Your details and background

(Please leave blank if you wish to remain anonymous)

1. Name or organisation

United Firefighters Union of South Australia Inc.

2. Email used to log into Engage

[redacted]

Questionnaire

If you are commenting on particular aspects of the expert report, please identify the particular sections or pages concerned. Your response should, where possible, provide evidence to support your statement.

1. Do you support the proposed workplace exposure standard (WES) for diesel particulate matter (DPM) to protect workers from the adverse health effects of exposure to diesel engine emissions (DEE)?

   ○ Yes

   ◉ No

2. What are your reasons for your response to Question 1? Please provide evidence or information to support your response.

1. Please see attached Submission from UFUSA

3. Is there an alternative WES to DPM as respirable elemental carbon, or additional WES that should be considered to protect workers from DEE? Please provide evidence or information to support your response.

   Please see attached Submission from UFUSA

4. What changes would you need to make in your workplace (over and above any controls currently in place) to ensure workers and others at the workplace are not exposed to levels of DPM above the proposed WES?
   a. Please include in your response:
      i. a description of the control measures currently in place at your workplace(s) to minimise exposure of workers and others to DEE.
      ii. details of any costs to implement the WES for DPM (e.g., upgrade of ventilation systems in area X, costing approximately $XXX).

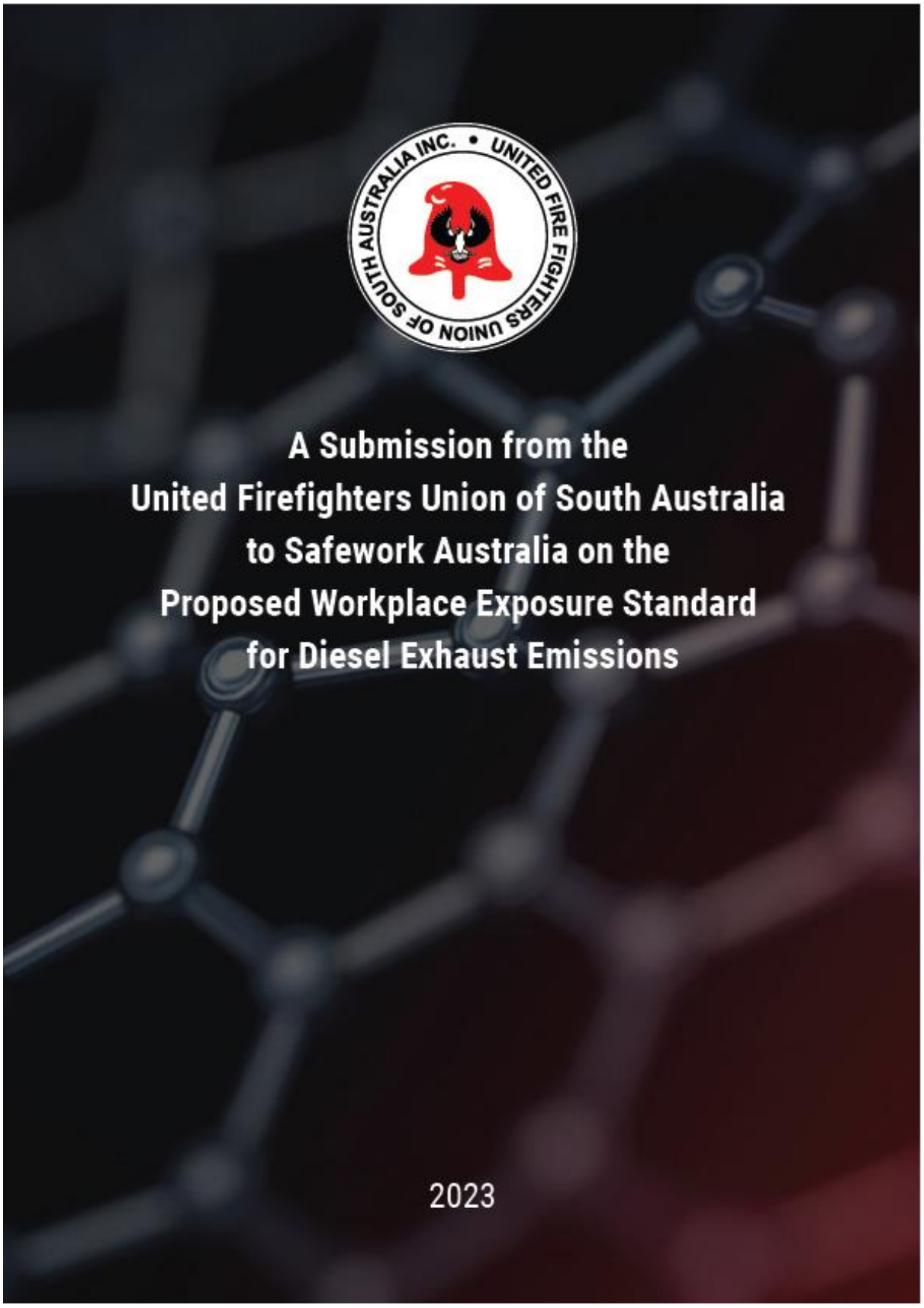
2. Please see attached Submission from UFUSA

5. Is there additional evidence or information that you think should be considered?
   Please see attached Submission from UFUSA

   Click or tap here to enter text.

6. Are there any additional comments you would like to make? (free text box with option to upload an attachment)

3. Please see attached Submission from UFUSA


A Submission from the
United Firefighters Union of South Australia
to Safework Australia on the
Proposed Workplace Exposure Standard
for Diesel Exhaust Emissions
2023

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United Firefighters Union of South Australia Submission to Safework Australia

Re: Proposed Workplace Exposure Standard for Diesel Particulate Matter.

Introduction

In 2021-2022, 3 SA Firefighters lost their lives to work, with immense impact on firefighters' families and loved ones (MFS 2021-2022 Annual Report). *The loss of these firefighters' lives is not simply a statistic that can be justified as incidental in either economic or academic responses to life threatening toxic exposures in their workplaces. This submission by the United firefighters Union of SA (UFUSA) to Safework Australia reflects the serious concern which is held for SA firefighters' continuing exposure to diesel exhaust emissions (DEE). In the first instance, and following the hierarchy of control model, the UFUSA pursues the complete elimination of diesel exhaust emissions exposure to firefighters in their work environment. Secondly, engineering controls in the firefighters' environment, such as point of capture exhaust extraction systems in fire stations, can also be initiated and implemented which will further assist in protecting firefighters from an already over-exposed toxic work environment until the elimination of diesel exhaust emission exposure is realised.*

However, the current Safework Australia proposal to establish a Diesel Particulate Matter (DPM) Workplace Exposure Standard, is not supported by the UFUSA for reasons outlined in the following submission.

The UFUSA supports the recent submission from the United Firefighters Union of Australia (UFUA) to the Safework Australia Consultation on a proposed Workplace Exposure Standard for Diesel Particulate Matter (United Firefighters of Australia, Hakkinen, 2023)

Firefighting is already a high-risk occupation.

This submission to Safework Australia is prepared for and made on behalf of the United Firefighters Union of South Australia (UFUSA).

The UFUSA is the union representing firefighters and engineering technical staff employed by the South Australian Metropolitan Fire Service (SAMFS) and firefighters employed by Ventia.

The global firefighting environment is already one of significantly high risk in terms of carcinogenic and toxic exposure to a range of substances and chemicals with much documented research into the adverse health effects including many cancers. The pinnacle of such research has resulted, with the World Health Organisation stating in June of 2022 that;

*"**Occupational exposure as a firefighter** was classified as carcinogenic to humans (Group 1) on the basis of sufficient evidence for cancer in humans.*
[and]
There was sufficient evidence for cancer in humans for the following cancer types: mesothelioma and bladder cancer.
[and]
There was limited evidence for cancer in humans for the following cancer types: colon cancer, prostate cancer, testicular cancer, melanoma of the skin, and non-Hodgkin lymphoma.
[and]
There was also strong mechanistic evidence in exposed humans that occupational exposure as a firefighter exhibits 5 of the 10 key characteristics (KCs) of carcinogens:[2] "is genotoxic" (KC2), "induces epigenetic alterations" (KC4), "induces oxidative stress" (KC5), "induces chronic inflammation" (KC6), and "modulates receptor-mediated effects" (KC8). (https://www.iarc.who.int/faq/iarc-monographs-evaluate-the-carcinogenicity-of-occupational-exposure-as-a-firefighter/ Accessed 23.05.2023)

Firefighters are regularly exposed to the toxic elements of combustion including such constituents as elemental carbon, Polycyclic Aromatic Hydrocarbons (PAH), aldehydes, benzene, carbon monoxide, and particulate matter. This exposure is not limited to

attending structure fires, wildfires, vehicle fires and the like. Indeed, many of the same elements of toxic exposure for firefighters which arise in their work environment from fire combustion processes, correspondingly, are the same elements as those contained in diesel exhaust emissions.

Additionally, firefighters are intimately exposed to these diesel exhaust emissions as a consequence of their day-to-day work operations. Firefighters' exposure to the toxic elements of fire combustion occurs in the first instance despite the use of breathing apparatus (BA) and the wearing of Level II personal protective equipment (PPE). Exposure to toxins can occur through not only direct inhalation, but also through dermal absorption during, and in the aftermath of attending a fire event. Firefighter toxin exposure is then further layered with the addition of diesel exhaust emissions from fire appliances and in particular, diesel particulate matter when attending incidents whilst firefighters operate fire appliance equipment and pumps. Firefighters are also regularly exposed to diesel exhaust emissions on engine start up and return to station due to inadequate and/or non-existent exhaust extraction systems in fire station engine rooms along with significant exposure during fire operations whilst operating appliance pumps and equipment.

As is widely understood, diesel exhaust emissions contain particulate matter and gaseous constituents. The most researched and expressed constituent of diesel exhaust is the diesel particulate matter which is made up of numerous elements such as respirable elemental carbon, organic carbon, Nitrous Oxide, Aldehydes and PAH's. This results in an aggregate and continuing exposure for firefighters to carcinogenic materials and toxins on a regular basis with its attendant long-term and cumulative effect upon firefighters' health. The cumulative effect of this exposure on multiple fronts cannot be understated.

Since 2013 and following the declaration by the WHO, IARC, that diesel exhaust is a Category 1 Carcinogen to humans, the UFUSA has proactively brought attention to the significance of these dire and cumulative health issues associated with exposure to diesel exhaust emissions in the firefighter environment, being at the forefront.

Workplace based engineering and administrative controls and solutions have been sought from the SA Government and the Person Conducting a Business or Undertaking

(PCBU) by the UFUSA, including point of capture exhaust extraction systems, replacement of ageing Fire Appliances, upgraded engine room ventilation fans, extended fan runtimes and automatic roller door operation, written clean room policies along with the regularised maintenance of fire appliances and removal of PPE from the Fire Station Engine Bays.

At the time of writing this submission, there has been no installation of point of capture (POC) exhaust systems in the fire station environments although a trial of POC systems has been agreed and is funded by government. The engineering and administrative control measures in station engine rooms proposed and listed above, whilst having a measure of veracity, in and of themselves do not and cannot ultimately resolve the fundamental issues associated with diesel engine use and its attendant toxic emissions.

Alternate fuel sources and new Fire appliance vehicles which emit zero toxic emissions are also still yet to be realised.

So, firefighters currently continue to be exposed to additional and unnecessary health and cancer risks associated with diesel exhaust emissions. These are over and above existing, and all too readily identifiable risks, associated with day-to-day Firefighting activities.

The problem with the setting of any arbitrary limit of diesel particulate matter exposure through a WES above zero, is that it requires firefighters to continue to accept additional exposure risks to cancer causing toxins and chemicals from DEE on top of existing exposures from attending fires.

3. Response to Safework Australia Proposal for a Workplace Exposure Standard

The UFUSA supports the submission to Safework Australia by the United Firefighters Union of Australia (UFUA) and seeks to make further comment in support of the UFUA submission (United Firefighters of Australia, Hakkinen, 2023).

The UFUSA does not support the establishment of a Workplace Exposure standard for Diesel Particulate matter for the following reasons:

3.1 The Precautionary Principle

The UFUSA follows the Precautionary Principle which advises that there is a responsibility to protect the firefighters from exposure to harm where science has found a plausible risk, such as diesel exhaust, which has been determined to be a Group 1 carcinogen by the World Health Organisation. Given the carcinogenic latency involved, the overwhelming scientific evidence from global research bodies such as the World Health Organisation and by following the Precautionary Principle, there can be no safe level of exposure to diesel exhaust emission. Thus, the goal must be the elimination of any exposure to firefighters from diesel exhaust emissions.

3.2 The SafeWork Australia Proposed Workplace Exposure Standard value

The UFUSA notes the 2022 research report on Workplace Exposure Standard for diesel particulate matter prepared for Safework Australia by SLR Consulting Australia Pty Ltd in which the Executive summary of the report recommends an 8-hour TWA of 15 micrograms REC/m3. The report records that the recommended measure of 15 micrograms REC/m3 is thus derived from an *approximation of the midpoint* of a number of globally researched Workplace Exposure Standards tabled in the report. The reported WES's range in value between

160micrograms/m3 (Total Carbon) and 5micrograms Respirable Elemental Carbon REC/m3. It further states that *"The candidate WES value is derived as an estimate of the concentration of DPM to which workers may be exposed for a lifetime without the likelihood of appreciable harm from non-cancer or cancer effects."* (SLR Consulting, 2022).

Setting an arbitrary Workplace Exposure limit of 15 micrograms per cubic metre such as proposed in the Safework Australia proposal and the SLR report through *"an approximate midpoint of derivations"*, (SLR Research Report 2022, p5) establishes a false and dangerous baseline of exposure which will thus be considered to be an acceptable limit by businesses. Once any false baseline is met, there will be little or no compulsion for a PCBU to move to zero exposure once the WES limit has been attained.

3.3 The measurement methodology

The measurement methodology required for the diesel particulate matter is as complex as is the totality of the chemical components in DPM and diesel exhaust emissions (DEE). As such, measuring but one component of DPM through the proxy of respirable elemental carbon (REC), once again provides a false baseline. Elemental carbon (EC) whilst having been assessed as a suitable proxy for DPM, still can provide false guidance in terms of the levels of exposure to toxicity. As highlighted by Landwehr et al, after treatment devices on newer technology diesel engines such as diesel particulate filters, preferentially remove up to 90% of elemental carbon and as such *"limits the feasibility of using elemental carbon as an indication of exhaust exposure"* (Landwehr et al, 2020,p1).

The proposal by Safework Australia to seek that PCBU's "*apply additional Workplace Exposure standards for other components of DEE such as Nitrogen Oxide"*, ((Safework Australia, 2023,p3) in conjunction with measurement of REC as DPM, assumes an unsustainable requirement that PCBU's will undertake multiple testing regimes for toxic elements of DEE which in themselves will be

costly and complex. The impost and complexity of various testing regimes on the PCBU will lead to incorrect, incomplete, and false testing regimes with commensurate results. This will inevitably leave firefighters carrying the health burden of exposure to unnecessary levels of carcinogenic material.

The use of REC as an effective proxy for DPM is further diminished according to McLaughlin et al, by the variability of the Elemental Carbon/Organic Carbon ratio which is affected by such things as differences in engine type, different emission profiles even with the same type of fuel, different engine, and fuel loads (McLaughlin et al, 2020). Therefore, with scientific research advising that not only is DPM a serious and recognised carcinogenic health risk but also that the combination of DPM and airborne contaminants pose the greater risk and with serious question marks about the efficacy of DPM measurement methodology, it should be recognised that there is no safe exposure level to diesel exhaust emissions (Landwehr et al, 2020).

3.4 Proposed code of practice

The UFUA has proposed that:

"a specific code of practice that outlines requirements and guidance for eliminating and mitigating DEE would be a more effective tool for assisting WHS Regulators to educate PCBU's and enforce the current requirements of the model Act and Regulations" (Hakkinen 2023).

The UFUSA supports this proposition and suggests further, that a firefighting industry specific code of practice for diesel exhaust emissions should be developed.

The object of the proposal is to ensure that any code of practice developed, takes into account the unique attributes of the firefighter environment which as stated earlier in this paper, is already a high-risk occupation with significant exposure to toxins from fires and combustion processes.

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