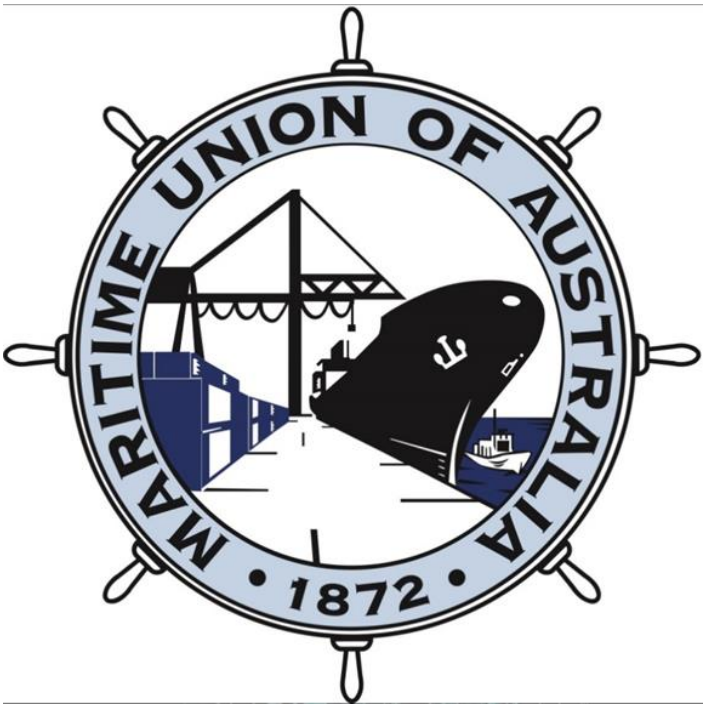

Maritime Union of Australia (MUA), a Division of the Construction Forestry Maritime Mining and Energy Union (CFMMEU)

Submission to the Royal Commission into National Natural Disaster Arrangements

28 April 2020

Authorised by: **Ian Bray, Assistant National Secretary**
MUA Division, CFMMEU

Inquiries: **Penny Howard, National Research Officer**
MUA Division, CFMMEU
penny.howard@mua.org.au

Introduction

This submission has been prepared by Maritime Union of Australia (MUA). The MUA is a Division of the 120,000-member Construction, Forestry, Maritime, Mining and Energy Union (CFMMEU) and an affiliate of the 20-million-member International Transport Workers' Federation (ITF).

The MUA represents approximately 14,000 workers in the shipping, offshore oil and gas, stevedoring, port services and commercial diving sectors of the Australian maritime industry.

Summary

This submission responds to the following terms of reference:

(a) The responsibilities of, and coordination between, the Commonwealth and State, Territory and local Governments relating to preparedness for, response to, resilience to, and recovery from, natural disasters, and what should be done to improve these arrangements, including with respect to resource sharing;

(b) Australia's arrangements for improving resilience and adapting to changing climatic conditions, what actions should be taken to mitigate the impacts of natural disasters, and whether accountability for natural disaster risk management, preparedness, resilience and recovery should be enhanced, including through a nationally consistent accountability and reporting framework and national standards;

(f) Ways in which Australia could achieve greater national coordination and accountability - through common national standards, rule-making, reporting and data-sharing - with respect to key preparedness and resilience responsibilities, including for the following.

(i) Land management, including hazard reduction measures;
(ii) Wildlife management and species conservation, including biodiversity, habitat protection and restoration;
(iii) Land-use planning, zoning and development approval (including building standards), urban safety, construction of public infrastructure, and the incorporation of natural disaster considerations;

The MUA submission focusses on three crucial issues that we believe need to be addressed in preparation for future emergency events such as bushfires and to improve Australia's emergency response capability. These are:

- The future role of ships, ports and associated maritime infrastructure, equipment and personnel as a critical element of Australia's emergency response capability;
- Addressing air quality impacts on the workforce; and
- Support for First Nations cultural burning.

It also submits that any credible action to reduce the impact of bushfires must also seek to urgently reduce greenhouse gas emissions and slow or stop the process of global heating so that it does not exceed 1.5°C.

The submission identifies practical proposals that can be taken by the Commonwealth Government to:

- Ensure that ships, ports and associated maritime infrastructure, equipment and personnel are adequate for emergency response situations, and that such maritime assets are integrated and coordinated in future emergency preparedness.
- Ensure better standards and procedures for dealing with the workforce and work health and safety aspects of poor air quality caused by smoke (with equal application to dust, also created by weather events).
- Support First Nations cultural burning.

MUA response to term of reference (a) – The responsibilities of, and coordination between, the Commonwealth and State, Territory and local Governments relating to preparedness for, response to, resilience to, and recovery from, natural disasters, and what should be done to improve these arrangements, including with respect to resource sharing

The role of ships and ports

Commercial and civilian operated ships and both state-owned and private ports played a crucial role in the nation's emergency response effort during the 2019-2020 bushfires.

Commercial ships including harbour towage and pilotage ships, offshore oil and gas anchor handling ships, ferries and civilian crewed Navy ships were all called upon and utilised as part of various emergency response exercises during the bushfires, in a range of coastal locations across Australia.

Ships from around the country assisted, such as:

- Tugs located in the Port of Eden operated by both Pacific Tug through Wide Bay Shipping Services (WBSS) and Svitzer.
- The Anchor Handling Tug Supply (AHTS) vessels, the *Far Saracen* and *Far Senator* operated by Solstad for Esso to service its offshore oil rigs and which home port at Westernport Victoria;
- Ferries operated by Kangaroo Island Ferries, which transported emergency services and Army equipment to fight fires and evacuated citizens on return legs; and
- The Navy training vessel, the *Sycamore,* operated by Teekay Shipping and crewed with civilian seafarers, which home ports at HMAS Waterhen Sydney Harbour.

These vessels were made available by their owners/operators and were operated by civilian maritime crews who worked in dangerous conditions in cooperation with other emergency

services personnel to support the emergency response effort, be it civilian evacuations or delivery of vital supplies such as fuel, food, medical provisions and emergency personnel.

Ships and ports, and the coastline along which they operate proved to be an important transportation and infrastructure resource when roads were blocked or congested, when aviation assets were in heavy use and when the coastline became an important safe haven for citizens and tourists fleeing the fires.

In hindsight it is now clear that ships, ports and associated maritime infrastructure, equipment and personnel have not to date been given the level of attention necessary in the development of emergency response capability in Australia and in utilising the nation's resources in emergency situations.

The result is that this pool of assets and the associated workforce now needs to be fully integrated into emergency response planning and coordination as part of enhancement of the nation's emergency response capability.

The MUA has for many years been raising issues about the poor state of Australia marine emergency response capability, mainly in relation to marine incidents given the nation's long, pristine and economically/environmentally important coastline. The important role played by ships and ports during the recent bushfire crisis has now highlighted an important new dimension to the role that can be undertaken by maritime assets in emergency situations.

A national strategic fleet

The proposal to establish a national strategic fleet in Australia has been gaining momentum since it was first advocated by the organisation representing Australian shipowners, Maritime Industry Australia Ltd (MIAL), supported by a range of organisations including maritime unions, political parties and national security experts, in 2016 when legislation regarding the regulation of coastal shipping was being considered by the Federal Parliament.[1]

Over the following three to four years the concept of a national strategic fleet has achieved bi-partisan political support and has attracted policy attention in national security circles and in consideration of policy to address Australia's fuel security. It has been and remains under consideration in Government and Parliamentary Inquires.[2]

[1] Maritime Industry Australia Ltd (MIAL) *Coastal Trading Green Paper: A Maritime Transition* of 2016 which proposed the creation of a national strategic shipping fleet, defined as ships that offer strategic national interest benefits to the nation

[2] For example, Bateman Sam, Australian Strategic Policy Institute, *Does Australia need a merchant shipping fleet?*, March 2020; the Senate Rural and Regional Affairs and Transport References Committee *Inquiry into the policy, regulatory, taxation, administrative and funding priorities for Australian shipping*, due for report in June 2020; the MUA report *Putting the 'Justice' in 'Just Transition' Tackling inequality in the new renewable economy,* November 2019; and the MUA report prepared by John Francis, *Australia's Fuel Security: Running on Empty*, November 2018

A national strategic fleet would comprise ships which are of national strategic importance to the nation, and provide a social and or community service benefit to the nation, and could include:

(i) Emergency towage vessels (ETVs - marine rescue and salvage ships) operated by the Australian Maritime Safety Authority (AMSA). There is only one such vessel at present, the *Coral Knight,* based in Cairns;

(ii) Research, supply and oceanographic ships such as those operated by or chartered to the CSIRO, the Australian Antarctic Division of the Department of Agriculture, Water and the Environment such as the *Aurora Australia* based in Launceston, and by marine authorities such as the Great Barrier Reef Marine Park Authority;

(iii) Border Force ships;

(iv) Certain Defence/Navy ships such as auxiliary fleet ships (particularly non-combat ships such as Navy training ships, Auxiliary Oil Replenishment (AOR) ships, supply ships etc.);

(v) Civilian training ships such as those operated by the Australian Maritime College (AMC);

(vi) Refined petroleum product (RPP) tankers involved in domestic and international supply chains providing national fuel security;

(vii) Coastal trading ships operating in regions where flood and cyclonic events invariably impact road and rail services supplying regional and remote communities such as north Qld and the NW of WA; and

(viii) Offshore wind turbine construction and maintenance ships.

The MUA now proposes that a new category, National Emergency Response ships, be added to the list above, being ships like harbour towage ships, offshore oil and gas industry support ships, ferries etc that can be made available in times of emergency. In combination with appropriate national strategic fleet ships already identified in the list above, these marine assets should be regarded as part of the suite of national emergency response marine assets that can be called upon in times of national emergency such as bushfires, floods and other severe weather events that the science is reporting will increase in frequency and intensity in the period ahead.

It is our submission that the Commonwealth and the States, through a COAG process, agree to compile a list of marine assets within the national strategic fleet that would be suitable to be called upon in times of national domestic emergency. We propose that the Commonwealth and States jointly enter into a partnership Memorandum of Agreement (or similar instrument) with the owners/operators of these marine assets setting out the conditions under which they can be called upon, and addressing any compensation issues regarding the temporary withdrawal of those assets from usual commercial operations. One of the conditions would need to address workforce issues, such as terms and conditions of employment while operating ships in emergency call up, including crew qualifications, training, hours of work, safety and workers' compensation aspects.

In addition to identification of existing ships that would form the national emergency response arm of the national strategic fleet, the idea of securing 'dedicated' national emergency response ships has emerged as an important feature in strengthening Australia's emergency response capability.

The timing of this proposal is fortunate as there are currently three eminently suitable ships that are already, or about to become available, that could be purchased by the Commonwealth to add to the national strategic fleet for emergency response and for other purposes such as seafarer training and charter for commercial coastal trading when not required for emergency response duties. These are:

- The *Aurora Australis*, a ship with considerable emergency response capability, when it completes its final mission under charter to the Australian Antarctic Division (AAD) sometime in 2020 to be replaced by the *RSV Nuyina*, which is under construction under a Federal contract and is due for completion later in 2020. The *Aurora Australis* has previously been charted to the Navy for humanitarian missions.
- Two ocean going RO-RO cargo ships owned by Toll Marine which were previously used in the Bass Strait trade (replaced with new-builds in 2019), and are now laid-up awaiting a buyer.

A national strategic fleet that delivers both a national emergency response capability and enhances the nation's economic security through the use of maritime assets to support fuel and energy security, carriage of dangerous goods and other national security requirements involving border force and customs functions is a matter that we hope will be considered by the Inquiry.

The MUA recommends that the Inquiry:

Recommendation 1
Acknowledge the important role that commercial and civilian operated ships and ports played in the nation's emergency response effort during the 2019-2020 bushfires.

Recommendation 2
Acknowledge that ships, ports and associated maritime infrastructure, equipment and personnel have not to date been given the level of attention necessary in the development of emergency response capability in Australia, and that this needs to be addressed as a high priority.

Recommendation 3
Note the public policy consideration being given to establishment of a national strategic fleet in Australia and that national emergency response capability is an important feature of a national strategic fleet.

Recommendation 4
Recommend that the Commonwealth and the States/Territories, through a relevant COAG process, undertake a stocktake of ships, ports and associated maritime infrastructure, equipment and personnel with a view to identifying those maritime assets that are suitable to be called upon in times of an emergency like fires, floods and other weather events and that as a result of that stocktake the Commonwealth and States jointly enter into a partnership Memorandum of Agreement (MOA) or similar instrument, supported by State/Territory

regulations if necessary, with the owners/operators of those maritime assets setting out the conditions under which they can be called upon in times of emergency, and that the MOA address, among other matters:

- *Compensation to marine asset owners/operators regarding the temporary withdrawal of those assets from usual commercial operations where there is loss to the owner/operator; and*
- *Workforce issues, such as terms and conditions of employment while operating ships in emergency call up, crew qualifications, crew training including emergency preparedness training, hours of work and rest, work health and safety, and workers' compensation.*

Recommendation 5

Recommend that the Commonwealth Government:

- *Purchase the Aurora Australis when it completes its final mission under charter to the Australian Antarctic Division (AAD) in 2020 and that it become a dedicated emergency response ship available for deployment throughout Australia in times of national emergency; and*
- *Purchase the two ocean going RO-RO cargo ships owned by Toll Marine which are currently laid up awaiting a buyer, and that these ships also become dedicated emergency response ships available for deployment throughout Australia in times of emergency; and*
    - *That Government owned ships purchased as dedicated emergency response ships be tendered out for commercial operations and as seafarer training ships when not on emergency response duty.*

MUA response to term of reference (b) Australia's arrangements for improving resilience and adapting to changing climatic conditions, what actions should be taken to mitigate the impacts of natural disasters, and whether accountability for natural disaster risk management, preparedness, resilience and recovery should be enhanced, including through a nationally consistent accountability and reporting framework and national standards;

Climate change

It is clear to us that a key driver behind the drought and bushfires of 2019-20 is global heating, driven by greenhouse gas emissions. The drought and fires had significant environmental and human health impacts, including on our members who experienced hazardous levels of bushfire smoke in their workplaces, and some of whom lost their homes in the fires. Any credible action to reduce the impact of bushfires must also seek to urgently reduce greenhouse gas emissions and slow or stop the process of global heating so that it does not exceed 1.5°C.

Recommendation 6
The Commonwealth Government to take urgent action to reduce greenhouse gas emissions sufficiently so as to ensure to ensure that global heating does not exceed 1.5°C, as global heating has been a key driver of increasing drought, bushfires, and poor air quality.

The health impacts of bushfire smoke

The geographic impact of the extreme bushfire season of 2019-20 was unprecedented, as smoke from bushfires affected millions of people located far from bushfire grounds. It was estimated in the *Medical Journal of Australia* that exposure to poor air quality due to bushfire smoke from the 2019-20 fires caused 417 premature deaths, over 3,000 extra hospitalisations for cardiorespiratory problems and 1,305 additional attendances for asthma attacks arising from smoke effects. This compares to 33 who reportedly died as a direct result of the bushfires.[3] The key data from the report are set out in Table 1.

Table 1: Estimated health burden attributable to bushfire smoke, Queensland, New South Wales, the Australian Capital Territory and Victoria, 1 October 2019 – 10 February 2020

	Estimated number of cases (95% confidence intervals)				
Outcome	Queensland	New South Wales	Australian Capital Territory	Victoria	Total
Excess deaths (any cause)	47 (17–77)	219 (81–357)	31 (12–51)	120 (44–195)	417 (153–680)
Hospital admissions, cardiovascular	135 (25–246)	577 (108–1050)	82 (15–149)	331 (62–602)	1124 (211–2047)
Hospital admissions, respiratory	245 (0–513)	1050 (0–2204)	147 (0–308)	585 (0–1227)	2027 (0–4252)
Emergency department attendances, asthma	113 (61–165)	702 (379–1026)	89 (48–131)	401 (217–586)	1305 (705–1908)

Source: The Medical Journal of Australia, March 2020, Research letter

There is a key role for the Commonwealth to play in coordinating a public health response that is nationally consistent and builds resilience to future fire events. Experts on the health effects of bushfire smoke argue that these measures should be considered in coordination with the broader response to bushfires:

> Managing the health impacts of fire smoke should be integral to landscape fire planning and bushfire emergency response. Close collaboration between health, education, environmental, fire management and emergency response agencies is essential for achieving the best overall outcomes for population health and wellbeing.[4]

[3] Borchers Arriagada, Nicolas, Palmer, Andrew J, Bowman, David MJS, Morgan, Geoffrey G, Jalaludin, Bin B and Johnston, Fay H, *Unprecedented smoke-related health burden associated with the 2019–20 bushfires in eastern Australia*, The Medical Journal of Australia, March 2020, https://onlinelibrary.wiley.com/doi/pdf/10.5694/mja2.50545

[4] Vardoulakis, Sotiris, Bin B Jalaludin, Geoffrey G Morgan, Ivan C Hanigan and Fay H Johnston, *Bushfire smoke: urgent need for a national health protection strategy*. The Medical Journal of Australia, 24 February 2020.

Below we outline how the bushfire smoke impacted on maritime workers, and key measures for the Commonwealth to reduce the health risks of future bushfire smoke events, in particular:

- Introducing a national hourly air quality standard for PM2.5 and PM10 particles, which would facilitate the harmonisation of the Air Quality Indexes used across different states.
- For Safe Work Australia to introduce national Exposure Standards for for PM2.5 and PM10 particles

Health impacts of bushfire smoke on maritime workers

The bushfire smoke crisis that lead to hazardous concentrations of PM2.5 and PM10 particulates affected east coast ports in the period between 30 October 2019 to 3 February 2020 and had an immediate and significant impact on maritime workers.

MUA members mainly work outdoors – on wharves loading and unloading ships, on international cargo ships lashing and unlashing shipping containers, on smaller ships, ferries, bunker barges, tugboats and pilot boats where members work as deck crew handling mooring lines, standing a lookout and carrying out maintenance. A great deal of the work is strenuous, requiring bending, lifting, and carrying large awkward items and working in confined spaces.

Virtually all work is carried out as part of a team, which means that communication between workers (including by radio) is essential to carrying out work effectively and avoiding life-threatening hazards.

Some MUA members work inside large machinery used to handle shipping containers (cranes, straddle carriers, shuttles, forklifts, rubber tyred gantries). While some of this machinery is air conditioned, in many cases it is old, not air-tight, and the air conditioning is not fitted with the HEPA filters required to remove the PM2.5 particles. Some items of machinery (rubber tyred gantries) offer a better and safer view for the driver if they roll down the window.

The effects on the workforce are described by a leading Health and Safety Representative:

> We had a few workers had to go to their GP for viral infections, and their GP told them that the effects of the infection on their lungs were exacerbated by smoke. Workers experienced watery itchy eyes, irritation of their throats and shortness of breath. They had headaches and constantly felt fatigued.[5]

First aid workers are employed at some of our larger workplaces. At one workplace with about 40-70 workers at a time, the following incidents were reported due to poor air quality.

[5] An elected and trained Health and Safety Representative under the WHS Act, who is also a worker at a Port Botany container terminal.

Unfortunately, at this workplace the employer refused to implement the MUA's advice on reducing workers' exposure (Table 2).

Table 2: First Aid incidents on days of hazardous air quality in a workplace where the employer refused to implement the MUA's advice to members to reduce their exposure to bushfire smoke.

Date	First Aid incidents at a Port Botany workplace on selected poor air quality days	Highest hourly levels of PM2.5 and PM10 recorded on that day at the closest monitoring sites (Randwick and Earlwood)
3 Dec 2019	- 5 people reporting eye irritation, some with trouble breathing due to smoke. - 3 people need oxygen therapy	PM2.5: 278 µg/m³ Randwick at 1200 PM10: 292 µg/m³ at Randwick at 1100
6 Dec 2019	- 13 people reporting eye irritation and the inability to breathe well due to smoke - Problems with eye irritation which needed to be flushed with saline - 2 people treated with oxygen therapy	PM2.5: 76 µg/m³at Earlwood at 1700 PM10: 135 µg/m³ at Randwick at 1700 Previous day also had hazardous air quality
10 Dec 2019	- 21 people reporting eye irritation and breathing problems due to smoke - 3 people treated with oxygen therapy	PM2.5: 468 µg/m³ at Randwick at 1200 PM10: 543 µg/m³ at Earlwood at 1200

Source: Air quality data from NSW Department of Planning, Industry and Environment, Search for and download air quality data (accessed on 18 March 2020).

Health and Safety Representatives report that they had never had to use oxygen therapy in the workplace with this level of frequency (eight times in a week). Some workers had childhood asthma re-triggered, and some needed to use the oxygen for an hour. In general workers had a high level of anxiety, both due to the immediate health effects of the smoke, the unknown longer-term implications, and the fear of repercussions from the employer for raising it as a health issue.

Mitigating the health impact on workers

We recommend that workers be considered an at-risk group worthy of particular consideration in relation to air quality standards. This is because:

- A significant portion of the workforce is potentially exposed to poor air quality at work, for many hours at a time, and over weeks and months.
- However, our experience is that employers do not offer workers a choice about whether they wish to be exposed to poor air quality and have not attempted to reschedule work to times of lower exposure. This means that workers are frequently not able to take the advice of health departments and Air Quality Indexes to reduce exposure to poor air

quality without also risking their livelihood. They are effectively forced to choose between their health and their job.

Despite the level of exposure of the maritime workforce to significant recurring periods of poor to hazardous air quality from, and the duty of care held by all employers under the WHS Act to provide a safe workplace, we did not have a single employer approach the workforce or the union with the aim of trying to limit the exposure of workers to hazardous air quality. Instead workers were encouraged to continue carrying out their work in the same way despite the new hazard.

Workers worked through the periodic exposure to hazardous air quality and the consequent effects between 30 October and 4 December. On 4 December, the MUA convened a meeting of Health and Safety Representatives from many of the affected NSW workplaces, who resolved to implement the activity recommendations of the NSW Air Quality Index and NSW Health as best as they could in their workplaces. 5 December and then 10 December were days of exceptionally hazardous air quality. When workers sought to implement the NSW Health air quality recommendations, employers threatened them with being stood down off pay, and claimed they were taking illegal industrial action. One employer withheld a portion of workers' pay.[6]

Employers asserted that the hazard of smoke was beyond their control so therefore they had no obligation to implement controls to reduce risk to the workforce.

Recommendation 7
That the Inquiry note that workers are an 'at risk' group because they do not have the freedom to follow health advice and reduce their own exposure unless their employer agrees – and employers have been generally unwilling to reschedule work to times of better air quality. Workers have had to risk their livelihood to reduce the impact of bushfire smoke on their health. Outdoor workers will also have a significant level of long-term exposure.

Implementing the hierarchy of controls of risk

In January 2020, Safe Work Australia published guidance on *Bushfires and air pollution,*[7] and later the more detailed document *Managing the risks from air pollution: Advice for PCBUs*.[8] These documents rightly emphasise the importance of using the hierarchy of controls of risk to reduce workers' exposure to hazardous air pollution. As Safe Work Australia advise, this means the first action to take is to: "Relocate work to areas with good air quality (for example,

[6] Peter Hannam and Anna Patty, Docks halt, electrical workers stop work as Sydney's pollution worsens, *Sydney Morning Herald*, December 5, 2019; Dana McCauley, 'Act of bastardry': Wharfies' Christmas bonus cancelled after smoke haze stopped work', *Sydney Morning Herald*, December 19, 2019.
[7] Safe Work Australia, *Bushfires and air pollution*, 8 January 2020.
[8] Safe Work Australia, *Managing the risks from air pollution: Advice for PCBUs*, 31 January 2020.

employees working from home or alternative sites). If air pollution is limited to outdoors, postpone outdoor work."[9]

Properly applying the hierarchy of controls of risk also coincides with the advice from air quality and health experts and state health departments that the most effective way to limit exposure to poor air quality is to stay indoors out of smoke, with all doors and windows closed.[10]

The WHS Act, Regulations, Codes and guidance material are very clear that the hierarchy of controls should be used to reduce risk in workplaces. However, once employers were forced to acknowledge the hazard, carry out risk assessments, and implement controls, most employers went straight to the lowest control measure in the hierarchy of control, Personal Protective Equipment. There are very significant limitations to the effectiveness of masks for the work carried out by maritime workers, as follows:

- Most workers are exposed to poor air quality for virtually all of their shift (eight or twelve hours in length).
- Masks are not effective as they are constantly bumped and dislodged due to strenuous work in often confined spaces.
- Masks do not protect the eyes, and constantly watering eyes means workers cannot see effectively to do their job safely.
- Masks also create other hazards, such as poor communication. The result was that in order to do the job safely, workers would temporarily remove their masks to speak to the workers alongside them or on the radio. A workplace Health and Safety Representative said that trying to talk through a radio wearing a mask sounds like "marbles underwater" and is incomprehensible.[11]
- Masks make breathing more difficult and lead to workers feeling more fatigued, which in turn is a safety hazard.
- Workers already wear heavy Personal Protective Equipment (PPE), including steel toed boots and coveralls, and usually work in the direct sun. Poor air quality frequently occurred on hot days (with some also humid), increasing the impact of poor air quality on the body and the resulting fatigue.

One employer brought in an occupational hygienist without any medical qualification, who told the workforce that masks were effective at any level of air quality, and for all tasks. This clearly goes against the hierarchy of controls of risk. Frequently workers were offered little in the way of consultation, proper training on the use of this PPE in the circumstances or information. This

[9] Safe Work Australia, *Managing the risks from air pollution: Advice for PCBUs*, 31 January 2020.

[10] Ana Porta Cubas, A/Prof Fay Johnston, Dr Amanda Wheeler, Dr Grant Williamson, Dr Christine Cowie, Dr Rachel Tham and Dr Tom Cole-Hunter. *Bushfire smoke: what are the health impacts and what can we do to minimise exposure? A factsheet from the Centre for Air Pollution, Energy and Health Research (CAR)* December 2019. A spokesman for Health NSW said it was "a duty of care for employers to make sure employees have a safe workplace. Our advice is don't be in it is the best way to avoid health issues." See Docks halt, electrical workers stop work as Sydney's pollution worsens, *Sydney Morning Herald*, 6 December 2019.

[11] An elected and trained Health and Safety Representative under the WHS Act a worker at a Port Botany container terminal.

put workers at risk, both because it meant that opportunities to reduce exposure were not taken, and because mask introduced new risks (such as the lack of ability to communicate).

The experience outlined above on the ineffectiveness and additional hazards caused by masks, mean that by far the most effective control measure is to reschedule work to times of better air quality.

Despite the long period of time over which workers were exposed, most poor and hazardous air quality was actually in short acute episodes of 4-6 hours, usually during hottest part of the day, with air quality significantly improving in the evening and night. This offers significant scope for work to be rescheduled to times of better air quality.

Need for hourly national air pollution standards

Moving work indoors or postponing it until a time of better air quality is not a decision that any worker or employer would take lightly, and therefore it is critical to determine at what level of hazard such a control should be implemented. To make this assessment, Safe Work Australia refers to the Air Quality Indexes in States and Territories.[12] However, there are very significant differences in the Air Quality Indexes between states in terms of what different concentration of pollutants are called (e.g. Poor, Very Poor, Hazardous), and what advice is given at different levels of concentration. This is a highly unsatisfactory situation.

Efforts should be put in clarify and coordinate the advice provided at different levels of air pollution. The NSW Health advice associated with the NSW AQI is that it clearly directs people on what action they should take at different levels of air quality. Other states should be encouraged to adopt similar advice in their AQIs. This is essential to reducing confusion and enhancing safety.

The inconsistency between State Air Quality Indexes is largely based on the lack of any national hourly air quality standards for PM2.5 or PM10 – current national standards for PM2.5 and PM10 are only measured as a 24-hour average or a one-year average. While a 24-hour or 1-year average may be of use for monitoring air quality in a general sense, it is totally insufficient for allowing workers and organisations to make decisions about what actions to take in response to poor or hazardous air quality.

Recommendation 8
That the Inquiry support the introduction of an hourly standard in the National Air Pollution Standards for PM2.5 and PM10, in addition to the current 24-hour and 1-year standards. This would allow states to better align their Air Quality Indexes and reporting.

[12] Safe Work Australia, *Bushfires and air pollution*, 8 January 2020. Safe Work Australia, *Bushfires and air pollution*, 8 January 2020.

What is an appropriate air quality standard?

In the absence of clear government standards or leadership from employers as the smoke crisis developed in 2019, our union had to rapidly develop advice to members on how best to protect themselves. This advice drew on existing Commonwealth and NSW standards, but had to be specifically developed to meet the needs of outdoor workers. Workers used these measures in some workplaces from 5 December 2019, and the advice was rolled out to all NSW members on 10 December and used until the bushfires were finally extinguished in early February. In mid-February, many of the Health and Safety Representatives who had been involved in developing and implementing these measures met to review and update them.

We are not aware of any existing research on the effects of bushfire smoke on outdoor workers, with the exception of firefighters, so the evidence offered by workers who are members of our union is particularly important.[13]

The advice issued to members is attached. Key aspects of the measures implemented were:

- Hourly average measurements of air quality accessible to all members of the workforce through the AirRater app (see airrater.org), which is run by the University of Tasmania using information from the NSW government monitors.
- Guidance that strenuous work such as lashing shipping containers cease when PM2.5 reached 37.5 micrograms per cubic meter (hourly average) and PM10 reached 75 micrograms per cubic meter. Lacking any agreed hourly standard in Australia, we applied the national standard for PM2.5 of 25 micrograms per cubic meter to hourly measurements, which made 37.5 micrograms per cubic meter the threshold for 'Very Poor' air quality.
- Other control measures to reduce exposure such as more frequent breaks and rotation of workers indoors to reduce the time they were exposed to poor air quality.

This advice was then used by elected and trained workplace Health and Safety Representatives in workplace risk assessments, Safety Committees, and in other negotiations with employers. Most employers eventually agreed to follow these recommendations, although none were vigilant in actually monitoring air quality – workers had to do this themselves.

One large employer in Port Botany refused to implement the MUA's advice, requiring workers to work using masks at all levels of air quality. The effects of this decision are highlighted in Table 2. On hazardous air quality days, the first aid person on duty had to administer oxygen to 2-3 workers per day who had difficulty breathing. First 5, and then 15, and the 21 people presented to first aid on each hazardous day with eye irritation and difficulty breathing. Some had such irritated eyes that the first aider used saline solution. The numbers of workers escalated with each hazardous day, suggesting a cumulative effect.

[13] Centre for Air Pollution, Energy and Health Research, submission to the NSW Inquiry into the health impacts of exposure to poor levels of air quality resulting from bushfires and drought, p.6.

In workplaces where the MUA's recommended measures were put in place (especially ceasing strenuous work when the hourly average of PM2.5 reached 37.5 micrograms per cubic meter), fewer health incidents were recorded. Leading Health and Safety Representatives reported that with these measures in place workers still experienced headaches and fatigue, but there was a significant reduction in the kind of acute breathing and eye issues reported in Table 2.

In terms of appropriate air quality measures for outdoor workers doing strenuous work, leading health and safety representatives report that:

> Workers started to experience health effects at 'poor' levels of air quality (hourly average of PM2.5 higher than 25 micrograms per cubic meter). At 'very poor' (hourly average of PM2.5 higher than 37.5 micrograms per cubic meter) or 'hazardous' (higher than 50 micrograms per cubic meter) it became very difficult to sustain outdoor work.[14]

When workplace Health and Safety Representatives involved in implementing the MUA's advice in workplaces reconvened to review the implementation of these measures in mid-February 2020, they agreed the following:

- Support for the MUA's existing advice and measures, and agreement that they were appropriate for the protection of workers from the effects of poor air quality
- After a detailed discussion of the impact on workers, the effectiveness of masks when performing various tasks, and overall workflow in container terminals, the measures were strengthened to provide clearer guidance (Table 3).

Table 3: Updated measures necessary to protect outdoor workers carrying out strenuous work, agreed in February 2020

Hourly average of air quality measures	Measures to protect workers
PM2.5 higher than 25 µg/m³ or PM10 higher than 50 µg/m³	15-minute break every hour for outdoor exposed workers Workers with pre-existing medical conditions to be assigned to alternate duties
PM2.5 higher than 37.5 µg/m³ or PM10 higher than 75 µg/m³	All outdoor exposed work to cease. Maintenance workers can attend to emergencies. Work in machinery can proceed if air conditioning is fitted with HEPA filters.
PM2.5 higher than 50 µg/m³ or PM10 higher than 100 µg/m³	All work to cease

[14] An elected and trained Health and Safety Representative under the WHS Act who is also a worker at a Port Botany container terminal.

Research supporting stronger air quality standards

In 2016 Australia improved its air quality standards to:

- Maximum concentration standard: an average of 25 micrograms/m^3 per day, and lower than an average of 8m^3 per cubic meter per year.
- And to improve standards to an average of 20 micrograms/m^3 per day, and 7m^3 per cubic meter per year by 2025.[15]

In 2016 Australia improved its standards for PM10 to:

- Maximum concentration standard: an average of 50 micrograms/m^3 per day, and lower than an average of 25m^3 per cubic meter per year.[16]

The need to improve these air quality standards even further is acknowledged by the agreement to improve them in 2025. Even more recent research found increased hospital admissions even at PM2.5 levels *below* 25 micrograms/m^3, and that hospital admissions increased with each 1 microgram increase in PM2.5 concentration.[17]

A recent article in the *British Medical Journal* concluded 'there is no safe lower limit to exposure'.[18]

Recommendation 9
That the Inquiry note the MUA experience as submitted that for outdoor workers doing strenuous work, workers started to feel obvious negative health effects once PM2.5 levels reached 25 micrograms per cubic meter, measured as an hourly average. We do not have the capacity to know if there are less perceptible health effects at lower levels of exposure.

Recommendation 10
That the Inquiry agree that workers should not be required to do strenuous outdoor work at PM2.5 levels above 37.5 micrograms per cubic meter or PM10 levels above 75 micrograms per cubic meter, measured as an hourly average. Measures to reduce workers' exposure should be taken before air pollution reaches those levels. Health observations of workers should be undertaken to see if there are also negative health effects at lower levels of air pollution.

Recommendation 11
That the Inquiry agree that hourly averages are better than 24-hour averages, but they are still too long to make decisions about safe levels of air pollution for outdoor workers. Information should be available on an instantaneous basis (or averaged over a few minutes). In Tasmania air quality is reported every 10 minutes.

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[15] https://www.legislation.gov.au/Details/F2016L00084
[16] https://www.legislation.gov.au/Details/F2016L00084
[17] Yaguang Wei et al. Short term exposure to fine particulate matter and hospital admission risks and costs in the Medicare population: time stratified case crossover study. *British Medical Journal*, 27 November 2019.
[18] Loxham et al. The health effects of fine particulate air pollution, Editorial, *British Medical Journal*, 27 November 2019.

Hourly air quality standards over multiple hours

In setting an hourly air quality standard, consideration must be given to the fact that it will be used over multiple hours. In the case of outdoor workers, hourly air quality standards will be used to manage their exposure over shifts of 8-12 hours in length.

Recommendation 12
That the Inquiry agree that the appropriate level for an hourly air quality standard should not be based on exposure for a single hour, but exposure over a day. The current NSW interim hourly standard and the Victorian hourly air quality standards are far too high and cannot be applied for 8-12 hours continuously.

Confusion about different Air Quality Indexes

There is very significant confusion in the community about how to measure air quality and the health effects of poor air quality. Multiple jurisdictions in Australia and around the world produce an Air Quality Index (AQI), but they are all based on different standards and different advice at different levels of air pollution.

In particular, the AQI produced by the American government is widely used on commercial apps and websites. These apps and websites are often more readily available and more user friendly than Australian state government websites, and give information on air quality in Australia, but using poorer American standards and with advice kicking in at higher levels of pollution. Many of the commercial apps are also designed to encourage people to buy their own monitors or air filters, rather than providing clear health advice. For example, the widely use 'AirVisual' app defaults to satellite observations even when the user is very close to a government air quality monitoring station, and then encourages the user to buy their own monitor to get more accurate information on local air quality.

Recommendation 13
That the Inquiry recommend that the Commonwealth Government coordinate a major public education campaign among states on the hazards of poor air quality, and how best to manage them. It should support the development of an easy to use air quality app linked directly to health advice on actions to take at escalating levels of air pollution. Air quality apps and websites providing information on locations in Australia should be required to report this using Australian standards.

Safe Work Australia Exposure Standards

Safe Work Australia should develop exposure standards for PM10 and PM2.5 in the context of bushfire smoke. There are currently no workplace standards for exposure to these particulates. This would help to ensure consistency and that standards are appropriate to workplaces.

Recommendation 14
That the Inquiry recommend that Safe Work Australia to develop workplace standards for exposure to PM2.5 and PM10.

Safe Work Australia

The hierarchy of controls of risk that are part of the WHS Act (described earlier) offer an excellent framework for addressing the risk of poor air quality. MUA Health and Safety Representatives in multiple workplaces dealt with employers and Safe Work NSW inspectors and hygienists around the issue of air quality in December 2019-February 2020. It is clear to us that considerable work needs to be done to address:

- What risk poor air quality from bushfire smoke and drought causes to workers, including the latest research on elevated PM2.5 particles.
- How the hierarchy of controls should be implemented to address the risk of poor air quality.
- The limitations of masks in reducing the risks of exposure.

There was considerable confusion in workplaces about appropriate measures for workers in vehicles. While many vehicles had air conditioning, it was eventually determined that very few were installed with HEPA filters that were effectively filtered out PM2.5 particles. This meant that workers had to wear masks inside vehicles, which then caused all the hazards outlined earlier. Other vehicles had to be operated with windows open to give workers a proper view of the containers they were picking up and dropping off. Eventually it was determined that machinery without HEPA filters should not be driven when PM2.5 was above 37.5 micrograms per cubic meter.

Safe Work Australia should take on a coordinating role to ensure that state WHS regulators have access to the best research on the health impacts of air quality and how to manage this.

Recommendation 15
That the Inquiry recommend that Safe Work Australia develop more detailed guidance for workplaces on how to implement the hierarchy of controls for air pollution across all types of workplaces and including vehicles. Safe Work Australia should facilitate training on the health effects of air pollution, how to implement the hierarchy of controls, and the limitations of PPE that reflects the latest science and research.

MUA response to term of reference (f) Ways in which Australia could achieve greater national coordination and accountability - through common national standards, rule-making, reporting and data-sharing - with respect to key preparedness and resilience responsibilities, including for the following.

(i) Land management, including hazard reduction measures;

(ii) Wildlife management and species conservation, including biodiversity, habitat protection and restoration;

(iii) Land-use planning, zoning and development approval (including building standards), urban safety, construction of public infrastructure, and the incorporation of natural disaster considerations;

The MUA notes that First Nations communities have managed their country for countless generations using traditional cultural burning techniques. Contemporary practitioners including the Firesticks Alliance Indigenous Corporation promote this method for fuel and hazard reduction, supporting the health of particular plants and animals and creating fire intervals across the landscape. Firesticks Alliance advocates that "implementing fire to enhance ecosystem health within culturally connected landscapes improves habitat condition and connectivity."

The 2019-20 bushfire crisis across Australia shows that vast funding increases are needed for land management and rehabilitation. The catastrophic impacts of climate change make this all the more urgent.

All levels of Government must work together to provide a coordinated and well-funded cultural burning program across the country, with training and rollout of the programs to be developed and controlled by local First Nations community members, ultimately, with the support of a First Nations Voice structure as called for in the Uluru Statement from the Heart.

The MUA supports the continuing struggles for First Nations people to have rights to land and responsibility for leading the management of their traditional country.

Recommendation 16

That the Commonwealth government work with states to provide a coordinated and well-funded cultural burning program across the country, with training and rollout of the programs to be developed and controlled by local First Nations community members.