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Coal Mine Fire at Morwell, Victoria, Australia. PEER REVIEWS

Review of the EPA Victoria response to the Morwell Coal Fire: Air Quality Assessment and Monitoring Programs.

Review scope:

1. Has the EPA been monitoring the right things in the right places to assess the smoke impacts?
2. Are there other data sources that could improve our assessment and monitoring in the short term?
3. Are there any other gaps or potential improvements in our current monitoring assessment and tools and methodology?
4. Are there approaches to communicating our data summaries EPA could consider to improve our current products (particularly in relation to material currently on the EPA web site)?
5. Will our current approach and outputs give EPA the level of confidence in the results to enable clear input into decision-making protocols, which are partially reliant on air quality monitoring?
6. Are there any other specific techniques the EPA might use for (a) monitoring smoke plume behaviour, (b) determining smoke source strength, (c) taking account of weather and other environmental conditions, (or) communicating results?
7. Any other relevant comments?

Reviewer details:

I am an independent air quality scientist from the Hunter Valley in NSW (brief CV details below). I have had more than 35 years of experience assessing the impacts of emissions from coal mining and power stations in the Hunter, and have worked as an independent advisor to community groups, local councils, and the NSW EPA on air pollution problems.

Brief Bio:

A/Prof Howard Bridgman, Conjoint Professor, School of Environmental and Life Sciences, University of Newcastle, has recognised expertise in air pollution, climate change, climatology, and environmental studies, developed over the past 35 years. His major areas of research locally have included projects evaluating dispersion of sulfur dioxide from Liddell Power Station; rainwater chemistry and quality in the Hunter Region; asthma and air quality on the east coast of NSW; and assessing sources and establishing a pollution inventory for Inner Newcastle and the Upper Hunter Region. Current research interests include air quality management problems in the Lower Hunter Region, and fine particulate chemistry and dispersion from urban and mining sources, and the history of air pollution and its problem in Newcastle, NSW. Howard is the author or co-author of over 100 refereed publications in international journals and conference proceedings, and numerous other reports. In 1999, he was elected as a Fellow to the Clean Air Society of Australia and New Zealand (CASANZ). In 2009 he was awarded Distinguished Service Medals by both the NSW State Branch and National executive of CASANZ. In 2013 he was awarded the CASANZ Clean Air Medal. He is currently President of CASANZ. He can be contacted by mobile telephone at 0425281387 and would be willing to talk with the press or radio stations if desired.



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Your understanding of the topic and scope:

I have read the information provided regarding monitoring and other information about the fire, and have a good understanding the problem and the needs for monitoring, forecasting plume behaviour, and proper public communication. The mine and the fire are close to Morwell, Victoria, and potentially the emissions from the fire can have important health and other impacts on the residents of Morwell and other nearby villages. The purpose of this report has been to review the VIC EPA monitoring program in response to the Hazelwood fire, and to comment on the adequacy of the response.

Material supplied by EPA:

1. More detailed maps of Morwell town (with monitoring sites)
2. List of EPA monitoring activities
3. Sample Air Quality Monitoring Report (issued twice daily)
4. Sample Air Quality Forecast (issued twice daily)
5. Sample of a Spot Weather Forecast sent to EPA by the Bureau of Meteorology
6. Selection of recent media coverage of the event
7. Sample of plume PM2.5 map from mobile monitor (jpg)

Additional material requested:

Nil

Any other relevant comments:

Response

1. Has the EPA been monitoring the right things in the right places to assess the smoke impacts

Monitoring sites are located at Morwell South (MS), Morwell East (ME), and Traralgon (Ta), as well as 10 other Latrobe Valley locations report real-time concentrations of carbon monoxide (CO), sulphur dioxide (SO₂) and particle matter (in two size ranges, PM_{2.5} (MS, ME) and PM₁₀ (Ta)) of greatest concern to human health as rolling hourly averages. *I recommend PM₁₀ monitoring at Morwell South, to provide better information about particle structure from the fire, and to assist understanding of particle chemistry analysis that could provide more details of potential health impacts on residents. The relationship of PM_{2.5} (fine) and PM₁₀-PM_{2.5} (coarse) size ranges to human health can overlap and is not clearly defined.*

I am impressed by the use of meteorological data and forecasts on a regular, short-term basis, to assist in decision making about handling the fire, and also informing the public about the immediate future of air quality problems from the fire.

The VIC EPA is working with Environment Tasmania on assessing the spatial distributions of PM_{2.5} in the Morwell and Traralgon using an automobile tracking program called BLANKET. The data can be presented colour coded by concentration level along the route of the automobile. *The spatial display is impressive and easy to understand and should be made available to the public via the dedicated web site.*



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Otherwise, I believe the VIC EPA has been monitoring the right things in the right places to provide appropriate and timely information and updates. *It is essential that such information updates be available for the public as soon as possible and on a regular basis.*

2. Are there other data sources that could improve our assessment and monitoring in the short term?

Aside from stationary and mobile monitoring of air pollution concentrations, VIC EPA, is already using other methods to provide more information. These include visual observations of plume extent on a regular basis, which also relates to attempts to extinguish the fire. Weather satellite information may provide plume extent information at specific time periods, but without more detailed investigation it is unclear to me whether this would add much to the information already available.

I understand that a measurement program focussing on the chemistry of the particle matter from the emissions plume has begun. *I believe that is approach is critical to understanding the potential for chemical and toxic impacts on public health and would encourage an extensive approach here, both for PM10 and PM2.5.*

I note that NOx emissions monitoring is not included. I do not know whether NOx emissions are important from an open cast fire, but they are important in the Hunter Valley when blasting occurs for a mine. *I suggest that, for completion of the pollutants listed for NEPM purposes, the VIC EPA consider monitoring for NOx at Morwell South, at least for the duration of the fire.*

3. Are there any gaps or potential improvements in our current monitoring assessment and tools and methodology?

VIC EPA has covered the major monitoring needs quite well, and aside from my suggestions above, I do not think much can be done to improve in these areas.

4. Are there approaches to communicating our data summaries EPA could consider to improve our current products (particularly in relation to material currently on the EPA web site)?

The web site currently contains information about the fire situation in five categories: Alerts, current and archived: forecasts of air quality in differing time periods; definitions of air quality terms; where to get more information (especially links to web sites with health information); Questions and Answers about air quality and the fire.

The presentation approach on the web site is straightforward, clear and easy to understand by the public. My only suggestion is that that answers to many of the questions are broad, generic and sometimes vague. Based on my experience in the Hunter Valley, the interested public do not consider these kinds of answers favourably. They want better information. *I recommend that the answers to the questions on the web site be revisited with the aim to provide some more details and more specifics, but still keeping the answers short, simple and direct.*



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I also suggest that information specific to the fire but not falling into these five categories be available for the public under a category perhaps titled “other information” or something similar. Included here could be the spatial PM from the car surveys, some chemistry information and the like. I would not expect many member of the public to visit this category but those interested will.

5. Will our current approach and outputs give EPA the level of confidence in the results to enable clear input into decision-making protocols, which are partially reliant on air quality monitoring (and data interpretation)?

Yes, I believe so, so long as the method of communication is clear and the information presented in a relevant matter to the need. Regular re-visits to the approach, considering possible improvements, should ensure the confidence remains high.

6. Are there any other specific techniques the EPA might use?

There are a range of other measurement techniques that could be used, but for immediate purposes, might be considered “exotic”, and perhaps not add much more information to what is already being done. An example of this is the use of a scanning LIDAR to evaluate the spatial distribution of PM in the plume, in three-dimension. The results would provide very useful details for research associated with emissions from an open cast fire plume, but may also provide useful information about plume extent under different weather conditions. If VIC EPA is interested in this approach, contact Stuart Young at CSIRO Marine and Atmospheric Research. Cost may be a decision-making factor.

There is one other communications mechanism I would recommend for the public, if it does not already exist. In the Hunter Valley, the public can download an app for their mobile phone or computer that allows receipt of an immediate air pollution alert transmission by text. The app in the Hunter comes from the NSW EPA and is used there mainly to transmit rolling 24-hour average alerts when the PM10 NEPM is exceeded. For Morwell and the fire, the immediacy of this information for the public is much more important, especially when the plume moves with changing atmospheric conditions. *I recommend that the VIC EPA develop and use a communications app for mobile phone and computer to issue alerts for the public.*

7. Are there any other relevant comments?

I recommend an open-access policy for the public to all reports and information about this situation. This should be publicised regularly. Public concerns about limits to VIC EPA reactions to the fire can be alleviated with an open information approach. This has worked well in the Hunter Valley, and has also allowed open and better informed discussion about public concerns.

At appropriate times, the VIC EPA should consider holding one or more public meetings, to provide updates on the situation and the results of research.

Representatives from an independent body, such as the Clean Air Society of Australia and New Zealand, could be involved in organising and chairing such meetings.