



Oregon

Kate Brown, Governor

Department of Consumer and Business Services
Oregon Occupational Safety & Health Division (Oregon OSHA)
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January 28, 2022

[Text of proposed rules](#)

Rules to Address Employee Exposure to Wildfire Smoke

Virtual Public Hearings Scheduled for:

Hearing Date	Time	Location	Hearings Officer
March 2, 2022	6:00 pm	Oregon OSHA, Salem	Lisa Appel
Please register for Rules to Address Employee Exposure to Wildfire Smoke on Mar 2, 2022 6:00 PM PST at: https://attendee.gotowebinar.com/register/1974878335118173710			
March 3, 2022	6:00 pm	Oregon OSHA, Salem	Lisa Appel
Please register for **Spanish-only** Rules to Address Employee Exposure to Wildfire Smoke on Mar 3, 2022 6:00 PM PST at: https://attendee.gotowebinar.com/register/7660699252952528400			
March 4, 2022	10:00 am	Oregon OSHA, Salem	Lisa Appel
Please register for Rules to Address Employee Exposure to Wildfire Smoke on Mar 4, 2022 10:00 AM PST at: https://attendee.gotowebinar.com/register/7499399797646206222			

After registering, you will receive a confirmation email containing information about joining the webinar. In order to ensure as many people as possible are able to testify, Oregon OSHA reserves the right to restrict oral testimony at the hearing to no more than 5 minutes.

Phone: The COVID-19 pandemic has required the use of alternate methods to gather comments, including virtual hearings. The Omicron variant surge has further restricted access for some stakeholders. In light of this unique situation, Oregon OSHA is offering the ability to leave a public comment on the proposed rules as a voicemail message, which will be transcribed and recorded if received before March 18, 2022, 5:00 PM. The agency will make reasonable efforts to translate messages that are not in English.

Voicemail messages may be left 24 hours a day by calling: 1-833-604-0884 (toll free) or 503-947-7396, and must be under two minutes in length.

Rulemaking Summary:

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the primary air contaminant of concern in wildfire smoke, fine particulate matter (PM2.5). While significant exposures to wildfire smoke can be unhealthy for anyone, workers with pre-existing health conditions such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease are at increased risk of serious or fatal health effects when exposed to high levels of PM2.5 in wildfire smoke. The Oregon Department of Environmental Quality released a report in July 2021: “*Wildfire Smoke Trends and the Air Quality Index*” documenting that Oregon’s air quality in 2020 was the worst on record; additionally, the report states that, “large wildfires have been increasing across the western United States in the last decade and are expected to become more frequent, according to the National Interagency Fire Center.” Therefore, these rules are needed to help protect workers from the hazards of PM2.5 stemming from major wildfire events, which are projected to increase in frequency and duration as well as increase the number of “unhealthy air quality days” in affected areas of Oregon.

On March 10, 2020, Governor Brown issued Executive Order 20-04 (EO 20-04) which directed certain state agencies to reduce greenhouse gas emissions (GHGs) and mitigate the impacts of climate change. EO 20-04 included a directive to the Oregon Health Authority (OHA) and Oregon OSHA to jointly develop a proposal for rules to protect employees from workplace exposures to excessive heat and wildfire smoke. In response to EO 20-04, Oregon OSHA, in collaboration with the OHA, a rulemaking advisory committee, and stakeholders, developed these proposed rules to protect employees from the potentially detrimental health effects from exposure to unhealthy and hazardous levels of wildfire smoke. Without these rules, employees likely face worsening air quality from wildfire emissions without adequate respiratory protections in place. These rules specifically outline air quality index (AQI) trigger levels for specific requirements that will reduce employee workplace exposure to unhealthy and hazardous air quality from wildfire emissions.

The immediate risks posed by the 2021 wildfire season made it necessary for Oregon OSHA to adopt temporary rules to protect affected employees from exposure to unhealthy levels of wildfire smoke. On August 3, 2021, the agency adopted [Administrative Order 9-2021: Temporary Rules to Address Employee Exposure to Wildfire Smoke](#). The temporary rules were put into effect statewide while the permanent rulemaking process progressed.

The agency, in consultation with OHA, engaged over 100 stakeholders from Labor and Business interests through a Rules Advisory Committee (RAC). The RAC met nine times beginning in February 2021, and Oregon OSHA presented multiple rule drafts for stakeholder comment. In addition, Oregon OSHA hosted four virtual listening sessions with Spanish translators, held in May and September 2021, to provide an opportunity for workers and other stakeholders to share their experience on the challenges of wildfire smoke in the workplace, in addition to hearing about how Oregon OSHA’s temporary rule affected their workplaces.

These proposed rules apply to all workers in Oregon covered under the Oregon Safe Employment Act (OSEAct). OAR 437-004-9790 applies to employers covered under Division 4 (Agriculture), while OAR 437-002-1080 applies to work activities covered under Division 2 (General Industry). Since worker exposure to unhealthy and hazardous air quality conditions from wildfire emissions is not limited to a specific industry, work activities covered under Division 3 (Construction) or Division 7 (Forest Activities) would also be required to comply with OAR

437-002-1080, per additional applicability requirements under OAR 437-003-0005 and OAR 437-007-0004, respectively.

The rules offer multiple exemptions for certain conditions. Enclosed buildings with a mechanical ventilation system are exempt, as well as vehicles with an air filtration system. Wildland firefighting, emergency operations and intermittent exposures (as defined in the proposed rules) are partially exempt.

The proposed rules require the following: exposure assessment; information, training and documentation; employer two-way communication; and exposure controls.

Of note, related to exposure controls, the proposed rules require employers to make NIOSH-approved respirators available for voluntary use when the AQI is at or above 101. Whenever employee exposure is at or above AQI 251, employers must ensure that employees wear NIOSH-approved respirators; to do this, the employer may implement the Wildfire Smoke Respiratory Protection Program described in Appendix A in lieu of conducting medical evaluations and fit testing required under 29 CFR 1910.134: Respiratory Protection. Lastly, when the AQI equals or exceeds 501, employers must ensure that employees wear NIOSH-approved respirators and implement a complete Respiratory Protection Program, in compliance with 29 CFR 1910.134: Respiratory Protection.

Please visit our website osha.oregon.gov/rules to view our proposed rules, or select other rule activity from this page.

When does this happen: Adoption tentatively will be in April 2022.

To get a copy: Our web site – osha.oregon.gov Rules and laws, then,
Proposed rules
Or call 503-947-7449

To comment: Department of Consumer and Business Services/
Oregon OSHA
PO BOX 14480
Salem OR 97309-0405
Email: OSHA.rulemaking@dcbs.oregon.gov
Fax: 503-947-7461
Voicemail: 1-833-604-0884 (toll free) or 503-947-7396

Comment period closes: March 18, 2022

Oregon OSHA contact: Tom Bozicevic, Salem Central Office @ 503-378-3272, or
email at Tom.BOZICEVIC@dcbs.oregon.gov

Note: In compliance with the Americans with Disabilities Act (ADA), this publication is available in alternative formats by calling 503-378-3272.

Secretary of State
NOTICE OF PROPOSED RULEMAKING HEARING*

A Statement of Need and Fiscal Impact accompanies this form.

Department of Consumer and Business Services/Oregon OSHA
Agency and Division

Administrative Rules Chapter Number

OAR 437

Lisa Appel
Rules Coordinator

350 Winter Street NE Salem OR 97301-3882
Address

503-947-7449
Telephone

RULE CAPTION

Rules to Address Employee Exposure to Wildfire Smoke

The Agency requests public comment on whether other options should be considered for achieving the rule's substantive goals while reducing the negative economic impact of the rule on business.

Virtual Public Hearings Scheduled for:

Hearing Date	Time	Location	Hearings Officer
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March 4, 2022	10:00 am	Oregon OSHA, Salem	Lisa Appel
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Auxiliary aids for persons with disabilities are available upon advance request.

RULEMAKING ACTION

ADOPT: OAR 437-002-1080, 437-004-9790

ORS 654.025(2), 654.035, 656.726(4)

Stat. Auth.

Other Authority

ORS 654.001 through 654.295

Stats. Implemented

RULEMAKING SUMMARY

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke, fine particulate matter (PM_{2.5}). While exposure to such levels of wildfire smoke can adversely affect anyone, workers with asthma, Chronic Obstructive Pulmonary Disease (COPD), or heart disease are at higher risk of serious or fatal health effects when their condition is exacerbated from such exposures. The Oregon Department of Environmental Quality released a report in July 2021: *Wildfire Smoke Trends and the Air Quality Index* documenting that Oregon's air quality in 2020 was the worst on record; additionally, the report states that, "Large wildfires have been increasing across the western United States in the last decade and are expected to become more frequent, according to the National Interagency Fire Center." Given this wildfire trend can increase unhealthy air quality days in Oregon, the rules are needed to protect workers.

On March 10, 2020, Governor Brown issued Executive Order 20-04 (EO 20-04) which directed certain state agencies to reduce greenhouse gas emissions (GHGs) and mitigate the impacts of climate change. EO 20-04 included a directive to the Oregon Health Authority (OHA) and Oregon OSHA to jointly develop a proposal for rules to protect employees from workplace exposures to excessive heat and wildfire smoke. In response to EO 20-04, Oregon OSHA, in collaboration with the OHA, a rulemaking advisory committee, and stakeholders, developed these proposed rules to protect employees from the potentially detrimental health effects from exposure to unhealthy and hazardous levels of wildfire smoke. Without these rules, employees likely face worsening air quality from wildfire emissions without adequate respiratory protections in place. These rules specifically outline air quality index (AQI) trigger levels for specific requirements that will reduce employee workplace exposure to unhealthy and hazardous air quality from wildfire emissions.

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The agency, in consultation with OHA, engaged over 100 stakeholders from Labor and Business interests through a Rules Advisory Committee (RAC). The RAC met nine times beginning in February 2021, and Oregon OSHA presented multiple rule drafts for stakeholder comment. In addition, Oregon OSHA hosted four virtual listening sessions with Spanish translators, held in May and September 2021, to provide an opportunity for workers and other stakeholders to share their experience on the challenges of wildfire smoke in the workplace, in addition to hearing about how Oregon OSHA's temporary rule affected their workplaces.

These proposed rules apply to all workers in Oregon covered under the Oregon Safe Employment Act (OSEAct). OAR 437-004-9790 applies to employers covered under Division 4 (Agriculture), while OAR 437-002-1080 applies to work activities covered under Division 2 (General Industry). Since worker exposure to unhealthy and hazardous air quality conditions from wildfire emissions is not limited to a specific industry, work activities covered under Division 3 (Construction) or Division 7 (Forest Activities) would also be required to comply with OAR 437-002-1080, per additional applicability requirements under OAR 437-003-0005 and OAR 437-007-0004, respectively.

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emergency operations and intermittent exposures (as defined in the proposed rules) are partially exempt.

The proposed rules require the following: exposure assessment; information, training and documentation; employer two-way communication; and exposure controls.

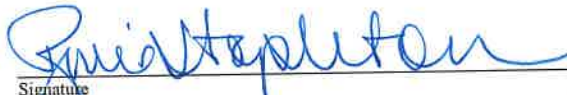
Of note, related to exposure controls, the proposed rules require employers to make NIOSH-approved respirators available for voluntary use when the AQI is at or above 101. Whenever employee exposure is at or above AQI 251, employers must ensure that employees wear NIOSH-approved respirators; to do this, the employer may implement the Wildfire Smoke Respiratory Protection Program described in Appendix A in lieu of conducting medical evaluations and fit testing required under 29 CFR 1910.134: Respiratory Protection. Lastly, when the AQI equals or exceeds 501, employers must ensure that employees wear NIOSH-approved respirators and implement a complete Respiratory Protection Program, in compliance with 29 CFR 1910.134: Respiratory Protection.

INDIVIDUAL RULE SUMMARY (By rule number)

Provide a brief summary of the rule (if new adoption), or a brief summary of changes made to the rule (if amending)

- OAR 437-002-1080 – Rule to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke: fine particulate matter (PM2.5).
- OAR 437-004-9790 – Rule to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke: fine particulate matter (PM2.5).

March 18, 2022
Last Day for Public Comment
Last day to submit written comments to the Rules Coordinator


Signature

Renee Stapleton
Printed name

1/28/2022
Date

*The Oregon Bulletin is published on the 1st of each month and updates the rule text found in the Oregon Administrative Rules Compilation. Notice forms must be submitted to the Administrative Rules Unit, Oregon State Archives, 800 Summer Street NE, Salem, Oregon 97310 by 5:00 pm on the 15th day of the preceding month unless this deadline falls on a Saturday, Sunday or legal holiday when Notice forms are accepted until 5:00pm on the preceding workday. ARC 920-2005

STATEMENT OF NEED AND FISCAL IMPACT

A Notice of Proposed Rulemaking Hearing or a Notice of Proposed Rulemaking accompanies this form.

Department of Consumer and Business Services/Oregon OSHA
Agency and Division

OAR 437
Administrative Rules Chapter Number

In the Matter of:

Adopting: OAR 437-002-1080, 437-004-9790

Rule Caption: Rules to Address Employee Exposure to Wildfire Smoke

Statutory Authority: ORS 654.025(2), 654.035, 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295

Need for the Rule(s):

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the primary air contaminant of concern in wildfire smoke, fine particulate matter (PM_{2.5}). While significant exposures to wildfire smoke can be unhealthy for anyone, workers with pre-existing health conditions such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease are at increased risk of serious or fatal health effects when exposed to high levels of PM_{2.5} in wildfire smoke. The Oregon Department of Environmental Quality released a report in July 2021: "*Wildfire Smoke Trends and the Air Quality Index*" documenting that Oregon's air quality in 2020 was the worst on record; additionally, the report states that, "large wildfires have been increasing across the western United States in the last decade and are expected to become more frequent, according to the National Interagency Fire Center." Therefore, these rules are needed to help protect workers from the hazards of PM_{2.5} stemming from major wildfire events, which are projected to increase in frequency and duration as well as increase the number of "unhealthy air quality days," in affected areas of Oregon.

On March 10, 2020, Governor Brown issued Executive Order 20-04 (EO 20-04), which directed certain state agencies to reduce greenhouse gas emissions (GHGs) and mitigate the impacts of climate change. EO 20-04 included a directive to the Oregon Health Authority (OHA) and Oregon OSHA to jointly develop a proposal for rules to protect employees from workplace exposures to excessive heat and wildfire smoke. In response to EO 20-04, Oregon OSHA, in collaboration with the OHA, a rulemaking advisory committee, and stakeholders, developed these proposed rules to help protect employees from the potentially detrimental health effects from exposure to unhealthy and hazardous levels of wildfire smoke. Without these rules, employees would be exposed to worsening air quality from wildfire emissions without adequate hazard controls, including respiratory protection. These rules specifically outline air quality index (AQI) trigger levels for specific requirements that will reduce employee workplace exposure to unhealthy and hazardous air quality from wildfire emissions.

Documents Relied Upon, and where they are available:

Oregon Executive Order 20-04 - Directing State Agencies to Take Actions to Reduce and Regulate Greenhouse Gas Emissions, available at: <https://www.oregon.gov/bcd/Documents/eo-energy-20-04.pdf>

AirNow reports air quality using the official U.S. Air Quality Index (AQI), available at: <https://www.airnow.gov/about-airnow/>

Oregon Department of Environmental Quality – Air Quality Monitoring Data, available at: <https://oraqi.deq.state.or.us/home/map>

Wildfire Smoke Trends and the Air Quality Index, July 2021, Oregon Department of Environmental Quality, available at: <https://www.oregon.gov/deq/wildfires/Documents/WildfireSmokeTrendsReport.pdf>

Oregon Health Authority’s Wildfires and Smoke resource webpage, available at: <https://www.oregon.gov/oha/PH/Preparedness/Prepare/Pages/PrepareForWildfire.aspx>

Oregon Wildfire Response Protocol for Severe Smoke Episodes, June 17, 2021, collaborative agency guidance document, available at: <https://www.oregon.gov/deq/FilterDocs/WFresponse.pdf>

Washington Department of Labor and Industries Emergency Rules regarding Wildfire Smoke, available at: <https://lni.wa.gov/rulemaking-activity/AO21-26/2126CR103E.pdf>

California Department of Industrial Relations Worker Protection from Wildfire Smoke rule, available at: <https://www.dir.ca.gov/dosh/doshreq/Protection-from-Wildfire-Smoke/Wildfire-smoke-emergency-standard.html>

Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: [Employment and Wages by Industry \(QCEW\) - QualityInfo](#)

Oregon Employment Department – A Snapshot of Oregon Firms by Size Class, 2021, August 25, 2021, by Sarah Cunningham, available at: [A Snapshot of Oregon Firms by Size Class, 2021 - Asset Publisher \(qualityinfo.org\)](#)

US Environmental Protection Agency (EPA) Outdoor Air Quality Data “Download Daily Data,” available at: [Download Daily Data | US EPA](#)

Dalton, M., and E. Fleishman, editors. 2021. Fifth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. <https://blogs.oregonstate.edu/occri/oregon-climate-assessments/>.

Statement Identifying How Adoption of Rule(s) Will Affect Racial Equity in This State:

Protections required by the proposed rules would apply to all workers covered under the Oregon Safe Employment Act (OSEAct). These rules are not expected to impact racial equity in the workplace for underrepresented communities.

Fiscal and Economic Impact:

Statement of Cost of Compliance:

1. Impact on state agencies, units of local government and the public (ORS 183.335(2)(b)(E)):

All state agencies and local government units are affected by the rules in the sense that they are employers under the Oregon Safe Employment Act (OSEAct). The public as a whole will be affected only to the degree that members of the public are employers and employees.

Costs incurred by Oregon OSHA represent similar costs associated with the promulgation, implementation and administration of workplace safety and health rules. In addition, Oregon OSHA and all other state agencies and local government units that have employees who will be exposed to an ambient air concentration for PM2.5 at or above 35.5 µg/m³ (micrograms per cubic meter) from wildfire emissions are affected by the rules as employers covered under the Oregon Safe Employment Act (OSEAct).

2. Cost of compliance effect on small business (ORS 183.336):

a. Estimate the number of small businesses and types of business and industries with small businesses subject to the rule:

According to the Oregon Employment Department, "A Snapshot of Oregon Firms by Size Class, 2021," August 25, 2021, there were 106,810 firms with fewer than 50 employees in Oregon in March 2021. These firms accounted for 96.0% of all firms statewide. Types of businesses and industries include any associated with work activities that can potentially expose employees to wildfire smoke, such as but are not limited to, Agriculture and Forestry (NAICS Code 11), Construction (NAICS Code 23), Landscaping Services (NAICS Code 561730), etc.

b. Projected reporting, recordkeeping and other administrative activities required for compliance, including costs of professional services:

Estimated costs related to administrative activities and professional services are identified under specific sections of the rule requirements listed below, and were determined by considering survey responses from stakeholders representing small and large businesses and administrative wage information from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs). In addition to wage information, a soft costs multiplier of 35 percent for items such as benefits and insurance, were included to account for administrative overhead.

c. Equipment, supplies, labor and increased administration required for compliance:

Estimated costs related to equipment, supplies, labor and increased administration for implementation are identified under specific sections of the rule requirements listed below and were determined by considering survey responses from stakeholders representing small and large businesses, example equipment costs, administrative and labor wage information from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs) and Table 2 (2021 Oregon Occupational Wage Data for Labor Costs), and 5-year AQI values in Table 3. In addition to wage information, a soft costs multiplier of 35 percent for items such as benefits and insurance, were included to account for administrative overhead.

Estimate of Fiscal Impact: OAR 437-002-1080 and OAR 437-004-9790 (Protection from Wildfire Smoke)

Scope and application estimated costs under Section 1:

The proposed rules would apply to public and private sector employers whose employees will be exposed to wildfire smoke where the ambient air concentration for fine particulate matter (PM_{2.5}) is at or above 35.5 µg/m³ which corresponds with an "Air Quality Index" value ≤101 for PM_{2.5}. The estimated cost for employers to determine workplace applicability, and to complete a comprehensive review of the proposed rules to determine administrative and operational needs for compliance, considered stakeholder provided survey data to determine an estimated time range between 2-80 hours to complete such a review.

- Using 2-80 hours for administrative time to complete a comprehensive review of the standard, the median (50th percentile) wage data from selected occupational profiles (NAICS code) from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, the estimated costs are:
 - General and Operations Managers (111021):
 - \$48.87/hr x 2-80hrs x 1.35 (soft cost estimate) = \$131.95 - \$5,277.96
 - Human Resource Managers (113121):
 - \$52.33/hr x 2-80hrs x 1.35 (soft cost estimate) = \$141.29 - \$5,651.64
 - Farmers, Ranchers, and other Ag Managers (119013):
 - \$38.29/hr x 2-80hrs x 1.35 (soft cost estimate) = \$103.38 - \$4,135.32
 - Construction Managers (119021):
 - \$48.47/hr x 2-80hrs x 1.35 (soft cost estimate) = \$103.87 - \$5,234.76
 - Occupational Health and Safety Specialists (299011):

- $\$38.84/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = $\$104.87 - \$4,194.72$

Exposure assessment estimated costs under Section 3:

The proposed rules would require employers to identify and monitor employees who are exposed to wildfire smoke at the start of each shift and as needed where the ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI ≤101). An employer's daily administrative cost to monitor significant changes in PM_{2.5} exposure levels during wildfire smoke events and to notify exposed employees and implement appropriate exposure controls is partially dependent on the number of geographical locations where employees are exposed.

- Using an estimated 1-4 hours total per day for administrative time to determine and monitor workplace ambient air concentration for PM_{2.5} or equivalent AQI value, the median (50th percentile) wage data from selected administrative occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, the estimated administrative costs per work location are:
 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (371012):
 - $\$26.52/\text{hr} \times 1\text{-}4\text{hrs} \times 1.35$ (soft cost estimate) = $\$35.80 - \$143.20/\text{day}$
 - Farmers, Ranchers, and other Ag Managers (119013):
 - $\$38.29/\text{hr} \times 1\text{-}4\text{hrs} \times 1.35$ (soft cost estimate) = $\$51.69 - \$206.77/\text{day}$
 - First-Line Supervisors of Construction Trades (471011):
 - $\$36.58/\text{hr} \times 1\text{-}4\text{hrs} \times 1.35$ (soft cost estimate) = $\$49.38 - \$197.53/\text{day}$
 - First-Line Supervisors of Production and Operating Workers (511011):
 - $\$29.25/\text{hr} \times 1\text{-}4\text{hrs} \times 1.35$ (soft cost estimate) = $\$39.49 - \$157.95/\text{day}$
- Businesses located in areas where internet service is available and is used by affected employers for general operational needs would incur minimal or no additional cost to check air quality conditions by visiting websites that provide daily AQI values for areas where employees are exposed. Such websites include Oregon Department of Environmental Quality, U.S. EPA AirNow, and Interagency Wildland Fire Air Quality Response Program.
- Employers who choose to use a PM_{2.5} monitoring device, rather than relying on the AQI value for the workplace location, to more accurately assess air quality for indoor work environments that do not have mechanical ventilation would incur costs associated with purchasing monitoring equipment and administrative time for employee training related to equipment use. While the estimated training costs associated with using a PM_{2.5} monitoring device is included in Section 4 (training and information) below, the estimated equipment cost for employers would depend on the number of such indoor locations where employees are exposed. Examples and estimated cost of PM_{2.5} measuring devices available to consumers for indoor and/or outdoor use, include but are not limited to:
 - PurpleAir PA-I \$199.99/unit/work location
 - Temtop LKC-1000E \$115.99/unit/work location
 - Kaiterra Laser Egg 2+ \$174.99/unit/work location
 - Dylos DC1100 Pro \$260.99/unit/work location
- Employee exposure to wildfire smoke in areas where internet service is unavailable and the employer does not use a PM_{2.5} monitoring device can use the 5-3-1 Visibility Index Values in Appendix B of the rule to estimate the current workplace location AQI.

Information and training estimated costs under Section 4:

The proposed rules would require employers to develop and implement annual wildfire smoke training for employees who may be exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI ≥101)

in a manner and language they readily understand. Employers needing to develop training materials in multiple languages due to employee needs will incur additional cost to do so.

- The estimated cost to develop employer-specific wildfire smoke training to supplement Oregon OSHA-supplied training materials considered stakeholder provided survey data to determine an estimated time range between 2-80 hours, the median (50th percentile) wage data from selected administrative occupational profile examples from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, for the estimated one-time administrative cost.
 - General and Operations Managers (111021):
 - $\$48.87/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$131.95 - \$5,277.96
 - Human Resource Managers (113121):
 - $\$52.33/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$141.29 - \$5,651.64
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 - $\$48.47/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$103.87 - \$5,234.76
 - Occupational Health and Safety Specialists (299011):
 - $\$38.84/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$104.87 - \$4,194.72
- The estimated total cost to implement annual wildfire smoke training to all affect supervisors and employees considered stakeholder provided survey data to determine an estimated total training time between 1-2 hours per person, the lowest and highest median (50th percentile) wage data from selected examples of administrative and labor occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs) and Table 2 (2021 Oregon Occupational Wage Data for Labor Costs), and an additional 35% for soft costs:
 - First-line Supervisors of Farming, Fishing, and Forestry Workers (451011)
 - $\$26.26/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$35.45 - \$70.90/person/yr
 - Human Resource Managers (113121):
 - $\$52.33/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$70.65 - \$141.29/person/yr
 - Farmworkers and Laborers, Crop, Nursery, and Greenhouses (452092):
 - $\$14.01/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$18.91 - \$37.82/person/yr
 - Electrical Power-Line Installers and Repairers: (499051)
 - $\$49.74/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$67.15 - \$134.30/person/yr

Training documentation estimated costs under Section 5:

The proposed rules would require employers to verify employee wildfire smoke training by preparing a written or electronic record that includes the name or identification of the employee trained, the date(s) of the training, and the name of the person who conducted the training.

- The estimated cost to document annual supervisor and employee wildfire smoke training in writing or electronically each year considered stakeholder provided survey data to determine an estimated documentation time between 2-40 hours, the lowest and highest median (50th percentile) wage data from selected examples of occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs;
 - First-line Supervisors of Farming, Fishing, and Forestry Workers (451011)
 - $\$26.26/\text{hr} \times 2\text{-}40\text{hrs} \times 1.35$ (soft cost estimate) = \$70.90 - \$1,418.04/yr
 - Human Resource Managers (113121):
 - $\$52.33/\text{hr} \times 2\text{-}40\text{hrs} \times 1.35$ (soft cost estimate) = \$141.29 - \$2,825.82/yr

Employer two-way communication estimated costs under Section 6:

The proposed rules would require employers to develop and implement a system to communicate wildfire smoke hazards before employees are exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI ≥101), whenever feasible. Stakeholder survey data indicated that employers would likely use existing mobile phones, satellite phones, email, radios, onsite meetings, electronic bulletin boards, or person-to-person systems to communicate wildfire smoke conditions to employees. While nearly all employer survey responses indicated that this specific rule requirement would have no or minimal additional costs, some respondents indicated that the estimated cost to develop and implement a new communication system may range from \$600-\$10,000 depending on employment size and operational needs.

Exposure controls estimated costs under Section 7: The proposed rules would require employers to implement engineering and administrative controls to reduce employee PM_{2.5} exposure to less than 35.5 µg/m³ (AQI <101). Engineering controls include, but are not limited to, temporarily relocating outdoor workers to available indoor areas or vehicles where the air is adequately filtered, and using a portable air purifier with a HEPA filter (or other high efficiency filter) effective for the size of the enclosed area where used. Although engineering controls such as using a portable air purifier can be an effective method for controlling wildfire smoke air concentrations in appropriate indoor environments, the standards acknowledge feasibility issues where engineering control methods would likely have significant site-specific limitations to be reasonably effective.

- For indoor and enclosed work environments where a portable air purifier would be effective, examples of their costs include:
 - Carbon Filter Air Purifier Home Office (800 sq. ft): \$164.69/unit [Home Depot](#)
 - XPOWER X-2580 commercial grade air purifier (1,500 sq. ft): \$637.29/unit [Home Depot](#)
 - XPOWER Commercial 3-Stage Filtration HEPA Air Purifier System (1,500 sq. ft): \$823.00/unit [Home Depot](#)
- Administrative controls include, but are not limited to, temporarily relocating outdoor work operations to another outdoor location with better air quality when work permits, and changing employee work schedules to when better air quality is forecasted. Estimated costs to temporarily relocate or delay work could include losses in productivity and revenue if there is a significant pause in work activities.

The proposed rules would require affected employers to make available NIOSH-approved filtering facepiece respirators for voluntary use whenever employees are exposed to an ambient air concentration for PM_{2.5} between 35.5-199.9 µg/m³ (AQI 101-250), and provide filtering facepiece respirators for require use at or above 200.9 µg/m³ (AQI ≥251). The annual estimated cost for employers to provide NIOSH-approved filtering facepiece respirators to employees under the standards includes the total number of exposed employees, the need to replace respirators during each shift, the unit cost of respirators provided, and the number of days each year employees are exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI ≥101).

- Using information listed below for examples of estimated cost for NIOSH-approved filtering facepiece respirators, and considering the 5-year averages of selected geographical area listed below and from Table 3 when the total daily AQI value was over 101, the daily estimated cost to provide NIOSH-approved filtering facepiece respirators per exposed employee: \$2.15/unit (average cost) x 2 (replacement) = \$4.30/employee/shift
 - Examples of costs for NIOSH-approved filtering facepiece respirator (average cost per unit \$2.15):
 - 3M Particulate Respirator 8200: \$1.15/unit [Amazon](#)
 - N95 Mask NIOSH Approved: \$1.79/unit [Amazon](#)
 - Honeywell Safety NIOSH-Approved N95: \$3.50/unit [Amazon](#)
 - While the increasing frequency and duration of future severe smoke events caused by large or long-duration wildfires is unknown, the US EPA AQI data for selected geographical areas in

Oregon, listed in Table 3 below, was used to determine the five-year (2017-2021) average for total days per year (from June 1 through September 30), where the AQI value for PM_{2.5} was:

- Between AQI 101-250 (voluntary respirator use) is:
 - Bend: 12.4 days
 - Eugene: 9.0 days
 - Grants Pass: 19.0 days
 - Hermiston-Pendleton: 5.8 days
 - Klamath Falls: 25.6 days
 - Medford: 22.4 days
 - Portland: 5.8 days
 - Salem: 5.4 days
 - The Dalles: 4.2 day
- Between AQI 251-500 (mandatory respirator use under a Wildfire Smoke Respiratory Protection Program described in the Appendix A, or equivalent program) is:
 - Bend: 3.0 days
 - Eugene: 1.8 days
 - Grants Pass: 2.2 days
 - Hermiston-Pendleton: 1.0 day
 - Klamath Falls: 0.8 days
 - Medford: 1.4 days
 - Portland: 1.2 days
 - Salem: 1.2 days
 - The Dalles: 1.0 day
- At or above AQI 501 (mandatory respirator use under a full Respiratory Protection Program in accordance with 29 CFR 1910.134) is:
 - Bend: 0.4 days
 - Eugene: 0.6 days
 - Grants Pass: None
 - Hermiston-Pendleton: None
 - Klamath Falls: None
 - Medford: 0.2 days
 - Portland: 0.2 days
 - Salem: 0.8 days
 - The Dalles: None

Note: All days listed at or above AQI 501 during the 5-year period occurred in 2020. The Oregon Department of Environmental Quality released a report in July 2021, "Wildfire Smoke Trends and the Air Quality Index," documenting that Oregon's air quality in 2020 was the worst on record.

Employers who would need to provide filtering facepiece respirators for mandatory use when employees are exposed to an ambient air concentration for PM_{2.5} at or above 200.9 µg/m³ (AQI ≥251), when such respirators are used exclusively for wildfire smoke, may implement and follow the Wildfire Smoke Respiratory Protection Program described in Appendix A of this standard in lieu of conducting medical evaluations and fit testing as would typically be required under 29 CFR 1910.134: Respiratory Protection, at no or minimal cost.

Employers without an existing Respiratory Protection Program, whose employees would use respirators exclusively for protection from wildfire smoke concentrations of PM_{2.5} at or above 500.4 µg/m³ (AQI ≥501), would incur additional cost to develop and implement a full Respiratory Protection Program in accordance with 29 CFR 1910.134 if administrative controls such as relocating or rescheduling affected work activities are

infeasible. Stakeholders provided survey responses considered indicated the estimated cost to implement a full respiratory program (excluding wages) ranged from \$100.00 - \$1500.00 per employee.

Information was received from a commercial construction industry stakeholder who indicated that complying with the proposed rule’s administrative control requirements could cost up to \$200,000 per week, but no further context or explanation of how the estimated cost was calculated, was provided.

Note: Data in Tables 1 (2021 Oregon Occupational Wage Data for Administrative Costs) and Table 2 (2021 Oregon Occupational Wage Data for Labor Costs) is from the Oregon Employment Department (OED) occupational profile reports for Occupational wage data in QualityInfo representing first quarter 2021 wages. Per OED (Data Sources and Limitations for Occupational Wages), *“the data used to create these estimates came from the Occupational Employment and Wage Survey. This survey samples more than 6,000 business establishments per year, taking three years to fully collect the sample of more than 18,000 establishments. The data used for the current wage estimates came from surveys that were conducted in 2017, 2018, 2019, and 2020. The wage data were then adjusted to 2021 using the Employment Cost Index. It is important to note that these wage rates may vary between industries, as well as by firm size within an industry. Also, when determining wage rates for individual occupations, it is important to assess current labor market conditions which may also affect wages.”*

Table 1: 2021 Oregon Occupational Wage Data for Administrative Costs				
North American Industrial Code System (NAICS)	Occupation Profile Description	Statewide average hourly wage in dollars (\$)		
		10th Percentile	50th Percentile (Median)	90th Percentile
111021	General and Operations Managers	20.33	48.87	78.24
113121	Human Resource Managers	30.70	52.33	84.19
119013	Farmers, Ranchers, and other Ag Managers	17.06	38.29	54.61
119021	Construction Managers	29.43	48.87	78.24
299011	Occupational Health and Safety Specialists	24.07	38.84	54.75
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	16.56	26.52	41.03
451011	First-line Supervisors of Farming, Fishing, and Forestry Workers	16.23	26.26	38.95
471011	First-Line Supervisors of Construction Trades	23.32	36.58	55.46
511011	First-Line Supervisors of Production and Operating Workers	18.67	29.25	44.91

Source: Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: [Employment and Wages by Industry \(QCEW\) - QualityInfo](#)

Table 2: 2021 Oregon Occupational Wage Data for Labor Costs

North American Industrial Code System (NAICS)	Occupation profile description	Statewide average hourly wage in dollars (\$)		
		10th Percentile	50th Percentile (Median)	90th Percentile
194093	Forest and Conservation Technician	13.64	18.27	30.27
292041	Emergency Medical Technicians and Paramedics	13.42	20.23	31.45
332011	Firefighters	15.14	32.01	50.22
333051	Police and Sheriff's Patrol Officers	26.83	38.24	49.08
373011	Landscaping and Groundskeeping Workers	12.93	17.50	25.43
373013	Tree Trimmers and Pruners	17.02	26.72	39.22
435041	Meter Readers, Utilities	18.38	26.28	34.94
435052	Postal Service Mail Carriers	18.73	24.07	32.59
452092	Farmworkers and Laborers, Crop, Nursery, and Greenhouses	12.40	14.01	18.33
452099	Agricultural Workers, All Other	12.41	18.94	32.03
454011	Forest and Conservation Workers	12.49	17.84	24.75
454021	Fallers (Logging)	22.54	32.78	40.60
454023	Log Graders and Scalers	14.22	22.97	29.52
454029	Logging Workers, All Other	17.15	21.76	26.52
472031	Carpenters	16.79	26.12	40.89
472061	Construction Laborers	13.97	20.46	31.79
472181	Roofers	14.95	24.13	38.66
472231	Solar Photovoltaic Installers	19.45	28.75	36.79
474051	Highway Maintenance Workers	20.26	26.65	31.86
499021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	15.69	25.79	39.61
499051	Electrical Power-Line Installers and Repairers	37.92	49.74	61.88
499052	Telecommunications Line Installers and Repairers	17.55	24.80	36.05
499071	Maintenance and Repair Worker wages	13.52	20.09	31.67
533021	Bus Drivers, Transit and Intercity	16.38	24.64	32.43
533022	Bus Drivers, School or Special Client	12.80	18.17	24.57
533033	Light Truck or Delivery Services Drivers	13.20	18.83	31.69
519198	Helpers – Production Workers	12.77	16.58	23.47
537063	Machine Feeders and Offbearers	13.61	18.28	24.66

Source: Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: [Employment and Wages by Industry \(QCEW\) - QualityInfo](#)

Table 3: Air Quality Index Values for Selected Areas in Oregon from June 1 through Sept 30 (2017 – 2021)

Geographic Area & Year	Estimated days with AQI value		
	101 – 250	251– 500	Over 500
Bend - 2017	21	6	0
Bend - 2018	16	0	0
Bend - 2019	0	0	0
Bend - 2020	3	5	2
Bend - 2021	22	4	0
Bend 5-year average	12.4 days	3.0 days	0.4 days
Eugene - 2017	20	2	0
Eugene - 2018	3	0	0
Eugene - 2019	0	0	0
Eugene - 2020	2	7	3
Eugene - 2021	20	0	0
Eugene 5-year average	9.0 days	1.8 days	0.6 days
Grants Pass - 2017	18	4	0
Grants Pass - 2018	34	0	0
Grants Pass - 2019	14	0	0
Grants Pass - 2020	11	7	0
Grants Pass - 2021	18	0	0
Grants Pass 5-year average	19 days	2.2 days	0.0 days
Hermiston-Pendleton - 2017	10	0	0
Hermiston-Pendleton - 2018	8	0	0
Hermiston-Pendleton - 2019	0	0	0
Hermiston-Pendleton - 2020	3	5	0
Hermiston-Pendleton - 2021	8	0	0
Hermiston-Pendleton 5-year average	5.8 days	1.0 day	0.0 days
Klamath Falls - 2017	18	1	0
Klamath Falls - 2018	40	0	0
Klamath Falls - 2019	4	0	0
Klamath Falls - 2020	21	3	0
Klamath Falls - 2021	45	0	0
Klamath Falls 5-year average	25.6 days	0.8 days	0.0 days
Medford - 2017	25	2	0
Medford - 2018	42	0	0
Medford - 2019	6	0	0
Medford - 2020	4	5	1
Medford - 2021	35	0	0
Medford 5-year average	22.4 days	1.4 days	0.2 days
Portland - 2017	13	0	0
Portland - 2018	6	0	0
Portland - 2019	0	0	0
Portland - 2020	4	6	1
Portland - 2021	6	0	0
Portland 5-year average	5.8 days	1.2 days	0.2 days
Salem - 2017	4	0	0
Salem - 2018	4	0	0
Salem - 2019	0	0	0
Salem - 2020	2	5	4
Salem - 2021	17	1	0
Salem 5-year average	5.4 days	1.2 days	0.8 days
The Dalles - 2017	14	1	0
The Dalles - 2018	5	0	0
The Dalles - 2019	0	0	0
The Dalles - 2020	0	4	0
The Dalles - 2021	2	0	0
The Dalles 5-year average	4.2	1.0	0.0

Source: AQI data from US Environmental Protection Agency (EPA) "Download Daily Data" using the highest daily AQI value for all monitors in the geographic area:
<https://www.epa.gov/outdoor-air-quality-data/download-daily-data>

Describe how small businesses were involved in the development of these rule(s):

Small businesses and others were involved in the development of this rule to the extent that their representatives represented them during the Rulemaking Advisory Committee meetings. Those interested

have also had the opportunity to comment on several pre-proposal drafts during the rulemaking process and a fiscal impact survey.

Was an Administrative Rule Advisory Committee consulted?

Yes, Oregon OSHA hosted nine virtual Rulemaking Advisory Committee meetings during this rulemaking process. Comments were accepted during meetings, through stakeholder feedback on pre-proposal drafts, and emails throughout the stakeholder engagement process. Oregon OSHA surveyed the Rulemaking Advisory Committee members on the provisions of the rule for gaining a greater understanding of the cost of compliance with the rule. A draft Fiscal Impact Statement was provided to the Advisory Committee members for comment. Those comments received were folded into the final Fiscal Impact Statement.

		
Signature	Printed name	Date

Administrative Rules Unit, Archives Division, Secretary of State, 800 Summer Street NE, Salem, Oregon 97310. ARC 925-2007

HOUSING COST IMPACT STATEMENT

FOR ESTIMATING THE EFFECT OF A PROPOSED RULE OR ORDINANCE ON THE COST OF DEVELOPING
A *TYPICAL 1,200 SQ FT DETACHED SINGLE FAMILY DWELLING ON A 6,000 SQ FT PARCEL OF LAND.
(ORS 183.534)
FOR ADMINISTRATIVE RULES

AGENCY NAME: DCBS/Oregon OSHA
HEARING DATES: March 2, 3, 4 2022
ADDRESS: 350 Winter Street NE
CITY/STATE: Salem OR 97301-3882
PHONE: 503-947-7449

PERMANENT: OAR 437-002-1080, 437-004-9790
EFFECTIVE DATE: Tentatively April 2022

BELOW PLEASE PROVIDE A DESCRIPTION OF THE ESTIMATED SAVINGS OR ADDITIONAL COSTS THAT WILL RESULT FROM THIS PROPOSED CHANGE.

PROVIDE A BRIEF EXPLANATION OF HOW THE COST OR SAVINGS ESTIMATE WAS DETERMINED.

IDENTIFY HOW CHANGE IMPACTS COSTS IN CATEGORIES SPECIFIED.

Description of proposed change:

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke, fine particulate matter (PM2.5).

Description of the need for, and objectives of the rule:

Due to the effects of climate change, Oregonians will experience increased wildfire smoke events, especially during the growing fire season. While exposure to unhealthy and hazardous levels of wildfire smoke can adversely affect anyone, workers with asthma, Chronic Obstructive Pulmonary Disease (COPD), or heart disease are at higher risk of serious or fatal health effects when their condition is exacerbated from such exposures. Even with advancements in climate science and computer modeling, it is still impossible to accurately forecast these seasonal, extreme smoke events. Since the agency is unable to accurately estimate the total days construction workers will be exposed to unhealthy and hazardous levels of wildfire smoke when constructing a typical single-family house, the estimated housing impact costs are provided on a daily basis. See attached Statement of Need and Fiscal Impact for daily Air Quality Index (AQI) values for selected areas in Oregon from June 1 through Sept 30 (2017 – 2021) in Table 3.

List of rules adopted or amended:

ADOPT: OAR 437-002-1080, OAR 437-004-9790

Materials and labor costs increase or savings:

OAR 437-004-9790 applies to employers covered under Division 4 (Agriculture), and would not have any appreciable impact to construction activities. OAR 437-002-1080 applies to work activities covered under Division 2 (General Industry); however, since worker exposure to unhealthy and hazardous air quality conditions from wildfire emissions is not limited to a specific industry, work activities covered under Division 3 (Construction) would also be required to comply with OAR 437-002-1080, per additional applicability requirements under OAR 437-003-0005.

While Oregon OSHA does not foresee any effects on material costs to construct a typical single-family house (3 bedrooms, 1 1/2 bathrooms, attached garage), the agency expects the following proposed rule site-specific requirements would directly increase administrative and personal protective equipment (PPE) costs of such projects.

Estimated administrative construction or other costs increase or savings:

The proposed rule would increase administrative cost by requiring contractors at affected residential construction sites to determine and monitor employee exposure to wildfire smoke at the start of each shift and

as needed when the ambient air concentration for PM2.5 is at or above 35.5 µg/m³ (AQI 101). The estimated cost to monitor significant smoke concentration level changes uses an estimated 1-2 hours per day for administrative time, the median (50th percentile) wage data for First-Line Supervisors of Construction Trades (471011) from Table 1 of the proposed rule's Statement of Need and Fiscal Impact, and an additional 35% for soft costs: \$36.58/hr x 1-2hrs x 1.35 (soft cost estimate) = \$49.38-\$98.77/day

The proposed rule would increase personal protective equipment (PPE) cost for contractors at affected residential construction sites by requiring them to provide NIOSH-approved filtering facepiece respirators for voluntary use whenever their employees are exposed to an ambient air concentration for PM2.5 between 35.5-199.9 µg/m³ (AQI 101-250), and provide filtering facepiece respirators for mandatory use at or above 200.9 µg/m³ (AQI 251). The estimated cost for employers to provide NIOSH-approved filtering facepiece respirators to employees for volunteer and mandatory use includes the total number of exposed employees, the need to replace respirators during each shift, the unit cost of respirators provided, and the unforeseeable number of days each year employees are exposed to an ambient air concentration for PM2.5 at or above 35.5 µg/m³ (AQI 101): Providing 2-4 NIOSH-approved filtering facepiece respirators to each exposed employee at \$2.15/unit (average cost from proposed rule's Statement of Need and Fiscal Impact) is \$4.30-\$8.60/employee/day.

Employers without an existing Respiratory Protection Program, whose employees would use respirators exclusively for protection from wildfire smoke concentrations of PM2.5 at or above 500.4 µg/m³ (AQI 501), would incur additional cost to develop and implement a full Respiratory Protection Program in accordance with 29 CFR 1910.134 if administrative controls such as relocating or rescheduling affected work activities are infeasible. Stakeholders provided survey responses considered indicated the estimated cost to implement a full respiratory program (excluding wages) ranged from \$100.00 - \$1500.00 per employee.

Land costs increase or savings:

Oregon OSHA does not foresee any effect on land costs.

Other costs increase or savings:

Oregon OSHA does not foresee any other costs development or construction costs.

PREPARERS NAME: Tom Bozicevic

EMAIL ADDRESS: tom.bozicevic@dcbs.oregon.gov

OFFICE OF THE SECRETARY OF STATE

SHEMIA FAGAN
SECRETARY OF STATE

CHERYL MYERS
DEPUTY SECRETARY OF STATE



ARCHIVES DIVISION

STEPHANIE CLARK
DIRECTOR

800 SUMMER STREET NE
SALEM, OR 97310
503-373-0701

NOTICE OF PROPOSED RULEMAKING
INCLUDING STATEMENT OF NEED & FISCAL IMPACT

CHAPTER 437
DEPARTMENT OF CONSUMER AND BUSINESS SERVICES
OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION

FILED
01/28/2022 10:55 AM
ARCHIVES DIVISION
SECRETARY OF STATE

FILING CAPTION: Rules to Address Employee Exposure to Wildfire Smoke

LAST DAY AND TIME TO OFFER COMMENT TO AGENCY: 03/18/2022 5:00 PM

The Agency requests public comment on whether other options should be considered for achieving the rule's substantive goals while reducing negative economic impact of the rule on business.

CONTACT: Oregon OSHA
503-947-7449
OSHA.rulemaking@dcbs.oregon.gov

350 Winter Street NE
Salem, OR 97301

Filed By:
Lisa Appel
Rules Coordinator

HEARING(S)

Auxiliary aids for persons with disabilities are available upon advance request. Notify the contact listed above.

DATE: 03/02/2022

TIME: 6:00 PM - 8:00 PM

OFFICER: Lisa Appel

ADDRESS: Virtual Hearing

350 Winter St. NE

Salem, OR 97301-3882

SPECIAL INSTRUCTIONS:

Please find registration information under Need for the Rule.

DATE: 03/03/2022

TIME: 6:00 PM - 8:00 PM

OFFICER: Lisa Appel

ADDRESS: Virtual Hearing

350 Winter St. NE

Salem, OR 97301-3882

SPECIAL INSTRUCTIONS:

This hearing will be conducted entirely in Spanish. Please find registration information under Need for the Rule.

DATE: 03/04/2022

TIME: 10:00 AM - 12:00 PM

OFFICER: Lisa Appel

ADDRESS: Lisa Appel

350 Winter St. NE

Salem, OR 97301-3882

SPECIAL INSTRUCTIONS:

Please find registration information under Need for the Rule.

NEED FOR THE RULE(S)

Please register for Rules to Address Employee Exposure to Wildfire Smoke on Mar 2, 2022 6:00 PM PST at:
<https://attendee.gotowebinar.com/register/1974878335118173710>

Please register for ****Spanish-only**** Rules to Address Employee Exposure to Wildfire Smoke on Mar 3, 2022 6:00 PM PST at:

<https://attendee.gotowebinar.com/register/7660699252952528400>

Please register for Rules to Address Employee Exposure to Wildfire Smoke on Mar 4, 2022 10:00 AM PST at:

<https://attendee.gotowebinar.com/register/7499399797646206222>

After registering, you will receive a confirmation email containing information about joining the webinar.

Phone: The COVID-19 pandemic has required the use of alternate methods to gather comments, including virtual hearings. The Omicron variant surge has further restricted access for some stakeholders. In light of this unique

situation, Oregon OSHA is offering the ability to leave a public comment on the proposed rules as a voicemail message, which will be transcribed and recorded if received before March 18, 2022, 5:00 PM. The agency will make reasonable efforts to translate messages that are not in English.

Voicemail messages may be left 24 hours a day by calling: 1-833-604-0884 (toll free) or 503-947-7396, and must be under two minutes in length

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the primary air contaminant of concern in wildfire smoke, fine particulate matter (PM2.5). While significant exposures to wildfire smoke can be unhealthy for anyone, workers with pre-existing health conditions such as asthma, chronic obstructive pulmonary disease (COPD), or heart disease are at increased risk of serious or fatal health effects when exposed to high levels of PM2.5 in wildfire smoke. The Oregon Department of Environmental Quality released a report in July 2021: "Wildfire Smoke Trends and the Air Quality Index" documenting that Oregon's air quality in 2020 was the worst on record; additionally, the report states that, "large wildfires have been increasing across the western United States in the last decade and are expected to become more frequent, according to the National Interagency Fire Center." Therefore, these rules are needed to help protect workers from the hazards of PM2.5 stemming from major wildfire events, which are projected to increase in frequency and duration as well as increase the number of "unhealthy air quality days," in affected areas of Oregon.

On March 10, 2020, Governor Brown issued Executive Order 20-04 (EO 20-04), which directed certain state agencies to reduce greenhouse gas emissions (GHGs) and mitigate the impacts of climate change. EO 20-04 included a directive to the Oregon Health Authority (OHA) and Oregon OSHA to jointly develop a proposal for rules to protect employees from workplace exposures to excessive heat and wildfire smoke. In response to EO 20-04, Oregon OSHA, in collaboration with the OHA, a rulemaking advisory committee, and stakeholders, developed these proposed rules to help protect employees from the potentially detrimental health effects from exposure to unhealthy and hazardous levels of wildfire smoke. Without these rules, employees would be exposed to worsening air quality from wildfire emissions without adequate hazard controls, including respiratory protection. These rules specifically outline air quality index (AQI) trigger levels for specific requirements that will reduce employee workplace exposure to unhealthy and hazardous air quality from wildfire emissions.

DOCUMENTS RELIED UPON, AND WHERE THEY ARE AVAILABLE

Oregon Executive Order 20-04 - Directing State Agencies to Take Actions to Reduce and Regulate Greenhouse Gas Emissions, available at: <https://www.oregon.gov/bcd/Documents/eo-energy-20-04.pdf>

AirNow reports air quality using the official U.S. Air Quality Index (AQI), available at: <https://www.airnow.gov/about-airnow/>

Oregon Department of Environmental Quality – Air Quality Monitoring Data, available at: <https://oraqi.deq.state.or.us/home/map>

Wildfire Smoke Trends and the Air Quality Index, July 2021, Oregon Department of Environmental Quality, available at: <https://www.oregon.gov/deq/wildfires/Documents/WildfireSmokeTrendsReport.pdf>

Oregon Health Authority's Wildfires and Smoke resource webpage, available at: <https://www.oregon.gov/oha/PH/Preparedness/Prepare/Pages/PrepareForWildfire.aspx>

Oregon Wildfire Response Protocol for Severe Smoke Episodes, June 17, 2021, collaborative agency guidance

document, available at: <https://www.oregon.gov/deq/FilterDocs/WFresponse.pdf>

Washington Department of Labor and Industries Emergency Rules regarding Wildfire Smoke, available at: <https://ini.wa.gov/rulemaking-activity/AO21-26/2126CR103E.pdf>

California Department of Industrial Relations Worker Protection from Wildfire Smoke rule, available at: <https://www.dir.ca.gov/dosh/doshreg/Protection-from-Wildfire-Smoke/Wildfire-smoke-emergency-standard.html>

Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: Employment and Wages by Industry (QCEW) - QualityInfo

Oregon Employment Department – A Snapshot of Oregon Firms by Size Class, 2021, August 25, 2021, by Sarah Cunningham, available at: A Snapshot of Oregon Firms by Size Class, 2021 - Asset Publisher (qualityinfo.org)

US Environmental Protection Agency (EPA) Outdoor Air Quality Data “Download Daily Data,” available at: Download Daily Data | US EPA

Dalton, M., and E. Fleishman, editors. 2021. Fifth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon. <https://blogs.oregonstate.edu/occri/oregon-climate-assessments/>.

STATEMENT IDENTIFYING HOW ADOPTION OF RULE(S) WILL AFFECT RACIAL EQUITY IN THIS STATE

Protections required by the proposed rules would apply to all workers covered under the Oregon Safe Employment Act (OSEAct). These rules are not expected to impact racial equity in the workplace for underrepresented communities.

FISCAL AND ECONOMIC IMPACT:

See statement of Fiscal and Economic Impact under the Cost of Compliance.

COST OF COMPLIANCE:

(1) Identify any state agencies, units of local government, and members of the public likely to be economically affected by the rule(s). (2) Effect on Small Businesses: (a) Estimate the number and type of small businesses subject to the rule(s); (b) Describe the expected reporting, recordkeeping and administrative activities and cost required to comply with the rule(s); (c) Estimate the cost of professional services, equipment supplies, labor and increased administration required to comply with the rule(s).

1. Impact on state agencies, units of local government and the public (ORS 183.335(2)(b)(E)):

All state agencies and local government units are affected by the rules in the sense that they are employers under the Oregon Safe Employment Act (OSEAct). The public as a whole will be affected only to the degree that members of the public are employers and employees.

Costs incurred by Oregon OSHA represent similar costs associated with the promulgation, implementation and administration of workplace safety and health rules. In addition, Oregon OSHA and all other state agencies and local government units that have employees who will be exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (micrograms per cubic meter) from wildfire emissions are affected by the rules as employers covered under the Oregon Safe Employment Act (OSEAct).

2. Cost of compliance effect on small business (ORS 183.336):

a. Estimate the number of small businesses and types of business and industries with small businesses subject to the rule:

According to the Oregon Employment Department, "A Snapshot of Oregon Firms by Size Class, 2021," August 25, 2021, there were 106,810 firms with fewer than 50 employees in Oregon in March 2021. These firms accounted for 96.0% of all firms statewide. Types of businesses and industries include any associated with work activities that can potentially expose employees to wildfire smoke, such as but are not limited to, Agriculture and Forestry (NAICS Code 11), Construction (NAICS Code 23), Landscaping Services (NAICS Code 561730), etc.

b. Projected reporting, recordkeeping and other administrative activities required for compliance, including costs of professional services:

Estimated costs related to administrative activities and professional services are identified under specific sections of the rule requirements listed below, and were determined by considering survey responses from stakeholders representing small and large businesses and administrative wage information from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs). In addition to wage information, a soft costs multiplier of 35 percent for items such as benefits and insurance, were included to account for administrative overhead.

c. Equipment, supplies, labor and increased administration required for compliance:

Estimated costs related to equipment, supplies, labor and increased administration for implementation are identified under specific sections of the rule requirements listed below and were determined by considering survey responses from stakeholders representing small and large businesses, example equipment costs, administrative and labor wage information from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs) and Table 2 (2021 Oregon Occupational Wage Data for Labor Costs), and 5-year AQI values in Table 3. In addition to wage information, a soft costs multiplier of 35 percent for items such as benefits and insurance, were included to account for administrative overhead.

Estimate of Fiscal Impact: OAR 437-002-1080 and OAR 437-004-9790 (Protection from Wildfire Smoke)

Scope and application estimated costs under Section 1:

The proposed rules would apply to public and private sector employers whose employees will be exposed to wildfire smoke where the ambient air concentration for fine particulate matter (PM_{2.5}) is at or above 35.5 µg/m³ which corresponds with an "Air Quality Index" value 101 for PM_{2.5}. The estimated cost for employers to determine workplace applicability, and to complete a comprehensive review of the proposed rules to determine administrative and operational needs for compliance, considered stakeholder provided survey data to determine an estimated time range between 2-80 hours to complete such a review.

- Using 2-80 hours for administrative time to complete a comprehensive review of the standard, the median (50th percentile) wage data from selected occupational profiles (NAICS code) from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, the estimated costs are:

- o General and Operations Managers (111021):

\$48.87/hr x 2-80hrs x 1.35 (soft cost estimate) = \$131.95 - \$5,277.96

- o Human Resource Managers (113121):

\$52.33/hr x 2-80hrs x 1.35 (soft cost estimate) = \$141.29 - \$5,651.64

- o Farmers, Ranchers, and other Ag Managers (119013):

\$38.29/hr x 2-80hrs x 1.35 (soft cost estimate) = \$103.38 - \$4,135.32

- o Construction Managers (119021):

\$48.47/hr x 2-80hrs x 1.35 (soft cost estimate) = \$103.87 - \$5,234.76

o Occupational Health and Safety Specialists (299011):

\$38.84/hr x 2-80hrs x 1.35 (soft cost estimate) = \$104.87 - \$4,194.72

Exposure assessment estimated costs under Section 3:

The proposed rules would require employers to identify and monitor employees who are exposed to wildfire smoke at the start of each shift and as needed where the ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101). An employer's daily administrative cost to monitor significant changes in PM_{2.5} exposure levels during wildfire smoke events and to notify exposed employees and implement appropriate exposure controls is partially dependent on the number of geographical locations where employees are exposed.

- Using an estimated 1-4 hours total per day for administrative time to determine and monitor workplace ambient air concentration for PM_{2.5} or equivalent AQI value, the median (50th percentile) wage data from selected administrative occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, the estimated administrative costs per work location are:

o First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (371012):

\$26.52/hr x 1-4hrs x 1.35 (soft cost estimate) = \$35.80 - \$143.20/day

o Farmers, Ranchers, and other Ag Managers (119013):

\$38.29/hr x 1-4hrs x 1.35 (soft cost estimate) = \$51.69 - \$206.77/day

o First-Line Supervisors of Construction Trades (471011):

\$36.58/hr x 1-4hrs x 1.35 (soft cost estimate) = \$49.38 - \$197.53/day

o First-Line Supervisors of Production and Operating Workers (511011):

\$29.25/hr x 1-4hrs x 1.35 (soft cost estimate) = \$39.49 - \$157.95/day

- Businesses located in areas where internet service is available and is used by affected employers for general operational needs would incur minimal or no additional cost to check air quality conditions by visiting websites that provide daily AQI values for areas where employees are exposed. Such websites include Oregon Department of Environmental Quality, U.S. EPA AirNow, and Interagency Wildland Fire Air Quality Response Program.

- Employers who choose to use a PM_{2.5} monitoring device, rather than relying on the AQI value for the workplace location, to more accurately assess air quality for indoor work environments that do not have mechanical ventilation would incur costs associated with purchasing monitoring equipment and administrative time for employee training related to equipment use. While the estimated training costs associated with using a PM_{2.5} monitoring device is included in Section 4 (training and information) below, the estimated equipment cost for employers would depend on the number of such indoor locations where employees are exposed. Examples and estimated cost of PM_{2.5} measuring devices available to consumers for indoor and/or outdoor use, include but are not limited to:

o PurpleAir PA-I \$199.99/unit/work location

o Temtop LKC-1000E \$115.99/unit/work location

o Kaiterra Laser Egg 2+ \$174.99/unit/work location

o Dylos DC1100 Pro \$260.99/unit/work location

- Employee exposure to wildfire smoke in areas where internet service is unavailable and the employer does not use a PM_{2.5} monitoring device can use the 5-3-1 Visibility Index Values in Appendix B of the rule to estimate the current workplace location AQI.

Information and training estimated costs under Section 4:

The proposed rules would require employers to develop and implement annual wildfire smoke training for employees who may be exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101) in a manner and language they readily understand. Employers needing to develop training materials in multiple languages due to

employee needs will incur additional cost to do so.

- The estimated cost to develop employer-specific wildfire smoke training to supplement Oregon OSHA-supplied training materials considered stakeholder provided survey data to determine an estimated time range between 2-80 hours, the median (50th percentile) wage data from selected administrative occupational profile examples from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs, for the estimated one-time administrative cost.

- o General and Operations Managers (111021):

$\$48.87/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$131.95 - \$5,277.96

- o Human Resource Managers (113121):

$\$52.33/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$141.29 - \$5,651.64

- o Farmers, Ranchers, and other Ag Managers (119013):

$\$38.29/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$103.38 - \$4,135.32

- o Construction Managers (119021):

$\$48.47/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$103.87 - \$5,234.76

- o Occupational Health and Safety Specialists (299011):

$\$38.84/\text{hr} \times 2\text{-}80\text{hrs} \times 1.35$ (soft cost estimate) = \$104.87 - \$4,194.72

- The estimated total cost to implement annual wildfire smoke training to all affect supervisors and employees considered stakeholder provided survey data to determine an estimated total training time between 1-2 hours per person, the lowest and highest median (50th percentile) wage data from selected examples of administrative and labor occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs) and Table 2 (2021 Oregon Occupational Wage Data for Labor Costs), and an additional 35% for soft costs:

- o First-line Supervisors of Farming, Fishing, and Forestry Workers (451011)

$\$26.26/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$35.45 - \$70.90/person/yr

- o Human Resource Managers (113121):

$\$52.33/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$70.65 - \$141.29/person/yr

- o Farmworkers and Laborers, Crop, Nursery, and Greenhouses (452092):

$\$14.01/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$18.91 - \$37.82/person/yr

- o Electrical Power-Line Installers and Repairers: (499051)

$\$49.74/\text{hr} \times 1\text{-}2\text{hrs} \times 1.35$ (soft cost estimate) = \$67.15 - \$134.30/person/yr

Training documentation estimated costs under Section 5:

The proposed rules would require employers to verify employee wildfire smoke training by preparing a written or electronic record that includes the name or identification of the employee trained, the date(s) of the training, and the name of the person who conducted the training.

- The estimated cost to document annual supervisor and employee wildfire smoke training in writing or electronically each year considered stakeholder provided survey data to determine an estimated documentation time between 2-40 hours, the lowest and highest median (50th percentile) wage data from selected examples of occupational profiles from Table 1 (2021 Oregon Occupational Wage Data for Administrative Costs), and an additional 35% for soft costs;

- o First-line Supervisors of Farming, Fishing, and Forestry Workers (451011)

$\$26.26/\text{hr} \times 2\text{-}40\text{hrs} \times 1.35$ (soft cost estimate) = \$70.90 - \$1,418.04/yr

- o Human Resource Managers (113121):

$\$52.33/\text{hr} \times 2\text{-}40\text{hrs} \times 1.35$ (soft cost estimate) = \$141.29 - \$2,825.82/yr

Employer two-way communication estimated costs under Section 6:

The proposed rules would require employers to develop and implement a system to communicate wildfire smoke

hazards before employees are exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101), whenever feasible. Stakeholder survey data indicated that employers would likely use existing mobile phones, satellite phones, email, radios, onsite meetings, electronic bulletin boards, or person-to-person systems to communicate wildfire smoke conditions to employees. While nearly all employer survey responses indicated that this specific rule requirement would have no or minimal additional costs, some respondents indicated that the estimated cost to develop and implement a new communication system may range from \$600-\$10,000 depending on employment size and operational needs.

Exposure controls estimated costs under Section 7: The proposed rules would require employers to implement engineering and administrative controls to reduce employee PM_{2.5} exposure to less than 35.5 µg/m³ (AQI <101). Engineering controls include, but are not limited to, temporarily relocating outdoor workers to available indoor areas or vehicles where the air is adequately filtered, and using a portable air purifier with a HEPA filter (or other high efficiency filter) effective for the size of the enclosed area where used. Although engineering controls such as using a portable air purifier can be an effective method for controlling wildfire smoke air concentrations in appropriate indoor environments, the standards acknowledge feasibility issues where engineering control methods would likely have significant site-specific limitations to be reasonably effective.

o For indoor and enclosed work environments where a portable air purifier would be effective, examples of their costs include:

Carbon Filter Air Purifier Home Office (800 sq. ft): \$164.69/unit Home Depot

XPOWER X-2580 commercial grade air purifier (1,500 sq. ft): \$637.29/unit Home Depot

XPOWER Commercial 3-Stage Filtration HEPA Air Purifier System (1,500 sq. ft): \$823.00/unit Home Depot

• Administrative controls include, but are not limited to, temporarily relocating outdoor work operations to another outdoor location with better air quality when work permits, and changing employee work schedules to when better air quality is forecasted. Estimated costs to temporarily relocate or delay work could include losses in productivity and revenue if there is a significant pause in work activities.

The proposed rules would require affected employers to make available NIOSH-approved filtering facepiece respirators for voluntary use whenever employees are exposed to an ambient air concentration for PM_{2.5} between 35.5-199.9 µg/m³ (AQI 101-250), and provide filtering facepiece respirators for require use at or above 200.9 µg/m³ (AQI 251). The annual estimated cost for employers to provide NIOSH-approved filtering facepiece respirators to employees under the standards includes the total number of exposed employees, the need to replace respirators during each shift, the unit cost of respirators provided, and the number of days each year employees are exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ µg/m³ (AQI 101).

• Using information listed below for examples of estimated cost for NIOSH-approved filtering facepiece respirators, and considering the 5-year averages of selected geographical area listed below and from Table 3 when the total daily AQI value was over 101, the daily estimated cost to provide NIOSH-approved filtering facepiece respirators per exposed employee: \$2.15/unit (average cost) x 2 (replacement) = \$4.30/employee/shift

o Examples of costs for NIOSH-approved filtering facepiece respirator (average cost per unit \$2.15):

3M Particulate Respirator 8200: \$1.15/unit Amazon

N95 Mask NIOSH Approved: \$1.79/unit Amazon

Honeywell Safety NIOSH-Approved N95: \$3.50/unit Amazon

o While the increasing frequency and duration of future severe smoke events caused by large or long-duration wildfires is unknown, the US EPA AQI data for selected geographical areas in Oregon, listed in Table 3 below, was used to determine the five-year (2017-2021) average for total days per year (from June 1 through September 30), where the AQI value for PM_{2.5} was:

Between AQI 101-250 (voluntary respirator use) is:

- Bend: 12.4 days
- Eugene: 9.0 days
- Grants Pass: 19.0 days
- Hermiston-Pendleton: 5.8 days
- Klamath Falls: 25.6 days
- Medford: 22.4 days
- Portland: 5.8 days
- Salem: 5.4 days
- The Dalles: 4.2 day

Between AQI 251-500 (mandatory respirator use under a Wildfire Smoke Respiratory Protection Program described in the Appendix A, or equivalent program) is:

- Bend: 3.0 days
- Eugene: 1.8 days
- Grants Pass: 2.2 days
- Hermiston-Pendleton: 1.0 day
- Klamath Falls: 0.8 days
- Medford: 1.4 days
- Portland: 1.2 days
- Salem: 1.2 days
- The Dalles: 1.0 day

At or above AQI 501 (mandatory respirator use under a full Respiratory Protection Program in accordance with 29 CFR 1910.134) is:

- Bend: 0.4 days
- Eugene: 0.6 days
- Grants Pass: None
- Hermiston-Pendleton: None
- Klamath Falls: None
- Medford: 0.2 days
- Portland: 0.2 days
- Salem: 0.8 days
- The Dalles: None

Note: All days listed at or above AQI 501 during the 5-year period occurred in 2020. The Oregon Department of Environmental Quality released a report in July 2021, "Wildfire Smoke Trends and the Air Quality Index," documenting that Oregon's air quality in 2020 was the worst on record.

Employers who would need to provide filtering facepiece respirators for mandatory use when employees are exposed to an ambient air concentration for PM_{2.5} at or above 200.9 µg/m³ (AQI 251), when such respirators are used exclusively for wildfire smoke, may implement and follow the Wildfire Smoke Respiratory Protection Program described in Appendix A of this standard in lieu of conducting medical evaluations and fit testing as would typically be required under 29 CFR 1910.134: Respiratory Protection, at no or minimal cost.

Employers without an existing Respiratory Protection Program, whose employees would use respirators exclusively for protection from wildfire smoke concentrations of PM_{2.5} at or above 500.4 µg/m³ (AQI 501), would incur additional cost to develop and implement a full Respiratory Protection Program in accordance with 29 CFR 1910.134 if administrative controls such as relocating or rescheduling affected work activities are infeasible. Stakeholders provided survey responses considered indicated the estimated cost to implement a full respiratory program (excluding

wages) ranged from \$100.00 - \$1500.00 per employee.

Information was received from a commercial construction industry stakeholder who indicated that complying with the proposed rule's administrative control requirements could cost up to \$200,000 per week, but no further context or explanation of how the estimated cost was calculated, was provided.

DESCRIBE HOW SMALL BUSINESSES WERE INVOLVED IN THE DEVELOPMENT OF THESE RULE(S):

Small businesses and others were involved in the development of this rule to the extent that their representatives represented them during the Rulemaking Advisory Committee meetings. Those interested have also had the opportunity to comment on several pre-proposal drafts during the rulemaking process and a fiscal impact survey.

Oregon OSHA hosted nine virtual Rulemaking Advisory Committee meetings during this rulemaking process. Comments were accepted during meetings, through stakeholder feedback on pre-proposal drafts, and emails throughout the stakeholder engagement process. Oregon OSHA surveyed the Rulemaking Advisory Committee members on the provisions of the rule for gaining a greater understanding of the cost of compliance with the rule. A draft Fiscal Impact Statement was provided to the Advisory Committee members for comment. Those comments received were folded into the final Fiscal Impact Statement.

WAS AN ADMINISTRATIVE RULE ADVISORY COMMITTEE CONSULTED? YES

HOUSING IMPACT STATEMENT:

FOR ESTIMATING THE EFFECT OF A PROPOSED RULE OR ORDINANCE ON THE COST OF DEVELOPING A *TYPICAL 1,200 SQ FT DETACHED SINGLE FAMILY DWELLING ON A 6,000 SQ FT PARCEL OF LAND. (ORS 183.534) FOR ADMINISTRATIVE RULES

Description of proposed change:

Oregon OSHA is promulgating these rules to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke, fine particulate matter (PM2.5).

Description of the need for, and objectives of the rule:

Due to the effects of climate change, Oregonians will experience increased wildfire smoke events, especially during the growing fire season. While exposure to unhealthy and hazardous levels of wildfire smoke can adversely affect anyone, workers with asthma, Chronic Obstructive Pulmonary Disease (COPD), or heart disease are at higher risk of serious or fatal health effects when their condition is exacerbated from such exposures. Even with advancements in climate science and computer modeling, it is still impossible to accurately forecast these seasonal, extreme smoke events. Since the agency is unable to accurately estimate the total days construction workers will be exposed to unhealthy and hazardous levels of wildfire smoke when constructing a typical single-family house, the estimated housing impact costs are provided on a daily basis. See attached Statement of Need and Fiscal Impact for daily Air Quality Index (AQI) values for selected areas in Oregon from June 1 through Sept 30 (2017 – 2021) in Table 3.

List of rules adopted or amended:

ADOPT: OAR 437-002-1080, OAR 437-004-9790

Materials and labor costs increase or savings:

OAR 437-004-9790 applies to employers covered under Division 4 (Agriculture), and would not have any appreciable impact to construction activities. OAR 437-002-1080 applies to work activities covered under Division 2 (General

Industry); however, since worker exposure to unhealthy and hazardous air quality conditions from wildfire emissions is not limited to a specific industry, work activities covered under Division 3 (Construction) would also be required to comply with OAR 437-002-1080, per additional applicability requirements under OAR 437-003-0005.

While Oregon OSHA does not foresee any effects on material costs to construct a typical single-family house (3 bedrooms, 1 1/2 bathrooms, attached garage), the agency expects the following proposed rule site-specific requirements would directly increase administrative and personal protective equipment (PPE) costs of such projects.

Estimated administrative construction or other costs increase or savings:

The proposed rule would increase administrative cost by requiring contractors at affected residential construction sites to determine and monitor employee exposure to wildfire smoke at the start of each shift and as needed when the ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101). The estimated cost to monitor significant smoke concentration level changes uses an estimated 1-2 hours per day for administrative time, the median (50th percentile) wage data for First-Line Supervisors of Construction Trades (471011) from Table 1 of the proposed rule's Statement of Need and Fiscal Impact, and an additional 35% for soft costs: \$36.58/hr x 1-2hrs x 1.35 (soft cost estimate) = \$49.38-\$98.77/day

The proposed rule would increase personal protective equipment (PPE) cost for contractors at affected residential construction sites by requiring them to provide NIOSH-approved filtering facepiece respirators for voluntary use whenever their employees are exposed to an ambient air concentration for PM_{2.5} between 35.5-199.9 µg/m³ (AQI 101-250), and provide filtering facepiece respirators for mandatory use at or above 200.9 µg/m³ (AQI 251). The estimated cost for employers to provide NIOSH-approved filtering facepiece respirators to employees for volunteer and mandatory use includes the total number of exposed employees, the need to replace respirators during each shift, the unit cost of respirators provided, and the unforeseeable number of days each year employees are exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101): Providing 2-4 NIOSH-approved filtering facepiece respirators to each exposed employee at \$2.15/unit (average cost from proposed rule's Statement of Need and Fiscal Impact) is \$4.30-\$8.60/employee/day.

Employers without an existing Respiratory Protection Program, whose employees would use respirators exclusively for protection from wildfire smoke concentrations of PM_{2.5} at or above 500.4 µg/m³ (AQI 501), would incur additional cost to develop and implement a full Respiratory Protection Program in accordance with 29 CFR 1910.134 if administrative controls such as relocating or rescheduling affected work activities are infeasible. Stakeholders provided survey responses considered indicated the estimated cost to implement a full respiratory program (excluding wages) ranged from \$100.00 - \$1500.00 per employee.

Land costs increase or savings:

Oregon OSHA does not foresee any effect on land costs.

Other costs increase or savings:

Oregon OSHA does not foresee any other costs development or construction costs.

TABLES REFERENCED IN THE COST OF COMPLIANCE FOR PROPOSED WILDFIRE SMOKE PROTECTIONS RULES

OAR 437-002-1080 and 437-004-9790
January 2022

Note: Data in Table 1: 2021 Oregon Occupational Wage Data for Administrative Costs and Table 2: 2021 Oregon Occupational Wage Data for Labor Costs is from the Oregon Employment Department (OED) occupational profile reports for Occupational wage data in QualityInfo representing first quarter 2021 wages. Per OED (Data Sources and Limitations for Occupational Wages), “the data used to create these estimates came from the Occupational Employment and Wage Survey. This survey samples more than 6,000 business establishments per year, taking three years to fully collect the sample of more than 18,000 establishments. The data used for the current wage estimates came from surveys that were conducted in 2017, 2018, 2019, and 2020. The wage data were then adjusted to 2021 using the Employment Cost Index. It is important to note that these wage rates may vary between industries, as well as by firm size within an industry. Also, when determining wage rates for individual occupations, it is important to assess current labor market conditions which may also affect wages.”

Table 1: 2021 Oregon Occupational Wage Data for Administrative Costs				
North American Industrial Code System (NAICS)	Occupation Profile Description	Statewide average hourly wage in dollars (\$)		
		10th Percentile	50th Percentile (Median)	90th Percentile
111021	General and Operations Managers	20.33	48.87	78.24
113121	Human Resource Managers	30.70	52.33	84.19
119013	Farmers, Ranchers, and other Ag Managers	17.06	38.29	54.61
119021	Construction Managers	29.43	48.87	78.24
299011	Occupational Health and Safety Specialists	24.07	38.84	54.75
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	16.56	26.52	41.03
451011	First-line Supervisors of Farming, Fishing, and Forestry Workers	16.23	26.26	38.95
471011	First-Line Supervisors of Construction Trades	23.32	36.58	55.46
511011	First-Line Supervisors of Production and Operating Workers	18.67	29.25	44.91

Source: Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: [Employment and Wages by Industry \(QCEW\) - QualityInfo](#)

Table 2: 2021 Oregon Occupational Wage Data for Labor Costs

North American Industrial Code System (NAICS)	Occupation profile description	Statewide average hourly wage in dollars (\$)		
		10th Percentile	50th Percentile (Median)	90th Percentile
194093	Forest and Conservation Technician	13.64	18.27	30.27
292041	Emergency Medical Technicians and Paramedics	13.42	20.23	31.45
332011	Firefighters	15.14	32.01	50.22
333051	Police and Sheriff's Patrol Officers	26.83	38.24	49.08
373011	Landscaping and Groundskeeping Workers	12.93	17.50	25.43
373013	Tree Trimmers and Pruners	17.02	26.72	39.22
435041	Meter Readers, Utilities	18.38	26.28	34.94
435052	Postal Service Mail Carriers	18.73	24.07	32.59
452092	Farmworkers and Laborers, Crop, Nursery, and Greenhouses	12.40	14.01	18.33
452099	Agricultural Workers, All Other	12.41	18.94	32.03
454011	Forest and Conservation Workers	12.49	17.84	24.75
454021	Fallers (Logging)	22.54	32.78	40.60
454023	Log Graders and Scalers	14.22	22.97	29.52
454029	Logging Workers, All Other	17.15	21.76	26.52
472031	Carpenters	16.79	26.12	40.89
472061	Construction Laborers	13.97	20.46	31.79
472181	Roofers	14.95	24.13	38.66
472231	Solar Photovoltaic Installers	19.45	28.75	36.79
474051	Highway Maintenance Workers	20.26	26.65	31.86
499021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	15.69	25.79	39.61
499051	Electrical Power-Line Installers and Repairers	37.92	49.74	61.88
499052	Telecommunications Line Installers and Repairers	17.55	24.80	36.05
499071	Maintenance and Repair Worker wages	13.52	20.09	31.67
533021	Bus Drivers, Transit and Intercity	16.38	24.64	32.43
533022	Bus Drivers, School or Special Client	12.80	18.17	24.57
533033	Light Truck or Delivery Services Drivers	13.20	18.83	31.69
519198	Helpers – Production Workers	12.77	16.58	23.47
537063	Machine Feeders and Offbearers	13.61	18.28	24.66

Source: Oregon Employment Department – Economic Data, Employment and Wages by Industry (All Counties), available at: [Employment and Wages by Industry \(QCEW\) - QualityInfo](#)

**Table 3: Air Quality Index Values for Selected Areas in Oregon
from June 1 through Sept 30 (2017 – 2021)**

Geographic Area & Year	Estimated days with AQI value		
	101 – 250	251– 500	Over 500
Bend - 2017	21	6	0
Bend - 2018	16	0	0
Bend - 2019	0	0	0
Bend - 2020	3	5	2
Bend - 2021	22	4	0
Bend 5-year average	12.4 days	3.0 days	0.4 days
Eugene - 2017	20	2	0
Eugene - 2018	3	0	0
Eugene - 2019	0	0	0
Eugene - 2020	2	7	3
Eugene - 2021	20	0	0
Eugene 5-year average	9.0 days	1.8 days	0.6 days
Grants Pass - 2017	18	4	0
Grants Pass - 2018	34	0	0
Grants Pass - 2019	14	0	0
Grants Pass - 2020	11	7	0
Grants Pass - 2021	18	0	0
Grants Pass 5-year average	19 days	2.2 days	0.0 days
Hermiston-Pendleton - 2017	10	0	0
Hermiston-Pendleton - 2018	8	0	0
Hermiston-Pendleton - 2019	0	0	0
Hermiston-Pendleton - 2020	3	5	0
Hermiston-Pendleton - 2021	8	0	0
Hermiston-Pendleton 5-year average	5.8 days	1.0 day	0.0 days
Klamath Falls - 2017	18	1	0
Klamath Falls - 2018	40	0	0
Klamath Falls - 2019	4	0	0
Klamath Falls - 2020	21	3	0
Klamath Falls - 2021	45	0	0
Klamath Falls 5-year average	25.6 days	0.8 days	0.0 days
Medford - 2017	25	2	0
Medford - 2018	42	0	0
Medford - 2019	6	0	0
Medford - 2020	4	5	1
Medford - 2021	35	0	0
Medford 5-year average	22.4 days	1.4 days	0.2 days
Portland - 2017	13	0	0
Portland - 2018	6	0	0
Portland - 2019	0	0	0
Portland - 2020	4	6	1
Portland - 2021	6	0	0
Portland 5-year average	5.8 days	1.2 days	0.2 days
Salem - 2017	4	0	0
Salem - 2018	4	0	0
Salem - 2019	0	0	0
Salem - 2020	2	5	4
Salem - 2021	17	1	0
Salem 5-year average	5.4 days	1.2 days	0.8 days
The Dalles - 2017	14	1	0
The Dalles - 2018	5	0	0
The Dalles - 2019	0	0	0
The Dalles - 2020	0	4	0
The Dalles - 2021	2	0	0
The Dalles 5-year average	4.2	1.0	0.0

Source: AQI data from US Environmental Protection Agency (EPA) "Download Daily Data" using the highest daily AQI value for all monitors in the geographic area:
<https://www.epa.gov/outdoor-air-quality-data/download-daily-data>

RULES PROPOSED:

437-002-1080, 437-004-9790

ADOPT: 437-002-1080

RULE SUMMARY: Rule to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke: fine particulate matter (PM2.5).

CHANGES TO RULE:

437-002-1080

Protection from Wildfire Smoke

Note: Oregon OSHA recognizes that occupational wildfire smoke exposures can occur in particularly dynamic situations. Employers must address such hazards based on the information available to them or that could have been available to them through the exercise of reasonable diligence.

(1) Scope and application. This standard applies to public and private sector employers whose employees are or will be exposed to wildfire smoke where the ambient air concentration for fine particulate matter (PM2.5) is at or above 35.5 µg/m³ (Air Quality Index value of 101 for PM2.5).

(a) 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 briefly open doors to enter or exit;

(B) Enclosed vehicles in which the air is filtered by a properly maintained cabin air filter system, and when the windows, doors, and other exterior openings are kept closed, except when it is necessary to briefly open doors to enter or exit;

Note: Buses, light rail, and other enclosed vehicles used for transit systems where doors are frequently opened to board and deboard passengers are NOT included under exemption (1)(a)(B).

(C) When the employer predetermines that operations affected by wildfire smoke will be suspended to prevent employee exposure to an ambient air concentration for PM2.5 of 35.5 µg/m³ (AQI 101) or higher; and

(D) Employees working from home.

(b) The following workplaces and operations are only subject to subsections (4)(a) through (4)(f) "information and training," and subsection (7)(b) "control by voluntary use of respirators" under this standard when feasible:

(A) Wildland firefighting and associated support activities such as fire camp services and fire management;

(B) All emergency operations that are directly involved in the protection of life or property, public safety power shutoffs, or restoration of essential services, such as evacuation, rescue, medical, structural firefighting, law enforcement, utilities, and communications; and

(C) Work activities involving intermittent employee exposure of less than 15 minutes in an hour to an ambient air concentration for PM2.5 at or above 35.5 µg/m³ (AQI 101) for a total exposure of less than one hour in a single 24-hour period.

(2) Definitions.

(a) Air Quality Index - The Air Quality Index (AQI) was developed by the U.S. Environmental Protection Agency (EPA) 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.

(b) Feasibility - The ability of an employer to implement any requirement in a rule. Oregon OSHA rules never prohibit work. Whether feasibility is mentioned in a provision of the rule, or not, if the employer can demonstrate that it is functionally impossible to comply or if doing so would prevent completion of the work, the employer need not comply, but must take any available reasonable alternative steps to protect the employees involved.

(c) Greater hazard - The ability of an employer to demonstrate that compliance with the requirements of the rule would expose an employee to a hazard associated with a substantially more serious injury or illness, thereby providing a narrow exception to the rule to the degree that the greater hazard exists. An example of a greater hazard in relation to the use of non-flame resistant filtering facepiece respirators would include potential facial burns to a qualified employee working within the minimum approach distance (MAD) of an energized high voltage electrical system where flame-resistant clothing is required.

(d) 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.

(e) PM2.5 - Solid particles and liquid droplets suspended in air, known as fine particulate matter, with an aerodynamic diameter of 2.5 micrometers or smaller and measured in micrograms per cubic meter (µg/m³).

(f) Sensitive groups - Individuals with pre-existing health conditions and those who are sensitive to air pollution who are among those likely to experience health problems from exposure to wildfire smoke. Examples of sensitive

groups include: people with lung disease such as asthma or chronic obstructive pulmonary disease (COPD), including bronchitis and emphysema, and those who smoke; people with respiratory infections, such as pneumonia, acute bronchitis, bronchiolitis, cold, flu, or those with or recovering from COVID-19; people with existing heart or circulatory problems, such as irregular heart beat, congestive heart failure, coronary artery disease, angina, and those who have had a heart attack or stroke; children under 18 years old, and adults over age 65; pregnant women; people with diabetes; and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician or other licensed healthcare provider.

(g) Wildfire smoke - Emissions from unplanned fires in wildlands, which may include adjacent developed and cultivated areas to which the fire spreads or from where it originates.

(h) Wildlands - Uncultivated and sparsely populated geographical areas covered primarily by grass, brush, trees, slash, or a combination thereof.

(3) Exposure assessment. Determine and monitor employee exposure to wildfire smoke where the ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101). Such assessments must be conducted at the start of each shift and as needed to identify and implement appropriate exposure controls under section (7), by using one or more of the following methods:

(a) Check the current and forecasted AQI value for PM_{2.5} from the Oregon Department of Environmental Quality, U.S. EPA AirNow or Interagency Wildland Fire Air Quality Response Program websites, or equivalent source;

(b) Check notifications of air quality advisories due to wildfire smoke issued by the Oregon Department of Environmental Quality or local government health agencies;

(c) Directly measure workplace ambient air concentration for PM_{2.5} in accordance with the testing device manufacturer's user instructions; or

(d) If the employer determines and can demonstrate that none of the methods under subsections (3)(a) through (3)(c) are practical for their work location, the employer can then use the 5-3-1 Visibility Index (see Appendix B, Table 1) to estimate the current air concentration for PM_{2.5} and equivalent AQI value.

(4) Information and training. Develop and implement wildfire smoke training for employees who may be exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101). The training must be provided annually before employees are exposed in a language and vocabulary readily understood, and in a manner that facilitates employee feedback. The training must include at least the following information:

(a) Symptoms of wildfire smoke exposure, including:

(A) Eyes: burning sensations, redness, and tearing of the eyes caused by irritation and inflammation of the eyes that can temporarily impair one's vision;

(B) Respiratory system: runny nose, sore throat, cough, difficulty breathing, sinus irritation, wheezing, shortness of breath; and

(C) Fatigue, headache, irregular heartbeat, chest pain;

(b) The potential acute and chronic health effects from wildfire smoke exposure, including increased risk of health effects to "sensitive groups" as defined in subsection (2)(f), and how health effects from long-term exposures may include increased risk of cardiovascular disease and increased severity of asthma;

(c) 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;

(d) How employees can obtain the current and forecasted ambient air concentration for PM_{2.5} and equivalent AQI value;

(e) The importance, limitations, and benefits of using N95 filtering facepiece respirators provided by the employer for both voluntary and mandatory use, and how to use and maintain them to reduce exposure to wildfire smoke;

(f) The employer's methods to protect employees from wildfire smoke covered under section (7), including how filtering facepiece respirators are required to be made readily available to employee for voluntary use when workplace ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101), and how employees can obtain such respirators before exposure and replace them when needed;

(g) Review of any job tasks performed by employees that the use of a filtering facepiece respirator would expose the wearer to a greater hazard than wildfire smoke and must not be used when performing such tasks;

(h) 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;

(i) The procedures the supervisor must follow when an employee reports or exhibits health symptoms which could necessitate medical attention such as, but not limited to, asthma attacks, difficulty breathing, and chest pain; and

(j) The employer's two-way communication system for wildfire smoke hazards covered under section (6).

Note: Oregon OSHA provides a Wildfire Smoke Online Course in English and Spanish and materials employers can use to assist with training elements under subsections (4)(a) through (4)(e).

(5) Training documentation. Verify employee training required under section (4) by preparing a written or electronic record that includes the name or identification of the employee trained, the date(s) of the training, and

the name of the person who conducted the training. The most recent annual training record for each affected employee must be maintained.

(6) Employer two-way communication. Before employees are exposed to ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101), develop and implement, whenever feasible, a system to communicate wildfire smoke hazards that includes the following:

(a) Notifying employees when current work location ambient air concentration for PM_{2.5}:

(A) Is at or above 35.5 µg/m³ (AQI 101);

(B) Is at or above 200.9 µg/m³ (AQI 251);

(C) Is at or above 500.4 µg/m³ (AQI 501); and

(D) Drops below levels requiring exposure control.

(b) Enabling and encouraging employees to inform their employer of any of the following:

(A) When air quality improves or worsens to verify current AQI value;

(B) Availability issues of appropriate exposure control measures required under section (7); and

(C) Health symptoms which may be the result of wildfire smoke exposure that could necessitate medical attention such as, but not limited to, asthma attacks, difficulty breathing, and chest pain.

(7) Exposure controls.

(a) Engineering and administrative controls. Implement engineering or administrative controls to reduce employee PM_{2.5} exposure to less than 35.5 µg/m³ (AQI 101) unless the employer can demonstrate that such controls are not feasible.

(A) Engineering controls include, but are not limited to, temporarily relocating outdoor workers to available indoor areas or vehicles where the air is adequately filtered, and using a portable air purifier with a HEPA filter (or other high-efficiency filter) effective for the size of the enclosed area where used.

(B) Administrative controls include, but are not limited to, temporarily relocating outdoor work operations to another outdoor location with better air quality when work permits, and changing employee work schedules when better air quality is forecasted.

(b) Control by voluntary use of respirators. Whenever employee exposure to PM_{2.5} is at or above 35.5 µg/m³ (AQI 101), even after the implementation of engineering and administrative controls, ensure NIOSH-approved filtering facepiece respirators that effectively reduce the wearer's inhalation of PM_{2.5}, are provided to exposed employees for voluntary use. Ensure such respirators for voluntary use are:

(A) Provided and replaced as needed at no cost to employees by either of the following methods:

(i) Distribute directly to each exposed employee; or

(ii) Maintain a sufficient supply for all exposed employees at each work location where exposure occurs. Such respirator supply availability and location must be made known, and be readily accessible, to all exposed employees in a manner that does not restrict or hinder employee access to obtain and replace them when needed.

(B) Store, maintain, and replace so that they do not present a health hazard to the user.

(c) Control by required use of NIOSH-approved respirators in accordance with a Wildfire Smoke Respiratory Protection Program. Whenever employee exposure to PM_{2.5} is at or above 200.9 µg/m³ (AQI 251), even after the implementation of engineering and administrative controls, ensure employees wear NIOSH-approved filtering facepiece respirators that effectively reduce the wearer's inhalation of PM_{2.5} when such use would not expose the wearer to a greater hazard. For such respirators used exclusively for wildfire smoke, the employer may implement and follow the Wildfire Smoke Respiratory Protection Program described in Appendix A of this standard in lieu of conducting medical evaluations and fit testing required under 29 CFR 1910.134: Respiratory Protection.

(d) Control by required use of NIOSH-approved respirators in accordance with 29 CFR 1910.134: Respiratory Protection. Whenever employee exposure to PM_{2.5} is at or above 500.4 µg/m³ (AQI 501), even after the implementation of engineering and administrative controls, ensure employees wear NIOSH-approved respirators that effectively protect wearers from PM_{2.5} when such use would not expose the wearer to a greater hazard. For respirators used exclusively to protect employees from wildfire smoke concentrations of PM_{2.5} at or above 500.4 µg/m³ (AQI 501), develop and implement a complete Respiratory Protection Program in accordance with 29 CFR 1910.134: Respiratory Protection.

Note: The requirements under subsections (7)(c) and (7)(d) do not apply to residents of employer-provided housing while they are inside the housing.

Note: Elastomeric respirators, when used exclusively for wildfire smoke protection at any PM_{2.5} concentration, must comply with all applicable requirements under 29 CFR 1910.134 - Oregon OSHA's Respiratory Protection standard.

Statutory/Other Authority: ORS 654.025(2), 654.035, 656.726(4)

Statutes/Other Implemented: ORS 654.001 through 654.295

RULE ATTACHMENTS DO NOT SHOW CHANGES. PLEASE CONTACT AGENCY REGARDING CHANGES.

OAR 437-002-1080
Protection from Wildfire Smoke
Appendix A
Mandatory Workplace Guidance for
THE USE OF FILTERING FACEPIECE RESPIRATORS TO ADDRESS WILDFIRE SMOKE

This appendix applies only to employers covered by this standard that require NIOSH-approved filtering facepiece respirators, including N95, P95, R95, N99, P99, N100 and P100, to be used by their employees exclusively for wildfire smoke exposures when the work location ambient air concentrations of PM_{2.5} is at or above 200.9 µg/m³ (AQI 251) and below 500.4 µg/m³ (AQI 501).

Filtering facepiece respirators are disposable, negative-pressure, air purifying respirators where an integral part of the facepiece or the entire facepiece is made of air contaminant filtering material. This appendix does not apply to other types of respirators, including but not limited to elastomeric tight-fitting respirators, nor does it apply to situations where workers use filtering facepiece respirators for protection against air contaminants other than PM_{2.5} from wildfire smoke.

Note: KN95 masks approved under the U.S Food and Drug Administration's (FDA's) Emergency Use Authorization can be used to substitute for NIOSH-approved filtering facepiece respirators for exposures under 500.4 µg/m³ (AQI 500) when such respirators are unavailable.

Employers whose workers are required to wear filtering facepiece respirators to protect against wildfire smoke exposures when workplace ambient air concentrations of PM_{2.5} is at or above 200.9 µg/m³ (AQI 251) must either develop and implement a respiratory protection program in accordance with the Respiratory Protection Standard (29 CFR 1910.134), or a **Wildfire Smoke Respiratory Protection Program** in accordance with the following requirements when workplace ambient air concentration of PM_{2.5} is under 500.4 µg/m³ (AQI 501):

- (A) Employee training.** Employers must ensure that employees wearing filtering facepiece respirators are trained in the proper use of the respirators, including putting them on and removing them, any limitations on their use, how to care for the respirator, and the ability to demonstrate a seal check as described in section (B) of this appendix.
- (B) Filtering facepiece respirator user seal check.** Each employee who uses a filtering facepiece respirator must perform a user seal check to ensure a sufficient face fit to maximize effectiveness each time the respirator is put on. Either the positive or negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method must be used.
 1. Instructions for positive pressure user seal check. Once you have properly donned the respirator, place your hands over the facepiece, covering as much surface area as possible. Exhale gently into the facepiece. The face fit is considered sufficient if a slight positive pressure is being built up inside the facepiece without feeling air passing between your face and the facepiece. If the particulate respirator has an exhalation valve, then performing a positive pressure check may not be possible. In such cases, a negative pressure check must be performed.
 2. Instructions for negative pressure user seal check. Negative pressure seal checks are typically conducted on particulate respirators that have exhalation valves. Once you have properly donned the respirator, cover the filter surface with your hands as much as possible and then

inhale gently. The face fit is considered sufficient if the facepiece slightly collapses towards your face without feeling air passing between your face and the facepiece.

3. Correcting problems discovered during the seal check. In the case of either type of seal check (positive or negative), if air leaks around the nose, use both hands to readjust the nosepiece by placing your fingertips at the top of the metal nose clip. Slide your fingertips down both sides of the metal strip to more efficiently mold the nose area to the shape of your nose. Readjust the straps along the sides of your head until a proper seal is achieved.

(C) Filtering facepiece respirator storage and replacement. Store, maintain, and replace so that they do not present a health hazard to the user.

OAR 437-002-1080
Protection from Wildfire Smoke
Appendix B
Information for Wildfire Smoke Protection

Table 1: Air Quality Index (AQI) Categories of Risk and Index Values, and Equivalent 24-hour Concentrations for PM2.5, and 5-3-1 Visibility Index Values

Category of Risk	AQI Index Values	PM2.5 Concentration in $\mu\text{g}/\text{m}^3$	Visibility Index Values (How far you can see)
Good	0 – 50	0.0 – 12.0	over 15 miles
Moderate	51 – 100	12.1 – 35.4	5 – 15 miles
Unhealthy for Sensitive Groups	101 – 150	35.5 – 55.4	3 – 5 miles
Unhealthy	151 – 200	55.5 – 150.4	1 – 3 miles
Very Unhealthy	201 – 300	150.5 – 250.4	1 mile
Hazardous	301 and higher	250.5 and higher	less than 1 mile

Note: When estimating the current AQI value by using the 5-3-1 Visibility Index, determine the limit of your visual range by looking for distant targets or familiar landmarks such as mountains, mesas, hills, or buildings at known distances (miles). The visual range is that point at which these targets are no longer visible. Ideally, the viewing of any distance target should be made with the sun behind you. Looking into the sun or at an angle increases the ability of sunlight to reflect off of the smoke, and thus making the visibility estimate less reliable.

Table 2: Wildfire Smoke Standard Requirements by AQI Value

AQI Value	General Requirements
101 - 250	<ol style="list-style-type: none"> 1. Assess and monitor air quality at each work location where employees are exposed; 2. Provide and document employees training; 3. Implement two-way communication system; 4. Implement feasible engineering and administrative controls; and 5. Provide N95 or equivalent NIOSH-approved filtering facepiece respirators for voluntary use.
251 - 500	<ol style="list-style-type: none"> 1. 1 through 4 for AQI 101 – 250 above; and 2. Provide N95 or equivalent NIOSH-approved filtering facepiece respirators for mandatory use by implementing a Wildfire Smoke Respiratory Protection Program in accordance with Appendix A.
501 and above	<ol style="list-style-type: none"> 1. 1 through 4 for AQI 101 – 250 above; and 2. Provide NIOSH-approved respirators for mandatory use by implementing a Respiratory Protection Program in accordance with 29 CFR 1910.134.
<i>See rules for complete requirements.</i>	

RULE SUMMARY: Rule to address worker exposure to unhealthy and hazardous levels of the main air pollutant in wildfire smoke: fine particulate matter (PM2.5).

CHANGES TO RULE:

437-004-9790

Protection from Wildfire Smoke

Note: Oregon OSHA recognizes that occupational wildfire smoke exposures can occur in particularly dynamic situations. Employers must address such hazards based on the information available to them or that could have been available to them through the exercise of reasonable diligence.

(1) Scope and application. This standard applies to public and private sector employers whose employees are or will be exposed to wildfire smoke where the ambient air concentration for fine particulate matter (PM2.5) is at or above 35.5 µg/m³ (Air Quality Index value of 101 for PM2.5).

(a) 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 briefly open doors to enter or exit;

(B) Enclosed vehicles in which the air is filtered by a properly maintained cabin air filter system, and when the windows, doors, and other exterior openings are kept closed, except when it is necessary to briefly open doors to enter or exit;

Note: Buses, light rail, and other enclosed vehicles used for transit systems where doors are frequently opened to board and deboard passengers are NOT included under exemption (1)(a)(B).

(C) When the employer predetermines that operations affected by wildfire smoke will be suspended to prevent employee exposure to an ambient air concentration for PM2.5 of 35.5 µg/m³ (AQI 101) or higher; and

(D) Employees working from home.

(b) The following workplaces and operations are only subject to subsections (4)(a) through (4)(f) "information and training," and subsection (7)(b) "control by voluntary use of respirators" under this standard when feasible:

(A) Wildland firefighting and associated support activities such as fire camp services and fire management;

(B) All emergency operations that are directly involved in the protection of life or property, public safety power shutoffs, or restoration of essential services, such as evacuation, rescue, medical, structural firefighting, law enforcement, utilities, and communications; and

(C) Work activities involving intermittent employee exposure of less than 15 minutes in an hour to an ambient air concentration for PM2.5 at or above 35.5 µg/m³ (AQI 101) for a total exposure of less than one hour in a single 24-hour period.

(2) Definitions.

(a) Air Quality Index - The Air Quality Index (AQI) was developed by the U.S. Environmental Protection Agency (EPA) 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.

(b) Feasibility - The ability of an employer to implement any requirement in a rule. Oregon OSHA rules never prohibit work. Whether feasibility is mentioned in a provision of the rule, or not, if the employer can demonstrate that it is functionally impossible to comply or if doing so would prevent completion of the work, the employer need not comply, but must take any available reasonable alternative steps to protect the employees involved.

(c) Greater hazard - The ability of an employer to demonstrate that compliance with the requirements of the rule would expose an employee to a hazard associated with a substantially more serious injury or illness, thereby providing a narrow exception to the rule to the degree that the greater hazard exists. An example of a greater hazard in relation to the use of non-flame resistant filtering facepiece respirators would include potential facial burns to a qualified employee working within the minimum approach distance (MAD) of an energized high voltage electrical system where flame-resistant clothing is required.

(d) 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.

(e) PM2.5 - Solid particles and liquid droplets suspended in air, known as fine particulate matter, with an aerodynamic diameter of 2.5 micrometers or smaller and measured in micrograms per cubic meter (µg/m³).

(f) Sensitive groups - Individuals with pre-existing health conditions and those who are sensitive to air pollution who are among those likely to experience health problems from exposure to wildfire smoke. Examples of sensitive groups include: people with lung disease such as asthma or chronic obstructive pulmonary disease (COPD), including bronchitis and emphysema, and those who smoke; people with respiratory infections, such as pneumonia, acute bronchitis, bronchiolitis, cold, flu, or those with or recovering from COVID-19; people with existing heart or circulatory problems, such as irregular heart beat, congestive heart failure, coronary artery

disease, angina, and those who have had a heart attack or stroke; children under 18 years old, and adults over age 65; pregnant women; people with diabetes; and people with other medical or health conditions which can be exacerbated by exposure to wildfire smoke as determined by a physician or other licensed healthcare provider.¶

(g) Wildfire smoke - Emissions from unplanned fires in wildlands, which may include adjacent developed and cultivated areas to which the fire spreads or from where it originates.¶

(h) Wildlands - Uncultivated and sparsely populated geographical areas covered primarily by grass, brush, trees, slash, or a combination thereof.¶

(3) Exposure assessment. Determine and monitor employee exposure to wildfire smoke where the ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101). Such assessments must be conducted at the start of each shift and as needed to identify and implement appropriate exposure controls under section (7), by using one or more of the following methods:¶

(a) Check the current and forecasted AQI value for PM_{2.5} from the Oregon Department of Environmental Quality, U.S. EPA AirNow or Interagency Wildland Fire Air Quality Response Program websites, or equivalent source;¶

(b) Check notifications of air quality advisories due to wildfire smoke issued by the Oregon Department of Environmental Quality or local government health agencies;¶

(c) Directly measure workplace ambient air concentration for PM_{2.5} in accordance with the testing device manufacturer's user instructions; or¶

(d) If the employer determines and can demonstrate that none of the methods under subsections (3)(a) through (3)(c) are practical for their work location, the employer can then use the 5-3-1 Visibility Index (see Appendix B, Table 1) to estimate the current air concentration for PM_{2.5} and equivalent AQI value.¶

(4) Information and training. Develop and implement wildfire smoke training for employees who may be exposed to an ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101). The training must be provided annually before employees are exposed in a language and vocabulary readily understood, and in a manner that facilitates employee feedback. The training must include at least the following information:¶

(a) Symptoms of wildfire smoke exposure, including:¶

(A) Eyes: burning sensations, redness, and tearing of the eyes caused by irritation and inflammation of the eyes that can temporarily impair one's vision;¶

(B) Respiratory system: runny nose, sore throat, cough, difficulty breathing, sinus irritation, wheezing, shortness of breath; and¶

(C) Fatigue, headache, irregular heartbeat, chest pain;¶

(b) The potential acute and chronic health effects from wildfire smoke exposure, including increased risk of health effects to "sensitive groups" as defined in subsection (2)(f), and how health effects from long-term exposures may include increased risk of cardiovascular disease and increased severity of asthma;¶

(c) 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;¶

(d) How employees can obtain the current and forecasted ambient air concentration for PM_{2.5} and equivalent AQI value;¶

(e) The importance, limitations, and benefits of using N95 filtering facepiece respirators provided by the employer for both voluntary and mandatory use, and how to use and maintain them to reduce exposure to wildfire smoke;¶

(f) The employer's methods to protect employees from wildfire smoke covered under section (7), including how filtering facepiece respirators are required to be made readily available to employee for voluntary use when workplace ambient air concentration for PM_{2.5} is at or above 35.5 µg/m³ (AQI 101), and how employees can obtain such respirators before exposure and replace them when needed;¶

(g) Review of any job tasks performed by employees that the use of a filtering facepiece respirator would expose the wearer to a greater hazard than wildfire smoke and must not be used when performing such tasks;¶

(h) 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;¶

(i) The procedures the supervisor must follow when an employee reports or exhibits health symptoms which could necessitate medical attention such as, but not limited to, asthma attacks, difficulty breathing, and chest pain; and¶

(j) The employer's two-way communication system for wildfire smoke hazards covered under section (6).¶

Note: Oregon OSHA provides a Wildfire Smoke Online Course in English and Spanish and materials employers can use to assist with training elements under subsections (4)(a) through (4)(e).¶

(5) Training documentation. Verify employee training required under section (4) by preparing a written or electronic record that includes the name or identification of the employee trained, the date(s) of the training, and the name of the person who conducted the training. The most recent annual training record for each affected employee must be maintained.¶

(6) Employer two-way communication. Before employees are exposed to ambient air concentration for PM_{2.5} at or above 35.5 µg/m³ (AQI 101), develop and implement, whenever feasible, a system to communicate wildfire

smoke hazards that includes the following:

(a) Notifying employees when current work location ambient air concentration for PM_{2.5}:

(A) Is at or above 35.5 µg/m³ (AQI 101);

(B) Is at or above 200.9 µg/m³ (AQI 251);

(C) Is at or above 500.4 µg/m³ (AQI 501); and

(D) Drops below levels requiring exposure control.

(b) Enabling and encouraging employees to inform their employer of any of the following:

(A) When air quality improves or worsens to verify current AQI value;

(B) Availability issues of appropriate exposure control measures required under section (7); and

(C) Health symptoms which may be the result of wildfire smoke exposure that could necessitate medical attention such as, but not limited to, asthma attacks, difficulty breathing, and chest pain.

(7) Exposure controls.

(a) Engineering and administrative controls. Implement engineering or administrative controls to reduce employee PM_{2.5} exposure to less than 35.5 µg/m³ (AQI 101) unless the employer can demonstrate that such controls are not feasible.

(A) Engineering controls include, but are not limited to, temporarily relocating outdoor workers to available indoor areas or vehicles where the air is adequately filtered, and using a portable air purifier with a HEPA filter (or other high-efficiency filter) effective for the size of the enclosed area where used.

(B) Administrative controls include, but are not limited to, temporarily relocating outdoor work operations to another outdoor location with better air quality when work permits, and changing employee work schedules when better air quality is forecasted.

(b) Control by voluntary use of respirators. Whenever employee exposure to PM_{2.5} is at or above 35.5 µg/m³ (AQI 101), even after the implementation of engineering and administrative controls, ensure NIOSH-approved filtering facepiece respirators that effectively reduce the wearer's inhalation of PM_{2.5}, are provided to exposed employees for voluntary use. Ensure such respirators for voluntary use are:

(A) Provided and replaced as needed at no cost to employees by either of the following methods:

(i) Distribute directly to each exposed employee; or

(ii) Maintain a sufficient supply for all exposed employees at each work location where exposure occurs. Such respirator supply availability and location must be made known, and be readily accessible, to all exposed employees in a manner that does not restrict or hinder employee access to obtain and replace them when needed.

(B) Store, maintain, and replace so that they do not present a health hazard to the user.

(c) Control by required use of NIOSH-approved respirators in accordance with a Wildfire Smoke Respiratory Protection Program. Whenever employee exposure to PM_{2.5} is at or above 200.9 µg/m³ (AQI 251), even after the implementation of engineering and administrative controls, ensure employees wear NIOSH-approved filtering facepiece respirators that effectively reduce the wearer's inhalation of PM_{2.5} when such use would not expose the wearer to a greater hazard. For such respirators used exclusively for wildfire smoke, the employer may implement and follow the Wildfire Smoke Respiratory Protection Program described in Appendix A of this standard in lieu of conducting medical evaluations and fit testing required under 29 CFR 1910.134: Respiratory Protection.

(d) Control by required use of NIOSH-approved respirators in accordance with 29 CFR 1910.134: Respiratory Protection. Whenever employee exposure to PM_{2.5} is at or above 500.4 µg/m³ (AQI 501), even after the implementation of engineering and administrative controls, ensure employees wear NIOSH-approved respirators that effectively protect wearers from PM_{2.5} when such use would not expose the wearer to a greater hazard. For respirators used exclusively to protect employees from wildfire smoke concentrations of PM_{2.5} at or above 500.4 µg/m³ (AQI 501), develop and implement a complete Respiratory Protection Program in accordance with 29 CFR 1910.134: Respiratory Protection.

Note: The requirements under subsections (7)(c) and (7)(d) do not apply to residents of employer-provided housing while they are inside the housing.

Note: Elastomeric respirators, when used exclusively for wildfire smoke protection at any PM_{2.5} concentration, must comply with all applicable requirements under 29 CFR 1910.134 - Oregon OSHA's Respiratory Protection standard.

Statutory/Other Authority: ORS 654.025(2), 654.035, 656.726(4)

Statutes/Other Implemented: ORS 654.001 through 654.295

RULE ATTACHMENTS DO NOT SHOW CHANGES. PLEASE CONTACT AGENCY REGARDING CHANGES.

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Protection from Wildfire Smoke
Appendix A
Mandatory Workplace Guidance for
THE USE OF FILTERING FACEPIECE RESPIRATORS TO ADDRESS WILDFIRE SMOKE

This appendix applies only to employers covered by this standard that require NIOSH-approved filtering facepiece respirators, including N95, P95, R95, N99, P99, N100 and P100, to be used by their employees exclusively for wildfire smoke exposures when the work location ambient air concentrations of PM_{2.5} is at or above 200.9 µg/m³ (AQI 251) and below 500.4 µg/m³ (AQI 501).

Filtering facepiece respirators are disposable, negative-pressure, air purifying respirators where an integral part of the facepiece or the entire facepiece is made of air contaminant filtering material. This appendix does not apply to other types of respirators, including but not limited to elastomeric tight-fitting respirators, nor does it apply to situations where workers use filtering facepiece respirators for protection against air contaminants other than PM_{2.5} from wildfire smoke.

Note: KN95 masks approved under the U.S Food and Drug Administration's (FDA's) Emergency Use Authorization can be used to substitute for NIOSH-approved filtering facepiece respirators for exposures under 500.4 µg/m³ (AQI 500) when such respirators are unavailable.

Employers whose workers are required to wear filtering facepiece respirators to protect against wildfire smoke exposures when workplace ambient air concentrations of PM_{2.5} is at or above 200.9 µg/m³ (AQI 251) must either develop and implement a respiratory protection program in accordance with the Respiratory Protection Standard (29 CFR 1910.134), or a **Wildfire Smoke Respiratory Protection Program** in accordance with the following requirements when workplace ambient air concentration of PM_{2.5} is under 500.4 µg/m³ (AQI 501):

- (A) Employee training.** Employers must ensure that employees wearing filtering facepiece respirators are trained in the proper use of the respirators, including putting them on and removing them, any limitations on their use, how to care for the respirator, and the ability to demonstrate a seal check as described in section (B) of this appendix.
- (B) Filtering facepiece respirator user seal check.** Each employee who uses a filtering facepiece respirator must perform a user seal check to ensure a sufficient face fit to maximize effectiveness each time the respirator is put on. Either the positive or negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method must be used.
 1. Instructions for positive pressure user seal check. Once you have properly donned the respirator, place your hands over the facepiece, covering as much surface area as possible. Exhale gently into the facepiece. The face fit is considered sufficient if a slight positive pressure is being built up inside the facepiece without feeling air passing between your face and the facepiece. If the particulate respirator has an exhalation valve, then performing a positive pressure check may not be possible. In such cases, a negative pressure check must be performed.
 2. Instructions for negative pressure user seal check. Negative pressure seal checks are typically conducted on particulate respirators that have exhalation valves. Once you have properly donned the respirator, cover the filter surface with your hands as much as possible and then

inhale gently. The face fit is considered sufficient if the facepiece slightly collapses towards your face without feeling air passing between your face and the facepiece.

3. Correcting problems discovered during the seal check. In the case of either type of seal check (positive or negative), if air leaks around the nose, use both hands to readjust the nosepiece by placing your fingertips at the top of the metal nose clip. Slide your fingertips down both sides of the metal strip to more efficiently mold the nose area to the shape of your nose. Readjust the straps along the sides of your head until a proper seal is achieved.

(C) Filtering facepiece respirator storage and replacement. Store, maintain, and replace so that they do not present a health hazard to the user.

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Appendix B
Information for Wildfire Smoke Protection

Table 1: Air Quality Index (AQI) Categories of Risk and Index Values, and Equivalent 24-hour Concentrations for PM2.5, and 5-3-1 Visibility Index Values

Category of Risk	AQI Index Values	PM2.5 Concentration in $\mu\text{g}/\text{m}^3$	Visibility Index Values (How far you can see)
Good	0 – 50	0.0 – 12.0	over 15 miles
Moderate	51 – 100	12.1 – 35.4	5 – 15 miles
Unhealthy for Sensitive Groups	101 – 150	35.5 – 55.4	3 – 5 miles
Unhealthy	151 – 200	55.5 – 150.4	1 – 3 miles
Very Unhealthy	201 – 300	150.5 – 250.4	1 mile
Hazardous	301 and higher	250.5 and higher	less than 1 mile

Note: When estimating the current AQI value by using the 5-3-1 Visibility Index, determine the limit of your visual range by looking for distant targets or familiar landmarks such as mountains, mesas, hills, or buildings at known distances (miles). The visual range is that point at which these targets are no longer visible. Ideally, the viewing of any distance target should be made with the sun behind you. Looking into the sun or at an angle increases the ability of sunlight to reflect off of the smoke, and thus making the visibility estimate less reliable.

Table 2: Wildfire Smoke Standard Requirements by AQI Value

AQI Value	General Requirements
101 - 250	<ol style="list-style-type: none"> 1. Assess and monitor air quality at each work location where employees are exposed; 2. Provide and document employees training; 3. Implement two-way communication system; 4. Implement feasible engineering and administrative controls; and 5. Provide N95 or equivalent NIOSH-approved filtering facepiece respirators for voluntary use.
251 - 500	<ol style="list-style-type: none"> 1. 1 through 4 for AQI 101 – 250 above; and 2. Provide N95 or equivalent NIOSH-approved filtering facepiece respirators for mandatory use by implementing a Wildfire Smoke Respiratory Protection Program in accordance with Appendix A.
501 and above	<ol style="list-style-type: none"> 1. 1 through 4 for AQI 101 – 250 above; and 2. Provide NIOSH-approved respirators for mandatory use by implementing a Respiratory Protection Program in accordance with 29 CFR 1910.134.
<i>See rules for complete requirements.</i>	