

29 October 2014

Coroners Court of Victoria



Dear Coroner

Voices of the Valley request to investigate Hazelwood mine fire: further submission

Thank you for providing our client with additional time to present a further submission to you regarding its request for a Coroner's investigation into the Hazelwood mine fire (**the mine fire**) pursuant to section 31 of the *Coroners Act 2008* (**the Act**).

Why an investigation is needed

A coronial investigation is warranted and necessary in the public interest for the following reasons:

- a. There is evidence that pollution from the mine fire caused an increase in deaths in the Latrobe Valley during and in the months after the fire.
- b. Studies show that short term exposure to pollution such as that released in the mine fire can result in deaths at the time of the pollution event and in the days following.
- c. This issue did not form part of the Hazelwood Mine Fire Inquiry (**Hazelwood Inquiry**) and has been inadequately dealt with by the Department of Health and therefore remains unresolved.
- d. The inconsistency in analysis of whether the mine fire is causative of an increase in deaths has resulted in confusion and additional distress for community members that needs to be resolved. Community members are very concerned that deaths may be continuing to occur as a result of the mine fire. The nominal attention given to the issue by the Government and Department of Health is not commensurate with the seriousness of the issue, the level of ongoing distress it is causing the Latrobe Valley community, and the ongoing threat relating to public health that exists while the issue remains unresolved.

Scope of the investigation

1. VoTV are seeking to clarify -
 - a. whether the pollution from the mine fire caused or contributed to the deaths of some residents;

- b. whether pollution from the mine fire poses the risk of causing or contributing to further deaths in the short term;
- c. whether any measures might be taken to prevent any such deaths; and
- d. whether any deaths could be prevented if similar circumstances occurred in the future.

Voices of the Valley Inc

- 2. Voices of the Valley (**VotV**) is an incorporated group of residents in the Latrobe Valley which formed in March 2014 during the mine fire due to concerns about the adverse effects the fire was having on the health of persons living and working in the affected area. The group currently has 49 members and 1030 Facebook members mainly from the locations of Morwell, Moe, Traralgon and surrounding areas.
- 3. VotV's primary concern relates to how pollutants released during the mine fire have affected, and may continue to affect, the health of residents and workers. During and since the fire they have given voice to the residents' concerns and played a valuable role in collating and presenting community views and experiences to the Hazelwood Inquiry.
- 4. VotV's objective is for the coal mines and coal fired power stations in the Latrobe Valley to be managed and operated in a way that ensures the long-term health and safety of residents and workers in the Latrobe Valley, including by preventing future mine fires and adverse health impacts from such fires.

Background on the Hazelwood mine fire

- 5. The mine fire ignited as a result of embers from nearby bushfires entering the mine. It burnt from 9 February 2014 and was declared safe on 25 March 2014.
- 6. The town of Morwell is located to the north of the Hazelwood Mine, with the southern boundary of the town 200 metres from the edge of the mine. In the days from 9 February to 25 March 2014, the town of Morwell, as well as the surrounding regions, were subject to severe smoke and ash from the mine fire.¹
- 7. The pollutants produced by the mine fire included carbon monoxide; particulate matter, especially small particles with a diameter of not more than 10

¹ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 22

micrometres (PM₁₀) and fine particles with a diameter of not more than 2.5 micrometres (PM_{2.5}); sulphur dioxide; nitrogen dioxide; volatile organic compounds; ozone; polycyclic aromatic hydrocarbons; dioxins; furans; and metals - magnesium, manganese, mercury and zinc.²

8. Monitoring of air quality in the second week of the Hazelwood Mine fire indicated very high levels of carbon monoxide and PM_{2.5}.
9. Each of the pollutants identified can have severe health effects on people, in particular vulnerable members of the community, including children, pregnant women and unborn children, the elderly, and those suffering from pre-existing cardiovascular and respiratory illnesses.³ Fine particulates (PM_{2.5}) are a very hazardous form of air pollution. We note that EPA Victoria states the following on its website:

Health effects of particles

In general, the smaller the particle, the greater its effect, as smaller particles can penetrate further into the lung to cause harm. Particles can aggravate existing lung and heart diseases, leading to increased hospital admissions and emergency room visits, and sometimes premature death. Airborne particles have also been associated with decreases in lung function, worsening of asthma and alteration in the body's defence and lung clearance mechanisms.

Sensitive members of the population include the elderly, children and people with existing lung or heart disease. Health benefits will result from any reduction of particle concentrations, whether or not the current levels are above or below the limit values.⁴

10. During the period of the mine fire, residents of Morwell reported a number of adverse health effects.⁵ The health effects were significant and commenced from the first day of the fire.⁶ Effects included amongst others, sore and stinging eyes, headaches, blood noses, nausea and vomiting, sinus and respiratory problems.⁷

Possible increase in deaths due to the mine fire

11. There is considerable ongoing concern in the Latrobe Valley community about the impact of pollution from the mine fire on the health of local residents, in particular

² Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 241.

³ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 23.

⁴ EPA Victoria's website at: <http://www.epa.vic.gov.au/your-environment/air/air-pollution/particles-in-air>.
And see par. 27 below.

⁵ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 23.

⁶ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 309.

⁷ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 309.

whether it caused or contributed to the deaths of some residents and whether it may lead to further deaths or serious illnesses.

VotV analysis

12. During and immediately after the mine fire, members of VotV noticed an increase in death notices in the newspaper.⁸ They collated this information and sought official statistics from Births Deaths and Marriages (**BDM**). Initially the request was made in May 2014, however BDM did not provide the figures until after the close of submissions for the Hazelwood Mine Fire Inquiry⁹. VotV's analysis of the figures it obtained from BDM indicated that there had been an increase in deaths during the time of the fire.

Associate Professor Adrian Barnett's analysis

13. VotV subsequently requested Associate Professor Adrian Barnett of Queensland University of Technology to review the data and provide an analysis (**attachment A**). Assoc. Prof. Barnett is a statistician with a particular focus on air pollution and health (Curriculum Vitae at **attachment B**).
14. Assoc. Prof. Barnett reviewed monthly deaths from January to June 2009 to 2014 across the four postcodes closest to the mine fire (being for Morwell, Moe, Traralgon and Churchill). He used a regression model to examine whether death rates were higher during the two months of the fire (February and March 2014).
15. The Barnett report concludes that, when monthly temperatures are factored in, there is an 80% (0.80) probability that the death rate during the fire was higher than average. The mean increase in deaths over that time was 11% (1.11) which translates to 11.2 additional deaths over the four postcodes during the time of the fire.¹⁰

Department of Health analysis

16. In response to VotV's concerns, the Department of Health reviewed the data from BDM and concluded that in March 2014 there was an increase in deaths across the

⁸ See par. 5, p 3 of VotV's submission dated 22 September 2014 (attachment H).

⁹ The figures provided by BDM to VotV can be found at p62 of VotV's submission dated 22 September 2014 (attachment H).

¹⁰ Adrian Barnett, *Analysis of death data during the Morwell mine fire*, September 2014, p. 4 (attachment A).

four postcodes of 21% compared to the previous five years; for the period January to June there was an 11% increase on the previous five years; but a 19% decrease in deaths in Morwell in February and March 2014 compared to the previous five years (**attachments C and D**). They also acknowledge there was an unexplained increase in deaths in Moe of 32% (**attachment D**). They conclude that the data from BDM shows nothing more than yearly variability.

17. However, there are a number of problems with the Department of Health's analysis. For example:
 - a. The Department of Health analysis consists of a basic comparison of the number of deaths in 2014 to the average number of deaths in the preceding five years. Unlike the Barnett report, it does not factor in monthly temperature or other mitigating and contributing factors.
 - b. It states that as 2014 was the third hottest summer on record, any additional deaths in that year could be attributed to the heat rather than the mine fire. However, it does not acknowledge that the first and second hottest summers on record were within the previous five years (that have been used for the five year average) and therefore deaths attributed to heat are unlikely to be higher in 2014 than they were in the five year average.
 - c. It does not factor in the high number of deaths in Morwell in January 2014 which may have led to a lower number of deaths in February 2014.
 - d. It also does not take account of the fact that a large number of Morwell residents relocated at some stage during the fires (possibly around 65%).¹¹
18. The Department of Health subsequently requested a further review of the BDM data from Melbourne University (**attachment E**). The report concludes that slightly more deaths occurred from January to June 2014 than the previous five year average, but that the evidence that this is not just due to chance is inconclusive¹².

¹¹ The Hazelwood Inquiry report notes that 65% of Morwell residents received a relocation or respite payment. Criteria included low income, hardship experienced by the smoke, and intention to leave for respite. Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 370

¹² Melbourne University, *Review of Birth Deaths & Marriages Victoria (BDMV) mortality data for the Latrobe Valley and the time of the Hazelwood coal mine fire in Morwell*, undated, p. 2

Government response

19. On the basis of the analysis done by the Department of Health, the Victorian Government has stated that the deaths were within the normal expected variation.¹³
20. However, the Government's conclusion does not appear well-founded. Both Assoc. Prof. Barnett and the authors of the Melbourne University review state that further analysis is required using additional data including cause of death. It is evident that further work is needed as a matter of priority to determine whether the mine fire did in fact result in an increase in deaths in the community and continues to pose a threat to the lives of people in the affected area in the short term. A coronial investigation may be a prompt for this further work or indeed lead to a recommendation to that effect pursuant to section 72(2) of the Act.
21. The Department of Health has stated that if there are any anomalies in the death rates, they can be investigated as part of the long term (20-year) health study that will be commissioned to understand the health effects of the mine fire. However, there are two problems with this approach -
 - a. it is not clear that short term deaths from the pollution will be part of this study (the focus is long term health impacts such as lung cancer); and
 - b. if it is included it may take some years for the study to report on this issue.
22. An investigation must be conducted as soon as possible so that, if necessary, advice can be given or other precautionary measures put in place to prevent unnecessary deaths from occurring from the mine fire, or other similar events that occur in the near future. In addition, it is a significant injustice to the Latrobe Valley community, particularly the families of the deceased, if the community is not provided with answers as soon as possible.

Hazelwood Mine Fire Board of Inquiry

23. The Hazelwood Inquiry commenced on 11 March 2014 and released a report of its findings on 2 September 2014.
24. The Hazelwood Inquiry investigated the origin and circumstances of the fire; the adequacy of measures taken to prevent the fire by the mine operator; the adequacy of the regulatory regime in relation to the risk of and response to the

¹³ See for example Victorian Parliamentary Debates, Legislative Assembly 17 September 2014, p. 3357

fire; and the adequacy of the response to the fire for the health and wellbeing of affected communities.¹⁴

Issues not canvassed at the inquiry

25. Although the Hazelwood Inquiry considered health impacts from the fire in some detail, it did not consider, and did not make a finding as to whether the smoke from the mine fire contributed to deaths during and immediately after the fire. It stated that “No information was provided to the Board on deaths occurring in the community during the period of the mine fire.”¹⁵

Could the mine fire have caused an increase in deaths in the Latrobe Valley?

26. The Hazelwood Inquiry noted that the Government had received advice during the time of the fire that “no additional deaths would be expected even if the level of exposure to the measured level of air quality continued for six weeks”¹⁶; but if fine particles remained in the extreme range for 3 months, it may result in additional deaths in the community¹⁷. However, the Hazelwood Inquiry noted that the advice “used the air quality level at the average exposure in Morwell during the fire – the actual exposure level used was not detailed”¹⁸ and “the study was based on a standard Victorian population and was not adjusted for the poorer health status found in Morwell”¹⁹.
27. The Hazelwood Inquiry commissioned an expert report on health impacts from Professor Donald Campbell, Director General, Medicine Program, Monash Health, who advised that *short term exposure to the pollutants released during the mine fire could cause adverse health impacts, including death (attachment F)*. Relevantly, the report states in relation to short term exposure to the pollutants released in the mine fire that:
- a. “There is strong evidence from epidemiological studies that daily (24 hour average) exposures to PM are associated with both mortality and morbidity

¹⁴ Terms of Reference, Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 44.

¹⁵ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 313.

¹⁶ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 317.

¹⁷ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 317.

¹⁸ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 317.

¹⁹ Hazelwood Mine Fire Inquiry, *Hazelwood Mine Fire Inquiry Report*, 2014, p. 317.

immediately and in subsequent days. Repeated (multiple day) exposures may result in larger health effects than the effects of single days.”²⁰

- b. “... [A]s the ambient air level concentration of PM_{2.5} increases by 10µg/m³ there is a 1.04% increase in mortality.” (That is, for every 10µg/m³ increase in PM_{2.5} the mortality increases 1.51% for respiratory causes, 0.84% for cardiovascular causes, 3.36% for ischaemic heart disease, 1.85% stroke and 2.86% for COPD.)²¹
- c. “There is strong evidence that links short term exposure (daily average levels) and mortality and morbidity, with effects not just due to exacerbation but also due to progression of underlying disease.”²²
- d. Clinical studies of PM_{2.5} exposure from traffic “suggest that 1-2 hour exposures can result in physiological changes, suggesting that this may be sufficient to contribute to exacerbations of chronic disease”.²³
- e. Short term exposure to Ozone, Carbon Monoxide, and PM_{2.5} can result in fetal death; death in the general population (due to effects on respiratory tract, cardiac conduction; coagulation state); and death in people with pre-existing ailments (due to effects on respiratory tract, cardiac conduction, coagulation state, pre-existing congestive cardiac failure).²⁴

Relevant correspondence between the Hazelwood Inquiry and VotV

28. At the time of the Hazelwood Inquiry VotV had begun to collect information regarding a possible increase in deaths due to the mine fire via newspaper death notices and had requested data from BDM but had not yet received a response. They presented their preliminary information to the Hazelwood Inquiry but were informed that as the date for submissions had closed and the report was close to being finalised, the Board could not consider the information. The Board informed VotV they would forward the information to the Coroner and Department of Health for further investigation **(attachment G)**.

²⁰ Donald Campbell, *Hazelwood Coalmine Fire Health Effects Report* 28 May 2014 p. 17 (attachment F)

²¹ Donald Campbell, *Hazelwood Coalmine Fire Health Effects Report* 28 May 2014 p. 16

²² Donald Campbell, *Hazelwood Coalmine Fire Health Effects Report* 28 May 2014 p. 16

²³ Donald Campbell, *Hazelwood Coalmine Fire Health Effects Report* 28 May 2014 p. 17

²⁴ Campbell, Table 1: *Short term health effects that may be caused by exposure to smoke from a brown coal fire, identifying the substance in the smoke that causes each effect* p. 23

Request to investigate

29. VoTV originally made an application for the Coroner to investigate the mine fire on 17 September 2014.
30. It is submitted that an investigation into the mine fire is commensurate with the objectives of the Act. Relevantly, the Act provides that:
 - a. it is a purpose of the Act to contribute to the reduction of the number of preventable deaths and fires through the findings of the investigation of deaths and fires, and the making of recommendations (section 1(c));
 - b. a coroner should liaise with other investigative authorities, official bodies or statutory officers to avoid unnecessary duplication of inquiries and investigations, and to expedite the investigation of deaths and fires (section 7);
 - c. when exercising a function under the Act, a person should have regard to the desirability of promoting public health and safety and the administration of justice (section 7(e));
 - d. a coroner may make recommendations to any Minister, public statutory authority or entity on any matter connected with a death or fire which the coroner has investigated, including recommendations relating to public health and safety or the administration of justice (section 72(2)).
31. A Coronial investigation would not result in any unnecessary duplication with other investigations nor be an unwarranted stress on the Court's resources. The issues VoTV seeks to have investigated were not considered in the Hazelwood Inquiry. A Coronial investigation would instead be complementary to the Hazelwood Inquiry and, through a confined scope, address a critical gap in the Inquiry's investigation and report. While this gap remains unresolved it continues to cause ongoing concern and distress within the Latrobe Valley community.
32. A Coronial investigation would also not duplicate consideration of these issues by the Department of Health. The Department of Health analysis has not properly investigated these issues and has not provided a response adequate to reassure the Latrobe Valley community that deaths did not occur and will not continue to occur, and that if there is a similar event during the upcoming fire season, immediate evacuation is not necessary.
33. The Victorian Government has stated that no deaths occurred. If a similar event occurred in the upcoming fire season it appears that the Government would again

hold the view that the pollution could not cause deaths unless it continued for longer than three months, and therefore would respond accordingly. It is in the public interest that this issue be resolved as soon as possible, in part to ensure preventable deaths do not occur in the future.

Yours sincerely,

Nicola Rivers

Lawyer

Environmental Justice Australia