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4.11 FIREFIGHTER "K"

1. I am an MFB operational staff member and I am a Senior Station Officer ('SSO') and I have 25 years of service in the MFB.
2. I went to Hazelwood on approximately 4 occasions during the deployment. I had medical testing for my carbon monoxide levels where a sensor was placed on my finger.
3. When I arrived for the first time on 14 February my CO reading was approximately 9%. The testing staff asked how long I had been in the mine, I told them I had just arrived. After discussions they told me the high reading must be due to attending other fires during the week. They put me on Oxygen for 30 minutes and then re-tested me. The reading was still over the 5% but as I was rostered as deputy divisional commander I was advised that providing I stay in the Div Com centre and not deploy into the pit itself I should be ok. I note that during that 4 day tour of duty Div Com was evacuated and relocated 3 times due to excessive carbon monoxide and being enveloped in smoke. The original location of the Div Com was supposed to have clean areas were firefighters could rehabilitate and rest to ensure no prolonged exposure to Carbon Monoxide. However in a lot of circumstances the CO levels were too high in this area, causing the CO monitors to go into alarm, hence the staging areas being relocated on a number of occasions.
4. As a deputy divisional commander I noticed a high proportion of both firefighting and mine staff were getting high readings including around 8% or 9%. A lot of these high readings were coming from people at the start of their shift who hadn't as of yet been down in the mine itself.
5. Conversely people who had been in the mine repeatedly I noticed were getting low readings. I became concerned about the reliability of the testing regime and requested to be tested on both hands on every finger by all three machines to test the validity of the results. If the results were accurate I should have had about the same reading on each occasion. My personal results ranged from 0% to 14%.

6. My main concern as the deputy Div Com, was not sending people home with false high readings but rather sending people into the mine with false low readings.
7. I reported my concerns to the incident management team based in Traralgon who sent a CFA manager down the following day shift. I explained what had occurred and he said he would look into it and also that a different type of testing device would be arranged which would be breathed into, but to my knowledge these never arrived. I then booked off duty at the end of that shift.
8. The following night shift the parameters had changed again and a new set of Carbon Monoxide protocols were established. These included not utilising oxygen as a means of lowering readings after high readings as it was discovered the oxygen masked the readings and did not displace the Carbon Monoxide in the blood. The testing staff were also instructed to place a towel over the finger during testing to stop any light affecting readings.
9. However there was still huge variability and people reading greater than 5% after the changed protocols. Also, the practice of using Oxygen to reduce people's readings and then assuming the CO had actually reduced was reinitiated at a later point.
10. Communications problems were an ongoing issue due to a limited number of CFA personal radios, and firefighters were working in a subterranean environment and it was difficult to send signals out. Due to not enough CFA personal radios, firefighters had to return to the truck to radio out, sometimes having to walk 90 metres, and then appliance location affected whether the transmission would actually be received by the Communications bus. The system was practically unworkable. This was known by management.
11. All firefighters were under strict instructions to have a mine driver escorting people in and out of the mine at all times. MFB were adhering to this policy and had safety and movement officers designated for this, however CFA and interstate firefighters were not adhering to the policy. The effect was that the divisional commander actually had no idea of the

numbers or locations of personnel in the mine at any one time, except for MFB personnel to some extent. However communication issues and vehicle identification issues affected the ability to determine locations of MFB appliances.

12. A potential catastrophic situation occurred on the night of the 15th of February when a May Day call was issued from CFA firefighters who had become entrapped by fire due to a sudden wind change and they had no idea of their location, meaning that appliances couldn't be redirected to perform a rescue. The trapped firefighters had no BA with them. They were lucky to be trapped on a water pipe as it would have been a high probability that they would have continued over the edge of a nearby ledge. Luckily during the confusion a mine escort driver was able to locate the entrapped firefighters and ferry them to safety.
13. At one instance there were a number of telebooms in place but with no signage on them to identify which appliance was which, causing great confusion. For instance when crews were being swapped over they would at times be taken to the wrong appliances which were a long way apart. Some of the appliances had no identification on them, including specialist appliances requiring specific qualifications.
14. I initiated a system of naming the appliances teleboom 1 through to teleboom 4 and placing large signage on each appliance.
15. However on a further shift the system was changed again and the trucks were causing confusion again.
16. It took another 8 hours until we had the teleboom 1 through to 4 system in place again.
17. The last time I was in the IMT the CFA were again insisting on self deploying in and out of the mine without escort because it was easier as they wouldn't have to rely on mine staff for escorting.
18. At another time we put in place a truck in the staging area to act as a rapid intervention vehicle if required. This arose due to the near catastrophic incident I mentioned earlier.

19. However management saw the system as a waste of a resource because it wasn't being involved in firefighting and re-deployed the vehicle to the mine at a later date.
20. At a later point, an HSR then insisted on the appliance being used as a rapid intervention and it was again taken out of the mine for this purpose.
21. There were enormous levels of frustration as changes were made to improve safety including personal CO monitoring devices, escorting of all persons into and out of the mine, improvements to identification of appliances and other systems which would then be changed again by subsequent management decisions.
22. On as far as I can recall the 14th of March an incident which I will describe occurred. I was the Commander in charge of Safety and was informed that there were no qualified CFA sector Commanders in charge of the sectors which put at risk all firefighters due to there being no management structure. There was also confusion over the location of crews and vehicles. I consulted with the HSR and we agreed to withdraw all crews until suitably qualified personnel were put in place so that crews could be re-deployed. I contacted the Incident Controller who was supportive of the action. It was during this time that it was also discovered that crews from the Queensdland Fire and Rescue Service were not located in the staging area but had actually relocated back to their motels because they had decided that the 2 hour turn around was too onerous so they instigated a 4 hour turn around without any knowledge of the Incident Controller, contrary to the protocols agreed by all parties and in operation. Suitably qualified MFB SSO's were put in place as sector Commanders due to the inability of the CFA to provide qualified personnel. This was raised to the Senior Duty Officer of the CFA at the change of shift the following morning who had organised staff deployment orders and he was apologetic and deeply embarrassed that such a situation could occur.
23. I have read the correspondence from Acting Chief Officer Peter Rau to all MFB staff on 26 March 2014. In his correspondence he states that all staff were instructed to wear BA whilst in the mine. I saw no instruction and I'm not aware of any time where all firefighters in the mine were wearing BA.

Further, our BA duration is approximately 30 minutes. The shifts in the mine were 2 hours. It took approximately 30 minutes to be transported from the staging area into the mine pit itself. Therefore the BA cylinder would have been depleted upon arrival at your appliance, causing a requirement to change a BA cylinder in a hazardous environment and further to that you would then be required to change it a further 2 times in the allocated 2 hour time period in the mine before getting back to the staging area and being relived. We didn't have that many BA cylinders or BA's because the relief crew would also have to wear BA to enter the mines and relieve firefighting duties at the fire front. The idea that all firefighters would wear BA lacks operational awareness of what was actually occurring and what could be achieved in battling this challenging fire. Additionally if it was a requirement for firefighters to wear BA at all times in the mine due to concerns of CO poisoning then surely the same instruction would need to be made to all mine staff who were operating in the same environment. I never saw any mine staff wearing BA in any occasion and I am not sure if they are suitably qualified or trained in wearing BA. The most I ever saw were staff wearing particulate filters, P2 masks, designed as a rudimentary form of respiratory protection in regards to airborne particulates, certainly not CO.

24. The fire was difficult enough, but coupled with the complex interagency issues and the health and safety concerns, firefighters were exhausted by the incident.
25. After being contacted by numerous members over their concerns about being exposed to water in the HARA pit that was deemed off limits and the hospitalisation of a firefighter with septicaemia after receiving a paper cut, the UFU contacted the Fire Services Commissioner, the MFB Acting CO Rau and the CFA CO Ferguson voicing concerns about the suitability of the water being used for fighting the fire.
26. The UFU was assured that the EPA were the statutory authority in charge of that aspect of the incident and were conducting regular testing which showed that the water was safe for use.

27. The UFU then commissioned its own independent testing of the water by Occupational Hygienists Bureau Veritas. The results confirmed the UFU that the water was not safe for use and posed a significant health risk to firefighters. The water contained elevated levels of E. Coli, coliforms and pseudomonas aeruginosa. The hygienist reported high levels prior to providing the final report and the UFU immediately notified Alan Quinton the MFB incident controller of the results. The UFU also notified the Fire Services Commissioner.
28. The Fire Services Commissioner announced that the UFU testing regime would be enacted to ensure firefighting activities were conducted safely. A number of additional personal protection protocols were instigated in an attempt to minimise exposure to firefighters using the contaminated water to fight the fire.

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[redacted]
MFB Regional Control Centre
Latrobe Valley Coal Mine Fires

13 February, 2014

Dear [redacted]

Re: Occupational Hygiene Advice (Health Monitoring Process) – Hazelwood Coal Mine Fire

At your request, I attended the Hazelwood mine yesterday evening and had discussions with [redacted] (Operations Officer) [redacted] (Operations Officer) and [redacted] (Scientific Officer) to review the health monitoring process for firefighters involved in fighting the mine fire. I understand that the process involves measurements of carboxy-haemoglobin (COHb) of the fire-fighters using a portable Masimo Rad-57 Pulse Oximeter fitted with SpCO sensor and that testing takes place at the ICC. The fire-fighters are monitored when they first arrive on site and prior to entry to the mine. The tests are repeated when the crews come back to the ICC for their breaks or if the atmospheric monitoring indicates that they have been exposed to CO above the action limits which were set at >50ppm for 60 minutes or >150 ppm at any time. The following COHb action levels were in use at the time of the review:

COHb Concentration	Action
SS %	OK to enter/re-enter
>5 %	No entry. O_2 Treatment for 20 minutes and retest. If repeat test SS %, OK to return to the fire ground or go home. If repeat test >5 %, repeat O_2 Treatment for 20 minutes and retest etc.
5-8 %	Send crew member home and refer to GP if symptomatic
>8 %	Refer crew member to paramedics

Monitoring of atmospheric CO levels was being undertaken using Drager PAC personal gas detectors (one per 4 man crew) with readings recorded every 15-minutes and radioed back to the ICC every 1-hour. Additionally, AreaRae Multi-gas/PIO monitors with wireless remote monitoring capability back-were being deployed in strategic positions to supplement the personal monitoring and provide spacial CO concentration information.

I observed the testing process and noted that there were a number of members who were being administered oxygen at the time (I observed 9 members at one time on O_2 therapy). During subsequent discussions, was advised that some of the members were arriving on site redeployed from other sites and had elevated COHb levels on arrival and that some (as high as 8 to 10% - a level that would require them to be referred to paramedics). I also understand that some of the members

smoked following their tests before re-entering the fire ground, which would contribute to an elevation of their COHb.

Discussion

Safe Work Australia (formerly the National Occupational Health and Safety Commission – NOHSQ states in its documentation to the Occupational Exposure Standard for carbon monoxide that: *"A level of 2.5-3% COHb is the lowest level at which clearly adverse health effects hove been well· documented. These health effects ore adverse cardiovascular effects on persons with pre-existing cllnically overt coronary artery disease, giving rise to symptoms of angina pectorlsN* and that there are stidies showing :" *adverse effects in middle-aged clinlcolly healthy men at 596 COHb, and one study showing non-specific effects suggestive of cardiac ischaem,a in healthy young men at a level of 2-49t.*

Safe Work Australia has set its Occupational Exposure Standard of 30 ppm for carbon monoxide in the breathing zone as an 8-hour time-weighted average concentration to maintain the COHb 5% to or below under normal temperatures, workloads and atmospheric pressures to minimise the risk to those persons with subchnicaICAO and to foetuses of exposed pregnant women and also to protect against adverse behavioural effects arising from carbon monoxide exposure.

The setting of a COHb action limit of SS % as a "Safe to Enter/Re-Enter" level in the Carbon Monoxide Exposure Management guideline for this Incident appears to have no clear rationale or justification. Although bosely based on the Safe Work Australia standard, setting of this limti is inconsistent with the goal of maintaining a COHb level well below 5% to minimise the risk symptoms of CO poisoning. It also appears contrary to the aidvice provided by the MFB Medical Officer (Michael Sargeant) regarding the use of COHb limits as a decision making tool for this purpose. Under these limits, it is likely that members who are at or Just below the 5% COHb level will be deployed in areas where their CO exposure will cause It to rapidly rise above this limit and thus potentially put them at risk of CO poisoning. This is particularly true given that the health-status of the members are unknown (particularly with respect to cardiovascular conditions) and that they will also be potentially exposed to depleted oxygen levels and elevated carbon dioxide levels (as well as airborne fine particulates and other airborne contaminants) and be undertaking increased levels of physical activity and elevated tempuratures, all of which increase physiological stress and contribute to an increased risk of elevated levels. This was evident in my observations of the number of members being administered oxygen therapy, some with symptoms, during my review. The cumulative effects of repeated elevated COHb levels followed by recovery and subsequent CO re-exposure cannot be predicted and make the use of a strict COHb limit as a decision making tool questionable. Additionally, the accuracy and efficacy of using a portable COHb pulse oximeter for use in this scenario has not been validated and adds to the uncertainty of applying such hm,ts.

A meeting was convened late on the 12u, February with the Deputy Incident Controller (tlllL operations officers, the MFB scientific officer and paramedic representatives to discuss the above issues. The participants agreed that the situation with respect to potential CO exposure risk was untenable and that immediate action was required The following resolutions were made at the meeting and were to be implemented on the night shift that evening:

- A strict "No Smoking" policy was to be enforced;
- Any entry Into the mine would require compulsory SCBA use;
- Work around the perimeter of the mine fire where CO levels were low could be undertaken without SCBA;
- Atmospheric monitoring, both personal using Drager personal gas detectors and AreaRae monitors for CO was to continue on an ongoing basis and results were to be collated and analysed for both spacial mapping and to correlate COHb levels with CO exposure levels;
- COHb levels screening was to continue, both initially when entering the site and periodically, but this was to be used as a surveillance tool to assess the risk to individuals rather than as a decision limit for re-entry;
- The above was to apply to all personnel working at the mine fire site including mine personnel as well as fire crews;
- Where practicable, the use of fire fighting and asset protection methods which did not involve personnel entering high atmospheric CO levels would be employed.

It is believed the implementation of the above recommended actions would significantly reduce the potential for elevated CO exposure and ensuing risks of adverse health effects. However, continued evaluation of the situation and refinement of the Implementation of these control and surveillance measures will ensure that the risk to fire crews ahd mine personnel are minimised.

Yours sincerely,

From: HOLLOWAY, Elizabeth On Behalf Of RAU, Peter
Sent: Wednesday, 26 March 2014 4:50 PM
To: Exchange Mailboxes (all)
Subject: Operations Update from the Acting Chief Officer

26 MARCH 2014

Update from Acting Chief Officer

Colleagues

I'd like to provide some additional information and clarification in light of recent media reports about health monitoring of carbon monoxide at Hazelwood, the 13 February letter by Robert Golec of AMCOSH to fire services, and the UFU bulletin issued yesterday.

During the Hazelwood incident, State, Regional and Incident control centres and their MFB and CFA staff have gone to significant lengths to protect the safety of our firefighters.

On 12 February, three days into the fire, fire services initiated a review of the health monitoring process at Hazelwood. A number of firefighters working at Hazelwood had presented to hospital for observation, either sent by us because they had elevated carbon monoxide (CO) readings found during routine individual CO blood level testing, or because they felt unwell after leaving their shifts at the mine.

This was to become a turning point where fire services began to treat Hazelwood not only as fire, but as a hazardous materials incident, with the associated protocols.

As part of the review, a meeting was held at the ICC at the Hazelwood mine, attended by Rob Golec, Deputy Incident Controller Commander Mitch Simons and his team and CFA's Brigade Medical Officer Dr Michael Sargeant. The outcome of the meeting formed the basis of the AMCOSH letter and its recommendations.

As a result of that meeting, all firefighters were immediately instructed from that night to wear breathing apparatus at all times when in the mine as per the recommendations of the letter. **Any claims that firefighters were never instructed to wear BA are incorrect.**

On 13 February, the Incident Controller was CFA Operations Manager Barry Foss and the Deputy Incident Controller was ACFO Darren Davies. At approximately 1500 hrs, some firefighters were observed not wearing breathing apparatus in the mine and Darren Davies immediately instructed all staff not wearing BA to evacuate the mine.

In order to establish a safe and practical system of work, the IC Barry Foss called a meeting which included Dr Michael Sargeant, senior operational staff from both MFB and CFA, MFB Scientific Officer Craig Tonks, the CEO from the mine, health commander from Ambulance Victoria and DCO Mike Smith from South Australia,

who is regarded as an expert in CO exposures to firefighters.

At this meeting, the team considered how to minimise firefighters' CO exposure to an equally safe level but in a more practical ways, such as based on atmospheric levels of CO, given operational limitations of using BA at all times. The group applied their combined expertise to determine the appropriate protocol.

At the conclusion of this meeting, decisions were taken and the following instruction for carbon monoxide management was issued:

- All crew must be checked by Health Monitoring personnel prior to entering the mine
- All crew leaders were to:
    - collect carbon monoxide detectors and ensure there is one per appliance (note this was modified to one per person on 28 February)
    - Log the detector reading every 15 minutes on a log sheet
    - Provide average and peak readings and map grid reference of location to the DivComm every hour via radio.
- Crews must not work in the mine for a continuous period greater than two hours without leaving the mine. These two hour periods of operation within the mine must not exceed four in any 12 hour period.
- If in any one-hour period there are two measurements greater than 50 ppm but less than 75 ppm, workers must withdraw from the area or immediately don breathing apparatus to remain working in this location
- At any time a carbon monoxide reading of 75 ppm or greater is recorded, BA must be immediately donned or workers must withdraw from this area. This must be immediately reported to DivComm.
- All crew must be rechecked by Health Monitoring personnel at the conclusion of their shift prior to leaving the site. Personnel will not be permitted to leave the site without appropriate clearance provided by the Health Monitoring personnel.

These protocols were instigated for night shift on the 13 February, captured in the Health Monitoring Plan, and operations resumed.

Health and Safety Representatives were on site and aware of the implementation of these protocols. These protocols have been in place continuously since 13 February.

The standard these processes adhere to is SafeWork Australia's National Occupational Health Exposure Standard, specifically set for working populations who are assumed to be healthy, physiologically resilient and supervised. That standard is 30 parts per million **averaged** over an eight hour day*, set to ensure the individuals COHb does not exceed 5%. The combination of tests is recommended where exposure may be prolonged.

This standard was developed specifically for the workplace and for that reason, has been deemed the appropriate standard to be applied, not the 2.5 to 3% set for the general population.
As an additional precaution, the State Controller issued a health and safety bulletin on 13 February that individuals suffering from cardiovascular or respiratory conditions should not be deployed to the incident. I included this advice in my Acting Chief Officer Update sent to all staff on 13 February.

Attached for your information is a further full report on medical monitoring on 20 March, also from AMCOSH, which states:
“It is my opinion that the medical monitoring program currently in place is robust and professionally conducted...”

As we at MFB are all aware, it takes time to set up an ideal structure in a crisis situation. All levels of the operation were involved in developing a model to create a safe working environment for our people and the community while we worked to get the fire under control.
In fact, from an Occupational Health and Safety perspective, this incident has been managed extremely successfully; in an incident without precedent, no one was seriously injured. This was due to the extraordinarily hard work and commitment of all involved.

Regards,

Peter Rau
Acting Chief Officer

*The time-weighted average of 30 ppm must be carefully controlled and there are ‘excursion’ limits listed in the SafeWork documentation. Please note we are applying a more conservative 50 ppm concentration as a maximum for any 1-hour period of exposure and 75 ppm concentration for any single peak exposure:

Concentration [(a)] (ppm)	**Total Exposure [(b)] (min)**
200	15
100	30
60	60

(a) Short-term excursions should never exceed 400 ppm.

(b) This duration represents the sum of exposures at this level over an 8-hour workday, and assumes no other exposure to carbon monoxide.

http://www.theage.com.au/victoria/new-coalmine-fire-in-latrobe-reignites-safety-fears-20141128-11w1ok

New coalmine fire in Latrobe reignites safety fears

Date November 28, 2014

Rania Spooner

A fresh coalmine fire in the Latrobe Valley has reignited concerns about the state's fire preparedness nearly a year after the Hazelwood mine fire covered Morwell in hazardous smoke.

A "hot spot" on the southern wall of the AGL Loy Yang mine, near Traralgon, was first reported shortly before 6am on Friday. The adjacent coal-fired power station is the largest in Victoria and supplies nearly one-third of Victoria's energy.

A CFA spokeswoman said firefighters had contained the fire by midday. "It's not spreading, it has been contained to one area," she said.

Six CFA vehicles were on site Friday afternoon, using water and fire suppressants to hold the spot. A helicopter was due to arrive at the site to carry out thermal imaging early afternoon.

The CFA reported the fire was not throwing smoke up and "therefore there is no community impact".

"No damage or injuries have been recorded and electricity production has not been affected," a spokesperson said.

The nearby Hazelwood coalmine fire burnt for more than a month in February and March, sending thick smoke over the town of Morwell, where residents complained of headaches, nosebleeds and breathing difficulties.

The fire was the subject of an inquiry, which earlier this year heard the full health impacts of the disaster may not be known for decades.

On Friday, the United Firefighters Union condemned the state's lack of preparedness for mine fires in the Latrobe Valley, claiming crews could not access the Loy Yang site for hours after the fire was detected, and that a crucial piece of equipment was unable to be used.

But that claim was rejected by an AGL spokeswoman, who said there had been no delay for firefighters entering the site.

An $800,000 aerial pumper, bought more than four years ago, was sitting idle in the Morwell fire station because there was no crew to operate it, the union stated.

"There are no permanent remote sensors in the mines and the aerial pumper - proudly branded with fresh Morwell stickers - can't be used without crew or equipment," UFU secretary Peter Marshall said.

However, CFA spokesman Gerard Scholten rejected that the aerial pumper was out of action and said it was not used because another piece of specialist firefighting equipment was better suited to the job.

"It's operational, it's staffed and it's ready to go," he said. "The ladder platform truck was the most appropriate truck to take because you can reach up high inside the mine."

A senior firefighter in the region said there was no way to know how long the fire had been burning underground before it broke through to the surface on Friday morning, because weekly helicopter thermal scanning flyovers had been cut back to fortnightly earlier in the year, and then "stopped altogether" in August.

"This fire has gone completely undetected, it's burnt underground for some time," the firefighter said.

Mr Scholten said the flyovers were only ever at the Hazelwood mine and had ceased because the incident had ended. "But what we do have is aircraft that can fly up there at a moment's notice," he said.

He praised the work of firefighters at Loy Yang, described the response as "textbook" and added that it should make the community feel confident in the region's firefighting abilities.

Read more: http://www.theage.com.au/victoria/new-coalmine-fire-in-latrobe-reignites-safety-fears-20141128-11w1ok.html#ixzz3hRgLBrDD