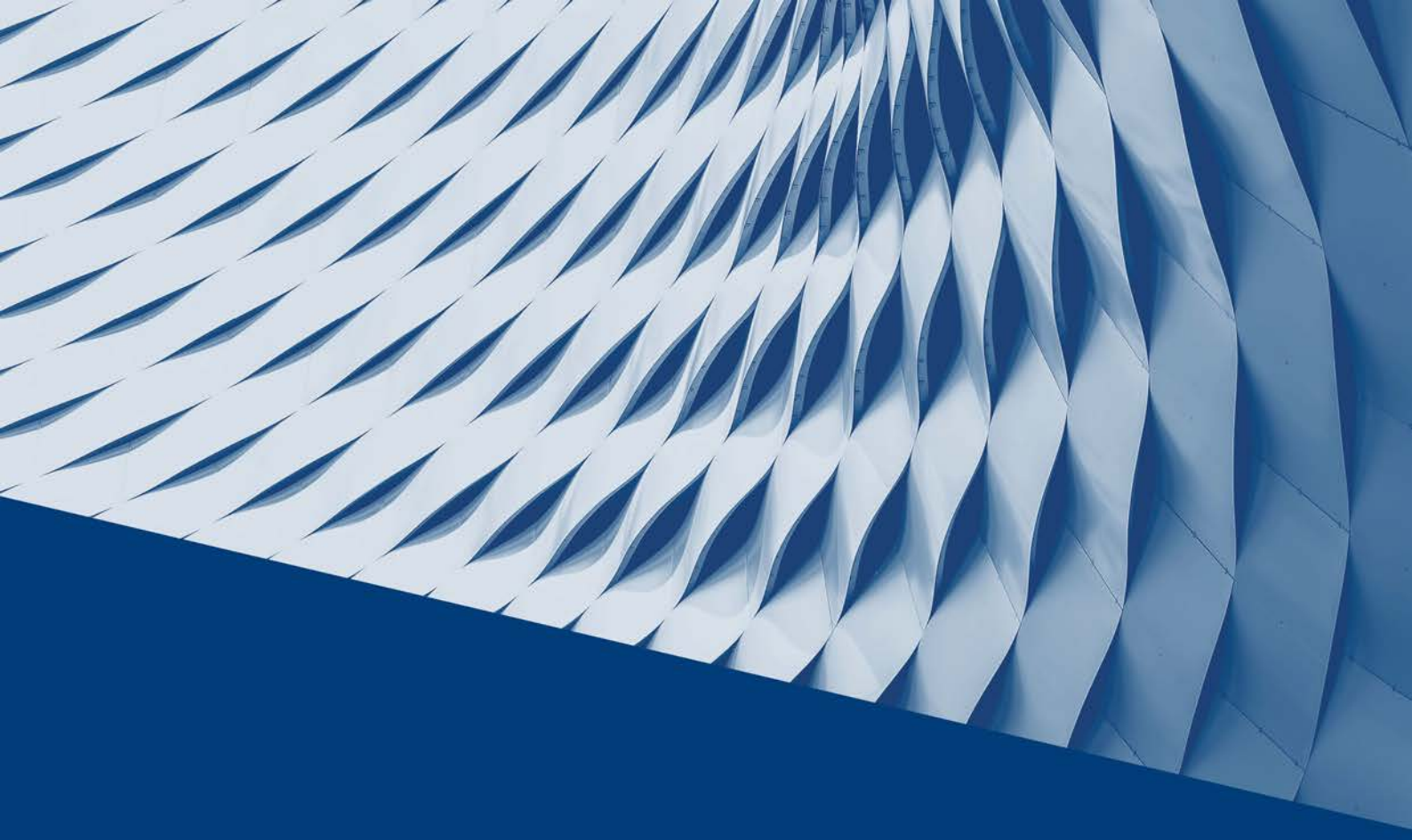

Diesel Exhaust Emissions WEL

Submission by the Australian Council of Trade Unions to Safe Work Australia

ACTU Submission, 2 June 2023
ACTU D. No 25/2023

ACTU
australian council of trade unions

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Introduction

About the ACTU

Since its formation in 1927, the ACTU has been the peak trade union body in Australia. It has played the leading role in advocating for, and winning the improvement of working conditions, including on almost every Commonwealth legislative measure concerning employment conditions and trade union regulation. The ACTU has also appeared regularly before the Fair Work Commission and its statutory predecessors, in numerous high-profile test cases, as well as annual national minimum and award wage reviews.

The ACTU is Australia's sole peak body of trade unions, consisting of affiliated unions and state and regional trades and labour councils. There are currently 43 ACTU affiliates who together have over 1.7 million members who are engaged across a broad spectrum of industries and occupations in the public and private sector.

The ACTU wishes to draw Safe Work Australia's attention to submissions from individual affiliates. The ACTU and unions appreciate the breadth and quality of the work published by SLR on behalf of SWA.

ACTU submission 2020

The ACTU refers SWA to the ACTU submission to SWA on Diesel Exhaust Emissions 2020.

The ACTU has not re-prosecuted those arguments (as to do so would be repeating that submission[1]) however in summary our key points were:

1. There is an overwhelming weight of evidence in relation to the harm caused by DEE including that provided by IARC, Cancer Council, HCOTN, and the effect on the children of women who have been occupationally exposed.
2. There is a need for a WES:

   In 2012, Lesley Rushton wrote an editorial in the Journal of the National Cancer Institute: *These results indicate that stringent occupational and particularly*

[1] The 2020 ACTU submission

environmental standards for DEE should be set and compliance ensured to have an impact on health outcomes.

The case for a dose response relationship is found in numbers of studies including Silverman et al in 2012.

3. The arguments for a delay in adoption of a WES do not hold up.
4. In 2020, the ACTU had been given advice, based on research by Vermeulen et al, that a limit of 0.1 mg/m3 is much too high and results in an unacceptable risk to exposed workers. Their study estimated that at:
    - 0.025 mg/m3, there would be an extra 69 cases per 1,000 workers.
    - 0.01mg/m3, the estimate was 20 cases per 1,000 workers and at 0.001 mg/m3, there would be an extra 1.7 cases per 1,000 workers.

Recommendations

Recommendation 1

Immediate adoption of WES for DEE, based on elemental carbon of

a. Mining industry: 0.05mg/m3.
b. All other industries: 0.01mg/m3.

Recommendation 2

Acknowledging that the SLR report is not a health-based WES and may be as much as 10 times higher than a health-based standard, accordingly, the ACTU proposes that the WES is progressively reduced over three years to a health-based standard, of 0.001mg/m3, as submitted by the Cancer Council of Australia in 2020.[2]

Recommendation 3

The ACTU supports the adoption of the following recommendations from the SLR report:

[2] Work by Vermeulen and co-workers provides good evidence that the current 'working limit' of 0.1 mg/m3 is much too high and results in an unacceptable risk to exposed workers. Based on their work, a strong argument can be made to have an exposure level of 0.01 mg/m3 (or lower) and a strict application of their work would suggest 0.001 mg/m3 would be more appropriate.

- A ‘Carcinogenicity Category 1A’ notation is recommended for DPM based on the weight of evidence from both human and animal studies indicating DEE is a lung carcinogen.
- In addition, it is recommended the candidate WES for DPM be applied in conjunction with appropriate management measures to control and/or minimise exposures to other indicators of potential concern within DEE including NO2, PAHs, and aldehydes to ensure the risk of health effects from the mixture as a whole is adequately controlled.

Discussion

1. Currently Safe Work Australia and numerous jurisdictions publish guidance on the control of diesel exhaust emissions.[3] The SWA Guide refers to the general duties of the WHS Act and should refer to WHS Regulation 40.e which requires a PCBU to, so far as reasonably practicable, provide *“ventilation enables workers to carry out work without risk to health and safety”.* The Code of Practice for Workplace Facilities outlines what should be the minimum that a PCBU provides regarding adequate ventilation. The circumstances in workplaces – see below – indicate that both PCBUs and regulators are failing to ensure that workers are provided with workplaces that are safe and without risks to health.

2. As outlined in our 2020 submission, the lack of a WES for DEE is an impediment to good health outcomes for many groups of workers. Currently there is no requirement for PCBUs to comply with Regulation 49 and therefore there is little incentive to apply risk control measures, according to Part 3.1 of the WHS Regulations, and therefore only rely on the general duties to ensure exposure to DEE is as low as reasonably practicable. Without a benchmark, health and safety regulators also appear to be constrained in requiring the use of higher order control measures.

Health impacts

3. The SLR report for SWA[4] reviews literature regarding the health effects of Diesel Exhaust Emissions. The SLR report concluded that:

[3] Guide to managing risks of exposure to diesel exhaust in the workplace (safeworkaustralia.gov.au)
[4] SLR - RESEARCH REPORT Workplace Exposure Standard for Diesel Particulate Matter December 2022

The literature review revealed that the critical health effects associated with exposure to DEE include lung irritation, which upon long-term exposure, can progress to an inflammatory response and lung cancer. DEE has also been shown to have an effect on cardiovascular parameters in human controlled exposure studies as well as being associated with cardiopulmonary disease in large-scale human investigations. DEE can also increase the response to other allergens but does not appear to be an allergen itself.

4. The IARC has concluded that both DPM and some gaseous components contribute to the carcinogenicity of DEE.

5. The Danish review of diesel exhaust particles concluded that:

   Based on the observed mechanisms of genotoxicity, the present working group concludes that DEP-induced mutagenicity and carcinogenicity occur by non-threshold mechanisms.[5]

6. The ACTU notes that SLR discusses in detail the exposure response debate but does not dispute the conclusions of IARC or the Danish review regarding the mechanism of genotoxicity.

7. The SLR report recommends a WES that is an approximate midpoint of the derivations discussed in the report i.e., midpoint between 7 and 25 ug REC/m3.

8. The Danish review refers to the evidence provided in the research by Vermeulen et al and notes that it provides solid epidemiological evidence using the dose-response relationship.

   The present working group considers this study by Vermeulen et al. as an important and relevant study that builds on the critical literature review performed by members of the IARC working group. Moreover, it provides information on dose-response relationship between exposure to diesel exhaust based on exposure measurements and risk of lung cancer.
   The present working group furthermore notes that the studies use cohorts of workers

[5] Diesel exhaust particles: Scientific basis for setting a health-based occupational exposure limit; The National Research Centre for the Working Environment, Copenhagen 2018

and nested case-control designs thus minimizing the risk of potential confounding caused by population-based comparison groups. Moreover, all three studies include exposure assessment in terms of EC exposure measurements.
The present working group is of the opinion that the meta-analysis can be used for quantitative risk assessment of DEPs even though the exposure was DEE and not only DEPs. Animal exposure studies have clearly shown that DEE and DEPs are carcinogenic, whereas filtered DEE is not (IARC 2014; HEI, 2012), thus showing that it is the particulate fraction of diesel exhaust that causes lung cancer.[6]

9. The Danish review[7] comes to the following conclusions:

> *The present working group recommends the approach using epidemiological data to derive OELs, since this approach relies on data from humans. Thus, the expected excess lung cancer risk based on epidemiological data is*
> *1: 1 000 at 0.45 µg/m3,*
> *1: 10 000 at 0.05 µg/m3 and*
> *1: 100 000 at 0.005 µg/m3 DEPs.*[8]

10. In 2022 Vermeulen et al estimate, using a Population Attributable Risk factor of 4.55 and 0.67% respectively, the excess lung cancer risk at 10ug/m3 as 166 per 10,000 and at 1ug/m3, 26 per 10,000.

11. Vermeulen et al further state that[9]

> *Using a more conservative prevalence estimate of only 5% of the working population being occupationally exposed to DEE (the number that was used in previous burden of disease calculations) and assuming the stricter Dutch exposure limit of 10 ug/m3 EC would apply, we still expect more than 50 000 workers to ever die of LC from DEE exposure.*

12. Based on 2012 exposures Carey et al[10] estimated

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[6] Ibid page 19
[7] Ibid
[8] Ibid page vi
[9] Ibid page 541
[10] https://aacrjournals.org/cancerpreventionresearch/article/12/1/13/47167/Interventions-to-Reduce-Future-Cancer-Incidence

At baseline, 600 (0.4%) future bladder and 4,450 (0.6%) future lung cancer cases over the lifetime of the cohort were estimated to be attributable to occupational exposure to DEE in those exposed in 2012. Up to 2,000 of these cases were estimated to be avoidable through the use of various interventions. Exhaust hoses (engineering controls) were estimated to be particularly effective.

13. Carex Canada has proposed the following for an OEL for DEE

    Based on evidence of increased lung cancer risk at very low levels, we recommend that Canadian jurisdictions move towards an OEL based on elemental carbon of 20 µg/m3 for the mining industry and 5 µg/m3 for other workplaces to protect worker health. The higher OEL recommended for the mining industry takes into account the feasibility of implementation in this industry that will have particular challenges and is meant as an interim target in a staged approach to eventually have one harmonized OEL for all workers.[11]

14. Given the evidence contained in the Danish review and the most recent estimates by Vermeulen et al, the ACTU does not support the WES proposed by SLR, as this does not reflect a health-based approach.

Workplace practices

15. Diesel exhaust emissions are a source of poor air quality for workers exposed due to the nature of their work and the immediate work environment (direct exposures), and those who are exposed due to general air pollution that applies to both indoor and outdoor workers (indirect exposures).

16. Outdoor and indoor workers, especially those near urban roads with heavy truck and larger commuter vehicle traffic, breathe in air contaminated with diesel exhaust emissions. There is currently no clear obligation on the PCBUs in control of that work to identify these risks and ensure that workers are protected from DEE.

[11] CAREXCanada_DEE_OEL_REPORT_2019.pdf page 3 accessed 1/6/23

17. Workplaces that are situated near roads, eg childcare centres, schools etc, can be contaminated with air pollution containing DEE. Childcare workers are exposed as children occupy both outdoor and indoor areas and often doors are required to be open. Many childcare centres are situated within 150 metres of busy roads for which air quality may often breach the WHO Guidelines. Some workplaces are likely to be experiencing PM2.5 levels above WHO Guidelines and general EPA guidelines.[12]

18. Duty holders across a broad range of industries are failing to protect workers from harmful exposures to DEE. For example:
    - During asphalting, road construction workers work directly behind and in the path of DEE diesel engines. These workers are also exposed to fumes from the asphalting processes which contain similar or the same compounds such as poly-aromatic hydrocarbons, benzene etc, therefore compounding workers exposures.
    - Diesel fuel continues to be used as a "slip agent" and in some cases is sprayed over the hoppers, ensuring that dermal exposure also occurs. Some progress has been made since 2017, but these working arrangements still exist.
    - Due to air inversions in open cut mining there is a layer of diesel fume in the work area; in above ground workshops where maintenance of diesel engines occurs – there is no point of capture exhaust systems and unlike in underground mining there is no Tag board so that operators know the number of diesel engines within workshops.
    - Fire services workers are exposed to DEE as the fire trucks idle in restricted spaces without any point of capture systems.
    - Workers involved in rail, bus, heavy vehicle, and commuter vehicles are regularly exposed to DEE. Point of capture exhaust systems are rare although rail maintenance has decreased the idling of rail engines in workshops.
    - In the past, diesel forklifts in warehouses and factories was a problem.
    - During the construction of basements, there is significant accumulation of DEE due to delivery trucks, cranes unloading etc.

[12] https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines
Maribyrnong City Council, Air Quality Improvement Plan, August 2022
Air pollution causes thousands of deaths in Australia each year. Residents and scientists are fighting back - ABC News

- Building fabrication workshops which can include the adjacent lunchrooms can often be filled with DEE.
- Diesel fuelled agricultural equipment including tractors, heavy vehicles and trucks that work in close proximity to workers, including in indoor and poorly ventilated environments are exposed to DEE.

19. There is no shortage of risk control measures which can be applied – for example:
    - Improved fuels
    - Dry and wet scrubber boxes
    - Point of capture exhaust systems
    - Regular maintenance of engines
    - Improved ventilation systems.

20. The costs associated with point of capture or ventilation systems vary considerably, depending upon the building, existing ventilation systems etc.

21. The ACTU does not have detailed information on the costs of upgrading ventilation systems, diesel engines or building design to ensure lower exposures. ACTU affiliates have been quoted between $50,000 and $80,000 for vehicles in restricted areas. Please refer to individual union affiliate submissions.

Summary

22. Workplace exposures to Diesel Exhaust Emissions (DEE) are commonplace - mining, transport, retail and repair work (diesel mechanics) machine manufacturing, mineral and material extraction, quarrying, asphalt making and agriculture and for individuals exposed to DEE from road traffic such as car park attendants, road construction, traffic controllers, those working near busy roads etc.

23. Not only are exposures common place, but there is also little evidence that duty holders are taking action to lower those exposures. As submitted by the ACTU in 2020:

    It is important that a WES is adopted, as its absence implies that there is little need for risk control measures.

    As noted in a Carex Canada review in December 2019:

    The absence of an OEL is of particular concern because many occupational disease prevention practices rely on the 'benchmark' that an OEL provides.

24. In 2023, the ACTU supports the immediate adoption of a WES, based on elemental carbon that is at or below:
    - Mining industry: 0.05mg/m3.
    - All other industries: 0.01mg/m3.

25. Adoption of the above must be followed by a progressive reduction in the WES to a health-based standard of 0.001mg/m3.

Appendix - SWA Consultation form

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)?

   The ACTU does not support the SWA proposal – please see Recommendations and ACTU Submission 2020 and section on Health Impacts.

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

   Please see Recommendations and ACTU submission 2020 and section on Health Impacts.

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 Recommendations and ACTU submission 2020 and section on Health Impacts.

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).Is there additional evidence or information that you think should be considered?

   Please see individual union submissions and section on Workplace Practices.

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