A Washington-based pilot study during last September's wildfire smoke events looked into hyperlocal, low-cost $PM_{2.5}$ monitoring versus relying on regulatory monitoring. The study found that this approach can be successful due to good sensor agreement when sensors are maintained and readings are calibrated. The project is deploying lower-cost smoke sensors on a weather station network (AgWeatherNet) with standardized instruments in rural Washington. A similar approach might be possible in Oregon.
- The proposed rules are based on 1-hour exposure concentrations, whereas the EPA enforces exposure limits for the population based on 24-hour averages. The EPA-based ambient air quality standards require that the 98th percentile of 24-hour average concentrations over a 3-year period be below 35 $\mu g/m^3$. The proposed wildfire rule establishes that hourly concentrations above 35 $\mu g/m^3$ are an action level for intervention, which is significantly more protective than the National Ambient Air Quality Standards.
- It is not specified in the rule which AQI reading should be consulted by employers. Air agencies typically report a forecasted $PM_{2.5}$ AQI that is intended to predict the 24-hour average $PM_{2.5}$ concentration based on modeling, as well as a "current" AQI (NowCast) reflecting a weighted average of the previous 3 or 12 hours of measurements, depending on pollutant variability, intended to reflect current conditions. Both measures can vary significantly from each other during wildfire smoke episodes. It is important to note that both these measures of AQI are significantly less variable than a real-time sensor measure that does not incorporate time-averaging of measurements.
- Rules should explicitly consider the duration of wildfire smoke events. It is likely that cumulative exposure to wildfire smoke over long periods may contribute to detrimental effects in workers.

3. Protective Measures

The hierarchy of controls offers possible interventions:

- **Personal Protective Equipment (PPE)**
  - For outdoor workers, and agricultural workers in particular, the use of N95s or other air-purifying respirators presents challenges. N95s (or certified alternatives) could be the most practical and effective solutions for wide-scale PPE use in the setting of smoke exposure, but respirators are not likely to provide adequate protection unless the person has passed a fit test. Use of N95 respirators may not be feasible for workers involved in strenuous activity due to the resistance to breathing imposed by the respirator.
  - We also caution that wildfire smoke and heat events often overlap in time, and respirator use could adversely impact thermal comfort under certain use cases.

- **Administrative Controls**
  - Productivity can be impacted by respirator use, thus incentive-based pay systems may inadvertently discourage respirator use. Being paid an hourly rate rather than piece rate can reduce agricultural workers' risks of heat-related illness symptoms and acute kidney injury, but this has not been examined with respect to smoke.
  - During periods of poor air quality, employers should manage worker activities to reduce exposure and dose, where feasible. This might include prioritizing indoor, less physically demanding activities and reducing shift length. In locations where air quality exhibits a diurnal pattern, work start/stop time could be adjusted to take advantage of times of day when the air quality is better.
  - In terms of research priorities, next steps are to: 1) characterize diurnal patterns of $PM_{2.5}$ and heat exposure and their synergism, 2) estimate dose and 3) determine a work/rest regimen that would minimize dose under different poor air quality conditions. Another consideration for such a regimen is the number of consecutive days above a threshold (i.e., acute vs. chronic exposure).
  - Although it does not currently exist, a decision-support tool with improved hyperlocal information on $PM_{2.5}$ and other smoke constituents from a state-of-the-art network of field monitors could inform administrative controls during wildfire smoke episodes.
  - Respirators remain the primary exposure reduction option for outdoor workers during severe wildfire smoke events, but they're not feasible or effective in many situations. Some employers have paused outdoor work during severe smoke events. Without wage protection, however, workers will still come to work in unsafe conditions because they need the paycheck.

- **Engineering Controls**
  - Short of stopping the work day under unsafe conditions or proper respirator use, the most promising at-work and at-home solutions pertain to engineering controls that provide clean air cooling space using mechanical ventilation for relief from smoke. In addition, because smoke events typically occur during hot months, this can be used as a cooling space if the air is conditioned and/or in the shade. Several recent studies have shown the promise of filtration interventions, such as portable air cleaners for improving indoor air quality during wildfire smoke events:
    - https://www.sciencedirect.com/science/article/abs/pii/S0048969721007105;
    - https://www.sciencedirect.com/science/article/abs/pii/S0360132320308118).

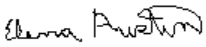
Hans Rosling Center for Population Health, 3980 15th Avenue NE, Seattle, WA 98195
deohs.washington.edu; deohs.washington.edu/nwcohs/; deohs.washington.edu/pnash/

Systematic evaluation of the measurement, action levels and protective measures for excessive heat and wildfire smoke exposure among workers is essential for developing evidence-based recommendations. Please contact us if we can assist with additional questions.

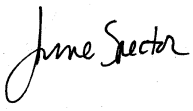
Sincerely,

Michael Yost, PhD, MS
Professor
Director, PNASH

Christopher Simpson, PhD, MSc
Professor
Director, NWCOHS



Elena Austin, ScD, MS
Assistant Professor
PNASH



June Spector, MD, MPH
Associate Professor
NWCOHS and PNASH

Edward Kasner, PhD, MPH
Clinical Assistant Professor
PNASH

Edmund Seto, PhD, MS
Associate Professor
NWCOHS

Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers who can reasonably expect employees to be exposed to wildfire smoke. Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

(2) The following workplaces and operations are exempt from these rules:

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

(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, except when it is necessary to open doors to enter or exit the vehicle.

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations~~, and when feasible, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m^3 (equivalent to an AQI at or above 151) and are encouraged to use them.~~

(e) Agricultural Labor Housing.

~~(e)~~(f) Employees exposed to aPM2.5 of 55.5 ug/m^3 or greater (equivalent to an AQI of 151 or greater) for a total of 1 hour or less during an 8 hour shift (1 hour 15 min during a 10 hour shift or 1 hour 30 min during a 12 hour or more shift) .

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Forestland- any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in the judgment of the forester, a fire hazard, regardless of how the land is zoned or taxed. As used in this subsection, "clearing" means any grassland, improved area, lake, meadow, mechanically or manually cleared area, road, rocky area, stream or other similar forestland opening that is surrounded by or contiguous to forestland and that has been included in areas classified as forestland under ORS 526.305 to 526.370.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, colds or flu; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Wildfire – an uncontrolled fire which is burning on forestland and which is damaging, or is threatening to damage, forest resources or structures. .
Wildfire Smoke – Emissions from wildfires or structural fires originating from wildfires as defined above..

(4) Identification of harmful exposures. The employer, or their designee, must determine and monitor employee exposure to PM2.5 for each workplace when wildfire smoke is present, to comply with these rules, at the start of each shift, and as often as needed, by one or more of the following methods:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or
(b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or
(c) Measure PM2.5 concentrations in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any; or
(d) If methods (a) through (c) are infeasible, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m^3 (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of ~~53~~5.5 ug/m^3 or greater (equivalent to an AQI of 15~~0~~1 or greater). The information and training must be provided at least once a year to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;
(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;

(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system; and
(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke.

(6) Employer two-way communication The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of 5~~3~~5.5 ug/m^3 or greater (equivalent to an AQI of 15~~0~~1 or greater). The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:

(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;
(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and
(c) Encouraging employees to inform the employer if any of the following occurs:
- When air quality improves and worsen; and
- Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(7) Control of harmful exposures to employees.

(a) Engineering controls. The employer must reduce employee exposure to ambient air concentrations of PM2.5 to less than 5~~3~~5.5 ug/m^3 (equivalent to an AQI of less than 15~~0~~1) by engineering controls whenever feasible. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is adequately filtered.

(b) Administrative controls. Whenever engineering controls are not feasible or effective to reduce employee exposures to PM2.5 to less than 5~~3~~5.5 ug/m^3 (equivalent to an AQI of less than 15~~0~~1), the employer must implement administrative controls, if practicable. Such controls may include one or more of the following:
(A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than 5~~3~~5.5 ug/m^3 (equivalent to an AQI of less than 15~~0~~1);
(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than ~~35~~55.~~5 ug~~5 ug/m^3 (equivalent to an AQI less than 15~~0~~1); and
~~(B)~~
~~(C) Limit each employee's exposures, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m^3 (equivalent to an AQI between 101 and 151), to the following durations:~~
~~(i) 1 hour during an 8-hour shift;~~
~~(ii) 1 hour 15 min during a 10-hour shift; or~~
~~(iii) 1 hour 30 mins during a 12-hour or more shift.~~

Formatted: Indent: Left: 1", No bullets or numbering

~~NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m³ (equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.~~

(c) Control by Respiratory Protective Equipment. Whenever administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 equal to or ~~to~~ less than 5~~3~~5.5 ug/m³ (equivalent to an AQI of less than 15~~0~~1), ~~with the exception of section (7)(b)(C),~~ but does not exceed 500, the employer must provide a sufficient number of respirators to all affected employees for voluntary~~mandatory~~ use in accordance with 29 CFR 1910.134 or Appendix A below. Respirators must be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece respirators. Respirators must be cleaned or replaced as appropriate, and stored and maintained so that they do not present a health hazard to users.

NOTE 1: Where the current AQI for PM2.5 ~~For employees who do not wear respirators in the course of their normal job duties but will only wear respirators to protect them from wildfire smoke, when the ambient air concentration for PM2.5~~ is at or above xx.x~~35.5~~ ug/m³ (equivalent to an AQI at or above 500~~101~~), ~~,~~ respirator use is required. The employer shall provide respirators with an assigned protection factor such that the PM2.5 levels inside the respirator correspond to an AQI of less than 151. ~~medical evaluations and fit testing are required if available. However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.~~

NOTE 2: For employees whose only use of respirators involves the voluntary use of filtering facepieces ~~when the ambient air concentration for PM2.5 is less than 35.5 ug/m³ (equivalent to an AQI below 151),~~ such as N95 respirators, fit testing and medical evaluations are not required.

~~(8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke, and be maintained until the official end of fire season for the county the worksite is located.~~

~~Table for Protection from Wildfire Smoke~~

~~Rule requirement~~	~~Ambient Air Concentration of PM2.5 and Equivalent AQI~~		
	~~< 35.5 ug/m³ (AQI: < 101)~~	~~35.5 – 55.5 ug/m³ (AQI: 101 – 151)~~	~~> 55.5 ug/m³ (AQI: > 151)~~
~~Identification of harmful exposure under section (4)~~	~~Yes~~	~~Yes~~	~~Yes~~
~~Employee information and training under section (5)~~	~~Yes~~	~~Yes~~	~~Yes~~

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Employer two-way communication system under section (6)	Yes	Yes	Yes
Engineering controls under section (7)(a)	No	Yes, when feasible	Yes, when feasible
Administrative controls under section (7)(b)(A) & (B)	No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No	Yes, if practicable	No
*Control by Respiratory Protective Equipment under section (7)(c)	No	Yes	Yes
Recordkeeping under section (8)	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li

Formatted: Left, Space After: 8 pt, Line spacing: Multiple 1.08 li


Local 328
AFSCME
Making OHSU Better For You


Local 3580
AFSCME


PORTLAND, OREGON
ESTABLISHED 1901


APANO
ASIAN PACIFIC AMERICAN NETWORK OF OREGON


BEYOND
TOXICS
Leadership For a Clean and Just Oregon


BLUEGREEN
ALLIANCE


FREE THE GOOD HERB
CANNABIS WORKERS COALITION
ALL POWER TO THE WORKERS
PDX
420


Ceasefire Oregon


CLIMATE JOBS PDX


climate
solutions
accelerating the transition
to our clean energy future


Ecumenical
Ministries
of Oregon


electrify
now


Families
For Climate


DOUGLAS COUNTY GLOBAL WARMING COALITION


KS Wild
Klamath-Siskiyou Wildlands Center


CWA
Local 7901
AFL-CIO


LWV
LEAGUE OF WOMEN VOTERS
OF OREGON


LABOR EDUCATION &
RESEARCH CENTER


LABORERS'
LOCAL 483
PORTLAND, OREGON
LiUNA!
Feel the Power


LOMAKATSI
RESTORATION PROJECT


oregon
MAIN STREET
alliance


NWJP
NORTHWEST WORKERS' JUSTICE PROJECT


NRDC


Oregon
AFL-CIO
Oregon's Union Movement


OREGON
AFSCME
COUNCIL 75


OCPP
OREGON CENTER
for PUBLIC POLICY
Because facts matter.


OrCAN
Oregon Climate & Agriculture Network


OPHA
Oregon Public
Health Association


oec
Oregon
Environmental
Council


Oregon
Law Center


ONA
Oregon
Nurses
Association
Voice of Oregon Nurses Since 1904


A Member's Union
OSEA
AFT Local 6732


OREGON STATE BUILDING &
CONSTRUCTION TRADES COUNCIL


PCUN


PDX
JOBS
WITH
JUSTICE


OREGON
PSR
PHYSICIANS
FOR SOCIAL
RESPONSIBILITY

June 9, 2021

Michael Wood, Administrator
Oregon OSHA
Michael.Wood@oregon.gov

Patrick Allen, Director
Oregon Health Authority
Patrick.Allen@dhsoha.state.or.us

RE: OREGON OSHA DRAFT EXCESSIVE HEAT AND WILDFIRE SMOKE RULES

Dear Director Allen and Administrator Wood,

On behalf of our broad coalition advocating for public health, worker and climate protections regarding the Excessive Heat & Wildfire Smoke rulemakings, we thank you for all your work so far in developing worker protections from heat-related illness and unhealthy levels of wildfire smoke. Climate change is already worsening public health crises in Oregon and frontline workers are amongst the first to suffer the impacts as the number of hot days and wildfires exponentially increase.[1] Black, Indigenous and people of color (BIPOC) and immigrant workers who are more likely to work dangerous, low-wage, and non-union jobs, are disproportionately impacted.

[1] The number of hot days considered unsafe due to excessive heat are expected to double by 2050. https://www.washington.edu/news/2020/04/28/agricultural-pickers-in-us-to-see-unsafely-hot-workdays-double-by-2050/

We urge you to keep these worsening climate impacts and inequities front of mind as you draft and finalize language for these rules. Simply put, any proposed standards must prioritize the health and well-being of Oregon's workers in climate-impacted conditions as opposed to the economic bottom lines or conveniences of businesses. In addition, these proposed standards must be based on the best science and health research available.

As Oregon OSHA and OHA continue to develop these rules, we urge you to incorporate the science and health-based thresholds that, at a minimum, are essential in order to protect as many vulnerable workers as possible. Our suggested thresholds and policies have been carefully vetted by a diverse stakeholder group of health and climate experts as well as frontline workers with lived experience working in hot and smoky conditions.

I. The current AQI proposals in the wildfire smoke rule must fully protect health-sensitive populations.

According to the American Lung Association, a whopping 21.5% of America's workforce already suffer asthma impacts at work, and **1** in **6** adult-onset asthma cases are caused by occupational exposures such as wildfire smoke.[2] And when AQI (air quality index) values are above 101, air quality is unhealthy for sensitive populations, ranging from those with asthma, respiratory illness, heart or lung disease, or pregnancy. We are pleased that the current iteration of the wildfire smoke rule includes an encompassing definition of "sensitive group."[3] Air quality is unhealthy for everyone at an AQI of 151 or above.[4]

Older adults are also particularly sensitive, and our workforce is aging: the number of Americans over age 55 in the labor force is projected to increase from 35.7 million in 2016 to 42.1 million in 2026. By 2026, aging workers will make up nearly a quarter of the labor force.[5]

A. Employers should increase ventilation and monitoring AQI in the workplace as a first step to reduce exposure. If increasing ventilation is not possible, all employers should provide NIOSH-approved N95 respirators for their employees/workers at 101 AQI, and portable air quality sensors should be provided for traveling employees.

During the worker listening sessions, it was mentioned multiple times that some employers were not providing N95 respirators to their workers during the September 2020 wildfires. We are supportive and grateful of language in the current draft rules to *require* employer-provided, NIOSH-approved N95 respirators when the AQI of a workplace reaches above 101.[6] However, Oregon OSHA should mandate respirator use at that threshold for all employees/workers including emergency essential workers, as opposed to having employers *encourage* the use.[7]

---

[2] https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/living-with-asthma/creating-asthma-friendly-environments/asthma-in-the-workplace.
[3] Draft Wildfire Smoke Rule (May 26, 2021) at p.1.
[4] https://www.airnow.gov/aqi/aqi-basics/; https://www.epa.gov/pmcourse/patient-exposure-and-air-quality-index.
[5] https://www.aging.senate.gov/imo/media/doc/Aging%20Workforce%20Report%20FINAL.pdf.
[6] Draft Wildfire Smoke Rule (May 26, 2021) at p.3.
[7] Draft Wildfire Smoke Rule (May 26, 2021) at p.1.

This agency should also require employers to train employees on proper usage, medical evaluation, and fit testing of respirators and should also require that employers provide respirators for voluntary use when workplace air quality is in the second tier of the AQI (i.e. between 51 and 100). Engineering controls to reduce PM 2.5 exposure to an AQI of below 101 are needed, and the draft rule does require this where feasible, but both engineering controls and the option to wear a respirator, especially for those in workplaces with open doors and windows, are necessary to adequately protect health-sensitive people with other comorbidities (ie. asthma, pregnancy) who need the air to be at an AQI below 100.

Lastly, because AQI is subject to change based on wind speed and direction, workers working in remote locations where weather data cannot be easily accessed, should be provided with portable air sensors.

B. Requirements to train and relocate employees/workers to an area lower than 101 AQI are appropriate; Employer communications about training at 51 AQI is appropriate.

We are supportive of the requirement of annual supervisor and employee training, provided that new employees and supervisors get trained and fit-tested on a rolling basis as they start work, and that employers document how the PM 2.5 concentration in ambient air is monitored in a 24 hour period.[8] We are also supportive of the requirement for employers to simply notify employees/workers of training opportunities and wildfire hazards in a language they understand, when AQI reaches 51.[9] These training opportunities must take place during paid time and attendance must be mandatory. These trainings must be effective, interactive, and must offer opportunities to ask questions and practice the information offered before the training and review are completed. Trainings must involve multiple modes for different types of learners and must include versions for low-literacy and those with little fluency in English. Trainings must also emphasize the prohibition against retaliation for workers who raise safety concerns, similar to the language in the Covid-19 rule.

However, even if wildland firefighters are to be exempt from respirator requirements, OSHA should still at the very least ensure that English-as-a-second language firefighters obtain health-relevant information and training in a language that they understand. Similarly, it is appropriate and more health-protective to have an employer change a work schedule or relocate an employee/worker to an area with an AQI lower than 101 if exposure cannot be controlled.[10]

II. Labor housing, emergency workers, and essential workers in indoor spaces with frequently opening windows/doors must not be excluded from wildfire smoke protections.

We remain concerned over the number of exemptions included in version 3 of your draft rules. Those living in labor housing do not have the luxury of "leaving" their work sites regardless of

[8] Draft Wildfire Smoke Rule (May 26, 2021) at p.2. Currently, fit-tests are not being required as part of formal training. *Ibid.* at p. 4.
[9] Draft Wildfire Smoke Rule (May 26, 2021) at p.3 (AQI thresholds changed from 101 to 51 for communications about training and wildfire risk, from the previous draft iteration).
[10] Draft Wildfire Smoke Rule (May 26, 2021) at p.3.

whether they are performing work duties. Farmworker housing in the middle of or adjacent to the fields leaves little or no space between work sites and housing. We heard stories at your listening session of farmworkers inhaling smoke 24 hours a day due to lack of PPE, and of an inability to get away from their work site. If agricultural labor housing is specifically excluded from the smoke rule,[11] parallel protections against heat stress and wildfire smoke must be included in rulemaking currently underway regarding agricultural labor housing. We urge you to prioritize these rules to ensure that farmworkers can get the relief they need from smoke, during their 'off-work' hours.

We also heard from bus drivers, warehouse workers, forest workers, and other essential workers during your worker listening sessions that smoke exposure and the resulting respiratory distress remains a problem. Specifically, during last year's devastating wildfires, bus drivers and warehouse workers working in buildings with negative air pressure did not have the required respiratory protection , and their employers did not provide PPE, nor allow them time off to remove themselves from the hazardous work environments. Simply put, relying on individual managers to choose to protect their workforce is inadequate, and there is no reason to believe a utility worker or a paramedic (currently exempt in the draft rules) who must be outside, would not suffer these same impacts without across-the-board protections.[12]

As per Oregon's Covid-19 guidelines, spaces with 50% or more of air cycled in from outdoor air are outdoor spaces.[13] OSHA should use the same definition and explicitly define workplaces that must frequently open and close doors (ie. a retail shop; drive through) as "outdoor," even if there is a building mechanical ventilation system, and apply the NIOSH-approved, employer provided respirator requirement to such instances.

III. Oregon OSHA's excessive heat rules must adequately consider unacclimatized workers, health-sensitive populations, and humidity impacting certain regions.

Workers/employees are at risk for excessive heat exposure and heat strain when the heat load is greater than the worker's ability to dissipate heat. Physical activity, environmental conditions, and clothing all contribute to the heat load. A 2019 study by a group of occupational health researchers found that a gradual increase in summer temperatures led to an increase in heat-related deaths among construction workers in the United States from 1992 to 2016. Over that 24-year period, 783 workers died from heat related causes. Construction workers—just 6% of the U.S. workforce—accounted for 36% of the heat-related deaths.[14] And between 2005 and 2012, 28 farm workers died from heat-related illnesses in California alone-- also likely underreported.[15]

---

[11] Draft Wildfire Smoke Rule (May 26, 2021) at p.1.
[12] Draft Wildfire Smoke Rule (May 26, 2021) at p.1.
[13] Outdoor" means any open-air space including any space which may have a temporary or fixed cover (e.g. awning or roof) and at least fifty percent of the square footage of its sides open for airflow such that open sides are not adjacent to each other." https://sharedsystems.dhsoha.state.or.us/DHSForms/Served/le2351b.pdf (at p. 1).
[14] https://onlinelibrary.wiley.com/doi/abs/10.1002/ajim.23024; https://nwlaborpress.org/2020/08/heat-kills/
[15] https://www.motherjones.com/food/2018/08/farmworkers-are-dying-from-extreme-heat/.

With strong rules, Oregon OSHA can help prevent such deaths and injuries from happening at the workplace. Basing measures and thresholds on health-based recommendations is essential for the protection of workers, and this agency must use health-conservative standards to ensure that the most health vulnerable and less physically fit employees still reap the benefits of health protections. For example, Oregonians are not as acclimated to high heat as people in other areas with heat standards, such as California.[16] What constitutes "high heat procedures" currently remains undefined and unclear.[17] Table 1 of Oregon OSHA's draft rules for excessive heat sets temperature threshold ranges for very heavy work at 70-77°F, and for light work for unacclimatized workers at 86°F.[18] While on the right track, this ambient terminal temperature threshold for light work could be set to 80°F for unacclimatized workers. Morris et al. 2019 finds that cases of occupational heat-related illness begin to rise with a heat index of 80°F.[19]

Local climate data must be considered to determine appropriate measures and thresholds. This must also be weighed with the availability and ease of obtaining current and future predicted forecasts. We also respectfully request this agency revert back to the language in version 1 of the draft rules that defines "heat wave" as "at least ten degrees Fahrenheit higher than the average high daily temperature in the preceding five days" as this definition better accounts for the specific weather and circumstances Oregon faces.[20]

Further, we request that Oregon OSHA consider the impact of humidity (ie, a heat index) in addition to its temperature thresholds to account for some parts of the state that experience higher humidity during the summer season. This specifically was mentioned during the listening session(s) by hazardous waste and city workers suffering humidity impacts in the Metro region, while wearing PPE.

As such, OSHA's final rules on excessive heat rule should specify at a minimum:

1. Workers/employees must have access to fresh, cool and cold (36-66°F),[21] and uncontaminated drinking water immediately available from their work site, and they must be encouraged to hydrate throughout the day. This water must be provided by employers. It is recommended by health experts that if someone is in heat for less than 2 hours and involved in moderate work activities, they should be encouraged to drink 1

[16] California's excessive heat rule sets mandatory high heat procedures at 95 °F.
[17] Draft Excessive Heat Rule (May 26, 2021) at. p.4.
[18] Draft Excessive Heat Rule (May 26, 2021) at. p.1.
[19] "When WBGT is unavailable, a Heat Index alert threshold of approximately 80 °F (26.7 °C) could identify potentially hazardous workplace environmental heat." *Accord* Moris et. al. (2019), Actual and simulated weather data to evaluate wet bulb globe temperature and heat index as alerts for occupational heat-related illness, available at https://pubmed.ncbi.nlm.nih.gov/30285564/.
[20] Draft Excessive Heat Rule (April 8, 2021) at p. 2; *See also* redlined rules submitted as Appendices A and B.
[21] Draft Excessive Heat Rule (May 26, 2021) at p. 2.

cup (8 oz.) of water every 15-20 minutes per NIOSH recommendations.[22] For prolonged exposure and high activity levels, workers should be provided electrolyte-containing beverages with low sugar or no sugar.[23]

2. Workers/employees must have shade within 400 feet of where they are performing their work When Temperatures reach 95 F, shade is not enough without additional interventions to allow employees to cool off successfully such as slush ice, cooling gel bandanas, and/or cooling mist. Alternatively, employers can promptly bring workers into cooling areas with air conditioners during their rest breaks or preventative cool-down breaks. Shade must be immediately available to the worksites so employees can obtain relief as needed without loss of work time or further exertion.[24]

3. Portable or permanent bathroom structures must be placed also within 400 feet walking distance from the work area to encourage employees to drink water and utilize bathrooms as necessary. Placing shade, water, and bathrooms too far from a workstation could discourage workers from taking necessary time to utilize the cool down station(s), hydrate, and take bathroom breaks.

4. Workers/employees must be allowed and encouraged to take regular and preventative cool-down breaks in the shade that are 15 minutes long in order to prevent overheating. These breaks should be a part of the compensated day and these breaks must be required upon a worker's report or exhibition of heat-stress symptoms.[25] It is important to stress that cumulative minutes for the cool down breaks can be longer than regular break times required under the current law as an incentive to encourage these necessary breaks without a loss of wages.

5. We also strongly encourage Oregon OSHA to require employers to develop and implement a Heat Stress Management Program. This program should be provided to employees prior to the start of heat season (May 1st), and both employees, monitors and supervisors should be trained. These trainings should be considered mandatory for all employees to attend with pay.
    a. These trainings must be effective, interactive and must offer opportunities to ask questions and practice the information offered before the training and review are completed. Trainings must involve multiple modes for different types of learners and must include versions for low-literacy and those with little fluency in English. Trainings must also emphasize the prohibition against retaliation for workers who raise safety concerns, similar to the language in the Covid-19 rule.
    b. These trainings must include an explanation of heat stress, heat strain, heat-related disorders, heat stress hygiene practices (such as fluid replacement, lifestyle, and health status) and how to recognize heat-related illness.

---

[22] See tables 6-2 and 6-3 in https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf.
[23] https://www.army.mil/article/186280/heat_can_kill_you; https://ucanr.edu/sites/safety/files/2901.pdf
[24] Multiple interventions is more effective than just one intervention. Chicas R, Xiuhtecutli N, Dickman NE, et al. Cooling intervention studies among outdoor occupational groups: A review of the literature. Am J Ind Med. 2020;1-20, available at https://doi.org/10.1002/ajim.23175.
[25] The 5 minutes provided for in the draft rule is not enough, in some cases, to prevent heat illness. Draft Excessive Heat Rule (May 26, 2021) at. p.4.

c. Trainings should also include policies of self-determination, acclimatization, site-specific countermeasures, and emergency response procedures which explains how to cool stricken employees, procedures for contacting emergency services, and how to provide clear worksite directions to emergency medical personnel.
d. The hierarchy of controls should be utilized, including but not limited to elimination or substitution of the hazards, increasing air velocity, using reflective or heat-absorbing shielding or barriers, providing access to cooling vests, a trained buddy system, and increasing the number of employees per task with appropriate applicable social distancing (if feasible).[26]
e. During high heat events, supervisors should check in with acclimatized employees within an hour or two for the start of the shift, half-way through a shift, and towards the end of the shift as well to ensure proper monitoring. The check in with unacclimatized employees should be more frequent. When the signs, symptoms, or indicators of severe heat illness (such as, but not limited to, decreased level of consciousness, staggering, vomiting, disorientation, irrational behavior or convulsions) are present, an employer must immediately contact emergency medical services and implement emergency response procedures. If employing a non-supervisory monitor to check with the employees in high heat, the monitor must have all the training a supervisor is required to have and must be trained to identify heat-related symptoms, how to address them and must have the power to remove the individual from the hazardous location to safety with appropriate transportation.

6. We are pleased and supportive of the current draft rule's 'Acclimatization Plan,' which specifies that increases to heat exposure for new and unacclimatized workers should be no more than a 20% increase per day.[27] Maximum work level increases should be phased in as illustrated in the tables below to ensure safe and proper acclimatization.

Table 1 for Unacclimatized Employees

Day 1	Day 2	Day 3	Day 4	Day 5
20% Increase to Heat Exposure	40% Increase to Heat Exposure	60% Increase to Heat Exposure	80% Increase to Heat Exposure	100% Fully Acclimatized

[26] See also https://www.cdc.gov/niosh/topics/heatstress/recommendations.html#:~:text=Control%20of%20Heat%20Stress&text=Engineering%20controls%20might%20include%20those,%2C%20wet%20floors%2C%20or%20humidity.
[27] https://www.cdc.gov/niosh/topics/heatstress/acclima.html; Draft Excessive Heat Rule (Acclimatization Plan) (May 26, 2021) at p. 6.

Table 2 for Re-Acclimatization

Days Away from Heat Exposure	Recommended Heat Exposure for 1st Day Back to Work	Recommended Heat Exposure for 2nd Day Back to Work	Recommended Heat Exposure for 3rd Day Back to Work	Recommended Heat Exposure for 4th Day Back to Work
>5	80%	100% (fully re-acclimatized)		
>12	60%	80%	100% (fully re-acclimatized)	
>20	50%	60%	80%	100% (fully re-acclimatized)

IV. Work traditionally measured by output quotas must be suspended during high smoke and heat events, and employees/workers who can be relocated to a safer work area must be.

Due to the exigent nature of wildfire smoke and excessive heat events, we urge Oregon OSHA to require that traditional output quotas be suspended in both final rules. Without such protections, workers/employees will undoubtedly try to physically exert themselves in an attempt to meet demands in conditions that don't allow it. Doing so will allow for the full implementation of the safety protocols and controls put forth by this agency and create workplace cultures that make supervisors and employees want to fully implement health-based protections. In a similar vein, this agency should specify that work shifts that can be flexible during both high heat and smoke events should be shortened or moved to different times to limit exposure, and employees/workers that can be physically relocated from a hot or smoky workplace to a cooler or safer place, must be.[28]

OSHA should also require the maintenance of wages and benefits when employees need to avoid an unhealthy workplace or miss work due to health impact from smoke or heat.

V. Oregon OSHA should strongly consider implementing emergency rules in preparation for this upcoming wildfire season and summer heat.

Because rules for wildfire smoke and excessive heat are not scheduled to be finalized until Fall 2021, we implore Oregon OSHA to implement emergency rules using the most health-protective thresholds as possible in anticipation of the forthcoming wildfire season and extreme summer temperatures by the end of June.

As is customary with new rules, Oregon OSHA must create a poster and visual information about the new requirements for both rules, which must be posted at central, highly-visible locations at

[28] Currently only the draft wildfire smoke rules address relocation. *Accord* Draft Wildfire Smoke Rule (May 26, 2021) at p.3.

the worksites. As to both rules, backup plans to get workers to emergency medical services must be in place when workers are in areas with poor cell phone reception; employees and supervisors/monitors must be aware of and know how to access the backup plan.

The comments set forth above are based upon the most recent information available provided by Oregon OSHA as of this submittal date, and are subject to change as this rulemaking progresses or as new scientific information becomes available.

We have also appended a red-lined version of your current draft rules with proposed language changes in an effort to be more concise, efficient, and clear (see attached Appendices A and B). We look forward to continuing our partnership with you in the rulemaking process and working together to ensure that no Oregon worker is forced to choose between their health and a paycheck.

Sincerely,

AFSCME Local 328
www.local328.org

AFSCME Local 3336
www.afscme3336.org

AFSCME Local 3580
www.afscme3580.org

Simeon Jacob
Environmental Justice Manager
Asian Pacific American Network of Oregon
simeon@apano.org

Shirley Block,
President
ATU Local 757
www.atu757.org

Wendy Minty, Southern Oregon
Environmental Justice Grassroots Organizer
Beyond Toxics
wmintey@beyondtoxics.org

Ranfis Villataro
Blue Green Alliance
Oregon State Policy Coordinator
rvillatoro@bluegreenalliance.org

Savina Fierro
Co-Founder and Executive Director
Cannabis Workers Coalition
hello@cannabisworkerscoalition.org

Ceasefire Oregon
Portland, Oregon
info@ceasefireoregon.org

A.J. Mendoza
President, Communications Workers of America Local 7901
president@cwa7901.org

Mark Darienzo and Dave King, Co-Chairs
Climate Jobs PDX
landd_2@q.com

Victoria Paykar
Oregon Transportation Policy Manager
Climate Solutions
victoria.paykar@climatesolutions.org

Aaron Salzman
Climate Advocacy Associate
Ecumenical Ministries of Oregon
asalzman@emoregon.org

Stuart Liebowitz, Facilitator
Douglas County Global Warming Coalition
dcglobalwarmingcoalition@gmail.com

Robert Yuhnke
Policy Committee
Elders Climate Action, Oregon Chapter

Brian Stewart
Founder
Electrify Now
brianstewart@electrifynow.net

Nora Lehmann
Board Co-President
Families for Climate
www.familiesforclimate.org

Michael Heumann, MPH, MA
HeumannHealth Consulting
heumannhealth@gmail.com

Joseph Vaile
Klamath-Siskiyou Wild
joseph@kswild.org

League of Women Voters of Oregon
Salem, OR
www.lwvor.org

Farrell Richartz, Business Manager &
Secretary-Treasurer
Liuna Laborers' Local 483
Farrell@liuna483.org

Carl Wilmsen, Ph.D.
Lomakatsi Restoration Project
nwfc@lomakatsi.org

Iris Hodge
Business Engagement Consultant
Main Street Alliance of Oregon
Iris@mainstreetalliance.org

Jane Stackhouse
On behalf of the Steering Committee
Metro Climate Action Team (MCAT)
info.mcat.olcv@gmail.com

Teniope Adewumi-Gunn, Ph.D., Climate
Change and Worker Health Science Fellow
Angus Duncan, PNW Consultant
Natural Resources Defense Council

Kate Suisman, Coalitions Manager
Northwest Workers' Justice Project
kate@nwjp.org

Dagoberto Morales-Duran
Director
NOWIA Unete, Center for Farm Worker
Advocacy
dago.uneteoregon@gmail.com

Kenneth D. Rosenberg, MD, MPH
OHSU-PSU School of Public Health
Portland

Graham Trainor, President
Oregon AFL-CIO
https://oraflcio.org/

Oregon AFSCME
www.oregonafscme.org

Janet Bauer
Senior Policy Analyst
Oregon Center for Public Policy
jbauer@ocpp.org

Megan Kemple
Co-Director
Oregon Climate and Agriculture Network

Jamie Pang, Environmental Health Program
Director
Nora Apter, Climate Program Director
Oregon Environmental Council
Jamiep@OECOnline.org;
Noraa@OECOnline.org

Joel Iboa, Executive Director
Oregon Just Transition Alliance
joel@ojta.org

Nargess Shadbeh, JD
Director of Farmworker Program
Oregon Law Center
nshadbeh@oregonlawcenter.org

Oregon Nurses Association
www.oregonrn.org

Jessica Nischik-Long
Executive Director
Oregon Public Health Association
jnischik.opha@gmail.com

Oregon School Employees Association (OSEA)
www.osea.org

Robert Camarillo, Executive Secretary
Oregon State Building and Construction Trades Council
www.oregonbuildingtrades.com

Ira Cuello-Martinez
Climate Policy Associate
Pineros y Campesinos Unidos del Noroeste
iracuello@pcun.org

Lisa Hubbard
Interim Executive Director
Portland Jobs with Justice
lisa@jwjpdx.org

Brad Reed
Campaign Manager
Renew Oregon
Brad@reneworegon.org

Blanca Gutierrez
Bilingual Organizer
Rogue Climate
blanca@rogueclimate.org

SEIU Oregon (SEIU Local 49 and SEIU Local 503)
www.seiu-oregon.org

Damon Motz-Storey
Healthy Climate Program Director
Oregon Physicians for Social Responsibility
damon@oregonpsr.org

Laura Krouse
Our Climate
Organizer
laura@ourclimate.us

Alan Journet Ph.D.
Co-Facilitator
Southern Oregon Climate Action Now
www.socan.eco

Gene Blackburn
Secretary Treasurer
Teamsters Local Union No. 206
gene.blackburn@teamsterslocal206.org

Jason Barbose
Senior Policy Manager
Union of Concerned Scientists
jbarbose@ucsusa.org

Jennifer Hess, DC, PhD
Associate Professor of Research
University of Oregon, Labor Education and Research Center
jhess@uoregon.edu

Estefanía Ponce-Domínguez
Labor Rights Organizer
Voz Workers' Rights Education Project
estefania@portlandvoz.org

Diane Hodiak
Executive Director
350 Deschutes

Amy Fellows, MPH
Executive Director
We Can Do Better
amy@wecandobetter.org

Clair Clark
Co-Coordinator
350 Salem OR
coordinators@350salemor.org

Linda Kelley
350 Eugene
https://350eugene.org/

Indi Namkoong
Coalition Manager
350PDX
indi@350pdx.org

CC: Tom.Bozicevic@oregon.gov

Theodore.Bunch@oregon.gov

Gary.L.Robertson@oregon.gov

Renee.M.Stapleton@oregon.gov

Attachments: Appendix A and B

BUNCH Theodore * DCBS

From: BUNCH Theodore * DCBS
Sent: Friday, June 18, 2021 12:50 PM
To: ROBERTSON Gary L * DCBS; STAPLETON Renee M * DCBS; MCLAUGHLIN Dave * DCBS; APPEL Lisa * DCBS
Subject: FW: Garland comments heat/smoke
Attachments: 2021-05 garvitae.docx

From: John Garland <johngarland49@gmail.com>
Sent: Friday, June 18, 2021 12:35 PM
To: Bozicevic Tom <tom.bozicevic@state.or.us>; BUNCH Theodore * DCBS <Theodore.BUNCH@oregon.gov>
Subject: Garland comments heat/smoke

Tom, Ted,

Please accept my comments on heat/wildfire smoke. I attach my vitae fyi.

Thank you,

Dr. John J. Garland, PE

FACC, OROSHA Committee Member

Professor Emeritus, FERM, Oregon State University

Past Leader & Deputy Leader, Ergonomics, International Union of Forestry Research Organizations

HEAT

GENERAL:

I have spent over 50 years in the forestry/logging sector as a worker, researcher, professor/extension specialist and judicial expert. I have fought wildland fires and been involved in heat/exertion research in logging. I have served the logging code review committees over 40 years with OROSHA.

It is an error to develop health rules that do not take into account the differences between work sites that are stationary and those mobile work sites in remote locations that are constantly changing. The proposed rules are so burdensome for logging that an employer's inability to comply makes them automatically in violation. It is mandatory to recognize these differences and craft rules that are effective and feasible.

Logging and forestry services are covered by Div. 7 codes and the work exposes workers to heat hazards. The work has seasons and for much of the year, workers are coping with

cold/wet work. The greatest heat exposure comes to those working with power saws, yarding with cables, and other workers on the ground. By most research, manual logging has one of the heaviest work loads (VERY HEAVY) as measured by energy expenditure and heart rate measures. Shade is often nonexistent, especially in fire salvage areas. The number of such exposed workers is diminishing with technology of tethered assisted vehicles, grapple yarding w/television, drone rigging systems, and other mechanized operations. Cabs provide shade and cooling from simple fans to state-of-the-art air conditioners. Logging employers are protective of their workers as they are scarce and valuable. ODF has overlapping control of forestry operations during high heat events to prevent fires and employers use "hoot owl" shifts terminating a 1 pm avoiding the hottest part of the day. This is a similar practice used by Southern loggers who face long seasons of high heat/humidity.

NIOSH references/tables/guidance were done in industrial/agriculture settings not in a forest environment. One proposed study I helped design was not funded.

WHAT MAKES SENSE:

TRAINING: Div 7 **437-007-0100 Safety and Health Program.** Rules provide the basis for training requirements already. Further specification for heat hazards could be added and good training materials for woods work already exist. Rule **437-007-0205 Hazard Identification.** Could be improved to add the health hazard of heat along with physical site conditions. Rule **437-007-0235 Working Conditions** could be expanded to include heat conditions specifically.

FLUID/WATER AVAILABILITY: Rule **437-007-0220 Medical Services and First Aid** could be expanded with fluid intake guidance and encouragement. The quart/hour can be excessive and each person has differential requirements. Timber cutters and power saw users working away from roads/vehicles have difficulty carry more than a quart of liquid. They are also often sole proprietors/partnerships not subject to rules. Cautions should be added for liquids such as stimulant drinks with caffeine, sugar, medicines, other chemicals that are popular with woods workers and increase metabolism, heart rate, kidney function, when added to heat stress. Loggers and forestry workers are likely underhydrated both in summer and the rest of the year.

MONITORING NOT ACCLIMATIZATION: CA rules stress monitoring during early work and proposed rules are infeasible for remote, mobile work sites. Shut downs during fire season make the maintenance of acclimizatation unworkable. Monitoring of returning employees after shut downs makes more sense. Rule **437-007-0140 Training: (2) Evaluate each employee who has previously received job safety and health instruction and training** could be improved to include monitoring for heat stress.

EMERGENCY CONDITIONS: **437-007-0200 Site Planning and Implementation** cover emergency location and treatments plus evacuation plans.

WHAT MAKES LITTLE SENSE OR IS INFEASIBLE:

(A) SHADE MUST BE PRESENT WHEN THE TEMPERATURE EXCEEDS 80 DEGREES FAHRENHEIT: Logging and forestry work sites may not have shade where work is actually taking place. When a worker is expected to climb/walk to a vehicle/canopy that adds excessive workload, they will not do it. Monitoring workers can help them take breaks, add fluids, and use air conditioned vehicles when needed. The worker's own condition is a better guideline than a shade requirement for infeasible conditions.

Mandatory Appendix A (1) for examples of workloads and Table 1: These trigger points are unworkable for logging and forestry operations. They may have some value as guidance but not as rules. CA uses a hand shaded trigger of 80deg F but that is often exceeded. Some agreed upon dry bulb temperature and duration/shift in the woods environment could trigger increased monitoring, fluids, etc, eg 80-85F. Work site locations are also highly variable and could either add or reduce heat stress based on wind conditions, elevation, vegetation or lack, etc. Also time of temp measure important.

CLOTHING ADJUSTMENTS: OROSHA calls for personal protective equipment that adds heat stress, eg, chainsaw safety chaps, hardhats, etc. that make the status of the worker for heat more important as safety gear is mandatory.

WILDLAND FIRE SMOKE

Others have submitted adequate comments on specifics of the proposed rules. I only add that air quality in remote, mobile sites can vary widely due to terrain, wind, elevation and many other factors. Local measures are needed to assess air quality. A established agency measure in a weather sink, 50 miles from the work is not adequate for rulemaking.

FINAL COMMENTS

Thank you for the opportunity to comment on proposed rules. I am deeply concerned with the safety and health of forest workers. I am also concerned that rules actually provide improvements and can be implemented in the forestry sector with its unique operational circumstances. Balance must be found.

Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers who can reasonably expect employees to be exposed to wildfire smoke. Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

Commented [TD1]: Recommend adding in fire season Dates for the rule to be active.

(2) The following workplaces and operations are exempt from these rules:

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

(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, except when it is necessary to open doors to enter or exit the vehicle.

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations, and when feasible, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m^3 (equivalent to an AQI at or above 151) and are encouraged to use them.

(e) Agricultural Labor Housing.

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, colds or flu; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Wildfire – Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildfire Smoke – Emissions from fires in "wildlands," as defined by the National Wildfire Coordinating Group. Wildlands are an area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

(4) Identification of harmful exposures. The employer, or their designee, must determine and monitor employee exposure to PM2.5 for each workplace when wildfire spoke is present, to comply with these rules, at the start of each shift, and as often as needed, by one or more of the following methods:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or
(b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or
(c) Measure PM2.5 concentrations in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any; or
(d) If methods (a) through (c) are infeasible, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m^3 (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The information and training must be provided at least once a year to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;
(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system; and
(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke.

Commented [TD2]: This still allows for a huge variant if you do not have an AQI monitoring station within your vicinity.

(d) makes the most sense for these areas if you don't buy a monitor and the wording of infeasible makes it harder to use.

Farmers creating dust could raise this level which could trigger this rule.

PEL for respirable dust is much higher 5000 ug/m3, than those proposed in this rule.

(6) Employer two-way communication The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:

(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;

(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and

(c) Encouraging employees to inform the employer if any of the following occurs:

- When air quality improves and worsen; and
- Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(7) Control of harmful exposures to employees.

(a) Engineering controls. The employer must reduce employee exposure to ambient air concentrations of PM2.5 to less than 35.5 ug/m^3 (equivalent to an AQI of less than 101) by engineering controls whenever feasible. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is adequately filtered.

(b) Administrative controls. Whenever engineering controls are not feasible or effective to reduce employee exposures to PM2.5 to less than 35.5 ug/m^3 (equivalent to an AQI of less than 101), the employer must implement administrative controls, if practicable. Such controls may include one or more of the following:

(A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than 35.5 ug/m^3 (equivalent to an AQI of less than 101);

(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than 35.5 ug/m^3 (equivalent to an AQI less than 101); and

(C) Limit each employee's exposures, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m^3 (equivalent to an AQI between 101 and 151), to the following durations: (i) 1 hour during an 8-hour shift;

(ii) 1 hour 15 min during a 10-hour shift; or

(iii) 1 hour 30 mins during a 12-hour or more shift.

NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m^3 (equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.

(c) Control by Respiratory Protective Equipment. Whenever administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 to less than 35.5 ug/m^3 (equivalent to an AQI of less than 101), with the exception of section (7)(b)(C), the employer must provide a sufficient number of respirators to all affected employees for mandatory use in

Commented [TD3]: What engineering controls would be available, the examples would all be excluded per section 2. Also we add the word adequately filtered here, which puts a higher standard then those exclusions in section 2.

As this is written I don't see anything you could do, to need this in the rule.

Commented [TD4]: These two controls have no bearing and don't allow for any change to your work. They basically say If you are above 101 you cannot work without respirators.

Commented [TD5]: Is there any science behind these exposures?

Commented [TD6]: Action levels are low, would recommend AQI of 300 before mandatory respirators and allow for voluntary use lower than that.

accordance with 29 CFR 1910.134 or Appendix A below. Respirators must be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece

respirators. Respirators must be cleaned or replaced as appropriate and stored and maintained so that they do not present a health hazard to users.

NOTE 1: For employees who do not wear respirators in the course of their normal job duties but will only wear respirators to protect them from wildfire smoke, when the ambient air concentration for PM2.5 is at or above 35.5 ug/m^3 (equivalent to an AQI at or above 101), medical evaluations and fit testing are required if available. However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.

NOTE 2: For employees whose only use of respirators involves the voluntary use of filtering facepieces when the ambient air concentration for PM2.5 is less than 35.5 ug/m^3 (equivalent to an AQI below 151), such as N95 respirators, fit testing and medical evaluations are not required.

(8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke and be maintained until the official end of fire season for the county the worksite is located.

Table for Protection from Wildfire Smoke

Rule requirement	Ambient Air Concentration of PM2.5 and Equivalent AQI		
	< 35.5 ug/m^3 (AQI: < 101)	35.5 – 55.5 ug/m^3 (AQI: 101 – 151)	> 55.5 ug/m^3 (AQI: > 151)
Identification of harmful exposure under section (4)	Yes	Yes	Yes
Employee information and training under section (5)	Yes	Yes	Yes
Employer two-way communication system under section (6)	Yes	Yes	Yes
Engineering controls under section (7)(a)	No	Yes, when feasible	Yes, when feasible
Administrative controls under section (7)(b)(A) & (B)	No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No	Yes, if practicable	No
*Control by Respiratory Protective Equipment under section (7)(c)	No	Yes	Yes
Recordkeeping under section (8)	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

Commented [TD7]: What is appendix A?

Commented [TD8]: What does if available mean?

Commented [TD9]: Each worksite is problematic. If you are relying on air now and you have dozens of worksites that you are relying on the same monitoring station, why do I have to record each worksite? Even if I have my own monitor and I have several worksites that are within a mile of each other there should be some latitude.

Commented [TD10]: How would we define this? Does this mean visible smoke? Only if a wildfire is in the area? Or everyday that the AQI hits a certain point.

Commented [TD11]: This statement appears to contradict the note 1 in section 7c

BUNCH Theodore * DCBS

From: Nargess Shadbeh <nshadbeh@oregonlawcenter.org>
Sent: Tuesday, June 8, 2021 6:05 PM
To: Kate Suisman; BUNCH Theodore * DCBS
Cc: Ira Cuello-Martinez; Jamie Pang; Nora Apter; Nargess Shadbeh
Subject: RE: Redline versions of the heat and smoke rules

Ted,

I am supportive of the redline version that we sent you yesterday at 5:52 p.m. but am interested in brining up a few more items for your consideration here.

We need to include a provision for creation of a poster and visual information at a central location at the worksites.

The training should have a specific focus section on training for monitors different and more complete than those who are employees in the field. The monitors must have not only greater indepth training but must practice those skills prior to the season to gain competency.

Any effective training must have interactive component with opportunity for Q/A and follow up. The training must involve multiple modes of training and including versions for low-literacy and those with little fluency in English or any written language.

Training must emphasize the information on the prohibition against retaliation for the workers.

There should be more specifics offered where there are a number of areas that simply indicate if not feasible can come up with alternatives. We need to specify as to the alternatives are to be.

Training for heat and hazardous smoke should not be only available to the workers after certain crisis event occurs, but that the workers at the sites should be attending these training that are to be paid time.

Kate may have additional thoughts to bring to your attention with these.

Nargess

From: Kate Suisman <kate@nwjp.org>
Sent: Monday, June 7, 2021 5:52 PM
To: BUNCH Theodore * DCBS <Theodore.BUNCH@oregon.gov>
Cc: Nargess Shadbeh <nshadbeh@oregonlawcenter.org>; Ira Cuello-Martinez <iracuello@pcun.org>; Jamie Pang <jamiep@oeconline.org>; Nora Apter <noraa@oeconline.org>
Subject: Redline versions of the heat and smoke rules

Hello Ted, please find attached redline versions of both rules from stakeholders OEC, PCUN, NWJP and OLC. We will be submitting a broader letter later this week with the support of a larger stakeholder group but wanted to get you these documents today as per your request. Please pardon some of the spacing issues.

Thank you and have a great night,

Kate Suisman (NWJP), Nora Apter (OEC), Jamie Pang (OEC), Ira Cuello Martinez (PCUN) and Nargess Shadbeh (Oregon Law Center)

Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers who can reasonably expect employees to be exposed to wildfire smoke during wildfire season spanning June through September in the State of Oregon.. Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

(2) The following workplaces and operations are exempt from these rules:

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

(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, except when it is necessary to open doors to enter or exit the vehicle.

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations, and when feasiblepracticable, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m_3 (equivalent to an AQI at or above 151) and are encouraged to use them.

(e) Other specific jobs or tasks identified by the employer, that require tools, or PPE designed to protect an employee from a job specific hazard that would render engineering, administrative, or N95 respirator use hazardous or unfeasible, documented though a hazard assessment conducted by the employer and employee or employee representative. a. Example – an electrician that must utilize arc flash rated clothing and face shield would not be required to don a N95 respirator for smoke protection while performing work and this should be documented in the hazard assessment.

(e)(f) Agricultural Labor Housing.

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Forestland- any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in the judgment of the forester, a fire hazard, regardless of how the land is zoned or taxed. As used in this subsection, “clearing” means any grassland, improved area, lake, meadow, mechanically or manually cleared area, road, rocky area, stream or other similar forestland opening that is surrounded by or contiguous to forestland and that has been included in areas classified as forestland under ORS 526.305 to 526.370.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, colds or flu; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Wildfire – an uncontrolled and unplanned fire which is burning on forestland and which is damaging, or is threatening to damage, forest resources or structures. .

Commented [SB1]: There needs to be delineation between a wildfire and prescribed burning.

Commented [JD2]: This is too ambiguous to be effective from a regulatory standpoint. What does it mean for wildfire smoke to be present? There should be a visibility standard.

Commented [JD3]: Language provides no regulatory threshold to employers. Employers cannot be expected to check AQI levels at every site in real time.

Commented [JD4]: How does OR-OSHA anticipate collecting feedback and what regulatory purpose does this serve? Will OR-OSHA provide training materials that can be provided by employers?

Suggested edit: strike or provide specifics.

Wildfire Smoke – Emissions from wildfires or structural fires originating from wildfires as defined above..

(4) Identification of harmful exposures. The employer, or their designee, must determine and monitor employee exposure to PM2.5 generated by wildfire smoke, for each workplace when wildfire smoke is presentdetected using one of the following methods., to To comply with these rules, at the start of each shift, and as often as needed, based on a 24-hour average, by one or more of the following methods, employers must:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or

(b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or

(c) Measure PM2.5 concentrations in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any; or

(d) If methods (a) through (c) are infeasible unpracticable, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m_3 (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of 3555.5 ug/m_3 or greater (equivalent to an AQI of 101 151 or greater). The information and training must be provided at least once a yearannually to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;

(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system; and
(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke.

(6) Employer two-way communication The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of 535.5 ug/m_3 or greater (equivalent to an AQI of 101 151 or greater) during wildfire season. The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:
Commented [SB5]: There needs to be qualifiers on monitoring and communication hazards for wildfire smoke or else it implies that this needs to be done year round.

Commented [JD6]: Why did OR-OSHA eliminate the voluntary mask requirement that was adopted by California?
(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;
(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and
(c) Encouraging employees to inform the employer if any of the following occurs:
• When air quality improves and worsen; and
• Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(7) Control of harmful exposures to employees.
(a) Engineering controls. The employer must reduce employee exposure to ambient air concentrations of PM2.5 to less than 3555.5 ug/m_3 (equivalent to an AQI of less than 101151) by engineering controls whenever feasible practicable. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is adequately filtered.

(b) Administrative controls. Whenever engineering controls are not feasible practicable or effective to reduce employee exposures to PM2.5 to less than 3555.5 ug/m_3 (equivalent to an AQI of less than 101151), the employer must implement administrative controls, if practicable. Such controls may include one or more of the following: (A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than 3555.5 ug/m_3 (equivalent to an AQI of less than 101151);
(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than 3555.5 ug/m_3 (equivalent to an AQI less than 101151); and or

a (C) Limit each employee's exposures, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m_3 (equivalent to an AQI between 101 and 151), to the following durations: (i) 1 hour during an 8-hour shift;
a
a

a (ii) 1 hour 15 min during a 10-hour shift; or
a (iii) 1 hour 30 mins during a 12-hour or more shift.
a
a

NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m_3 (equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.
(c) (c)(a) Control by Respiratory Protective Equipment. Whenever administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 to less than 35.5 ug/m_3 (equivalent to an AQI of less than 101), with the exception of section (7)(b)(C), the employer must provide a sufficient number of respirators PPE to all affected employees for mandatory use in accordance with 29 CFR 1910.134 or Appendix A below. Respirators PPE must either be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece respirators or KN95 facemasks. Respirators must be cleaned or replaced as appropriate, and stored and maintained so that they do not present a health hazard to users.

Commented [SB7]: The state of Oregon has distributed and is distributing again KN95 for employees to wear to protect from wildfire smoke exposure. KN95's must be allowed in addition to N95s.

Commented [JD8]: Employees in sensitive groups will have masks available to them and can use those when AQI is less than 500 without fear of retaliation. Triggering of the respiratory protection rule at an AQI or 101 or even 151 is not necessary when masks are made available to sensitive groups who have been educated about the risk of wildfire smoke.
Commented [JD9]: For how long must records be maintained?
Commented [JD10]: This is not feasible as currently drafted. All Oregon employers with employees who perform any outdoor work will be required to record AQI in real-time under the current language and will have to hire someone just to manage this new program. This is unreasonable and is not framed in a way that provides regulatory direction regarding recordkeeping.
Commented [JD11]: OR-OSHA cannot leave this much ambiguity and should clarify the actual dates of fire season
(c) (b) ForIf AQI is detected above 500, respirators are must be worn, unless an employer determines that an employee cannot or does not pass medical monitoring or fit testing due to religious, medical, or physical reasons. (A) NOTE 1: For employees who do not wear respirators in the course of their normal job duties but will only wear respirators to protect them from wildfire smoke, when the ambient air concentration for PM2.5 is at or above 535.5 ug/m_3 (equivalent to an AQI at or above 101151), but below AQI of 500, medical evaluations and fit testing are required if available. However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.not required. However employees who utilize the N95 respirators voluntarily below the AQI of 500 must have a signed OSHA Respirator Program Appendix D on file with the employer.
(A)
(B) NOTE 2: For employees whose only use of respirators involves the voluntary use mandatory use of filtering facepiecesfacepiece respirators when the ambient air concentration for PM2.5 is equal to or greater than an AQI of 500, less than 535.5 ug/m_3 (equivalent to an AQI below 151), such as N95 respirators, fit testing and medical evaluations are not required.

(8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke, and be maintained until the official end of fire season for the county the worksite is locatedfrom June through the end of September.

Table for Protection from Wildfire Smoke

Rule requirement	**Ambient Air Concentration of PM2.5 and Equivalent AQI**	
< 35.5 ug/m_3 (AQI: < 101)	35.5 – 55.5 ug/m_3 (AQI: 101 – 151)	> 55.5 ug/m3 (AQI: > 151)

Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers who can reasonably expect employees to be exposed to wildfire smoke during wildfire season spanning June through September in the State of Oregon. ~~.~~ Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

(2) The following workplaces and operations are exempt from these rules:

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

(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, except when it is necessary to open doors to enter or exit the vehicle.

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations, and when ~~feasible~~practicable, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m^3 (equivalent to an AQI at or above 151) and are encouraged to use them.

(e) Other specific jobs or tasks identified by the employer, that require tools, or PPE designed to protect an employee from a job specific hazard that would render engineering, administrative, or N95 respirator use hazardous or unfeasible, documented though a hazard assessment conducted by the employer and employee or employee representative.

a. Example – an electrician that must utilize arc flash rated clothing and face shield would not be required to don a N95 respirator for smoke protection while performing work and this should be documented in the hazard assessment.

~~(e)~~(f) Agricultural Labor Housing.

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

Forestland- any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in the judgment of the forester, a fire hazard, regardless of how the land is zoned or taxed. As used in this subsection, "clearing" means any grassland, improved area, lake, meadow, mechanically or manually cleared area, road, rocky area, stream or other similar forestland opening that is surrounded by or contiguous to forestland and that has been included in areas classified as forestland under ORS 526.305 to 526.370.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to air pollution from wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, colds or flu; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Wildfire – an uncontrolled and unplanned fire which is burning on forestland and ~~which~~ is damaging, or is threatening to damage, forest resources or structures. ~~.~~

Wildfire Smoke – Emissions from wildfires or structural fires originating from wildfires as defined above..

(4) Identification of harmful exposures. The employer, or their designee, must determine and monitor employee exposure to PM2.5 generated by wildfire smoke, for each workplace when wildfire smoke is ~~present~~detected using one of the following methods. ~~, to~~ To comply with these rules, at the start of each shift, ~~and as often as needed~~, based on a 24-hour average, by one or more of the following methods, employers must:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or
(b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or
(c) Measure PM2.5 concentrations in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any; or
(d) If methods (a) through (c) are ~~infeasible~~ unpracticable, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m^3 (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of ~~35~~55.5 ug/m^3 or greater (equivalent to an AQI of ~~101~~ 151 or greater). The information and training must be provided ~~at least once a year~~annually to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;

Commented [SB1]: There needs to be delineation between a wildfire and prescribed burning.

Commented [JD2]: This is too ambiguous to be effective from a regulatory standpoint. What does it mean for wildfire smoke to be present? There should be a visibility standard.

Commented [JD3]: Language provides no regulatory threshold to employers. Employers cannot be expected to check AQI levels at every site in real time.

Commented [JD4]: How does OR-OSHA anticipate collecting feedback and what regulatory purpose does this serve? Will OR-OSHA provide training materials that can be provided by employers?

Suggested edit: strike or provide specifics.

(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system; and
(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke.

(6) Employer two-way communication The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of ~~53~~5.5 ug/m^3 or greater (equivalent to an AQI of ~~101~~ 151 or greater) during wildfire season. The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:

(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;
(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and
(c) Encouraging employees to inform the employer if any of the following occurs:
- When air quality improves and worsen; and
- Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(7) Control of harmful exposures to employees.

(a) Engineering controls. The employer must reduce employee exposure to ambient air concentrations of PM2.5 to less than ~~35~~55.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151) by engineering controls whenever ~~feasible~~ practicable. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is adequately filtered.

(b) Administrative controls. Whenever engineering controls are not ~~feasible~~ practicable or effective to reduce employee exposures to PM2.5 to less than ~~35~~55.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151), the employer must implement administrative controls, if practicable. Such controls may include one or more of the following:
(A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than ~~35~~55.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151);
(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than ~~35~~55.5 ug/m^3 (equivalent to an AQI less than ~~101~~151); ~~and~~ or
(C) Limit each employee's exposures, when ambient air concentrations of PM2.5 is between 35.5 and 55.5 ug/m^3 (equivalent to an AQI between 101 and 151), to the following durations:
(i) 1 hour during an 8-hour shift;

Commented [SB5]: There needs to be qualifiers on monitoring and communication hazards for wildfire smoke or else it implies that this needs to be done year round.

Commented [JD6]: Why did OR-OSHA eliminate the voluntary mask requirement that was adopted by California?

(ii) 1 hour 15 min during a 10-hour shift; or
(iii) 1 hour 30 mins during a 12-hour or more shift.

NOTE: Exposure times under (7)(b)(B)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than 55.5 ug/m^3 (equivalent to an AQI greater than 151), may be continuous or combined durations, and should reduce work intensity.

~~(c)~~ (c)(a) Control by Respiratory Protective Equipment. Whenever administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 to less than 35.5 ug/m^3 (equivalent to an AQI of less than 101), with the exception of section (7)(b)(C), the employer must provide a sufficient number of ~~respirators~~ PPE to all affected employees for ~~mandatory~~ use in accordance with 29 CFR 1910.134 or Appendix A below. ~~Respirators~~ PPE must either be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece respirators or KN95 facemasks. Respirators must be cleaned or replaced as appropriate, and stored and maintained so that they do not present a health hazard to users.

(c) (b) ~~For~~If AQI is detected~~,~~ above 500, respirators ~~are~~ must be worn, unless an employer determines that an employee cannot or does not pass medical monitoring or fit testing due to religious, medical, or physical reasons.

~~(A)~~ NOTE 1: For employees who do not wear respirators in the course of their normal job duties but will only wear respirators to protect them from wildfire smoke, when the ambient air concentration for PM2.5 is at or above ~~53~~5.5 ug/m^3 (equivalent to an AQI at or above ~~101~~151), but below AQI of 500, medical evaluations and fit testing are ~~required if available. However, establishing a respiratory protection program, per 29 CFR 1910.134, is NOT required.~~not required. However employees who utilize the N95 respirators voluntarily below the AQI of 500 must have a signed OSHA Respirator Program Appendix D on file with the employer.

(A)

(B) NOTE 2: For employees whose only use of respirators involves the ~~voluntary use~~ mandatory use of filtering ~~facepieces~~facepiece respirators ~~when~~ the ambient air concentration for PM2.5 is equal to or greater than an AQI of 500, ~~less than 53 5.5 ug/m^3 (equivalent to an AQI below 151), such as N95 respirators,~~ fit testing and medical evaluations are ~~not~~ required.

(8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke, and be maintained ~~until the official end of fire season for the county the worksite is located~~from June through the end of September.

Table for Protection from Wildfire Smoke

Rule requirement	Ambient Air Concentration of PM2.5 and Equivalent AQI		
	< 35.5 ug/m^3 (AQI: < 101)	35.5 – 55.5 ug/m^3 (AQI: 101 – 151)	> 55.5 ug/m^3 (AQI: > 151)

Commented [SB7]: The state of Oregon has distributed and is distributing again KN95 for employees to wear to protect from wildfire smoke exposure. KN95's must be allowed in addition to N95s.

Commented [JD8]: Employees in sensitive groups will have masks available to them and can use those when AQI is less than 500 without fear of retaliation. Triggering of the respiratory protection rule at an AQI or 101 or even 151 is not necessary when masks are made available to sensitive groups who have been educated about the risk of wildfire smoke.

Commented [JD9]: For how long must records be maintained?

Commented [JD10]: This is not feasible as currently drafted. All Oregon employers with employees who perform any outdoor work will be required to record AQI in real-time under the current language and will have to hire someone just to manage this new program. This is unreasonable and is not framed in a way that provides regulatory direction regarding recordkeeping.

Commented [JD11]: OR-OSHA cannot leave this much ambiguity and should clarify the actual dates of fire season

Identification of harmful exposure under section (4)	Yes	Yes	Yes
Employee information and training under section (5)	Yes	Yes	Yes
Employer two-way communication system under section (6)	Yes	Yes	Yes
Engineering controls under section (7)(a)	No	Yes, when ~~feasible~~ practicable	Yes, when ~~feasible~~ practicable
Administrative controls under section (7)(b)(A) & (B)	No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No	Yes, if practicable	No
*Control by Respiratory Protective Equipment under section (7)(c)	No	Yes	Yes
Recordkeeping under section (8)	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

Protection from Wildfire Smoke

(1) Scope and application. These rules apply to public and private employers when the AQI at a work environment is above an AQI of 51 and employers ~~who~~ can reasonably expect employees to be exposed to wildfire smoke. Employee exposure levels to wildfire smoke must be determined by the current workplace ambient air concentration for particulate matter 2.5 (PM2.5), regardless of the concentrations for other pollutants.

(2) The following workplaces and operations are exempt from these rules:

(a) Enclosed buildings and structures in which the air is filtered for fine particulate by a functioning mechanical ventilation system and ~~the employer ensures~~ the~~at~~ exterior openings, such as windows, doors, and bays doors, ~~and other exterior openings~~ are kept closed, except when it is necessary to open doors for personnel or vehicles to ~~open doors to~~ enter or exit.

(b) Enclosed vehicle~~s~~ cabs in which the air is filtered for fine particulate by a functioning 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.

~~(b)~~

(c) Wildland firefighting and associated support activities such as fire camp services and fire management.

(d) Evacuation, rescue, utilities, communications, and medical operations that are directly aiding emergency operations or firefighting operations, and when feasible, all affected employees are provided a sufficient number of NIOSH-approved respirators for PM2.5 for voluntary use when the ambient air concentration for PM2.5 is at or above 55.5 ug/m^3 (equivalent to an AQI at or above 151) and are encouraged to use them.

(e) Agricultural Labor Housing.

(3) Definitions.

AQI – The Air Quality Index was developed by the US Environmental Protection Agency as an indicator of overall air quality and is based on the five criteria pollutants regulated under the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For purposes of this regulations, only the AQI for PM2.5 above ambient levels are used for determination of exposure and controls.

NIOSH – The National Institute for Occupational Safety and Health of the United States 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.

Sensitive Group – Groups of people who are most susceptible to health problems as a result of exposure to ~~air pollution from~~ wildfire smoke and they include: anyone who has had a heart attack or stroke, congestive heart failure, coronary artery disease, or angina; pregnant women; people with lung conditions such as asthma or chronic obstructive pulmonary disease (COPD); people with respiratory infections such as pneumonia, acute bronchitis, ~~colds or flu~~; people who smoke tobacco; people with or recovering from COVID-19, and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician.

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

Vehicle – A means of transporting people or things including automobiles, trucks, rail cars and planes.

Wildfire – Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

Wildfire Smoke – Particulate ~~E~~emissions from fires in "wildlands," as defined by the National Wildfire Coordinating Group. Wildlands are an area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

(4) Identification of harmful exposures. At AQI above 51, t~~T~~he employer, or their designee, must determine and monitor employee exposure to PM2.5 for each workplace when wildfire sm~~o~~oke is present, to comply with these rules, at the start of each shift, and as often as needed, by one or more of the following methods:

(a) Check the current ambient air concentration for PM2.5 from any of the following websites: U.S. EPA AirNow, or the Oregon Department of Environmental Quality's air quality website; or
(b) Obtain forecasts and the current concentration in ambient air for PM2.5 directly from the U.S. EPA (via AirNow), the Interagency Wildland Fire Air Quality Response Program, or the Oregon Department of Environmental Quality's air quality website; or
(c) Measure PM2.5 concentrations ~~in ambient air in accordance with the manufacturer's instructions for the testing device. Employers, or their designee, who measure PM2.5 concentrations in ambient air must follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any~~following Appendix B; ~~;~~ or
(d) If methods (a) through (c) are infeasible, employers must use the 5-3-1 Visibility Chart to estimate the current air quality and corresponding AQI risk category.

EXCEPTION: Section (4) does not apply if the employer assumes that the current concentration in ambient air for PM2.5 is greater than 55.5 ug/m^3 (equivalent an AQI greater than 151) and complies with sections (5),(6) and (7) with that assumption.

(5) Employee information and training. Employers must develop and implement information and training regarding wildfire smoke before employees are exposed to a workplace ambient air concentration for PM2.5 of 35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The information and training must be provided at least once a year to all affected employees in a manner and language they understand. Employers must ensure that the training provides an opportunity for feedback from employees about the topics covered in the training, which must include at least the following elements:

(a) The potential health effects of wildfire smoke, including increased risk of health effects to sensitive groups;
(b) The definition of sensitive group as defined under section (3);
(c) How employees can obtain the current ambient air concentration for PM2.5 and equivalent AQI level;
(d) How to effectively operate and interpret any air quality monitoring device provided by the employer to comply with these rules, for each employee designated by the employer to operate such devices;
(e) The employer's methods to protect employees from wildfire smoke;
(f) The employee's right to report health issues related to wildfire smoke exposure and obtain medical treatment for workplace exposure to wildfire smoke without fear of retaliation;
(g) The employer's two-way communication system; and
(h) The importance, limitations, and benefits of using a respirator when provided by the employer, and how to properly put on and use respirators when exposed to wildfire smoke.

Formatted: Indent: Left: 0"

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

(6) Employer two-way communication system. The employer must develop and implement a system for communicating wildfire smoke hazards before employees are exposed to a workplace ambient air concentration for PM2.5 of
35.5 ug/m^3 or greater (equivalent to an AQI of 101 or greater). The two-way communication system must be implemented in a manner and language understood by all employees, including provisions designed to encourage employees to inform the employer of wildfire smoke hazards at the worksite without fear of retaliation. The system must include at least the following elements:

(a) The current workplace ambient air concentration for PM2.5 and equivalent AQI level;
(b) Employer provided protective measures available to employees to reduce their wildfire smoke exposures; and
(c) Encouraging employees to inform the employer if any of the following occurs:
- When air quality improves and worsens; and
- Adverse health symptoms that may be the result of wildfire smoke exposure such as asthma attacks, difficulty breathing, and chest pain.

(d) Notifying employees when ambient air concentrations for PM2.5 and equivalent AQI drops below levels requiring controls.

(7) Exposure Controls ~~of harmful exposures to employees.~~

(a) Engineering controls. The employer must reduce employee exposure to ambient air concentrations of PM2.5 to less than ~~35.5~~55.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151) by engineering controls whenever feasible. Engineering controls include providing enclosed buildings, structures, or vehicles where the air is filtered for fine particulates by a functioning mechanical ventilation system. If engineering controls are not sufficient to reduce exposure to PM2.5 to less than a current AQI of 151, then the employer shall reduce employee exposures to the extent feasible using engineering controls.~~adequately filtered.~~

(b) Administrative controls. Whenever engineering controls are not feasible or effective to reduce employee exposures to PM2.5 to less than ~~5~~5.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151), the employer must implement administrative controls, if practicable. If an individual identifies themselves to an employer as meeting the definition of Sensitive Group, the employers shall implement administrative controls as feasible for those individuals at an AQI above 101. Such controls may include one or more of the following:
(A) Relocate work to an outdoor location where the current ambient air concentration of PM2.5 is less than ~~5~~5.5 ug/m^3 (equivalent to an AQI of less than ~~101~~151, or less than 101 for Sensitive Groups);
(B) Change work schedules or activities to ensure employee exposures to ambient air concentrations of PM2.5 is less than ~~5~~5.5 ug/m^3 (equivalent to an AQI less than ~~101~~151, or less than 101 for Sensitive Groups);
~~); and~~or

~~(B)~~(C) Limit each employee's exposures without use of respiratory protection, when ambient air concentrations of PM2.5 is between ~~5~~5.5 and 105~~5~~5.5 ug/m^3 (equivalent to an AQI between 151~~101~~ and 200, or 101 and 150 for Sensitive Groups~~151~~), to the following durations:

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

(i) 1 hour total during an 8-hour shift;
(ii) 1 hour ~~15~~ 30 min total during a 10-hour shift; or
(iii) ~~2~~1 hour total 30 mins during a 12-hour or more shift.

NOTE: Exposure times under (7)(b)(C~~B~~)(i) – (iii) are not allowed when current ambient air concentrations of PM2.5 are greater than ~~55~~150.5 ug/m^3 (equivalent to an AQI greater than ~~151~~200) without use of respiratory protection.~~, may be continuous or combined durations, and should reduce work intensity.~~

(8) Control by Use of Respiratory Protecti~~ve~~on Equipment. At AQI greater than 101, the employer should make available for voluntary use respirators to employees in Sensitive Groups if other controls cannot be implemented.

At AQI greater than 151, the employer must provide ~~a sufficient number of~~ respirators for voluntary use if requested by an employee.

Whenever engineering and/or administrative controls are not practicable or not effective to reduce employee exposures to current ambient air concentrations of PM2.5 to less than

150~~35~~.5 ug/m^3 (equivalent to an AQI of less than 200~~101~~), ~~with the exception of section (7)(b)(C),~~ the employer must provide ~~a sufficient number of~~ respirators to all affected employees for mandatory use in accordance with 29 CFR 1910.134 or Appendix A below. Respirators must be NIOSH-approved devices that effectively protect the wearers from inhalation of PM2.5, such as N95 filtering facepiece~~s~~ ~~e~~ respirator.

Commented [SK1]: OSHA has allowed the use of respirators from other approved jurisdictions due to NIOSH-approved respirator shortages. If this enforcement memo is still applicable in Summer 2021, can respirators from other jurisdictions be use for wildfire smoke?

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

respirators. Respirators must be cleaned or replaced as appropriate, and stored and maintained so that they do not present a health hazard to users.

NOTE 1: ~~For~~Employers who do not ~~employees who~~require the ~~do not wear~~use of respirators for workplace hazards other than ~~in the course of their normal job duties but will only wear respirators to protect them from~~ wildfire smoke~~,~~ when the ambient air concentration for PM2.5 is at or above ~~35.5~~ an AQI of ~~ug/m³ (equivalent to an AQI at or above 101~~201~~)~~, must provide ~~medical evaluations based on timing~~user training and fit testing(if feasible based on timing), are required if available. ~~However, e~~ Establishing all other elements of a full respiratory protection program, per 29 CFR 1910.134, is NOT required.

NOTE 2: ~~For employees~~Employers whose only use of respirators involves ~~the~~ voluntary use ~~use of filtering facepieces~~ when the ambient air ~~concentration~~ AQI for PM2.5 is ~~less~~ greater than 151, ~~than 35.5 ug/m³ (equivalent to an AQI below 151),~~must implement ONLY the requirements for voluntary use per 29 CFR 1910.134. ~~such as N95 respirators, fit testing and medical evaluations are not required.~~

Commented [CF2]: Or OR-OSHA equivalent

(~~9~~8) Recordkeeping. Employers must document how the PM2.5 concentration in ambient air is measured and monitored when wildfire smoke is present at the workplace to comply with these rules. Such documentation must be conducted daily for each worksite where employees are exposed to wildfire smoke, and be maintained until the official end of fire season for the county the worksite is located.

Rule requirement	Ambient Air Concentration of PM2.5 and Equivalent AQI			
	AQI: 51-101~~< 35.5 ug/m³ (AQI: < 101)~~	35.5 – 55.5 ug/m³ (AQI: 101 – 151)	> 55.5 ug/m³ (AQI: ~~>~~151-200)	AQI: >200
Identification of harmful exposure under section (4)	Yes ~~Yes~~	Yes	Yes	Yes
Employee information and training under section (5)	No~~Yes~~	Yes	Yes	Yes
Employer two-way communication system under section (6)	No~~Yes~~	Yes	Yes	Yes
Engineering controls under section (7)(a)	No~~No~~	~~Yes, when feasible~~No	Yes, when feasible	Yes, when feasible
Administrative controls under section (7)(b)(A) & (B)	No~~No~~	~~Yes, if practicable~~No	Yes, if practicable	Yes, if practicable
Administrative control under section (7)(b)(C)	No~~No~~	~~Yes, if practicable~~No	~~No~~Yes	Yes
*Control by Respiratory Protective Equipment under section (8~~7~~)(c)	No~~No~~	~~Yes~~No	~~Yes~~Voluntary	Mandatory
Recordkeeping under section (9~~8~~)	Yes~~Yes~~	Yes	Yes	Yes

*Including the establishment of a Respiratory Protection Program

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

Appendix B

Employers who chose to measure PM2.5 concentrations in ambient air to determine exposure must:

-Sample at approximately breathing zone height
-Sample in a representative outdoor work location(s)
-Sample in accordance with the manufacturer's instructions for the sampling device.
-Follow the manufacturer's instructions for care, maintenance, and calibration and use associated correction factors, if any.

Concentrations must be measured during the work shift when conditions appear to worsen. Concentrations used for determining controls must be the average value over 15 min of sampling.

,

Formatted: Tab stops: 4.77", Left + Not at 3.25" + 6.5"

825 Madison St.
Albany, CA 94706

June 18, 2021

VIA EMAIL

Michael Wood, Administrator
Oregon OSHA
Michael.Wood@oregon.gov

Patrick Allen, Director
Oregon Health Authority
Patrick.Allen@dhsoha.state.or.us

Dear Director Allen and Administrator Wood:

I write to urge Oregon OSHA to reconsider exempting wildland firefighters from the rule it is developing for protecting workers from exposure to wildfire smoke.

There is a growing body of scientific evidence showing that wildland firefighters are exposed to high levels of wildfire smoke and that that exposure has many adverse health effects. For example, Navarro et al.[1] calculated the relative risk of developing lung cancer and cardiovascular disease among wildland firefighters across different scenarios (firefighters working a short season (49 days) and those working a long season (98 days); and career durations of 5, 10, 15, 20 and 25 years). Across all scenarios and career durations, wildland firefighters were at increased risk of developing lung cancer and cardiovascular disease. Risk of lung cancer increased steadily as career length increased. Risk of cardiovascular disease increased sharply for firefighters with 5 to 15 year careers, and further increased slightly over 20-25 year careers.

Other studies have documented adverse health effects of smoke exposure among wildland firefighters as well. A recent study of wildland firefighters in Greece found that chronic occupational exposure to smoke led to increased airway and systemic inflammation that could possibly lead to greater sensitivity to allergens and development of asthma.[2] Adetona et al.[3] found that exposure to wood and diesel smoke of wildland firefighters using drip torches to ignite prescribed burns had increased levels of compounds in their blood associated with

[1] Navarro, Kathleen M, Michael T Kleinman, Chris E Mackay, Timothy E Reinhardt, John R Balmes, George A Broyles, Roger D Ottmar, Luke P Naher, and Joseph W Domitrovich. 2019. "Wildland firefighter smoke exposure and risk of lung cancer and cardiovascular disease mortality." *Environmental research* 173:462-468.
[2] Gianniou, Niki, Charilena Giannakopoulou, Efrossini Dima, Matina Kardara, Paraskevi Katsaounou, Alexandros Tsakatikas, Charis Roussos, Nikolaos Koulouris, and Nikoletta Rovina. 2018. "Acute effects of smoke exposure on airway and systemic inflammation in forest firefighters." *Journal of asthma and allergy* 11:81.
[3] Adetona, Anna M, Olorunfemi Adetona Jr, Robert M Gogal, David Diaz-Sanchez, Stephen L Rathbun, and Luke P Naeher. 2017. "Impact of work task-related acute occupational smoke exposures on select proinflammatory immune parameters in wildland firefighters." *Journal of occupational and environmental medicine* 59 (7):679.

inflammation. Inflammation is a risk factor for cardiovascular disease. Gaughan et al.[4] found higher levels of arterial stiffness in a hot shot crew that had been exposed to wildfire smoke 4 days previously than in a hot shot crew that had not been exposed recently. Booze et al.[5] found that occupational exposure to benzene and formaldehyde over a lifetime led to excess cancer cases.

Navarro et al.[6] estimated that wildland firefighters experience levels of exposure during wildfire events that are similar to exposures in communities that are highly impacted by wildfires. They caution that exposure levels are likely higher for wildland firefighters than community residents because the former are exposed to these concentrations for longer periods, not just for a few days or weeks during a single wildfire event. There is strong evidence of negative health impacts resulting from acute exposure to wildfire smoke in the general public, particularly with regard to asthma, chronic obstructive pulmonary disease, bronchitis and pneumonia,[7] and it stands to reason that, with higher exposure levels, wildland firefighters will be at increased risk.

Promotoras (Community Health Workers) at the Northwest Forest Worker Center have spoken with experienced wildland firefighters who said that they would like to have N-95 respirators at hand not only to protect themselves from smoke, but also from airborne ash and dust. Two of the firefighters said that they have asthma and that it is exacerbated by exposure to smoke, ash, and dust while fighting fires. They said that in the past they have developed bronchitis and pneumonia from such exposure.

Because the scientific evidence shows that exposure to wildfire smoke increases the risk of lung and heart disease among wildland firefighters, and because at least some firefighters want protection from wildfire smoke, ash, and dust, they should not be exempt from Oregon OSHA's wildfire smoke rule. At a minimum, they should not be exempt from the training and communication requirements in the rule. All workers have the right to know what hazards they are being exposed to in the workplace. They can then make informed choices about career paths they want to follow and the risks they are willing to take.

In addition to exposure while fighting fires, wildland firefighters often continue to be exposed to unhealthful air while in the fire camps where they camp during their firefighting assignments. This means that they could be breathing unhealthful air even when resting, for up to 24 hours per day. Many non-firefighting personnel also work in fire camps, including cooks, fire response managers, medical personnel, and others. These workers are also often exposed to unhealthful air

---

[4] Gaughan, Denise M, Paul D Siegel, Michael D Hughes, Chiung‐Yu Chang, Brandon F Law, Corey R Campbell, Jennifer C Richards, Stefanos F Kales, Marcia Chertok, and Lester Kobzik. 2014. "Arterial stiffness, oxidative stress, and smoke exposure in wildland firefighters." *American journal of industrial medicine* 57 (7):748-756.
[5] Booze, Thomas F, Timothy E Reinhardt, Sharon J Quiring, and Roger D Ottmar. 2004. "A screening-level assessment of the health risks of chronic smoke exposure for wildland firefighters." *Journal of occupational and environmental hygiene* 1 (5):296-305.
[6] Op. cit.
[7] Cascio, Wayne E. 2018. "Wildland fire smoke and human health." *Science of the total environment* 624:586-595; Reid, Colleen E, Michael Brauer, Fay H Johnston, Michael Jerrett, John R Balmes, and Catherine T Elliott. 2016. "Critical review of health impacts of wildfire smoke exposure." *Environmental health perspectives* 124 (9):1334-1343.

when working in the camps. Firefighting support activities should therefore also not be exempted from the smoke rule.

Given these considerations, as well as the scientific evidence, I urge Oregon OSHA to:

1. Include wildland firefighters in the wildfire smoke rule, or, at a minimum, exempt them only from the part of the smoke rule that requires them to use respirators when the air quality reaches unhealthful levels;
2. If wildland firefighters are exempted from being required to wear respirators, at least require employers to provide them with N-95 respirators so that they will have them at hand for optional use when air quality is unhealthful;
3. Do not exempt firefighting support activities such as fire camp services and fire management from the rule.

Thank you very much for the opportunity to participate in the rule drafting process and for considering my comments.

Sincerely,

Carl Wilmsen, Ph.D.

Cc: Theodore Bunch, theodore.bunch@oregon.gov