Small Business Economic Impact Statement Memo - Revised	WAC 296-820-805 through WAC 296-820-860. WAC 296-307-09805 through WAC 296-307-09860.

Date: December 12, 2023

1. Describe the rule, including: a brief history of the issue; an explanation of why the rule is needed; and a brief description of the amendments that would impose new or additional costs on affected businesses, including small businesses.

Wildfire smoke is a complex mixture of gases, water vapor, and particles created from the burning of materials, including vegetation. Air pollution from wildfire smoke can spread a long distance from its source.[1] When inhaled, wildfire smoke can cause health problems. Outdoor workers, along with pregnant women; older adults; individuals with existing cardiovascular and respiratory disease; and individuals living in areas of lower socioeconomic status are especially at risk for wildfire smoke-related health effects.

Particle pollution, particularly fine particles sized 2.5 microns (μm) in diameter or smaller (referred to as $PM_{2.5}$) composes approximately 90% of the total particulate mass in wildfire smoke and is a significant primary health concern. $PM_{2.5}$ is a major component in ambient air pollution as well and has been studied globally for its impact on health. The U.S. Environmental Protection Agency (EPA) has provided systematic literature reviews of $PM_{2.5}$ exposure and its relation to adverse health outcomes since at least 2009. In summary, the EPA has classified the relationship to both short- and long-term $PM_{2.5}$ exposure as likely to be causal for respiratory effects; causal for cardiovascular effects; and causal for all cause (non-accidental) mortality. The relationship for long-term $PM_{2.5}$ exposure is likely to be causal for nervous system and likely to be causal for cancer.

Finally, although potential differences in toxicity between ambient $PM_{2.5}$ compared to that generated from wildfires has been incompletely characterized, available animal toxicological and human epidemiologic evidence suggest worse outcomes from wildfire-associated $PM_{2.5}$ exposure. The adverse human health outcomes investigated in this evidence included respiratory and cardiovascular outcomes (e.g., hospitalization, morbidity) as well as all-cause mortality.

Prior to the issuance of the L&I emergency wildfire smoke rule in summer 2021, there were no regulations to address the hazard of wildfire smoke inhalation among outdoor workers in Washington State. While the Federal Occupational Safety and Health Administration (OSHA) provides resources to workers and employers regarding the hazard of wildfire smoke, and requires employers to protect workers from the anticipated hazards associated with the response and recovery operations for wildfires that workers are likely to conduct, no specific federal regulations exist to mandate protections against the hazards posed by wildfire smoke.

That said, several Washington State regulations exist that address wildfire smoke generally, if not specifically, and apply to workers exposed to this hazard.

RCW 49.17.060 requires that "each employer…furnish to each of his or her employees a place of employment free from recognized hazards that are causing or likely to cause serious injury or death." Known as the "Safe Place" standard, this provision, which is also codified in WAC 296-800-11005 and 296-307-018, is construed to apply broadly to any hazard that may cause serious harm to employees. Wildfire smoke, under certain circumstances, could invoke safe place protections for employees.

[1] NOAA: https://twitter.com/noaasatellites/status/1032311533668319232?lang=en.

Chapter 296-802 WAC, addresses employee medical and exposure records, and applies to non-agricultural employers that make, maintain, contract for, or have access to records of employee exposures to toxic substances, which is interpreted to include wildfire smoke. The standard requires that employers maintain these records, inform employees of these records, and provide access to these records when requested. L&I interprets chapter 296-802 WAC to mean that the record retention requirements of that standard do not apply to freely available regulatory air monitoring data generated by the EPA or Washington State Department of Ecology.

Chapter 296-841 WAC regulates airborne contaminants in the workplace. As wildfire smoke is a complex mixture of airborne contaminants, including gases and particulates, chapter 296-841 WAC applies to wildfire smoke exposures in the workplace. While the primary pollutant in wildfire smoke is fine particulate matter ($PM_{2.5}$), the specific chemical components of the particulate vary depending on several factors, including the fuel (wood, buildings, equipment, etc.) that is burned; the temperature of the burn; and atmospheric aging. While regulatory thresholds may exist for each component, the changeable nature of wildfires and the resultant smoke render it impossible to conduct an actionable chemical analysis of the particulate component of wildfire smoke. No Washington State occupational regulatory threshold currently exists that is specific to particulate matter from wildfire smoke, and existing Washington State regulations for particulate matter more generally are insufficient to protect employees from the hazard posed by wildfire smoke.

This rulemaking was originally initiated in response to a September 28, 2020 petition for L&I to create rules to protect agricultural workers during wildfire smoke events, in response to the historic 2020 wildfires. L&I responded by accepting the petition and initiating formal rulemaking by filing a pre-proposal statement of inquiry (CR-101) on October 20, 2020.

Four sections of the adopted rule impose a quantified economic cost upon impacted businesses. These include (1) WAC 296-820-815 and 296-307-09815: Identification of harmful exposures, (2) WAC 296-820-820 and 296-307-09820: Hazard communication system, (3) WAC 296-820-825 and 296-307-09825: Information and training, and (4) WAC 296-820-840 and 296-307-09840: Respiratory protection. These are further detailed in section 3 below.

2. Identify which businesses are required to comply with the rule using the North American Industry Classification System (NAICS).

The proposed rule applies to all employers with employees who are outdoors and are likely exposed to wildfire smoke. As discussed in the Section 1.3.1 of the Cost-Benefit Analysis (CBA), L&I used outdoor exposure data from Bureau of Labor Statistics (BLS) Occupational Requirements Survey (ORS) to determine the number of workers affected. Using the number of affected workers in each occupation estimated in Section 1.3.1 in the Cost-Benefit Analysis (CBA) for this rulemaking, and their employment by each industry, L&I was able to estimate the number of businesses in each industry that are likely affected by this proposed rule (see Table 2.1).[2]

Table 2.1. Share and number of businesses that are likely impacted in each industry

NAICS	Sector	Share of affected businesses	Number of affected businesses	Affected businesses as % of total affected
11	Agriculture, Forestry, Fishing and Hunting	53.3%	3,480	11.1%
21	Mining, Quarrying, and Oil and Gas Extract	22.2%	29	0.1%

[2] Assuming the share of affected workers in a certain industry is similar to that of affected businesses in that industry.

22	Utilities	16.8%	38	0.1%
23	Construction	45.1%	12,744	40.8%
31-33	Manufacturing	6.8%	527	1.7%
42	Wholesale Trade	12.5%	1,544	4.9%
44-45	Retail Trade	5.9%	841	2.7%
48-49	Transportation and Warehousing	21.8%	1,098	3.5%
51	Information	3.2%	186	0.6%
52	Finance and Insurance	3.1%	201	0.6%
53	Real Estate and Rental and Leasing	16.5%	1,196	3.8%
54	Professional, Scientific, and Technical Services	2.8%	910	2.9%
55	Management of Companies and Enterprises	2.0%	14	0.0%
56	Administrative, Support and Waste Mgmt.	25.1%	3,352	10.7%
61	Educational Services	5.7%	217	0.7%
62	Health Care and Social Assistance	2.8%	1,747	5.6%
71	Arts, Entertainment, and Recreation	12.8%	392	1.3%
72	Accommodation and Food Services	4.1%	623	2.0%
81	Other services except public administration	9.2%	1,845	5.9%
99	State and Local Governments	14.0%	279	0.9%
	Overall	11.7%	31,263	99.9%

3. Identify and analyze the probable costs to comply with the adopted rule.

3.1 Cost of identification of harmful exposures

WAC 296-820-815 and 296-307-09815 require employers to determine employee $PM_{2.5}$ exposure levels at worksites periodically as needed. Employers have options in the methods used to collect this information including: (1) checking $PM_{2.5}$ forecasts and current levels from one of eight sources;[3] (2) obtaining $PM_{2.5}$ forecasts and current levels directly from one of four sources by either telephone, email, text, or other effective methods;[4] or (3) measuring current $PM_{2.5}$ levels at the worksite in accordance with WAC 296-820-845 and 296-307-09845.[5]

In order to estimate the cost of this requirement L&I looked at the amount of time it would take to determine the $PM_{2.5}$ levels as well the frequency of checks. Each option would require administrative time in order to obtain the necessary information. The number of checks would occur with greater frequency as the $PM_{2.5}$ levels rise and health risk increases due to exposure. This would predominantly occur during the wildfire season (July to September)[6] where the $PM_{2.5}$ levels would most likely be

[3] These include Washington Department of Ecology website, Air Quality WA mobile app, Washington Smoke Information website, U.S. EPA AirNow Fire and Smoke Map, U.S. EPA AirNow website, U.S. EPA AirNow mobile app, U.S. Forest Service AirFire website, or Local Clean Air Agency website.

[4] The four sources include the Department of Ecology, Local Clean Air Agency, U.S. EPA, or U.S. EPA EnviroFlash.info.

[5] These sections provide the guidance employers must follow when measuring $PM_{2.5}$ levels directly at worksites. This includes guidance on the design and manufacturing specifications of the monitor used to measure particulate levels, and the training requirement for the person(s) supervising, directing, or evaluating the monitoring, among others.

[6] According to the Emergency Management Division, the wildland fire season in Washington usually begins in early July and typically culminates in late September.

at the trigger levels outlined in the section and be related to wildfire smoke. Based on internal technical staff estimates employers would spend about one minute each time when checking $PM_{2.5}$ levels.[7]

Analysis of historical $PM_{2.5}$ data for the wildfire season show that for more than 96% of the time $PM_{2.5}$ concentrations were below 20.5 $\mu g/m^3$. Examination of levels above 20.5 $\mu g/m^3$ show about 64 hours when levels were 20.5 to 35.4 $\mu g/m^3$, 85 hours when it was between 35.5 to 250.4 $\mu g/m^3$,[8] 3.0 hours when it was between 250.5 to 500.3 $\mu g/m^3$, and 1.0 hours when the $PM_{2.5}$ levels were at or above 500.4 $\mu g/m^3$ (see Table 3.1).

Table 3.1.1 Average number of hours and frequency of $PM_{2.5}$ checks

$PM_{2.5}$ level at	Number of hours per wildfire season	Frequency of checks	Number of checks per season
20.5 - 35.4 $\mu g/m^3$	64	every 4 hours	16
35.5 - 250.4 $\mu g/m^3$	85	every 2 hours	43
250.5 - 500.4 $\mu g/m^3$	3.0	every 2 hours	2.0
>= 500.5 $\mu g/m^3$	1.0	every hour[9]	1.0

In estimating costs L&I uses an eight year forward period (2023-30), going forward referred to as the model period, and discounts back to present day figures using the 5% social discount rate. L&I relies upon two main assumptions to estimate these costs. First, in order to determine the concentration levels of the day, employers would have to check at least once every day for the total of 153 days in each wildfire season, most likely at the beginning of the workday. Second, L&I assumes that the number of checks needed during the day in addition to the initial check is dependent upon the daily maximum concentration level (see Table 3.1.2) from the historical data. Given the average monitoring time, and the hourly wage of a typical supervisor of $67.16, the estimated cost to impacted businesses to determine $PM_{2.5}$ levels would be $2.1 million each year.[10]

The method used by an employer to determine the $PM_{2.5}$ levels would most likely involve either the use of a mobile device, a computer with access to the internet, or special dedicated measuring equipment. The first two methods would impose none to minimal device cost since typical employers would most likely have such a device, even in most remote sites. For employers with remote worksites which are unconnected to the internet and without cellular service, employees would probably have to directly monitor $PM_{2.5}$ exposures with a dedicated device. The number of employees at those remote worksites who would need devices to do the direct measurement is estimated to be relatively small at 4,178 over the next eight years. However, given that the measurement choices that an employer can use are discretionary and not requirements, we assume no device costs for this adopted requirement.

[7] While this time would vary depending on various reasons, for instance the method the employer uses to obtain the measure, on average an individual instance of this task is expected to take about one minute.
[8] The greater number of hours here is due to the wider spread in this $PM_{2.5}$ concentration range.
[9] For ease of assessing costs, L&I rounded the number of checks at this concentration to 1.
[10] L&I believes these estimates to be somewhat conservative as we do not assume an increasing frequency of concentration nor the negative impacts from extreme wildfires resulting from climate change.

Table 3.1.2 Cost of identification of harmful exposure

	Cost factor	
Monitoring time	Minimum number of checks per wildfire season	153
	Additional number of checks per wildfire season	
	20.5 - 35.4 µg/m^3	16
	35.5 - 250.4 µg/m^3	43
	250.5 - 500.4 µg/m^3	2.0
	>= 500.5 µg/m^3	1.0
	Average time to monitor the $PM_{2.5}$ levels	1 minute
	Employee hourly wage plus benefit	$67.16
	Total monitoring cost over 9 years	$19,026,455
	Annualized	$2,128,351

3.2 Cost of hazard communications

WAC 296-820-820 and 296-307-09820 require employers to establish and implement a system for communicating the hazards of wildfire smoke in a form understandable by employees. Such a system must include procedures for (1) informing employees of the current $PM_{2.5}$ when at least two consecutive current $PM_{2.5}$ readings meet or exceed a certain threshold; (2) enabling and encouraging employees to inform employers of (a) worsening air quality, (b) availability issues of appropriate exposure control measures, and (c) adverse wildfire smoke exposure symptoms; and (3) a wildfire smoke response plan tailored to the workplace that must include at least ten listed minimum elements. This wildfire smoke response plan must also be included in the written Accident Prevention Program (APP).

Impacted businesses would incur new costs to create the necessary procedures for communicating with employees when trigger thresholds are met, and procedures for employees to communicate worsening air quality, issues with exposure control measures with employers, and any adverse wildfire smoke symptoms. The costs that employers are expected to incur include (1) the cost of creating the system for communication, broken down by (i) administrative time, and (ii) cost of any necessary assets; and (2) creation of a Wildfire Smoke Response Plan (WSRP).

System for communication

Creating any system for communication involves several stages which includes planning, design, implementation, testing, and deployment. The time and asset requirements of each depends on the complexity of the system. The adopted requirements of this section make this one a relatively simple communication system and is not expected to use any significant amount of time or assets.

L&I believes that a significant number of employers already have a communication system in place that satisfies the requirements of the adopted communication system here. The remaining number of businesses who would need to create this system is assumed to be relatively small. To determine the cost of this requirement to those impacted businesses, we first assess the administrative time needed to complete the system. Based on the variability of different business operations, L&I believes it would take approximately 2 to 3 hours to complete the various stages involved in the procedures.[11] Assuming that

[11] Estimates based on internal technical staff advice.

80-90% of current employers have an existing communication system, using the average hourly wage of $95.14 for a typical manager,[12] the cost to complete the procedures is estimated to be $148,072 to $386,104 annualized over the model period.

Next, we analyzed possible asset requirements. In addition to communicating in-person, employers would most likely use existing communication devices like radios or cellular telephones to facilitate communication between themselves and employees. L&I believes there would be none or minimal cost for communication devices since mostly all employees would have at least a mobile phone equipped to receive and send voice and text messages. However, there may be a number of employees who are working remotely in locations with no cellular service and where a radio would be the most viable communication device. As mentioned in section 3.1 above, L&I estimates the number of these employees to be approximately 4,178 over the next eight years. On the high end of our estimates, if all of these workers require a device for communication then this results in a total of 8,356 devices being needed.[13] However, as we assume that 80-90% of businesses already have a system in place, we assume that on the low end approximately 10% of these workers would need a device, which results in 836 devices. Based on the average price of a long-range radio of $64.62, L&I estimates a cost of $6,628 to $66,278 on impacted businesses each year over the model period. Overall, the administrative time for communication procedures plus the equipment cost are expected to impose approximately $154,700 to $452,382 each year.

Wildfire smoke response plan

Employers would also incur costs of creating a WSRP and including this plan in their written APP. L&I provides a template that employers could use to quickly complete their plan. Assuming the typical employer utilizes this template, internal staff estimates creating a typical WSRP would take on average 1 to 2 hours. Using the same average hourly wage of an employee most likely responsible for creating this plan of $95.14, L&I estimates the annualized cost to impacted businesses to be $381,836 to $763,671. Including this plan in the written APP would simply entail updating the APP with this information, and this is not expected to take any significant time.

Overall, the total cost of compliance with this requirement for impacted businesses is estimated to be $536,536 to $1.2 million each year over the model period (see Table 3.2).

Table 3.2. Cost of hazard communication

Cost factor		
Communication system	Number of employers requiring a new system	6,909 – 10,085
	Procedures	
	Average time to complete communication procedures	2 - 3 hours
	Hourly rate of an employee completing procedures	$95.14
	Total cost of creating and implementing procedures	$1,105,095 - $2,881,573
	Devices	
	Number of workers needing devices	418 - 4,178
	Average device cost	$64.62
	Total cost in 8 years	$49,490 - $494,895

[12] This hourly wage represents the average median starting wage plus benefits of 30.4% of employees most likely responsible for completing this task

[13] This assumes one device for the employee and one device for the employer to facilitate the two-way communication. This represents the upper end of probable devices needed.

Wildfire smoke response plan	Total number of firms needing a WSRP	35,494
	Average time to complete a WSRP	1 - 2 hours
	Hourly wage of employee completing WSRP	$95.14
	Total cost of WSRP	$2,916,482 - $5,832,964
Overall	Total cost range in 8 years	$4,071,066 - $9,209,433
	Annualized cost	$536,536 - $1,216,053

3.3 Cost of information and training

WAC 296-820-825 and 296-307-09825 require employers to provide workers with information and training prior to work which exposes them to $PM_{2.5}$ concentration of at least 20.5 $\mu g/m^3$ (AQI 69) and at least annually thereafter. This training includes a minimum of ten components contained within the full Appendix A of the adopted rules. Employers are required to provide this training in a manner and language readily understandable by the employee. In addition, these sections also require supervisors to be provided information and training at similar concentration levels, on requirements in WAC 296-820-825(2) plus procedures they must follow (a) to implement the provisions of WAC 296-820-805 through 296-820-860 and WAC 296-307-09805 through 296-307-09860; (b) if an employee exhibits wildfire smoke symptoms; and (c) to move or transport employees to an emergency medical service provider, or other appropriate level of care, if necessary.

The adopted sections would impose a new cost on businesses that need to train their employees and supervisors. Cost of compliance with this section was broken down into two parts: (1) cost of developing the training material, and (2) cost of providing the required training to employees and supervisors. Based on internal technical staff estimates, impacted businesses are expected to spend 2 to 4 hours developing the necessary training material. Using an average hourly wage of $95.14 of an employee most likely completing this task, L&I estimates one-time cost of $5.8 million to $11.7 million on impacted businesses, or $763,671 to $1,527,342 each year when annualized over the model period. Providing this training material in a language understood by employees imposes translation costs on impacted businesses. The distribution of workers with limited English proficiency across all impacted industries is not known. While the Agriculture, Forestry, Fishing and Hunting, and Construction industries would have workers who do not understand English and would need translation services, not all businesses in these sectors will need translation services. However, for the purposes of this analysis, we assume all businesses in these two sectors, 52% of total impacted businesses, would need translation services. This approach implies a probable over estimation of these costs. Using the average cost of $20 to $75 for translation services for each affected business, L&I estimates this to impose annualized cost of $43,477 to $163,037 over the model period to these affected businesses.

To estimate the cost of training employees and supervisors, L&I determined the number of those workers who would need training annually and the average amount of time this training would take. Using the average hourly wage of $55.70 for non-supervisory workers and $67.16 for supervisors, plus an average training time of 30 minutes for initial training and 15 minutes for subsequent trainings, L&I estimates this requirement would impose approximately $6 million upon impacted businesses each year. The total cost of the adopted information and training requirement is estimated to cost impacted businesses $6.8 million to $7.7 million each year over the model period (see Table 3.3).

Table 3.3. Cost of information and training

	Cost factor	
Training development	Total number of employers	35,494
	Average time to develop training materials	2 - 4 hours
	Hourly wage of manager	$95.14
	Total cost	$5,832,964 - $11,665,929
	Annualized	$763,671 - $1,527,342
Translation services	Average number of employers	16,224
	Average cost of translation services	$20 - $75
	Total cost	$324,475 - $1,216,780
	Annualized	$43,447 - $163,037
Employee training	Number of employees over 8 years	435,361
	Average initial training time	30 minutes
	Average subsequent training time	15 minutes
	Hourly wage of employee	$55.70
	Total cost	$51,841,108
	Annualized	$5,906,118
Supervisor training	Average number of supervisors each year	4,709
	Supervisor hourly wage	$67.16
	Total cost	$674,180
	Annualized	$76,774
Overall	Total cost in 8 years	$57,994,952 - $63,941,726
	Annualized cost	$6,790,040 - $7,673,272

3.4 Cost of respiratory protection

WAC 296-820-840 and 296-307-09840 address employer requirements regarding respiratory protection. L&I only assessed the components of these sections that have a cost implication for impacted businesses. First, at $PM_{2.5}$ levels of 35.5 $\mu g/m^3$ (AQI 101) to 250.4 $\mu g/m^3$ (AQI 300) employers must provide, and encourage the use of, N95 filtering-facepiece respirators to all exposed employees either directly or by maintaining a sufficient supply at each worksite where exposure occurs. Second, at $PM_{2.5}$ levels of 250.5 $\mu g/m^3$ (AQI 301) to 500.3 $\mu g/m^3$ (AQI 499) employers must distribute N95 filtering-facepiece respirators directly to each exposed employee. Similar to the first requirement, employers must also encourage the use of the respirator by exposed employees. Third, $PM_{2.5}$ levels of 500.4 $\mu g/m^3$ (AQI 500) to 554.9 $\mu g/m^3$ (beyond the AQI) require employees to be enrolled in a complete Respiratory Protection Program (RPP) in accordance with chapter 296-842 WAC. Employers must provide, and require the wearing of, either (a) N95 filtering-facepiece respirator, (b) half-facepiece air purifying respirator equipped with P100 filters, or (c) other respirators equipped with P100 filters with an Assigned Protection Factor (APF) of 10 or greater. At this threshold employees who are exposed for a total of 15 minutes or less during a 24-hour period are exempt from the RPP. Fourth, where the current $PM_{2.5}$ level is at least 555 $\mu g/m^3$ employees must be enrolled in a complete RPP (in accordance with chapter 296-842 WAC). At these levels, employers must provide, and require to be worn, a respirator equipped with a P100 filter which is either a (a) loose-fitting powered air purifying, (b) full-facepiece air purifying,

(c) full-facepiece powered air purifying, or (d) other respirators with an APF of 25 or more, such that the $PM_{2.5}$ levels inside the respirator are less than 55.5 µg/m^3.

Table 3.4.1. Respirator requirements at different $PM_{2.5}$ thresholds

Respirator options	$PM_{2.5}$ µg/m^3			
	35.5 - 250.4	250.5 - 500.3	500.4 - 554.9	≥ 555
N95 filtering-facepiece	*	*	*	
Half-facepiece air purifying respirator equipped with P100 filter			*	
Other respirator equipped with P100 filter with an APF of at least 10			*	
Loose-fitting powered air purifying respirator w/ P100 filter				*
Full-facepiece air purifying respirator w/P100 filter				*
Full-facepiece powered air purifying respirator w/P100 filter				*
Other respirator with an APF of at least 25				*

Below we address each requirement within this subsection for cost implication.

i. $PM_{2.5}$ levels of 35.5 µg/m^3 (AQI 101) to 250.4 µg/m^3 (AQI 300)

Compliance with this adopted subsection would require employers to purchase and have available for use N95 respirators for all exposed employees. Here, employers are not required to distribute the respirators but simply to provide them and encourage employees to use them. The cost of compliance would be for the purchase of the respirators. The total number of respirators needed is a function of how many days those respirators would be needed and how many employees would need them. Historical data shows there were an average of 9.64 days during wildfire season that the daily maximum $PM_{2.5}$ was in this range,[14] and L&I assumes this will not change significantly over the next few years. The number of exposed employees at these levels is estimated at 316,339 annually over the next eight years. Each employee is assumed to require one mask per workday. Given the average cost of a typical N95 respirator of $0.40 to $1.40, the number of impacted employees, and the typical number of days when the $PM_{2.5}$ levels are at the trigger threshold, L&I estimates impacted businesses would incur approximately $857,959 to $3,002,856 each year over the model period.

ii. $PM_{2.5}$ levels of 250.5 µg/m^3 (AQI 301) to 500.3 µg/m^3 (AQI 499)

This subsection requires employers to distribute N95 respirators directly to each exposed employee. L&I anticipates that not all respirators purchased by employers as a result of requirement at levels of 35.5 µg/m^3 (described above) would have been used by employees as they are only encouraged, but not required, to use them at that specific $PM_{2.5}$ level, and there would be a sufficient quantity of N95 respirators available to be distributed to employees exposed at concentration listed in this subsection. Therefore, there is no cost for purchasing additional respirators, and any new cost associated with this requirement would be the time it takes the employer to actually distribute the respirators. Distributing respirators directly to employees is not expected to take any significant time as employers would simply place the respirators in a common area and instruct

[14] This represents the calendar days. L&I used business days (calendar days minus weekends and holidays) in the calculation of the cost impact.

employees to take one, or hand them out at the beginning of each shift. As a result, L&I estimates this would impose minimal to no cost on impacted businesses.

iii. $PM_{2.5}$ levels of 500.4 µg/m³ (AQI 500) to 554.9 µg/m³ (beyond the AQI)

At this $PM_{2.5}$ level, employers are required to enroll impacted employees in a complete RPP in accordance with chapter 296-842 WAC. Employers must also provide and require to be worn either (a) N95 filtering-facepiece respirators, (b) half-facepiece air purifying respirators equipped with P100 filters, or (c) other P100 filter equipped respirator with an APF of at least 10.

This requirement imposes two main cost components on impacted businesses – (1) the cost of enrolling employees in a RPP and its associated costs; and (2) the cost of the respirators. Consistent with prior sections, L&I assessed cost for this component on a forward 8 year period.

First, we determined how many employees would likely be exposed at these $PM_{2.5}$ concentrations. The increasing risk of negative health effects with each increase in $PM_{2.5}$ levels means that the number of workers exposed at higher levels of $PM_{2.5}$ concentrations would be lower/reduced as employers act to address worker safety or because of operational constraints. As $PM_{2.5}$ levels rise to this extremely hazardous level L&I believes that there would be specific occupations or employees deemed mission critical who would not necessarily be able to avoid work in these conditions. These are expected to constitute a very small number, on average 5% in certain industries, of total impacted workers. We estimate on average 875 employees would be exposed at these levels each year.

In addition to the N95 filtering-facepiece respirators, employers would need to provide the option of the two other types of respirators on exposure days. In estimating a reasonable cost of this requirement, L&I assumes an average of one day each year when the $PM_{2.5}$ concentration was in this range, which is much higher than the historical data indicates. L&I also assumes that two N95 respirators would be needed per employee. Using this average number of days, the number of exposed employees, and the average cost of the respirator options, L&I estimates this would impose new cost of about $689 to $30,761 each year on impacted businesses over 8 years (see Table 3.4.2).[15]

Next, we determined the RPP cost component. The RPP into which employees must be enrolled has several aspects which would probably impose a cost on impacted businesses. These include development of a written program, medical evaluations, conducting fit-tests, and providing training. The probable costs an employer would face depend on the actual number of employees who need to be enrolled in the RPP.

$PM_{2.5}$ levels of 250.5 µg/m³ (AQI 301) and above are considered hazardous with caution for everyone to avoid outdoor exertion, so fewer workers would be exposed at $PM_{2.5}$ concentrations of 500.4 µg/m³ to 554.9 µg/m³. At those concentrations most employers would either stop work or implement some level of exposure control, like adjusting working schedules. We assume that approximately 25% of employers would be subject to work in these conditions. At such elevated $PM_{2.5}$ levels, most of those impacted employers would most likely already have an established respiratory protection program as per requirements of chapter 296-842 WAC. L&I believes that only a small number, 5-10% of these employers would need to fully create and enroll employees in an RPP.

To estimate the cost to impacted businesses, L&I assessed the RPP components starting with the development and maintenance of a written program (WAC 296-842-12005). Given the assumptions to the number of impacted businesses and the average

[15] Due to the uncertainty of the degradation/replacement rate of the P100 filter which is based on the variability of its use, L&I did not factor the cost of replacement P100 filters into this analysis.

time of 2 to 4 hours to complete a typical written program, L&I estimates this component of the RPP to impose approximately $9,044 to $36,178 annualized on impacted businesses.

WAC 296-842-14005 outlines the scope of the medical evaluations. An initial medical evaluation is required prior to fit-testing and must be completed by all impacted employees. Subsequent medical evaluations may be needed by some employees in certain situations like changes in worksite conditions, or as recommended by a licensed health care professional.[16] L&I assumes that employees will use either an online/virtual service for their medical evaluation, or an employer conducted one. Although the adopted language does not require an annual medical evaluation, given that fit-testing must be done at least annually and is the prerequisite of an evaluation before fit-testing, it logically implies that medical evaluations must also be an annual requirement. To assess the cost of this requirement, L&I therefore assumes that medical evaluations need to be conducted on an annual basis. Consequently, this estimation reflects the upper limit of costs, given our assumption that all impacted workers would undergo medical evaluations each year.

Given the nature of the evaluation, L&I believes that businesses within the health and safety industry would have the necessary competencies and qualifications to conduct their own evaluations. All other industries are assumed to use an online or virtual option. The number of employees who would be part of an employer conducted evaluation is estimated to be approximately 1,087 over the 8 years. Given the average time of 15 to 20 minutes to complete an evaluation, the hourly wage of $55.70 and $94.04 for an employee and evaluator respectively, L&I estimates this component to impose approximately $4,568 to $6,091 annually on impacted businesses. The number of employees likely to complete an online evaluation is estimated to be 5,916. Using an average online cost of $29.00 for medical evaluations, $55.70 for employee wages, and 15 to 20 minutes per evaluation, the estimated annualized cost is approximately $293,225 to $390,966.

WAC 296-842-15005 outlines the scope of the fit-testing requirements. This subsection requires, among other things, that a quantitative fit-test be conducted at least twelve months after initial testing. In determining the cost of fit-testing to impacted businesses, L&I used an average cost of $30 to $80 for a quantitative fit-test, an employee hourly wage of $55.70 and an average time to complete a fit-test of 15 to 20 minutes. Based on these, L&I estimates annualized cost of $34,740 to $74,388 to impacted businesses.

WAC 296-842-16005 outlines the provisions and requirements around the training employees must receive. This is an annual requirement with which employees must comply. From the WAC's description, L&I estimates this training will take about 15 to 30 minutes per impacted employee per year. The number of impacted employees over the 8-year model period is approximately 7,003. Using the same employee hourly wage as above, plus the average time per training, L&I estimates this requirement to impose about $10,950 to $21,901 annualized on impacted businesses.

Based on the number of required respirators, and the individual components of the RPP enrollment likely to impose a cost, L&I estimates this aspect to cost employers approximately $353,216 to $560,285 each year over the model period (see Table 3.4.2).[17]

[16] See Table 7, WAC 296-842-14005

[17] Due to the uncertainty of the degradation/replacement rate of the P100 filter which is based on the variability of its use, L&I did not factor the cost of replacement P100 filters into this analysis.

Table 3.4.2. Respirator & enrollment costs at $PM_{2.5}$ levels of 500.4 µg/m^3 to 554.9 µg/m^3

	Cost factors	
Respirators	Number of days when $PM_{2.5}$ was 500.4 to 554.9 µg/m^3	1
	Number of employees impacted	7,003
	Average cost of an N98 face-filtering respirator	$0.40 - $1.40
	Average cost of an alternative respirator	$19.33 - $35.70
	Total cost of respirators	$6,126 - $273,356
	Annualized	$689 - $30,761
RPP enrollment	Written program	$67,500 - $270,002
	Employee medical evaluations	$2,676,843 - $3,569,123
	Quantitative Fit-testing	$307,938 - $690,689
	Effective training	$97,860 - $195,719
	Total cost of RPP enrollment	$3,156,267 - $4,621,293
	Annualized	$352,527 - $529,524
Overall	Total cost in 8 years	$3,156,267 - $4,998,889
	Annualized Costs	$353,216 - $560,285

iv. $PM_{2.5}$ level is at least 555 µg/m^3

For $PM_{2.5}$ levels of at least 555 µg/m^3, employers must also enroll employees in a complete RPP, and provide, and require to be worn, P100 filter-equipped respirators which are either (a) loose-fitting powered air purifying, (b) full-facepiece air purifying, (c) full-facepiece powered air purifying, or (d) assigned a protection factor of 25 or more such that $PM_{2.5}$ concentration inside of the respirators would be less than 55.5 µg/m^3.

Requirements of this subsection confer on employers the responsibility of ensuring employees impacted at these thresholds be enrolled in an RPP. L&I believes there would be no cost for this aspect of this subsection since employees would have already been enrolled in an RPP for compliance in the previous subsection which has a lower threshold. As a result, the cost employers would incur from this requirement is that of providing the new respirators to address the risks of employee exposures at the higher $PM_{2.5}$ levels. However, historical data shows there were no days when the $PM_{2.5}$ concentrations were at this level over the last 5 years except just a few days from certain locations in 2020 and only 2 days from Okanogan County in 2021. Furthermore, at these levels, L&I believes that similar to employer response to requirements at levels of 500.4 µg/m^3 (described above), only mission critical or emergency response employees would be exposed, and employers would most likely stop work or implement some other exposure control. As a result, impacted employers are not expected to incur any cost from this adopted requirement.

Total cost of respiratory protection

Overall, L&I estimates this adopted requirement to impose $1.2 to $3.6 million each year on impacted businesses over the model period (see Table 3.4.3).

Table 3.4.3. Total cost of respiratory protections

Cost factor	Annualized cost
Respirators	$858,648 - $3,033,617
RPP enrollment	352,527 - $529,524
Total	$1,211,176 - $3,563,142

3.5 Summary of Total Compliance Costs of the Proposed Rule

Overall, the adopted rule is estimated to impose approximately $10.7 million - $14.6 million on all impacted businesses each year over the model period (see Table 3.5).

Table 3.5. Summary of total costs

Section	Annualized costs	
	Low	High
Identification of harmful exposures	$2,128,351	
Hazard communication	$536,536	$1,216,053
Information and training	$6,790,040	$7,673,272
Respiratory protection	$1,211,176	$3,563,142
Total	**$10,666,102**	**$14,580,817**

4. Determine whether or not the proposed rule will impose more than minor costs on businesses in an industry.

As analyzed above, L&I estimates the total cost of compliance with the proposed rule to be $10.7 million to $14.6 million each year for all the affected businesses. Based on this cost range and the share of affected businesses in each industry estimated in Section 2 (see Table 2.1), the average per-business cost of the proposed rule is in a range of $257 to $3,695 depending on the specific industry to which a business belongs. Comparing this per-business cost to the minor cost threshold of 1 percent of annual payroll for each industry[18] shows this unit cost is far below the minor cost threshold for all industries (see Table 4.1).

Table 4.1. Average Per Business Cost VS Minor Cost Threshold by industry

Industry	Per-business cost	Minor cost Threshold
Agriculture, Forestry, Fishing and Hunting (11)	$435 - $573	$5,914
Mining, Quarrying, and Oil and Gas Extract (21)	$389 - $509	$12,915
Utilities (22)	$546 - $729	$28,354
Construction (23)	$292 - $372	$5,852
Manufacturing (31-33)	$697 - $942	$29,247
Wholesale Trade (42)	$334 - $432	$10,604

[18] Based on the QCEW data for 2021 (most recent available) and adjusted to 2022 figures using 6.45% inflation rate (December 2021 to December 2022).

Retail Trade (44-45)	$662 - $893	$22,588
Transportation and Warehousing (48-49)	$568 - $763	$15,969
Information (51)	$635 - $855	$77,467
Finance and Insurance (52)	$424 - $558	$19,916
Real Estate and Rental and Leasing (53)	$295 - $376	$5,647
Professional, Scientific, and Technical Services (54)	$275 - $348	$9,457
Management of Companies and Enterprises (55)	$1,333 - $1,837	$93,730
Administrative and Support and Waste Management (56)	$375 - $490	$8,421
Educational Services (61)	$1,610 - $2,228	$5,617
Health Care and Social Assistance (62)	$287 - $365	$4,513
Arts, Entertainment, and Recreation (71)	$481 - $639	$5,647
Accommodation and Food Services (72)	$441 - $582	$4,733
Other services except public administration (81)	$257 - $324	$2,542
State and Local Governments (99)	$2,653 - $3,695	$203,393
Overall[19]	$382 - $498	$11,968

As the results in Table 4.1 reveals, the average per-business cost is far less than the minor cost threshold of impacted businesses. Therefore, an SBEIS is not required for this rulemaking pursuant to RCW 19.85.030(1), and the information provided in Section 1 through Section 3 is sufficient to fulfill the requirements in the Regulatory Fairness Act (RCW 19.85). It is also worth noting that the information provided above serves the purpose of making this determination only, and should not be treated as the content of an official SBEIS report specified in Section 19.85.040 RCW of this law.

[19] Represents the weighted per business cost of the total number of affected firms and the total industry cost, and minor cost threshold based on the total number of firms and total wages paid.