

**IN THE MATTER OF
The Hazelwood Coal Mine Fire Inquiry**

STATEMENT OF COSTA KATSIKIS

Date of Document: 27 May 2014
Filed on behalf of: The State of Victoria
Prepared by:
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Attention: Peter Stewart

I, COSTA KATSIKIS, of 10 Baker Street, Richmond, Victoria, Hazmat Unit Commander, Special Operations Department, Metropolitan Fire and Emergency Services Board (**MFB**), can say as follows:

1. My full name is Costa Katsikis. My date of birth is 19 April 1965.
2. I am the Hazmat (Hazardous Materials) Unit Commander, Special Operations Department of the MFB. I am based at 10 Baker Street, Richmond, Victoria.
3. I have been in my current role since 14 December 2012. My primary responsibility involves supporting MFB Operations with an effective Hazmat and Scientific Advisor capability. This includes: skills acquisition and maintenance of specialist Hazmat Technicians; maintenance and service of specialist equipment, including Chemical Biological and Radiological (**CBR**) equipment; fostering inter-operability with other agencies and sharing information across jurisdictions to ensure continuous improvement; and represent MFB at various national and jurisdictional committees.
4. I work alongside other agencies and Government departments to exercise and enhance jurisdictional Hazmat and CBR capability. This includes: providing skills acquisition and maintenance for Victoria Police and Ambulance Victoria in the use of Personal Protective Equipment (**PPE**); assisting Department of Health with CBR courses; chairing the state CBR Training Working Group; and participating as the MFB representative at the Australasian Fire Authorities Council Hazmat Technical Group.
5. I have a Graduate Diploma and Graduate Certificate in Applied Management from the Charles Sturt University; Associate Diploma of Fire Technology from Swinburne University and a Diploma of Training and Assessment Systems from the University of Melbourne. I also hold various other specialist qualifications obtained following internal MFB courses and external courses.

6. As an MFB commander, I have received training in Incident Management that allows me to assume the role of Incident Controller (**IC**) at various fires and incidents, in line with the State Emergency Response Plan and arrangements. I have been an MFB commander since 2010. I was acting Assistant Chief Officer of MFB Special Operations department for several months from 20 September 2013 until late January 2014.
7. I have been employed by the MFB since 29 September 1988. I have attended several significant incidents including Hazmat, structure fires and non-structure fires as the officer in charge, and in Incident Management Team (**IMT**) support and technical roles. I attended the Coode Island fire as part of the MFB Breathing Apparatus specialist crew, coordinating fire fighter breathing apparatus activities. I have also taken part in a number of other high profile incidents and fires as part of IMTs. This had included incidents such as floods and bushfires, in a variety of IMT roles and locations, including interstate.
8. I have provided this statement pursuant to the request made by Counsel Assisting the Hazelwood Coal Mine Fire Board of Inquiry by letter dated 22 May 2014 (**Letter**).
9. I note that the Letter requesting this statement seeks information from the Deputy ICs for the period 14-16 February 2014 in relation to the Hazelwood Mine Fire. I was one of the Deputy ICs in this period on day shift.
10. I first arrived at Hazelwood late afternoon on 13 February 2014 in preparation for my deployment to the Hazelwood Mine commencing 14 February 2014 to assist the IMT, following a request from CFA for MFB support. I commenced as one of two Deputy ICs in the IMT that was operating from the Hazelwood Mine at the time, on 14 February 2014.
11. At 0800 hours on 14 February 2014, I met up with the day shift IMT and we received a collective handover briefing from the night shift IMT that had been operating the previous shift. This type of briefing is standard practice during crew changeovers and helps to establish situational awareness of the incident and associated issues. At this meeting I received information about the extent and location of the fire within the mine.
12. During the course of the morning, I had a discussion with the Hazmat Sector commander Andrew O'Connell on site. We discussed the current Hazmat strategy and atmospheric monitoring activities in place. MFB Commander Andrew O'Connell told me that atmospheric detection equipment had been strategically placed around the mine perimeter due to limited detection resources. This included fixed Area RAE detection equipment with a capability to monitor a number of different hazardous materials (carbon monoxide, hydrogen sulphide, oxygen, lower explosive limits and volatile organic compounds). Additionally, CFA and MFB specialist Hazmat Technicians were required to drive around the mine and relay Carbon Monoxide (**CO**) readings via radio and mobile phone back to a Hazmat base station at the Divisional Command point that was established on the mine perimeter. These readings were compared to Australian occupational exposure standards to ensure the safety of fire fighters and mine workers. The fixed perimeter detection equipment also provided early warning for potential community impact during elevated CO readings and changing weather conditions. In the event of high CO readings being registered around the perimeter near the freeway, a Hazmat Technician would be deployed into the community to assess the risk using hand held detection equipment whilst maintaining communications with the Hazmat base station.

13. MFB and CFA atmospheric detection equipment in conjunction with an Australian occupational exposure standard (SafeWork Australia Occupational Exposure Standards, Health and Safety Information Systems) was also used to delineate between safe and hazardous areas around the mine site. A COLD zone identified an area with CO readings of up to 9 parts per million (**ppm**) and was considered a safe area. A WARM (Unrestricted) zone identified an area of CO readings less than 30 ppm allowing fire fighters and mine workers to work in standard PPE, including a particular type of disposable mask known as a P2 respirator, maintain standard work hours and undergo health surveillance as per the site procedure. A WARM (Protective Action) zone identified an area of CO readings between 30 to 50 ppm with a requirement for fire fighters to wear Self Contained Breathing Apparatus (**SCBA**) and implement regular crew rotations. A HOT (Restricted) zone identified an area where CO readings were greater than 50 ppm with a requirement for full PPE to conduct essential works. These standards were established prior to my arrival at the mine and sourced from the Health Management Plan – Hazelwood Coal Mine Fire, Version 0.3 that I received on 14 February 2014 (Attachment 1) [\[MFB.0001.001.0001\]](#).
14. In relation to the safety of the community, detection was also being carried out in and around the community of Morwell. That detection occurred whenever the detection devices being used within the Mine recorded a level at or about 9 ppm and the prevailing wind meant that affected air was being carried in the direction of Morwell. In this instance MFB and CFA Hazmat Technicians would be deployed into the community to conduct atmospheric monitoring using hand held detection equipment. Similarly, the Scientific Advisor would liaise with the Environment Protection Authority (**EPA**) and Department of Health (**DH**) for guidance.
15. The level of 9 ppm had been set prior to my arrival at the Mine. However, I was later made aware that it was consistent with the Australian Government, Department of Environment and Heritage recommendation, which was being applied to community exposure by EPA and DH (as opposed to the Occupational Standard applied at the Mine for fire fighters and mine workers). The Department of Environment and Heritage recommend the ambient air CO level is kept below 9 ppm and persons not exceed this level for more than 8 hours in one year. I sourced this information from the Health Management Plan – Hazelwood Coal Mine Fire, Version 0.3 that I received on 14 February 2014 (Attachment 1) [\[MFB.0001.001.0001\]](#).
16. On the morning of 14 February 2014, the IMT was informed by the DH representative on site (Stephen Waddington) that he was informed by the EPA atmospheric expert (Paul Torre) that EPA had undertaken CO walking monitoring in Morwell during the morning with no CO detected and occasional smoke events detected. I recall that the IC had also requested that Mr Waddington obtain a written confirmation of EPA's activity and responsibility for community monitoring.
17. I was not involved in the issuing of any advice messages to the community on 14 February 2014.
18. On 15 February 2014, I started at 0800 as Deputy IC. Following the commencement of my shift, I recall that the Regional Controller Andrew Zammit had attended for a meeting with the Hazelwood IMT. I do not recall the time of this meeting. Attendees included the IC Nick Brown, Deputy IC Bloink, Hazmat Sector Commander Andrew O'Connell, Regional personnel and I. At this meeting it was decided to appoint Andrew O'Connell as the third Deputy IC due to the complexity

of the Hazmat response and associated atmospheric monitoring requirements. The appropriateness of the Incident Control Point and Divisional Command Point was also discussed at this meeting.

19. Following this meeting I arranged a meeting with the Hazmat Deputy IC, the Safety Officer, the Occupational Health and Safety Support Officer, and the Ambulance Victoria Health Commander. The purpose of this meeting was to plan an appropriate structure to effectively manage the Hazmat and Safety Sectors. The meeting also identified additional resource requirements to enable effective operations. Relocation resources were also discussed and identified at this meeting, as the current facilities and location of the Divisional Command site did not offer continuous responder safety due to changing weather conditions and proximity to the Mine. Additionally the current Incident Control Point was under-resourced and could not cater for IMT expansion. I recall that the IC approved the relocation of both the Divisional Command Point and Incident Control Point.
20. At around midday on 15 February 2014, Deputy IC Andrew O'Connell telephoned and advised me that Hazmat Technicians were recording elevated CO readings within some parts of Morwell. I conveyed this information to the IC and advised Andrew O'Connell to return to the Incident Control Point to discuss further, as he was still at the Hazelwood site. A meeting was held at the Incident Control Point once Andrew O'Connell returned. Attendees included: the IC Nick Brown, the three Deputy ICs, the Scientific Advisor and the Public Information Officer. At this meeting the Scientific Advisor confirmed that CO levels in some parts of Morwell South were high. A weather report was also provided to the IMT indicating a late wind change that afternoon. The change in wind conditions was likely to blow the smoke and hazard elsewhere or disperse it. I recall the IMT discussed the need to warn the community and decided to release a telephone warning advising residents to 'shelter in place'. I also recall that the IC instructed Deputy IC O'Connell to assist the Public Information Officer to draft the message and identify the target area for release.
21. A warning was then issued as a result of the elevated readings. Whilst I do not know details of it, I was aware that it advised people to shelter in place and monitor sources of information for updates.
22. Following this briefing a telephone hook up was established with a DH Toxicologist. Mr Waddington, the IC, the three Deputy ICs and the Scientific Advisor were present during this conversation. During this conversation the DH Toxicologist stated that CO levels of 15ppm were similar to cars in Sydney Road, Melbourne or standing near a gas cooker. She also made reference to other standards that included higher thresholds over a longer period of time.
23. Following this conversation I recall the IC showing concern due to this conflicting information. I also recall the IC telephoning the Regional Controller Andrew Zammit, as he did not seem convinced by the DH Toxicologist's reasoning. I was in the room during this conversation but cannot recall the dialogue.
24. A wind change occurred which caused the CO levels in the town to be reduced. I passed that information on to the IC. I am aware that a downgrade message was issued, but I was not directly involved in how or when that occurred.
25. On 16 February 2014, the IMT had been relocated from the Mine site to the Traralgon Incident Control Centre (ICC). During the afternoon of 16 February, I attended an IMT meeting, which was attended by those who made up the IMT and

members of the Emergency Management Team (EMT) including: Victoria Police, DH and EPA. The CFA Scientific Advisor was linked into the meeting via a telephone connection whilst returning to the ICC.

26. The purpose of the meeting was to make a decision on what to tell the community as CO levels had risen. CO readings from the southern end of Morwell were discussed. The Scientific Advisor advised the group that these readings were in the high 20s to low 30s ppm with a peak reading of 60 ppm. These readings were consistent both inside and outside the bowls club and had remained steady for a number of hours. There was no predicted weather change for the next 12 hours and visibility was reported to be poor.
27. At this meeting the IMT and EMT discussed the feasibility of a 'shelter in place' advice, however, this did not appear to be a sound option as the readings from the bowls club, both internally and externally, indicated that sheltering in place would still pose an exposure risk. The option to voluntary relocate community was also discussed but Victoria Police were concerned as evacuation plans could take hours to implement and this had not been initiated.
28. I recall that the IC had requested the Public Information Unit and the Hazmat Deputy IC to draft a community message at the conclusion of this meeting but I was not involved in this process.
29. Following this meeting, the IC Nick Brown and I were advised by the Regional Controller Andrew Zammit, that an agreement had been reached in relation to community warnings. We were then directed that information regarding elevated CO levels be passed on from the Hazmat sector via the Scientific Advisor to the EPA for data analysis. The EPA would then provide this information to the DH who would ultimately decide on the appropriate community warning to be issued.
30. By reason of this process, I did not have any involvement in warnings that were issued in relation to CO levels on 16 February 2014. I have since discussed this matter with Andrew Zammit and I understand that the final decisions about community warnings made on 16 February 2014 and following were made pursuant to an Air Quality Decision Tool prepared by the State Control Team after expert advice from the DH and EPA.

Dated: 27 May 2014

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COSTA KATSIKIS

Health Management Plan

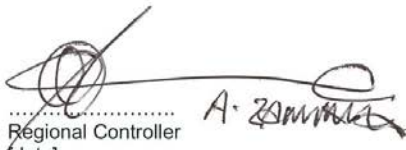
Hazelwood Coal Mine Fire

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This Plan including all Appendices has been approved and endorsed by the following:

Approval:


.....
Regional Controller
[date]

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Incident Controller
[date]

.....
CFA Medical Officer
[date]

Endorsed by:

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State Controller
[Date]

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CFA Chief Executive Officer
[Date]

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MFB Chief Executive Officer
[Date]

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VICSES Chief Executive Officer
[Date]

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CFA Chief Officer
[Date]

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MFB Chief Officer
[Date]

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VICSES Chief Officer
[Date]

Purpose

The Health Management Plan for the Hazelwood Coal Mine Fire has been developed to manage the health of all personnel on the fireground at the Hazelwood Mine.

The Plan documents the health arrangements in relation to:

- The health monitoring process for personnel deployed to the mine fire that involves measurements of carboxy-haemoglobin (COHb) of personnel in the Hot and Warm Zones

Crew Selection

General Health Issues

Individuals who are heavy smokers, have a history of cardiovascular or respiratory conditions should not be deployed to this incident. This is due to the increased physiological sensitivities that might be attributable from increased carbon monoxide levels in the open cut fire.

Crews planning to be deployed for a shift in the open cut fires should have 24hrs of “clear time” away from smoke logged incidents (e.g. prior deployments).

Female Personnel

Due to the increased presence of carbon monoxide at the open cut fire there is a risk to the foetus of pregnant women exposed to high levels of concentrations from the carbon monoxide at this incident.

Due to this risk any female fire-fighter who is pregnant or there is any chance they may be pregnant, should not attend this incident due to the increased potential exposure to carbon monoxide. Female firefighter should seriously consider this advice.

Pre Entry, Pre Tasking Pre Deployment

Crews are to be briefed of the risks and safe work practices from CO prior to deployment. Prior to release crews should be made aware of the symptoms of CO exposure and advise to present to hospital should these occur. Symptoms include headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion.

Crew Health Management

The following is to occur:

- Agencies providing crews for deployment are to ensure the crew selection criteria are met.
- The Incident Controller will determine the Hot Zone and Warm Zone.
- The Incident Controller will identify 'Dirty' and 'Clean' areas and appropriate areas for decontamination and disrobing.
- Crew health observations are to occur and be recorded in accordance with the Health Monitoring Process (Attachment 1).
- Where any results do not meet the criteria established they are not to be deployed.
- Crew deployment shift times are to be recorded and monitored to ensure they do not exceed the maximum timeframes according to the classification of the work area.
- There will be ambient gas monitoring in Hot and Warm Zones.
- A 'bagging' and 'tagging' process will be followed.
- The incident is to be deemed a non-smoking site to reduce the impact of CO build up in individual's
- All gas monitoring results are to be logged and maintained. Results that exceed defined levels are to be investigated to ensure crew welfare is not placed at risk and appropriate control strategies are in place
- All injuries, near misses or hazards are to be notified via the chain of command, recorded and action taken where deemed appropriate

Shift Arrangements

Maximum shift durations for this incident are in accordance with the **Process of handling C0 p 24 of 25 Incident shift plan 13/2/14**

These shifts arrangements should be regularly reviewed and will be modified based on risks identified such as:

- extreme heat
- heavy smoke logging
- work activity
- work rate

The contracted Decontamination and Cleaning Service Provider can attend and collect items from the staging area. Cleaned items will be returned to the staging area within 24 hours (excluding boots which will take 48 hours due to drying time).

Appendix 1 - Carbon Monoxide Information

Background

Carbon monoxide (CO) has a high affinity for haemoglobin (Hb) in blood. Hb is the compound that transports oxygen (O₂) in the blood stream. CO is absorbed via the lungs into the blood stream where it forms carboxy-haemoglobin (COHb). CO has 240 times the affinity for Hb than oxygen so that:

$$\frac{\text{CO Hb}}{\text{O}_2\text{Hb}} = \frac{240 \text{ pCO}}{\text{pO}_2}$$

In basic terms, low levels of CO will rapidly displace O₂ from Hb and rapidly reduce the blood's oxygen carrying capacity. Small quantities of carbon monoxide (CO) are produced in the human body naturally. This leads to a background level of 0.3 – 0.7% COHb in normal individuals.

Ambient air that has a CO level of 35 ppm will result (under normal circumstances) in a CO Hb concentration of 5 %.

The half-life of COHb is 2 – 5 hours.

CO – Acute poisoning:

The appearance of symptoms in someone suffering from acute exposure is dependent on the following:

- The concentration of CO in air breathed
- The exposure time
- The degree of physical exertion
- Individual susceptibility

Susceptible individuals include the following:

- Pregnant females – toxicity to foetus
- People with anaemia (low blood count)
- People who have cardio –vascular or blood vessel disease(CVD)
- Smokers and those with respiratory disorders

Acute effects are summarised in the following:

CO Hb Concentration	%	Principal signs and symptoms
0.3 – 0.7		No signs or symptoms, normal endogenous background
2.5 – 5		No symptoms. Compensatory increase in blood flow to vital organs. People with CVD may lack compensatory reserve and experience chest pain.
5 – 10		Visual light threshold increased
10 – 20		Headache (“frontal tightness”), possible shortness of breath. May be lethal for someone with severe heart disease.

20 – 30	Moderate headache, nausea, flushing
30 – 40	Severe headache, dizziness, nausea
>40	Collapse, coma, convulsion, death

N.B. This is given as a guide only and there may be considerable variation depending individual history.

Acute poisoning

Acute CO poisoning may result in neurological problems.

Primary recovery may be followed by a subsequent neuropsychiatric relapse days or even weeks after poisoning. The degree of brain damage after CO poisoning is determined by the intensity and duration of exposure.

Repeated exposure

CO does not accumulate in the body, it is completely excreted after each exposure if sufficient time in air is allowed. Remember half life of CO in blood is 2 – 5 hours. However it is possible that repeated mild / moderate poisonings can lead to permanent nervous system damage (headaches, dizziness, impaired memory, personality changes and weakness in limbs).

Attachment 2 - LATROBE VALLEY COAL MINE ICC – HEALTH MONITORING PROCESS

The following process is being undertaken to monitor and manage the health of all personnel on the fireground at the Hazelwood & Yallourn Mines.

Entry to the Warm Zone

1. Personnel (emergency service organisation personnel, mine workers and contractors) enter the staging area and hand in 'T cards' to the Staging Officer
2. Personnel are directed to enter the official entrance of the Hazelwood Div Com building.
3. Two hygiene stations are established at the Div Com entrance for the personnel to wash hands before entry.
4. Personnel enter the Health Monitoring (HM) assessment area via cordoned walkway and sit with available HM team member.
5. HM team member (HM team member includes CFA Health member with appropriate qualifications or Health Professional) attaches Pulse Oxymeter probe to personnel's third finger and obtains a CO reading.
6. HM team member records:
 - CO reading
 - Time
 - Name
 - Smoker or non – smoker status
 - Previous activity associated with fire in the last 24 hours
7. Based on the CO reading, the HM team member directs the person to take the specific actions, as described in Table One below. Levels of carboxy-haemoglobin (COHb) above the exposure standard carry increasingly severe health risks that must be managed.

CO READINGS	ACTIONS
Reading 1 - less than 5%	<ul style="list-style-type: none"> • Person is released from HM assessment area via designated exit and instructed to: <ul style="list-style-type: none"> - enter the incident control centre for tasking, or - return to staging area for deployment to the Hot Zone, and/or - rest, and/or - eat.
Reading 1 – equal to or greater than 5%	<ul style="list-style-type: none"> • Person receives a black cable tie wrist band (indicating excessive CO reading) and is instructed to sit in the assessment area for: <ul style="list-style-type: none"> - 15 minutes of O2 therapy through mask with 48% oxygen saturation at 8 litres per minute - rest period of five minutes after O2 therapy - must return to next available HM team member to have 2nd CO reading taken and recorded.

Table 1 – Entry to the Warm Zone Shift Commencement – CO Readings & Actions – Test 1

8. Once a person has recorded a first reading above 5% and has received O2 therapy, they are retested. Based on the 2nd CO reading, the HM team member directs them to take specific actions, as described in Table 2 below.

CO READINGS	ACTIONS
Reading 2 - less than 5%	Person has black wrist tie removed and is released from HM assessment area via designated exit and instructed to: <ul style="list-style-type: none"> - enter the incident control centre for tasking, or - return to staging area for deployment to the Hot Zone, and/or - rest, and/or - eat.
Reading 2 – equal to or greater than 5% and less than 8%	<ul style="list-style-type: none"> • If reading is 5% or above, person is informed that they must leave the site. • To indicate that the person is approved to exit the black wrist tie is removed and is wrist tagged with white ID tag (to be worn for 48 hours). • HM team member briefs person of potential health issues and to seek further medical advice if required. • Member directed that they: <ul style="list-style-type: none"> - Must not enter the fireground - Must report to the Strike Team Leader to notify them they cannot respond. • If member is local, Peer Support organises transport back to the member’s home location. If member is not local (e.g. Ocean Grove) member can be offered other duties in the Warm or Cold Zone. • White wrist tag is checked off when exiting Mine perimeter by security.

Table 2 – Exit from the Hot Zone during Shift– CO Reading and Actions – Test 2

9. All personnel that have a reading equal to or under 5% are approved to enter the staging area for deployment to the Hot Zone.

Shift Completion or Exit from the Hot Zone

10. Any personnel who are deployed to the Hot Zone (e.g. for fighter fighting duties) return to the Warm Zone at any time during their shift must go through the official entrance and undertake the health monitoring process detailed under ‘Entry to the Warm Zone – Shift Commencement’ as described in steps 3-8 (including the actions taken when CO levels are equal to or over 5%).
11. At the completion of shift, all personnel are required to undertake the health monitoring process. The process is the same as described above in steps 3-8 but the following actions are taken based on the CO reading.

CO READINGS	ACTIONS
Shift Completion Reading 1 - less than 5%	<ul style="list-style-type: none"> • Person is informed they can leave the site via designated exit. • To indicate that the person is approved to exit the black wrist tie (where applicable) is removed and is wrist tagged with white ID tag (to be worn for 48 hours). • HM team member briefs person of potential health issues and to seek further medical advice if required. • White wrist tag is checked off when exiting Mine perimeter by security.
Shift Completion Reading 1 - greater than 5%	<ul style="list-style-type: none"> • Person receives a black cable tie wrist band (indicating excessive CO reading) and is instructed to sit in the assessment area for: <ul style="list-style-type: none"> – 15 minutes of O2 therapy through mask with 48% oxygen saturation at 8 litres per minute – rest period of five minutes after O2 therapy – must return to next available HM team member to have 2nd CO reading taken and recorded. • If the 2nd CO reading is less than 5%, person is able to proceed, as per 'Shift Completion Reading 1 – less than 5%' (see above). • If the 2nd CO reading is equal to or more than 5%, person is assessed by the Ambulance Victoria representative on site and managed accordingly.

Table 3 – Exit from the Hot Zone at Shift Completion – Test 1

12. Personnel are informed about the period of time before they are eligible to return to the site for continuation of fire operations. This time period is shown at the site on a 'no return to site' chart. [Chart Attached]

CO Reading of Equal to or Greater than 8%

13. Any person with a reading equal to or above 8% at entry or exit stage, are immediately referred to Ambulance Victoria where they will be assessed and either sent home or to hospital for further assessment and monitoring.

CO Levels and Data Collection

14. The data collected by the Health Monitoring team is currently being recorded in a database that will give the ability to search and sort for individual readings per person.

Briefings – Pre Entry, Pre Tasking and Pre Release

15. On change of shift, strike teams are given a specific briefing on health and CO issues.

Operations within the Hot Zone

16. During deployments within the Hot Zone, strike team crews receive a CO detector to monitor levels in their environment.

17. Crews are required to:

- Wear SCBA at all times in the Hot Zone
- Adhere to and enforce a strictly no smoking policy
- Log the CO reading on the detector every 15 minutes on the sheet provided to them.
- Radio Hazelwood Div Com every hour with both average and peak readings and provide map grid reference.
- Any crew registering 50ppm for 5 minutes on the detector must also radio Hazelwood Div Com.
- Any crews registering 75ppm or above must immediately move out of the area into clean air, contact Hazelwood Div Com and report to the Health Monitoring team.
- Atmospheric monitoring, personal and remote monitoring will continue on an ongoing basis and results will be collated and analysed for both special mapping and to correlate COHb levels with CO exposure levels.

Operations within the Warm Zone

18. Additional monitoring of the CO levels is being undertaken by remote monitors and by hazmat teams. This information is being recorded in a database.

19. Work within the Warm Zone is able to be undertaken without SCBA.

Post Deployment Medical Monitoring

20. Agencies Health and Safety representative should undertake the following post deployment medical monitoring:

[insert frequency, tests and actions to be undertaken]

Delineation of Safety Zones for Carbon Monoxide Exposure Management by Atmospheric Monitoring

Background

To support the site health surveillance program, continuous monitoring of Carbon monoxide levels is being undertaken.

One member of each operational Fire Appliance is wearing a CO monitor. Members of Hazelwood mining and power station employees are also monitoring CO in their work areas. Results are being recorded by DIVCOMM and Hazelwood OHS respectively.

In addition, positional monitors (AreaRAEs) are continuously monitoring CO, Oxygen, Volatile Organic Compounds, Flammability and Hydrogen sulphide levels throughout the site, including administration areas. These monitors are deployed in areas of concern and results are transmitted wirelessly to the HazMat Team in the Staging Area for continuous surveillance and risk assessment.

The Scientific Advisor will advise the HazMat Sector Commander when and where zone classifications need to be changed.

HazMat Technicians are also monitoring CO throughout the Morwell community.

Table 1: Safety Zones and Action Levels – Operational Areas

The purpose of the following zones is to minimise the risk of personnel exceeding the biological exposure limit of 5% Carboxyhaemoglobin.

Zone	CO Concentration (ppm)	Exposure Management
Cold - Offsite	9	DoH and EPA should be consulted for guidance
Warm - Unrestricted	<30	At this level firefighters/workers are permitted to work in standard PPE, including P2 respirator, standard work hours, and undergo health surveillance as per site procedure.
Warm – Protective Action	30-50	As per site SCBA, crew rotation procedure
Hot - Restricted	>50	As per site procedure for essential works

Reference: SafeWork Australia Occupational Exposure Standards, Health and Safety Information System.

Cold Zone - Community Health Limits

Government of Australia, Department of Environment and Heritage recommend the ambient air CO level be kept below 9 ppm and persons not exceed this level for more than 8-hours in one year. DoH and EPA should be consulted for guidance.

DRAFT