IN THE MATTER OF
The Hazelwood Mine Fire Inquiry

STATEMENT OF JOHN DAMIAN MERRITT

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Filed on behalf of: The State of Victoria
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Attention: Peter Stewart

I, John Damian Merritt, of 60 Denmark Street, Kew, Victoria, Chief Executive Officer, VicRoads, can say as follows:

Introduction

1. My full name is John Damian Merritt. My date of birth is 17 February 1959.

2. From 1 February 2010 to 2 May 2014, I was the Chief Executive Officer at Environment Protection Authority (**EPA**). On 5 May 2014 I commenced a new role at VicRoads and am now the Chief Executive at the Roads Corporation (**VicRoads**) based at 60 Denmark Street, Kew Victoria.

3. My primary responsibility at EPA involved managing the organisation as a whole and implementing the 5 year plan in line with EPA's strategic priorities and 6 key environmental protection priorities. I was the Chief Executive Officer at EPA during the period of the Hazelwood Coal Mine Fire (**the Hazelwood Mine Fire**) in relation to which the Inquiry has been appointed.

4. I hold a Bachelor of Economics from Monash University.

5. This statement has been prepared pursuant to the request made by Counsel assisting the Hazelwood Coal Mine Fire Board of Inquiry at a meeting on 23 April 2014 and

by letter of 1 May 2014 (the **Letter**). A copy of this letter is in Document [VGSO.0003.001.0015].

6. The Letter requests that this Statement answer 22 questions. My statement seeks to address each of these questions and to provide further information to the Board about EPA's role in responding to the subject of the Inquiry. These are set out in Part B of the statement.

7. This statement is made by me as the former Chief Executive Officer of EPA. It includes information drawn from numerous sources within EPA as well as information within my personal knowledge and experience. I am satisfied as fully as I can be that the statement is true and correct.

8. From the date of its formal notification of the Hazelwood Mine Fire on 11 February 2014, EPA made a number of immediate decisions which included the appointment of key EPA staff to coordinate its role in the emergency response and to mobilise air quality monitoring equipment.

9. There were some 136 of EPA staff involved in the EPA response to the incident with sustained involvement throughout from Christopher Webb, Director, Environmental Regulation who was given operational responsibility and was the EPA representative on the State Emergency Management Team (**SEMT**). He was also present in the State Control Centre (**SCC**) and in the Latrobe Valley during the period of the Hazelwood Mine Fire. Early in the incident EPA put in place its own emergency structure and appointed an Incident Commander. These roles were primarily performed by Elizabeth Radcliffe and Tim Bessell-Brown (experienced personnel and trained in emergency response). On 11 February 2014, I appointed EPA's principal air quality scientist, Dr Paul Torre as Science Officer to support the Regional Control Centre (**RCC**). Dr Torre then attended in Morwell the next day, on 12 February 2014. My statement is informed by the actions of these other EPA staff involved from the head office in Melbourne, the Traralgon office, and the Monitoring and Assessments Unit at EPA's Centre for Applied Science in Macleod.

10. I personally attended at the Latrobe Valley throughout the Hazelwood Mine Fire and remained engaged with the incident while in Melbourne. From my recollection and diary notes I was in the Latrobe Valley on the dates listed below. I attended the RCC, ICC, press conferences, public meetings, the respite centres and engaged with members of the Morwell community and also met with personnel from the agencies involved in the response.

    (a) 18, 19, 20, 21, 24, 26, 27, 28 February 2014; and

    (b) 4, 5, 6, 7, 10, 11, 13, 14, 17, 18 and 19 March 2014.

Overview of this Statement

11. This Statement has three parts.

12. First, **Part A** sets out an overview from the perspective of EPA regarding the Hazelwood Mine Fire. Second, **Part B** contains answers to the questions of the Board numbered 1 to 22.

13. Third, **Part C** contains the following Appendixes:

(a) Appendix One: Centre for Applied Science Staff Expertise;

(b) Appendix Two: Table of Air Monitoring Equipment;

(c) Appendix Three: Peer Reviews; and

(d) Appendix Four: Media Releases and Advisories.

Part A: EPA Overview of the Hazelwood Mine Fire

The incident

14. The experience of the Hazelwood Mine Fire was unprecedented and created numerous challenges for EPA - the duration of the fire, the repetitive impacts of the smoke, its static source and proximity to the community made this an incident of a unique scale.

15. EPA's predominant role in incidents is to provide expert advice and guidance on environmental impacts. However, beyond its customary role, this incident required EPA to rapidly establish an extensive monitoring and testing network, provide quick turnaround reporting and communicate accurate and scientifically sound results in an easy to understand form, to multiple audiences.

16. EPA places a high importance on its values. The strength of its culture is to apply these values regardless of the situation. Throughout the incident and its challenges, its people provided authoritative advice, were accountable for their decisions and actions, communicated transparently and collaborated with all agencies.

17. EPA immediately responded to the request on 11 February 2014 for it to be involved in the State response to the Hazelwood Mine Fire. EPA allocated staff, some of whom were already present in the Latrobe Valley. An important strategic decision was taken late on 11 February 2014 and implemented on 12 February 2014 to re-establish the recently decommissioned fixed air quality monitoring station in East Morwell. The EPA Monitoring and Assessments Unit also identified a number of items of mobile and portable equipment that could be deployed to Morwell to ensure that all important particulates could be monitored. A Table of Air Monitoring Equipment, a description of the equipment and how each was used and when it first commenced logging data is set out in Appendix Two of my Statement. This also includes images of the equipment and data images.

EPA as regulator and environmental authority

18. EPA is Victoria's environmental regulator. EPA is actively engaged in both preventative and responsive programs to reduce harm to the environment across the State. With a field team located in Traralgon as well as other regional centres, EPA has a long history working with businesses and industries in the Gippsland and Latrobe Valley region, including with the power generation operators. The Traralgon team are all members of the local community. EPA's regulatory role requires in depth involvement and understanding of the industries it regulates. EPA has expertise in environment management practices, as well as environment impacts.

19. In addition to its operational activities as an environmental authority, EPA has undertaken a number of monitoring activities and studies over the past three decades

in the Latrobe Valley. Most recently EPA carried out a year long study into the quality of the air in the valley as an assessment of the impacts of power generation activity, and the annual cycle of planned burns. This study is described in Part B Question 5.

20. EPA maintains a high level of in-house capability in environmental sciences. Through its Centre for Applied Sciences (**CAS**) based at Macleod, EPA has 58 scientists directly engaged in their disciplines, with a broad cross section of qualifications and experience. Many of these individuals are recognised as leaders in their fields in Australia. Appendix One provides an overview of those scientists directly involved in the incident. Throughout the Hazelwood Mine Fire, the expertise of the CAS team, particularly the Monitoring and Assessments Unit was drawn upon from air quality science and technology, water quality, soil quality and contamination, chemical analysis, data quality and science program design.

EPA as support agency

21. EPA is involved in numerous pollution incidents every year. EPA is called on as a support agency for emergencies regularly to advise on spills, fire-fighting water controls and short term off-site air quality impacts. EPA is involved in bushfire season activities through its smoke forecasting and advisories. The three distinguishing features of the Hazelwood Mine Fire that provided the challenges to EPA existing expert knowledge and practices, were the static location of the pollution source (i.e. as compared to bushfires), the extended period of the impacts (i.e. as compared to typical HAZMAT incidents), and the close location of the population leading to high intensity of the impacts.

22. EPA's traditional support role, built through its regular involvement in support of spills and industrial fires, is to provide expert advice to emergency services on potential environmental impacts to assist in operational decision making. In addition, EPA is involved through natural events such as bushfires and floods, providing air quality and smoke forecasting, assisting the community and business with matters such as the disposal of dead stock and levy exemptions for waste.

23. EPA's role as a support agency in the Hazelwood Mine Fire was primarily to provide expert advice, information and analysis on the environmental impacts of the mine fire, particularly on Morwell and surrounding towns. EPA built monitoring and testing regimes based on an expert assessment of what was required and explicit requests for support and advice.

24. Beyond its traditional role, the scope, scale, resources and duration of EPA activities in the incident was unprecedented. The innovation, adaptation and pace of the incident exceeded previous demands and EPA responded beyond my expectations.

EPA monitoring and testing regime

25. One of EPA's key statutory responsibilities is to monitor and report on the state of the environment in Victoria. Central to this objective is an extensive air monitoring network on which EPA assesses the air quality against SEPP objectives. A more comprehensive summary of the SEPPs and their objectives is provided in Part B Question 2. The basis for this monitoring is a comparison against annual air standards that represent the long term air quality across the state. Monitoring is designed to capture the cumulative impacts of a range of point and diffuse sources of pollution.

26. Where a localised impact requires investigation, EPA also has the capability and equipment to carry out programs on a more discrete geographical scale. This monitoring is used to identify more concentrated impacts and sources, but is still carried out over extended time frames and compared against SEPP defined levels. Recent examples in Brooklyn Industrial Precinct, Francis Street Yarraville and the Latrobe Valley have gathered 12 months of data before definitive assessment can be carried out.

27. In response to the Hazelwood Mine Fire, EPA escalated air monitoring capacity in Morwell and the surrounding areas. The immediate priority actions initiated were:

    (a) on 11 February 2014, to recommission the Morwell East ambient air monitoring station to capture all particulates;

    (b) on 11 February 2014, to deploy EPA's Principal Air Quality Scientist to attend the Traralgon RCC and to evaluate the location of equipment;

    (c) on 11 February 2014, the identification of other existing and mobile equipment (such as the DustTraks) that could be deployed (including existing EPA equipment such as the BAM and other equipment that could be hired);

    (d) on 11 February 2014, a search for a powered site close to the Mine Fire that was a strategic location and suitable for some of the mobile equipment to housed (ultimately this was identified as South Morwell Bowling Club, 200 meters from the Mine); and

    (e) on 12 February 2014, to use CFA/MFB AreaRAE monitor and occupational hand-held CO monitors to capture CO readings.

28. Appendix Two contains a list of the monitoring equipment, when they each commenced logging data, and images of the equipment in situ.

29. On 12 February 2014, monitoring of small particulates less than 2.5 micrometers in diameter (**$PM_{2.5}$**) commenced at the Morwell East station. On 13 February 2014, monitoring of carbon monoxide (**CO**) commenced. On 13 February 2014, CFA equipment, on EPA advice was relocated to the northern perimeter of the mine and mobile rounds were conducted through Morwell.

30. The number and location of instruments continued to expand over the ensuing days and a full description of the equipment, what it measured, its operational functionality and dates is set out in the remainder of my Statement.

31. The SEPP standards are based on impacts of pollution on 'sensitive receptors' which are aspects of the environment that may be harmed. In the case of water and soil, these may be plants or invertebrates. In the case of air, humans are the focus. The human health considerations are long term impacts of environmental pollutant levels and do not represent acute human health risk. EPA does not routinely monitor for, or maintain specific expertise in, short term or acute health impacts

32. EPA collaborated extensively throughout the incident with Department of Health (**DH**) and the Chief Health Officer (**CHO**) who maintain the appropriate technical expertise in short term human health impacts from pollutants. EPA's expertise in air

monitoring provided the capability, equipment and methodology to capture and collate information in the appropriate form for DH personnel to interpret and undertake the risk assessment of health impacts.

33. The challenge for both groups was the lack of directly applicable standards against which results could be compared and conclusions drawn. Rapid and ground breaking work during the incident to develop operational decision making protocols for CO and $PM_{2.5}$ was an example of the collaboration of two sets of experts in extremely challenging circumstances. These protocols were:

    (a) Hazelwood Open Cut Brown coal fires - $PM_{2.5}$ Health Protection Protocol dated 6 March 2014 (**the $PM_{2.5}$ Protocol**) [EPA.0001.007.0267]; and

    (b) Latrobe Valley Coal Fires Carbon Monoxide Response Protocol v1.0 (RCC) dated 27 February 2014 with interim protocols in place from 15 February 2014 (**the CO Protocol**) **[EPA.0001.007.0041]**.

34. During the incident, air monitoring levels continued to be reported in comparison with the SEPP levels, in particular 25 micrograms per cubicmetre (ug/m^3) for $PM_{2.5}$ and 9 parts per million (**ppm**) for CO. While this number was not entirely relevant to the levels experienced in the early stages of peak smoke, with no equivalent acute human health risk levels the alternative was to report with no comparison level.

35. In addition to air monitoring, EPA undertook extensive sampling and testing of water, ash and soil, as well as individual air samples to identify what other components may be in the smoke. The samples were tested for a broad range of metals and organic materials in order to provide a clear picture for operational purposes, and the community, of what impacts the smoke and ash were having on the local environment. The results of this testing were shared with DH who undertook the human health risk assessments.

36. This presented two challenges for EPA and its science team. For many of the chemical species being tested, there were no levels outlined in relevant standards. All results were reported, against a relevant standard where a standard was available. Where there was no applicable standard a comparable 'best available' was used. Additionally, the volume of these results required rapid but accurate analysis, interpretation and translation.

37. Results of the sampling program, as expected by EPA scientists, provided very few results that exceeded relevant available standards (as detailed in Part B Question 8). The majority of metals and organic materials were below detectable levels. The characteristics of the soil, water and ash largely reflected normal local levels. Although EPA anticipated the outcome of these results, given the levels of anxiety and concern in the community it was decided by EPA that a definitive answer was required rather than to solely rely on expert opinion.

38. One of the primary roles of EPA's scientists and technicians is to collect data about the air environment. EPA interprets the results in order to fully understand the extent of the event, the sources of pollution, how it is being transported and dispersed in the air, what effect it might be having, and what needs to be done to reduce the effects on the environment. They do this by:

(a) identifying the most relevant parameters based on knowledge of the situation and expert opinion;

(b) rapid deployment and commissioning of appropriate monitoring equipment;

(c) analysing the measurements using computer models;

(d) integrating other data such as that relating to the weather, the state of the fire, demographics on where there might be sensitive areas, previous results and publications; and

(e) forming a sound scientific picture of the event, and potential risks and issues, and communicating this clearly to stakeholders.

39. Communication of this process, along with whatever relevant information, assumptions and analysis procedures, has to be tailored to meet the needs of the specific stakeholder needs, including:

(a) other EPA scientific staff for review and comment;

(b) operational personnel including EPA, and other affected agencies, such as the DH and the CHO;

(c) other EPA staff such as the communications team to formulate the public messaging and update the web site; and

(d) to the affected, and broader, community.

40. These are not in priority order, for in practice they will often occur in parallel. Smoke contains a wide range of components, almost all of which are measured and evaluated in some way. From an air quality perspective there are three major categories – particulates (as $PM_{2.5}$ and PM_{10}), gases (mainly CO) and key toxic components (such as benzene, mercury and other metals, organic compounds, and dioxins).

Importance of scientific rigour in emergency situations

41. As a support agency, EPA is often called upon to provide its advice on local environmental impacts of an incident. This is important in the context of the normally short duration of such incidents, where little definitive information is available and expert opinion is valuable to assist rapid critical decision making. EPA undertakes this role regularly, authoritatively and confidently. EPA expertise in air, water and soil impacts, and the potential risks and mitigation actions that can be taken are an important component of EPA core responsibilities. During the Hazelwood Mine Fire advice was provided to a range of agencies.

42. In circumstances where there is a lack of available data, the expectations and needs for accuracy are appropriately limited. During the early stages of the Hazelwood Mine Fire when air quality readings exceeded limits in the measurement standards, absolute accuracy of the readings was not the highest priority. Indicative data was sufficient.

43. However, there are clearly instances when accuracy is necessary. With the development of the trigger levels within the CO Protocol the difference between a level of 26ppm and 27ppm might have been the difference in evacuating 1,000 people or not. Accuracy is critical. Similarly, with its commitment to report all material publicly, accurate application of sampling and testing methods is critical.

44. Expert opinion and advice normally provided during incidents by EPA is immediate and possible as the experts largely draw on their knowledge. This expectation was translated across to the monitoring and sampling programs throughout the incident, despite the inherent lag times for testing, analysis and interpretation. This resulted in pressure to provide rapid answers on the results of monitoring and sampling both by agencies and the community.

45. The challenge in the Hazelwood Mine Fire incident was to manage the risks associated with seeking to provide highly accurate results, within appropriate timeframes in an emergency situation.

46. These risks were mitigated by EPA ensuring a rigorous quality assurance (**QA**) program throughout the incident. Sampling was only carried out by appropriately trained personnel, testing was carried out by NATA certified laboratories and key methodologies that were developed or adapted through the incident (such as our monitoring and smoke forecasting methodologies) were independently peer reviewed.

47. These activities were carried out in support of, and in parallel to, its activities and allowed us to undertake its role quickly, but with confidence in our results and information.

Communication

48. EPA cannot discharge its statutory functions unless it communicates information on air quality. During bushfire season, this takes the form of regular forecasts for smoke impacts, and through the Bushfire Smoke, Air Quality & Health Protocol (Bushfire Smoke Protocol) agreed with DH, EPA issues Smoke Advisories when those impacts are expected to be significant, with an accompanying set of health messages from the CHO.

49. According to the Protocol, the communications are either 'low level' or 'high level'. More detail is provided in both EPA and DH websites and this information is usually well coordinated and channelled through emergency channels during bushfire and planned burning periods. As a well-established, familiar and understood methodology, this was the default approach during the early phase of the incident.

50. As the incident unfolded, it became clear that more information was required by the community. The challenge was that the next level of information, such as individual test results, started to introduce more complex scientific ideas, principles and concepts, and as such required substantially more explanation and translation into easily understood terms.

51. The release of detailed scientific information during an emergency, without sufficient explanation and interpretation, would have created an unacceptable risk of interference to critical communication channels.

52. In addition to a significant media presence, social media activity and community engagement EPA on 21 February 2014 established a dedicated 'microsite' within its existing web site. The microsite was used to provide forecasts, monitoring and results, along with explanations of what they meant, background information on combustion and air pollutants. As the testing continued, the microsite grew and restructured to keep pace with the needs of the multiple audiences.

53. The additional challenge of multiple audiences was the need to translate complex science and to tailor communications to meet the needs of operational personnel, other experts, the media and the community. Each has its specific requirements and multiple versions of materials were managed throughout.

54. EPA is committed and continues to, make available all testing results.

Terminology

55. Section B references a number of terms which have either significant or specific meaning in EPA's context. To avoid misunderstanding, I offer the following definitions:

55.1 **Risk Assessment**: a scientific assessment of what could occur (likelihood) and how good or bad such an occurrence could be if it happened (consequence). This is done before and during any incident as more information or questions arise.

55.2 **Parameter**: a chemical, physical or biological thing that is monitored, tested or assessed (e.g., lead in water, $PM_{2.5}$ in air or benzene in soil) and compared to an environmental standard.

55.3 **Collecting Data**: counting or collecting data about any parameter across all 3 environmental segments: air, water and soil. In common use this is often called 'monitoring'.

55.4 **Test**: any chemical, physical or biological assessment done. It could be a chemical analysis done in a laboratory, a physical assessment of the size of particles in the air or a biological assay for the presence of bacteria. Some of these tests are immediate and occur in 'real time'; some tests take one day; some take a week or less and some of the less frequently run and more complex tests can take over a month to complete by a qualified laboratory. It depends on the parameter being tested.

55.5 **Interim vs Final Results**: as some tests take longer than others to complete and as EPA was endeavouring to have as much information available for decision-making as soon as possible, EPA followed a process of requesting 'interim' results as soon as they were available. For example the interim results for water and ash samples could take 3 to 4 days, and the final results could take more than 2 weeks. The difference in time is due to quality assurance processes run by the laboratory. In EPA experience, it is very rare that final results differ from the interim results.

55.6 **Interpretation**: the activity that EPA scientists do to understand what all the tests of monitoring data means. They work with their own knowledge, colleagues and other experts as well as the scientific literature to build this understanding.

55.7 **Quality Assurance (QA)**: this is a crucial part of the process where EPA scientists double-check the quality of the work. Often it involves predetermined quality standards and approaches and almost always involves people who are different to those who created the work. It involves quality assurance of scientific equipment, processes, monitoring design, data and interpretation. When it is the latter few activities it is called **Peer Review**.

55.8 **Reporting**: EPA scientists describe what the science is telling them to the end user. This could involve a physical report, a sentence on a webpage or verbal/written advice.

55.9 **Forecasting**: is a specific type of reporting involving estimating and predicting the state or level of some parameter in the future (e.g., the amount of smoke or $PM_{2.5}$ tomorrow). It involves modelling many data inputs and may draw heavily on weather information from the Bureau of Meteorology when it relates to air quality.

Part B: Answers to Questions in the Letter from the Board

Question 1: Provide a brief overview of the EPA's role and responsibilities, and its organisational structure

56. EPA is established as a body corporate with perpetual succession under section 5 of the *Environment Protection Act 1970* (Vic) (**EP Act**).

57. As the state's environmental regulator, EPA's key roles are to regulate businesses and industry to drive compliance with the EP Act, and to monitor and report on the state of the environment, to help ensure a safe and healthy environment for Victoria. There are a number of standards (national and international standards) that inform monitoring practices.

58. In line with current international regulatory practice, EPA allocates resources where the biggest difference can be made based on the potential harm to the environment, and the likelihood of non-compliance with the law.

59. This is best detailed in EPA's publication Compliance and Enforcement Policy **[EPA.0001.004.0049]**.

60. During my period as Chief Executive Officer, EPA has created and implemented a 5 Year Plan 2011-2016. A copy of the 5 Year Plan 2011-2016 can be found at **[EPA.0007.002.0115]**:

    (a) Deal with Past Pollution;

    (b) Tackle Current Environmental Issues; and

    (c) Shape the Future.

61. These three strategic responsibilities have been further focussed down to 6 key environmental protection priorities representing key pollution sources:

    (a) Landfills;

    (b) Organic waste processors;

(c) Stormwater;

(d) Waste stockpiling;

(e) Industry/residential encroachment; and

(f) Contaminated land.

62. As Chief Executive Officer of EPA, my role was to oversee the implementation of the 5 Year Plan and 6 key environmental protection priorities by EPA's five Directors and each of their Directorates:

(a) Environmental Regulation;

(b) Knowledge, Standards & Assessment;

(c) Strategic Relations;

(d) Strategy and Support; and

(e) Corporate Services.

63. A copy of the Basic Organisations Chart for EPA can be found at [EPA.0001.003.0001].

64. During the incident EPA participated in the State Emergency Management Team and the Regional Command Centre (**RCC**). Over the duration of the incident approximately 136 EPA staff, including science staff, were directly involved in the response in some way, with a further 30 in support roles, out of a total agency staff of approximately 330. This represents approximately 50 per cent of its total staff involved in the response to the Hazelwood Mine Fire. A significant proportion of EPA applied science staff were also directly involved in the response. At least 28 science officers played an active role in EPA's science program responding to the incident.

Question 2: Identify and attach any relevant State Environment Protection Policies, including the State Environment Protection Policies on Ambient Air Quality and Air Quality Management

65. State Environment Protection Policies (**SEPPs**) are policy instruments made by the Governor in Council on the recommendation of EPA under s 16 of the EP Act. SEPPs are developed through a rigorous public process including a full public policy impact assessment as set out in s 18(a) of the EP Act with similar measures required for the development and adoption of National Environment Protection Measures (**NEPM**) which may be incorporated in a SEPP. By convention a draft SEPP and an Impact Assessment are considered by the Victorian Competition and Efficiency Commission and Cabinet before they are adopted. Some SEPPs (for example SEPP - Ambient Air Quality) also adopt national standards, in this instance the National Environment Protection measures made under the *National Environment Protection Council (Victoria) Act 1995*. The NEPM regime is modelled on the Victorian SEPP.

66. SEPPs aim to safeguard specific environmental values and human activities (termed beneficial uses) that warrant protection in the State of Victoria. Examples of beneficial uses in the SEPP for ambient air quality include:

(a) human health and wellbeing;

(b) ecosystem protection;

(c) visibility;

(d) useful life and aesthetic appearance of buildings, structures, property and materials;

(e) aesthetic enjoyment; and

(f) local amenity.

67. SEPPs aim to express the public expectations, needs and priorities for using and protecting the environment. They establish the uses and values of the environment that the Victorian community wants to protect; define the environmental quality indicators and objectives; and describe the attainment and management programs that will ensure the necessary environmental quality is maintained and improved. Under the EP Act, the requirements in environmental regulations, works approvals, licences and other regulatory tools must be consistent with and contribute to the achievement of the objectives set out in SEPPs. SEPPs have been established for a number of environmental segments including air, water, noise and soil.

68. There are three SEPPs particularly relevant to the operation of the Hazelwood power station and mine:

(a) SEPP (Ambient Air Quality);

(b) SEPP (Air Quality Management); and

(c) SEPP (Waters of Victoria).

A copy of each of these SEPPs can be found at [EPA.0001.006.0469], [EPA.0001.006.0485] and **[EPA.0003.001.0026]**

Question 3: Identify and attach the standards or guidelines against which the EPA measures air, water and soil quality

Continuous Air Monitoring

69. The air standard values are listed in Air Standard Values Table and are based on protecting human health whereas the water standards EPA uses are based on environmental protection. Individual standards and guidelines against which samples are assessed are described below.

Table One: Air Standard Values

Analyte	Phase	Source	Period	Value
Criteria				
Carbon monoxide (CO)	Gas	NEPM	8-hour	9000 ppb
Nitrogen dioxide (NO_2)	Gas	NEPM	1-hour	120 ppb

Analyte	Phase	Source	Period	Value
Nitrogen dioxide (NO_2)	Gas	NEPM	Annual	30 ppb
Ozone (O_3)	Gas	NEPM	1-hour	100 ppb
Ozone (O_3)	Gas	NEPM	4-hour	80 ppb
Sulphur dioxide (SO_2)	Gas	NEPM	1-hour	200 ppb
Sulphur dioxide (SO_2)	Gas	NEPM	24-hour	80 ppb
Sulphur dioxide (SO_2)	Gas	NEPM	Annual	20 ppb
Particles ($PM_{2.5}$)	Particle	EPA	24-hour	25 $\mu g/m^3$
Particles ($PM_{2.5}$)	Particle	EPA	Annual	8 $\mu g/m^3$
Particles (PM_{10})	Particle	NEPM	24-hour	50 $\mu g/m^3$
Lead (Pb)	Particle	NEPM	Annual	0.5 $\mu g/m^3$
Visibility	Mixed	NEPM	1-hour	20 m

Sampling of air, ash, water and soil

70. The standards and guidelines that EPA uses are as follows:

70.1 In general air based samples were assessed against either '*NEPM - National Environmental Performance Measure*', '*TCEQ-US Texas Commission on Environmental Quality*', '*ATSDR-US Dept. of Health Agency for Toxic Substances and Disease Registry*', or '*EPA - An EPA reporting criterion based on SEPP*'.

70.2 In general, toxicants in water samples were assessed against standards specified in '*ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy. ANZECC and ARMCANZ. Vol 1. The Guidelines*, as *required in State Environment Protection Policy (Waters of Victoria) (2003), Special Gazette No. S 107, Victorian Government Printer*'.

70.3 Additional Australian standards were used in some circumstances, these being the Recreational Water Quality Guidelines and the Australian Guidelines for Drinking Water.

70.4 Soil and ash samples were primarily assessed against '*National Environment Protection (Assessment of Site Contamination Measure) – Against HIL: Residential-A*' or '*EPA Victoria, Soil Hazard Categorisation and Management (IWRG 621) against Fill Material Upper Limits*' with the exception of some Monocyclic aromatic hydrocarbons (MAHs) where the DH provided advice that the appropriate standard values are those that relate to direct contact with soils. These standards were assessed against '*The National Environment Protection (Assessment of Site Contamination) Measure against HSL Direct Contact Residential A*'.

71. The following guidelines are also commonly used:

    (a) ANZECC & ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy. ANZECC and ARMCANZ. Vol 1.

    (b) Website: http://www.environment.gov.au/resource/australian-and-new-zealand-guidelines-fresh-and-marine-water-quality-volume-1-guidelines

    (c) Guidelines for Managing Risks in Recreational Water

    (d) http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/eh38.pdf

    (e) Australian Drinking Water Guidelines (2011) - Updated December 2013

    (f) https://www.nhmrc.gov.au/guidelines/publications/eh52

72. During the incident the sampling and testing regime developed was deliberately broad and comprehensive as described in Part A. This assisted to ensure that a definitive set of information, and answers, was available to operational personnel and the community. As a result, many of the chemical species analysed are not identified in available standards, and significant research was undertaken to source the most relevant guidelines.

Question 4: Describe the environmental monitoring undertaken by the EPA in the Latrobe Valley prior to 9 February 2014, in relation to air, water and soil quality. Include reference to the location of monitors and the substances being monitored such as common air pollutants, fine particulate matter and air toxins

73. Environment assessment commenced in the Latrobe Valley with an air monitoring site established at Darnum North in 1979 and continued until recently. Further sites were added at Traralgon and Moe in 1981. Monitoring continues at Traralgon. Air quality assessment was also done between 1979 and 1989 at Morwell East, and between 1980 and 1985 at Morwell West. This evolving air monitoring program responds to the significant emissions to air from power generating activities in the Latrobe Valley airshed.

74. Latrobe Valley Air Monitoring Network (an historic committee of multiple agencies including EPA that operated the network) has provided annual summaries of air quality results to EPA each year since 1980. The annual summaries confirm that the levels of air pollution measured at Morwell East and Morwell West during these periods remained below the current SEPP air quality objectives for sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide. These are the established international air quality indicators for coal fired power generation.

75. Measurement of PM_{10} at the Morwell East station continued until May 2013 as no daily PM_{10} averages had been measured that exceeded the current PM_{10} air quality objective.

76. The air quality objective for Local Visual Distance[1] was frequently not met at both Morwell East and Morwell West. Throughout the 1980s and 1990s the monitoring year was reported as a 12 month period between September and August. The most number of days exceeding the LVD air quality standard of 20km occurred at Morwell East between September 1980 and August 1981 when 65 days did not meet the objective. Many of the extreme LVD values during this time were attributed to smoke from fuel reduction burning and local urban emissions during calm and stable atmospheric conditions in autumn and winter.

77. The Annual results are available at <http://www.epa.vic.gov.au/our-work/monitoring-the-environment/monitoring-victorias-air/monitoring-results/>

78. There have also been a series of scientific studies conducted on air quality in the Latrobe Valley since 1980 and described in various EPA reports throughout the years, including that outlined in Question 5. These run to many hundreds of pages. They can be provided if considered relevant to the Inquiry.

Soil

79. There were no specific regional soil monitoring programs in the Latrobe Valley.

Water

80. EPA has sampled and tested rivers and streams in the Latrobe and adjacent catchments over many years (for example 'Environmental condition of rivers and streams in the Latrobe, Thomson and Avon catchments', Publication 831, 2002). This has relied on sampling the biota (specifically macro-invertebrates which are insects and other bugs in lay terms) as well as sampling and testing the water quality for a limited suite of chemicals (e.g. pH) and physical properties (e.g. salinity and turbidity).

81. EPA currently has four ongoing water assessment sites in the Latrobe Valley and an additional four sites in the broader region as part of the River MAP program funded by the Department of Environment and Primary Industry, which is a program to assess and report on the environmental health of Victorian waterways.

82. In 2013, EPA published the results of a study investigating potential water quality impacts in two sub-catchments of the Latrobe River ('Impacts of intensive agriculture and plantation forestry on water quality in the Latrobe catchment, Victoria', Publication number 1528, 2013).

83. Some businesses in the Latrobe Valley under licence to EPA, sample and test the water for certain chemicals. This includes power station monitoring of Hazelwood Pondage, Eel Hole Creek and the Morwell River.

Question 5: Outline the case study conducted by the EPA in Morwell East in 2012-2013 to measure local impacts of air pollutants and provide a copy of the results and any report on the study

84. A specific air quality study was done from February 2012 to May 2013 at Morwell East and Traralgon. The study was done in order to assess local air pollution,

[1] Local Visual Distance or LVD is an indicator of particles in the air

predominantly from the power generation industry. The main objective of the study was to determine whether the Morwell/Traralgon area met air quality standards when the local power stations were operating. For this study, a new temporary fixed monitoring site was established at Morwell East and additional air monitoring instrumentation was deployed.

85. The study showed levels of the air pollutants measured at both Morwell East and Traralgon were comparable and below the air quality objectives or standards except for small particles (PM_{10} and $PM_{2.5}$). Of the 15 months of environmental assessment done, levels of PM_{10} were above the standard at both sites for 4 days at Traralgon and 6 days at Morwell East. For $PM_{2.5}$ the levels were above the reporting standard for 7 days at Traralgon and 5 days at Morwell East. These levels in excess of the standards were mainly due to significant smoke impacts from a local bushfire in January 2013 and planned burning in May 2013.

86. The study confirmed that the Morwell/Traralgon area was within air quality standards when the power stations were operating. However it also showed that the area can be subject to air pollution in excess of the standards during times of bushfire and planned burns.

87. Information regarding the study may also be found in EPA Publication 1547 July 2013, available on EPA web site at http://www.epa.vic.gov.au/our-work/publications/publication/2013/september/1547.

88. This monitoring activity in Morwell East occurred in 2012/2013 and by early 2014 EPA had not completely demobilised the temporary fixed air monitoring station.

Question 6: Outline the EPA's strategy in relation to the fires at the Mine, as it developed from 9 February 2014. Attach a copy of each iteration of EPA Data Analysis and Monitoring Strategy.

89. EPA's strategy in relation to the Hazelwood Mine Fire included the following elements:

(a) as a support agency, to provide quality, timely expertise, information and advice to support the control and other support agencies (e.g. DH);

(b) to be responsive to the public needs and demands and those of other government agencies, particularly the CHO;

(c) to demonstrate EPA's core values of transparency, accountability and authoritativeness, above and beyond its role as a support agency.

(d) to use its expertise proactively and strategically to assess the environmental impacts of a unique event while following existing protocols and working within Victoria's emergency management system;

(e) to have a strong visible presence in the Latrobe Valley;

(f) to maintain scientific integrity and rigour.

90. In addition to this overall strategy, a specific operational strategy was developed to guide EPA operations in the RCC, the Data Analysis and Monitoring Strategy (**DAM**) during the Hazelwood Mine Fire, which contained the following operational strategic priorities as a support agency:

    (a) maximise the information value of available monitoring assets;

    (b) maximise the automation and real time availability of the data/information;

    (c) match product with the needs of stakeholders ;

    (d) support a streamlined and clearly understood decision making process with other agencies ; and

    (e) continuously re-evaluate against stakeholder needs and upgrade or amend if necessary.

91. EPA's strategy in relation to the Hazelwood Mine Fire was informed by the Emergency Management Manual Victoria and its defined role as a support agency. As an agency with support and lead responsibilities within the emergency framework EPA has an existing internal Emergency Management Plan, key staff have ongoing emergency management training, and the organisation has undertaken emergency management exercises (including a multi-agency mock scenario on 27 August 2013).

92. As described in Part A, EPA's activities as a support agency during the Hazelwood Mine Fire evolved and were adapted in response to the changing nature of this unprecedented incident, the changing structure for incident management, and the changing expectations of the public and other agencies for provision of information.

93. The long-lasting nature of the incident meant that the usual health advisories for bushfires (based on smoke exposure for shorter periods of time) had to be adapted both in terms of the nature of the smoke and ash and other risk factors (due to the fire being a coal fire). Further, the exposure to the smoke and other irritants was longer than normally encountered. I now turn to describe the regulatory parameters which guided me and EPA during the Hazelwood Mine Fire and informed EPA response as a support agency.

94. Under Part 7 of the Emergency Management Manual Victoria, I recognise that EPA:

    (a) is not listed as a key support agency for fire;

    (b) is a key support agency for incidents involving hazardous materials, marine pollution oil spills and pollution into inland waters; is a primary support agency for environmental impact assessment; and

    (c) is a control agency for incidents involving pollution of inland waters.

95. EPA assessed potential risks to water quality during the period of the Hazelwood Mine Fire, e.g. from ash deposited and washed into waterways, and collected data on potential impacts on water quality as outlined below, no significant impacts on

waterways were identified. This is for two reasons. Firstly, any ash was highly diluted. Secondly, all interpretation was within the context of existing water quality which has been affected by long-standing industrial, urban and agricultural activities in the catchment.

EPA's role regarding fire

96. Throughout the Hazelwood Mine Fire, EPA's primary role as a support agency was to provide independent, credible, high quality scientific expertise to seek to understand and report on the environmental impact of the event to enable and support other agencies in their roles and to inform the public.

97. During the incident, EPA carried out a broad range of continuous monitoring of air quality, as well as sampling and testing of air, ash, soil and water. EPA experts provided analysis and interpretation of these results against the most directly relevant, or in some cases the best available, standards and guidelines. As described in Part A, as an environmental regulator the majority of the standards utilised relate to environmental protection, although this can include a component of human health protection. With some results, with advice and guidance from DH experts, EPA also compared and reported against standards that were more human health focussed. In all cases, results were reported relative to these standards and guidelines in order to allow better operational decision making, and with the aim of improving the understanding of the community.

98. The majority of EPA emergency response work is in relation to spills, particularly where there is impact on storm water or waterways. Throughout previous bushfire seasons, including 2013-14, EPA's predominant role in relation to bushfires has been to provide:

    (a) Ambient air quality reports and smoke forecasting on a statewide basis;

    (b) Bushfire smoke advisories on behalf of DH;

    (c) Advice to the public regarding disposal of dead stock; and

    (d) Providing waste levy exemptions for disposal of bushfire generated wastes.

99. EPA is not routinely involved in responses to fires to the level experienced in the Hazelwood Mine Fire.

100. That said, during the Hazelwood Mine Fire, EPA responded to requests from agencies and to public concerns and also proactively used its expertise and experience to apply its environmental science program. EPA worked closely and co-operatively with other agencies through Victoria's emergency management system, iteratively and strategically developing its environmental science program and providing other relevant support.

Air Monitoring and sampling of air, ash, water and soil during the Hazelwood Mine Fire

101. EPA air quality scientists were focussed on fine particles from the fire from an early stage, as well as CO. The testing for $PM_{2.5}$ and CO was as a result of the anticipated hazards of a fire of this type. $PM_{2.5}$ has not generally been tested for in the rest of the

EPA ambient air monitoring network as it is most often related to short term events such as fires or from poorly controlled vehicle emissions. The Traralgon station has equipment that tests for PM_{10} but not $PM_{2.5}$.

102. To undertake air quality monitoring during the incident EPA had 3 ambient monitoring stations 2 fixed (**Morwell East** and **Traralgon**) and one mobile laboratory (**MoLab**), as well as 6 portable units (**DustTraks and ADRS**) measuring $PM_{2.5}$ and CO continuously. Four of the portable units were used in specific strategic locations and two mobile units were used in cars, to track smoke. As described in Part A the reporting levels for measurements $PM_{2.5}$ are based on annual exposure limits, and are EPA's standard benchmark for assessing air quality during normal conditions. They are not designed for use in emergency events, but were a useful operational comparison for all but the worst days of the incident. EPA worked closely with DH personnel during the incident both to capture and report important data, and to provide expert air quality advice, in the development of operational protocols resulting in the $PM_{2.5}$ Protocol and CO Protocol that were then used operationally for EPA reporting .

103. There was heavy reliance and close collaboration between EPA and DH on the existing Bushfire Protocol which was developed for smoke from bushfires and fuel reduction burning. Based on EPA forecasts against set trigger levels, this formed the basis for the regular smoke advisories provided to the public.

104. EPA made the strategic decision to test for a range of other air, water, ash and soil parameters on the basis that a precautionary approach and definitive answers to potential questions would provide the best community assurance. Given the inherent time lag in sampling, testing, analysis and reporting being weeks for some testing, it was deemed important to commence this testing .

105. The initial focus of EPA's provision of results and data was to the CHO and RCC and ICC personnel for operational decision making purposes. EPA also invested significant effort in providing information to the community in a variety of formats that evolved throughout the incident.

EPA's Quality Assurance Approach throughout the Hazelwood Mine Fire

106. EPA's program throughout the response period was delivered consistently with EPA routine quality assurance protocols.

107. The Quality Assurance effort included:

(a) Using EPA's standing, external Science and Engineering Advisory Committee (SEAC) chaired by Dr John Stocker to oversee, EPA sought peer review of its processes and response. This occurred in parallel and did not delay provision of results;

(b) External peer review, to ensure that EPA was using the correct methodology in light of international best practice. This was undertaken in parallel to the monitor and sampling program and did not delay this process;

(c) EPA's standard air quality monitoring network has quality assurance accreditations and is compliant with Australian quality standards assessed by the National Accreditation Testing Authority

[redacted] [redacted]

(NATA). NATA has also accredited EPA in the field of 'Chemical Testing and Forensic Operations'. EPA maintains this as standard quality control for prosecutions and all regulatory activity. This accreditation was invaluable in quality control in emergencies such as the Hazelwood Mine Fire; and

(d) EPA implemented a Data Quality Management Plan as part of the response to the incident that sets out what EPA will monitor and sample and to ensure quality assurance covering all data collected in this program. A copy of the Data Quality Management Plan is provided in **[EPA.0001.007.0158]**.

108. It is standard practice within science to use peer reviewers to challenge and improve the quality of the work. EPA commissioned peer reviews for two reasons: it is routine scientific practice, and it achieves continuous improvement by doing this. During the incident, peer review assisted to reinforce EPA decision-making and confirm the robust nature of its approach which included being responsive to public needs and maintaining scientific integrity. Both were elements, potentially competing, of its strategy and needed to be balanced.

109. EPA used peer review from a small number of experts during the incident and in parallel with EPAs continuing response. The peer reviews included the following experts:

109.1 Review of Process for Public Health Protection:

(a) HR Ross Anderson, F Med Sci, MD MSc FFPH FRCP. Professor of Epidemiology and Public Health, St Georges, University of London and King's College London; and

(b) Dr Fay Johnston, Senior Research Fellow, Environmental Epidemiology, Menzies Research Institute Tasmania at University of Tasmania.

109.2 Review of the Air Quality Assessment and Monitoring Programs:

(a) A Prof Howard Bridgman, Conjunct Professor, School of Environmental and Life Sciences, University of Newcastle.

109.3 Review of Soil and Ash Monitoring and Assessment:

(a) Dr Robert Edis, Certified Professional Soil Scientist, Honorary Associate Professor with the University of Melbourne.

109.4 Review of Water Monitoring and Assessment:

(a) Dr Vincent Pettigrove, Chief Executive Officer, Principal Research Fellow. Centre for Aquatic Pollution Identification and Management.

110. Document IDs are provided in Appendix Three.

111. A supplementary paragraph 111 can be found at the end of this statement.

[redacted]

[redacted]

112. A summary of the science response was produced to assist in summarising the complexity of a growing program A copy of the document (Summary of *EPA's Monitoring Program* 27 February 2014) is provided Document **[EPA.0004.001.0001]**.

Question 7: Describe the additional environmental monitoring undertaken by the EPA in the Latrobe Valley in response to the fires at the Hazelwood Coal Mine (the Mine), from 9 February 2014 to date. Include reference to the locations of additional monitors, the types of monitors, when they were first put in place, and the substances being monitored. Include specific reference to any additional monitoring undertaken of volatile organic compounds and fine particulate matter smaller than PM.

Response in relation to the Hazelwood Mine Fire

113. In response to a request from the SCC, on 11 February 2014 to provide increased air quality monitoring in the Morwell area, EPA made a number of immediate decisions including the decision to re-establish the Hourigan Road Morwell East ambient air monitoring station (**Morwell East**).

114. As noted above, to undertake air quality monitoring during the incident EPA had 3 ambient monitoring stations, 2 fixed (Morwell East and Traralgon) and one MoLab at Morwell Bowls Club, as well as 6 portable units (ADS, DustTraks and Travel Blankets) measuring $PM_{2.5}$ and CO log continuously. Four of the portable units were used in specific strategic locations and two mobile units were used in cars, to track smoke. These instruments and equipment were installed and commenced logging

[redacted]

data at different times. Descriptions of the instruments and equipment are in Appendix Two.

115. There were two EPA hand held CO monitors used for regular spot measurements at numerous locations twice to three times a day. Additionally EPA used readings from CFA and MFB AreaRae CO monitors (AreaRae) as indicative data throughout the incident, whilst Morwell East, MoLab and the portable units provided the reference data once established.

116. The three ambient monitoring stations, Morwell East, MoLab and Traralgon allowed continuous air monitoring of the criteria or wide spread major air pollutants $PM_{2.5}$, PM_{10}, CO, visibility reduction, SO_2, NO_2, O_3 and measurements were reported against SEPP(AAQ) reporting levels, as outlined in the table below.

117. Air samples were also collected at four sites for short periods of time (24 hours or weekly) and sent for laboratory analysis. These samples were analysed for numerous substances (in order of 100 or more).

118. The site at the Morwell East was used to represent the general air quality in Morwell. It housed the Beta Attenuation Monitor (**BAM**) for $PM_{2.5}$, along with other instruments and was logging data from 12 February 2014. The primary and high impact site for testing air quality was the Morwell Bowling Club in South Morwell (South Morwell or the Bowling Club) given its proximity to the Mine. The MoLab was located at this site and was fully working as an air quality monitoring facility by 19 February 2014. However, the portable DustTrak (for $PM_{2.5}$) was also located at the Bowling Club from 13 February 2014 and was logging data from that date.

119. The Bowling Club was chosen as it was the closest to the fire from which it was possible to conduct testing. Most of EPA's conclusions and actions were based on the worst-case conditions, which were considered to be those captured by testing at this site. The air quality at other locations throughout Morwell (and further afield), where most of the population of Morwell lived, was considered likely to be less affected, and this has been confirmed by the subsequent analysis of the data.

$PM_{2.5}$

120. The primary initial concern of EPA's air quality expert was around concentrations of particulates, as $PM_{2.5}$. Levels of $PM_{2.5}$ correlate directly with visible smoke. Long term exposure to $PM_{2.5}$ is accepted as having well-known deleterious health effects on all sectors of the human population.

121. The DustTrak that EPA installed is a portable $PM_{2.5}$ monitor. It is a visibility monitor which estimates particulates. It was located at the Morwell Bowling Club on 13 February 2014. The two BAM $PM_{2.5}$ monitors were located at the Morwell East site. On 19 February 2014 the second was located at the Morwell Bowling Club. Subsequent correlation of the data on $PM_{2.5}$ from the BAM and DustTraks shows these portable monitors were as accurate within around +/- 10% at daily averages of approximately 100 micrograms per cubic meter.

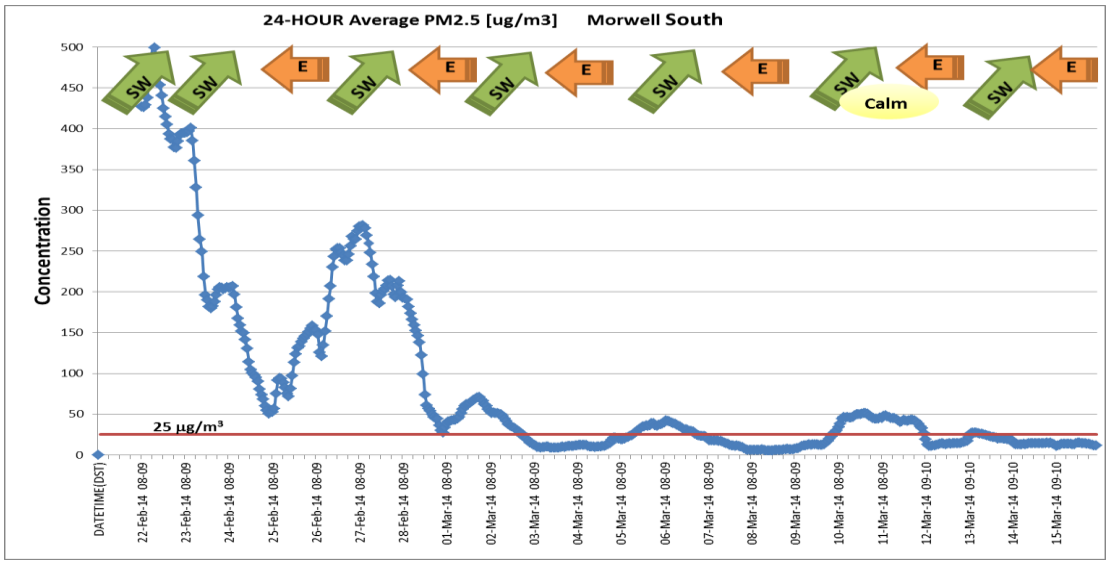
122. Data was available for analysis by EPA experts, and provision of advice, once logging commenced. Summaries of indicative analysis were made available to DH and RCC personnel from 16 February 2014. The first regular data summary was prepared on 19 February and sent to various EPA staff and the CHO and DH. These

reports contained summaries and graphs of the validated data obtained, along with commentary and compared to the relevant standards.

123. Consistent reporting was operative immediately after this and continued at least daily until the end of March. Over the critical periods from 21 February 2014 until 25 March 2014, summary reports and smoke forecasts were issued twice daily and sent by email to over 50 people, including EPA, CHO, DH, FSC, CFA, ICC and RCC.

124. The first fully quality-controlled publishable $PM_{2.5}$ data from the Morwell South station was made available on 19 February 2014 on that day to the RCC and CHO. The Morwell South station measured $PM_{2.5}$ continuously from 19 February 2014. The graph below shows the levels of $PM_{2.5}$ measured at the Morwell South site over the period 22 February 2014 to 15 March 2014.

Graph One: Rolling 24 hour averages for $PM_{2.5}$ at Morwell South



125. This graph shows:

(a) the advisory reported level of 25 micrograms per cubic meter as a red line;

(b) that in the period 22-23 February the levels of $PM_{2.5}$ reached a peak 24-hour concentration of 500 micrograms per cubic meter;

(c) that the advisory reporting level was exceeded continually until 2 March 2014, on three other occasions between 2 March 2014 and 13 March 2014, and not thereafter;

(d) that the measurements showed the advisory reporting level as being exceeded on 15 days;

(e) that the smoke effects on Morwell were very much influenced by the wind direction (shown by arrows); although the fire was burning continuously, it only affected Morwell when winds were from the southwest, or calm.

126. The levels of $PM_{2.5}$ particulates were measured and logged prior to 19 February 2014 on portable equipment and therefore this data is not represented on the graph.

127. Although the $PM_{2.5}$ concentrations were very high, they are not unusually high for a bush fire event. There have been several occasions in Victoria over the last few years where $PM_{2.5}$ levels near to fires have been higher.

PM_{10}

128. Another very common (and longer standing) measure of particulate effects is PM_{10}. Initially PM_{10} monitoring was not conducted, in favour of applying all technical resources to measuring $PM_{2.5}$. However PM_{10} monitoring from 28 February 2014 tracks the $PM_{2.5}$ results closely, as expected, and shows that standard levels were exceeded on the same days as for $PM_{2.5}$. The highest 24-hour level for PM_{10} was 142 micrograms per cubic meter on 1 March 2014, compared to the standard of 50 micrograms per cubic meter.

Carbon monoxide

129. The other initial area of concern was CO. This has well defined health effects, and is widely monitored by EPA using the BAMs. Carbon monoxide levels are covered by both health and environmental standards.

130. EPA uses the ambient air quality advisory reporting level of 9ppm for CO as its standard comparison. During the incident, the CO Protocol developed by DH with EPA assistance nominated a range of health trigger levels and durations – the lowest of which was 27ppm for 8 hours.

131. Unlike $PM_{2.5}$, CO in very high concentrations can result in fatality through asphyxiation. However, CO is metabolised and people removed from exposure situations where no immediate harm has occurred will recover. Firefighters are regularly exposed and use hand-held devices to check the level of CO to which they might be exposed. As a result, a large number of spot measurements were taken of CO around the Morwell site.

132. On the weekend of 15 and 16 February 2014 high CO readings were experienced overnight prior to consolidated monitoring being finalised - the following arrangements were in place:

(a) On Saturday the Hazelwood ICC received instantaneous CO readings of up to 15 ppm, and queried EPA and DH personnel whether these readings were of concern when compared with the reporting level of 9ppm (8 hour rolling average). Whilst it was explained that this was not a comparable number, in the absence of any established action trigger levels, on a precautionary basis the CFA issued a Watch and Alert Advisory.

(b) To support further operational decision making about CO concentrations EPA's air quality expert advised on the ideal siting of the AreaRae CO monitors – one at the Mine perimeter and others in selected locations throughout Morwell. The additional points in Morwell township were established overnight and remained in place throughout the incident.

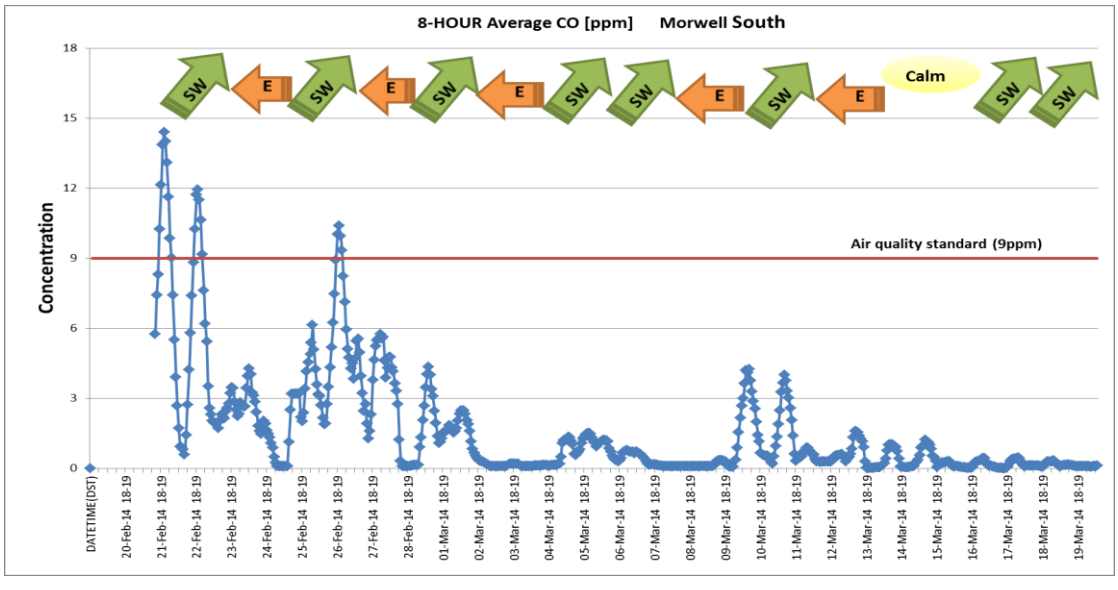
(c) CO readings continued to be sourced from these monitors – and the readings from the Mine perimeter were compared with other readings from CO monitors in locations further away from the Mine. Being a gas, CO readings fluctuate constantly and disperse rapidly.

(d) CO readings were manually recorded from each monitor with EPA's air quality expert providing advice to the Incident Commander on the results from the AreaRaes. He was consulted and worked with DH to determine the trigger levels for human health impacts. A risk matrix was established on 15 February 2014 and provided to the ICC.

(e) EPA's air quality expert, along DH technical personnel attended the Traralgon RCC on 16 February 2014 to consult with the fire services, and to provide a working draft of the CO Protocol that night. Work continued to operationalize this over the following week.

133. Below is a graph of results for the 8-hour measurements of CO at the Morwell South site, equivalent to the one above for $PM_{2.5}$.

Graph Two: Rolling 8 hour averages for CO at Morwell South



134. This graph shows that CO exceeded the 9 ppm air quality standard on three days during the period from 19-27 February 2014. CO concentrations were lower for the rest of the period and did not exceed the standard again.

135. The levels of CO were being logged and provided in summary data, but not measured by this equipment prior to 19 February 2014 and are therefore not shown on the graph.

Toxic components

136. Coal smoke contains a wide range of components. These range from simple sulphur compounds, through to various inorganic and organic chemicals, through to toxics such as dioxins and furans. EPA made an early decision to test for as many of these

as possible – even though some of the analyses are very costly and can take many weeks to complete. Such was the scope of this testing that it would be difficult to find an airborne contaminant of any kind that was not included in the testing regime.

137. Air samples were collected on filters in special canisters and in absorbent tubes sent for analysis. A very large number of toxic components were sampled and analysed, over 100 compounds and elements. Each of these were assessed against defined criteria that had been agreed with the DH. The process for deciding on these levels involved meetings and discussions between EPA air quality scientists and various DH staff. It is understood that the CHO approved these before they were used.

138. All but one of 14 of the volatile organic compounds measured were many times lower than their air quality guideline value. Only benzene exceeded the assessment criterion of 9.0 parts per billion, which it did at two of the three sampling locations:

(a) Maryvale Crescent Early Learning Centre (9.2 parts per billion on one occasion);

(b) Morwell Bowling Club (14 parts per billion on 26 February 2014 and 9.7 parts per billion on 27 February 2014).

EPA informed the DH of these results. The emails directly sent to the DH included several staff and the CHO. EPA has committed to continuing measuring benzene levels until at least March 2015.

Locations of measuring equipment

139. EPA placed additional measuring equipment in the Latrobe Valley as set out in Table Two.

Table Two: Location of additional EPA monitoring samples and sites in the Latrobe Valley the period 9 February 2014 to 27 March 2014

Locations of additional monitors	*Types of Additional Monitors*	*When they were first put in place (all 2014 unless stated)*	*The Substances being monitored*	*Total sites and/or samples for period 9 February until 27 March 2014*
Morwell South Morwell East	Air for $PM_{2.5}$ using BAMs	12 February 2014	Particles as PM2.5	2 sites, every 5 minutes
Morwell South Morwell East Traralgon	Air for PM_{10} using TEOMs	South and East - 28 February 2014 Traralgon since 2006	Particles as PM10	3 sites, every 5 minutes
Morwell South Morwell East Traralgon	Air for CO using correlation analysers	South - 19 February 2014 Traralgon since 2002	Carbon monoxide	3 sites, every 5 minutes
Morwell South Morwell East Traralgon	Air for visibility using nephelometers	South - 19 February East 13 February	Visibility (as impaired by smoke)	3 sites, every 5 minutes

		Traralgon since 2002		
Morwell South Morwell East Traralgon	Air for SO_2, NO_2, O_3 using standard lab instruments	South - 19 February 2014 East 13 February 2014 Traralgon since 2002	Sulphur dioxide, nitrogen dioxide, ozone	3 sites, every 5 minutes
Kernot Hall Uniting Church	Air for $PM_{2.5}$ using DustTraks and ADRs	19 February 2014	Particles as $PM_{2.5}$ and PM_{10}	4 sites, every 10 minutes
Moe	Air for $PM_{2.5}$ and PM_{10}	28 February 2014	Particles as $PM_{2.5}$ and PM_{10}	1 site, every 10 minutes
Churchill	Air for $PM_{2.5}$ and PM_{10}	28 February 2014	Particles as $PM_{2.5}$ and PM_{10}	1 site, every 10 minutes
All around Morwell	Air for $PM_{2.5}$ and PM_{10}	21 February 2014	Particles as $PM_{2.5}$ and PM_{10}	'Travel blanket'. Two of these roving around Morwell in vehicles 36 samples
Morwell South	Air for chemicals using a high volume filter sampler	25-26 February 2014	36 inorganic compounds and metals including mercury. PAHs Radionuclides Dioxins and furans	During the peak smoke events 2 samples
Morwell South Morwell East	Air for volatile organics using canisters	25-26 February 2014	62 different organic compounds including benzene	3 sites, weekly 18 samples
Morwell South Morwell East	Air for chemicals using Radiello tubes	25-26 February 2014	47 different organics and volatiles	3 sites, weekly 18 samples
Thoms Bridge 11 Willis St 26 McDonnell St 7 Davy St Morwell East Morwell South Traralgon Golf Keegan St Reserve Lake Narracan	Soil (surface and subsurface), by digging samples	24 February 2014	Range of soil contaminants	9 sites, weekly, 193 samples total
Bowls Club German Club 11 Willis St 26 McDonnell St 34 Wallace St	Surface ash, by sample collection off surfaces	24 February 2014	Ash borne contaminants	5 sites, weekly, 37 samples total

Latrobe River 11 Willis St Morwell East AMS Morwell South AMS Dirty Dam Hara Dam Traralgon Golf Hazelwood Pondage Main Drain Eel Creek (2) Lake Narracan	Water physical, by bottle samples	18 February 2014	Range of water contaminants	12 sites, weekly, 75 samples
Hazelwood (Mine) Pondage	Water biological, by bottle samples	15 February 2014	Water used in firefighting	1 site, multiple samples, three times per week, 173 samples

Question 8: Describe any additional testing undertaken by the EPA in the Latrobe Valley in response to the fires at the Mine, from 9 February 2014 to date. Include reference to ash sampling, soil testing, testing of drinking water.

140. The additional testing undertaken by EPA in the Latrobe Valley in response to the Hazelwood Mine Fire is set out in my answer to Question 7 for the air environment.

Water

141. EPA has measured, tested and interpreted water quality at 7 locations, both within and outside the affected zone, at weekly intervals since the first week of March 2014.

142. EPA collected data in waterways (wetlands, streams, rivers and drains) near Morwell for chemicals which may have come from the smoke and ash given off from the burning coal. These chemicals can pollute the water and include heavy metals (such as zinc and lead), complex organic compounds (such as benzene and toluene), surfactants (which are in fire-fighting products), as well as many other compounds.

143. In all, EPA tested the water for 94 different chemicals, a list that includes mono- and poly-cyclic aromatic hydrocarbons, halogenated volatiles, surfactants, solvents and nutrients.

144. EPA sampled and tested the water in one water tank, located in Willis Street, Morwell on four occasions from 23 February 2014 to 17 March 2014. Although there was no indication that this tank water was used for drinking, EPA compared the results to the drinking water standards. EPA ceased this sampling and testing when advised by the DH that it was unnecessary and have not tested any other drinking water supplies.

145. EPA monitoring has also included times before rain and after significant rainfall as the rain may have washed contaminants from the land into the waterways.

146. EPA sampled and tested the water quality in three dams which were used for firefighting. These dams were sampled three times each week and the data provided to the CFA Occupational Health & Safety consultant for interpretation.

Soil

147. EPA sampled and analysed surface and sub-surface soils both within the affected zone and outside of the affected zone during the incident as well as a number of weeks after the Hazelwood Mine Fire ended. Approximately 65 soil samples were taken (including surface and sub-surface) until 7 April 2014. Results to date for soil and sub-surface soil have been consistent and within the normal variation that would be expected for soil samples.

148. The ash is no longer being deposited on the soil and any impact that may occur to the soils from ash that has been deposited will only be observed in long term studies, such as those proposed in the ongoing recovery monitoring plan for one year following the incident at three monthly intervals.

Ash

149. Ash samples were taken during the incident where sufficient deposits of ash were found. 11 ash samples were collected until the week of 13 March 2014. These samples were collected from garages and sheds where the ash had been protected from rain and wind. Further ash deposits have not been found since. With the conclusion of the Hazelwood Mine Fire further deposition on soils has not occurred. In addition, rains are expected to have washed away ash that may have been present or remaining from when the fire was burning.

150. Initial results to date for ash samples, which are still to be confirmed suggest that some ash came from the Hazelwood Mine Fire and other ash came from grass fires and bushfires. The ash collected in March 2014 will be further analysed to determine whether it contains contaminants that could leach out into the nearby waterways and soil. The results of that analysis will inform the long term study.

Question 9: In relation to each substance monitored or tested for by the EPA in the Latrobe Valley from 9 February 2014 to date, provide the results of the monitoring and testing over time, relative to any applicable standard.

151. Results of all the monitoring and testing over time and relative to applicable standards are described in the following Tables and documents:

Table Three: Soil, Ash and Water results

Document Id	Main Date	Title
[EPA.0007.002.0183]	13/05/2014	Soil and Ash Results and Graphs.xlsx
[EPA.0007.002.0187]	12/05/2014	Water Data Table.pdf
[EPA.0007.002.0188]	13/05/2014	Water results and graphs.xlsx

Table Four: Ash results by element tested for

Document Id	Main Date	Title
[EPA.0006.001.0001]	8/05/2014	Ash Results for Arsenic.pdf
[EPA.0006.001.0002]	8/05/2014	Ash Results for BaP TEQ (LOR).pdf
[EPA.0006.001.0003]	8/05/2014	Ash Results for Benzene.pdf
[EPA.0006.001.0004]	8/05/2014	Ash Results for Benzo(a)pyrene.pdf
[EPA.0006.001.0005]	8/05/2014	Ash Results for Boron.pdf

Document Id	Main Date	Title
[EPA.0006.001.0006]	8/05/2014	Ash Results for Cadmium.pdf
[EPA.0006.001.0007]	8/05/2014	Ash Results for Cobalt.pdf
[EPA.0006.001.0008]	8/05/2014	Ash Results for Copper.pdf
[EPA.0006.001.0009]	8/05/2014	Ash Results for Lead.pdf
[EPA.0006.001.0010]	8/05/2014	Ash Results for Manganese.pdf
[EPA.0006.001.0011]	8/05/2014	Ash Results for Mercury.pdf
[EPA.0006.001.0012]	8/05/2014	Ash Results for Metals - All.pdf
[EPA.0006.001.0013]	8/05/2014	Ash Results for Metals - No Standard Values.pdf
[EPA.0006.001.0014]	8/05/2014	Ash Results for Napthalene.pdf
[EPA.0006.001.0015]	8/05/2014	Ash Results for Nickel.pdf
[EPA.0006.001.0016]	8/05/2014	Ash Results for Organics - All.pdf
[EPA.0006.001.0017]	8/05/2014	Ash Results for Organics - No Standard Values.pdf
[EPA.0006.001.0018]	8/05/2014	Ash Results for Selenium.pdf
[EPA.0006.001.0019]	8/05/2014	Ash Results for Tin.pdf
[EPA.0006.001.0020]	8/05/2014	Ash Results for Toluene.pdf
[EPA.0006.001.0021]	8/05/2014	Ash Results for Total PAHs.pdf
[EPA.0006.001.0022]	8/05/2014	Ash Results for Zinc.pdf
[EPA.0006.001.0023]	8/05/2014	Ash Results for Zylenes.pdf

Table Five: Soil results by element tested for

Document Id	Main Date	Title
[EPA.0006.002.0001]	8/05/2014	Soil Results for Acenaphthylene.pdf
[EPA.0006.002.0002]	8/05/2014	Soil Results for Acetone.pdf
[EPA.0006.002.0003]	8/05/2014	Soil Results for Aluminium.pdf
[EPA.0006.002.0004]	8/05/2014	Soil Results for Anthracene.pdf
[EPA.0006.002.0005]	8/05/2014	Soil Results for Arsenic.pdf
[EPA.0006.002.0006]	8/05/2014	Soil Results for BaP TEQ (LOR).pdf
[EPA.0006.002.0007]	8/05/2014	Soil Results for BaP TEQ (zero).pdf
[EPA.0006.002.0008]	8/05/2014	Soil Results for Barium.pdf
[EPA.0006.002.0009]	8/05/2014	Soil Results for Benzo(a)anthracene.pdf
[EPA.0006.002.0010]	8/05/2014	Soil Results for Benzo(a)pyrene.pdf
[EPA.0006.002.0011]	8/05/2014	Soil Results for Benzo(b)fluranthene.pdf
[EPA.0006.002.0012]	8/05/2014	Soil Results for Benzo(ghi)perylene.pdf
[EPA.0006.002.0013]	8/05/2014	Soil Results for Benzo(k)fluranthene.pdf
[EPA.0006.002.0014]	8/05/2014	Soil Results for Boron.pdf
[EPA.0006.002.0015]	8/05/2014	Soil Results for Cadmium.pdf
[EPA.0006.002.0016]	8/05/2014	Soil Results for Chromium (total).pdf
[EPA.0006.002.0017]	8/05/2014	Soil Results for Chrysene.pdf
[EPA.0006.002.0018]	8/05/2014	Soil Results for Cobalt.pdf
[EPA.0006.002.0019]	8/05/2014	Soil Results for Copper.pdf
[EPA.0006.002.0020]	8/05/2014	Soil Results for Fluoranthene.pdf
[EPA.0006.002.0021]	8/05/2014	Soil Results for Fluorene.pdf
[EPA.0006.002.0022]	8/05/2014	Soil Results for Indeno(123)pyrene.pdf
[EPA.0006.002.0023]	8/05/2014	Soil Results for Iron.pdf

Document Id	Main Date	Title
[EPA.0006.002.0024]	8/05/2014	Soil Results for Lead.pdf
[EPA.0006.002.0025]	8/05/2014	Soil Results for Manganese.pdf
[EPA.0006.002.0026]	8/05/2014	Soil Results for Mercury.pdf
[EPA.0006.002.0027]	8/05/2014	Soil Results for Napthalene.pdf
[EPA.0006.002.0028]	8/05/2014	Soil Results for Nickel.pdf
[EPA.0006.002.0029]	8/05/2014	Soil Results for Phenanthrene.pdf
[EPA.0006.002.0030]	8/05/2014	Soil Results for Pyrene.pdf
[EPA.0006.002.0031]	8/05/2014	Soil Results for Selenium.pdf
[EPA.0006.002.0032]	8/05/2014	Soil Results for Strontium.pdf
[EPA.0006.002.0033]	8/05/2014	Soil Results for Thorium.pdf
[EPA.0006.002.0034]	8/05/2014	Soil Results for Tin.pdf
[EPA.0006.002.0035]	8/05/2014	Soil Results for Titanium.pdf
[EPA.0006.002.0036]	8/05/2014	Soil Results for Total PAHs.pdf
[EPA.0006.002.0037]	8/05/2014	Soil Results for Vanadium.pdf
[EPA.0006.002.0038]	8/05/2014	Soil Results for Zinc.pdf

152. Where the results of the substances monitored and/or tested exceeded applicable standards are indicated in the documents and are also set out in my answers to Question 7.

Question 10: Were any technical difficulties encountered by the EPA in undertaking monitoring in the Latrobe Valley from 9 February 2014, including equipment failure? If so, identify the difficulties and describe the steps taken to overcome them.

153. In an incident such as this EPA learns a great deal about its equipment, its capability, its processes/systems and its partners. There were some challenges in its scientific program.

Technical Difficulties – Air.

154. Some of the equipment used for monitoring and reporting on air quality is very advanced, and complex. It requires skill and attention to keep it running under any circumstance and during the time of the incident there were several technical matters that needed attention. None of these were particularly unusual, and each was dealt with quickly, for example:

(a) The first set of technical challenges occurred very early with the decision in the first week to set-up a full featured monitoring station close to the fire at Morwell South. Individual testing equipment had to be sourced from within the current network, checked, calibrated and brought up to standard in tight timeframes. The MoLab housing needed mechanical work, the site needed power and the data communications needed configuring. None of these were difficulties individually, but difficulty was experienced in trying to perform all of these functions very quickly. A process that might normally take 4 weeks was completed in 4 days;

(b) On 14 February 2014, the newly installed modem at Morwell East failed. This did not result in any loss of data (it was still being

recorded inside the station), but did result in a delay of 32 hours in getting the data streaming directly onto EPA website;

(c) On 16 February 2014, there was a software problem on the main data collection system that required a system re-start. Again there was no loss of data, but resulted in a 10 hour gap in the web site display;

(d) On 19 February 2014, the wind direction sensor at Morwell South was twisted by strong winds and there was a loss of local wind direction data for 42 hours until it could be replaced;

(e) On 22 March 2014, the modem in the particle monitor at Moe failed, and this took 60 hours to replace due to its very specialised nature. Again data was not lost however this data set was not available for the web site;

(f) On 27 March 2014, the AM particle monitor at Morwell South had to be cleaned (due to the heavy smoke impacts since deployment). This resulted in a data loss of 5 hours;

(g) The MoLab shed that had become the Morwell South monitoring site developed a leak in the roof on two occasions. This was attended to in the first instance with tape, and in the second with a tarpaulin. There was no loss of data. (This mobile monitoring facility will be overhauled in May 2014); and

(h) There were early difficulties with the transfer of CO data from CFA to EPA. The technologies were incompatible as such a transfer had never been attempted previously. The issue was mitigated by a labour-intensive manual transfer until an automated process could be finalised. By the second week of the response, an EPA officer was specifically tasked with doing this transfer each day. The process was streamlined by the second week in March. For any future application more appropriate arrangements will be made with CFA.

Technical Difficulties – Water

155. Background sites are important to understand the water quality in the area close by but not impacted directly by the fire. Initial guidance on choice of background sites relied on local knowledge but visits to the recommended location by scientific field staff found this to be unsuitable. This required relocation of a background site and addition of another background site after the monitoring program had commenced.

Technical Difficulties – Soil

156. Initially surface and sub-surface samples were used to distinguish between impacts from ash deposition and natural background. This was difficult to interpret as the ash deposition on the surface of the soil was not physically enough to result in a change outside the natural variation of the soils. This was with the exception of the initial soil sample that was taken on 18 February 2014.

157. More appropriate background sites were later determined with surface and sub-surface samples taken both within and outside of the areas impacted by the ash.

Technical Difficulties – Ash

158. Ash deposition was not significant on soils in the region and as explained above, with the exception of the initial sample taken at a residence very close to the mine, ash was only found in protected areas where it had been blown and accumulated. In addition, these protected areas also protected the ash from being washed away by the rain.

159. Distinguishing ash that had resulted from the mine fire from ash that was from the bush fire was a challenge. Once results were received, it became evident that the ash from the different sources was different in the compounds present.

Technical Difficulties – Laboratory Access

160. EPA has a contract with one NATA accredited laboratory. This laboratory was extremely busy with the number of samples being sent for analysis. Having more than one laboratory on contract to provide the services will reduce the pressures on the single laboratory in a future event.

Question 11: Provide a summary of the EPA's environmental monitoring in the Latrobe Valley since 9 February 2014. Include in the summary when, for what duration and to what extent the results of the EPA's monitoring exceeded relevant standards or guidelines, identifying those standards or guidelines.

161. This question is addressed in answer to Question 7. Attached to my statement are the results for:

(a) the soil and ash;

(b) water; and

(c) air quality results are set out in Graphs One and Two in Question 7.

Question 12: What environmental monitoring does the EPA propose to undertake in the Latrobe Valley in future?

162. EPA has committed to longer term environmental assessment (including monitoring) in the areas surrounding the Mine to supplement the existing and ongoing long term monitoring at Traralgon. EPA will also supplement the Traralgon long term station by installing additional particle monitoring at this site.

163. EPA will also continue collecting data and interpreting results for particles ($PM_{2.5}$ and Visibility) and gaseous parameters (eg SO_2, CO, NOX, O_3 etc) at its Morwell South site and a subset of these compounds at its Morwell East site for 12 months. The collection of data and interpreting results for both respirable silica and poly-cyclic aromatic hydrocarbons will continue for 12 months at Morwell South. In addition to these stations, particles will be sampled at both Moe and Churchill to gauge air quality within the range of potential effects for 12 months. Data on Volatile Organic compounds (**VOCs**) will be collected using passive samplers at three locations across Morwell for the next 12 months.

164. EPA will not be doing further ash or soil sampling in the area, as results from sampling to date have not shown significant impacts to the soil from ash deposition. Ash has not fallen since March 2014.

165. EPA has four long term river health assessment sites around the Latrobe Valley (east of Yallourn, Yarragon, Traralgon and north of Morwell) with an additional four sites just outside the Valley. These will continue to be sampled, along with catchments down-stream of the Latrobe Valley.

166. EPA is reviewing its extended water sampling program as rolled out during the fire at the Mine and expects to cease this program as it has not shown any significant impacts to water quality in the affected area. Other water quality assessment programs will occur. EPA will develop a citizen science program in the Morwell area where residents, schools and community groups will be able to play an active role in assessing the environment.

Question 13: Provide your views on what worked well, what did not work well and what could have been done better in relation to the EPA's environmental monitoring in the Latrobe Valley before and during the fires at the Mine.

Capability

167. EPA is the only State government agency with expertise in environmental monitoring and modelling.

168. EPA is currently implementing the Science and Engineering Capability Reform to:

(a) Strengthen leadership and technical capability in applied science;

(b) Fill gaps to address EPA's current and future applied science capability requirements;

(c) Streamline access to fit-for-purpose applied science knowledge; and

(d) Enhance collaboration and integration across the organisation, and beyond.

169. I believe that EPA performed above and beyond expectations to respond effectively to the need to monitor the environmental impacts of the Hazelwood Mine Fire. EPA's capability and culture enabled this.

Capacity

170. A key issue for EPA arising from the Hazelwood Mine Fire is its capacity to effectively provide timely, quality and appropriate environmental monitoring data, interpretation and modelling on the potential impacts of emergency incidents on the community and environment, to support emergency response and recovery. EPA has over time resourced greater capacity for rapid monitoring of potential environmental and community impacts following emergencies.

171. During the Hazelwood Mine Fire, EPA collected approximately 529 individual air, water, soil and ash samples. EPA's foundation capacity in environmental chemistry, water and soil monitoring provided a sound basis to respond to this and other

emergencies. For example, EPA has invested in training a suite of staff, including on-ground regulatory officers, to take high quality environmental samples. There are generally not concerns that EPA requires greater 'stand by' capacity for these functions. Many of these samples required analysis by laboratories external to EPA's laboratories.

172. EPA should review contracts with external laboratories to provide environmental analysis and services to ensure those contracts have appropriate clauses for emergency events including the ability to ramp up and prioritise peak emergency demand, contingencies for very high demand, and flexibility to respond to different hazards and emergencies. EPA should also ensure it has relationships or agreements with additional laboratories to avoid overloading a single laboratory.

Standards

173. EPA experts provided analysis and interpretation of environmental monitoring results against the most directly relevant, or in some cases the best available standards and guidelines. As an environmental regulator the majority of the standards applied relate to environmental protection, although this can include a component of human health protection. The lack of research into and the development of standards to inform assessment of the kind of exposures in the Hazelwood Mine Fire should continue to be considered by health authorities and environment protection authorities nationally and priority given to the development of standards for greatest risks to at vulnerable communities.

Equipment

174. In recent years the MFB in particular has been funded and has built significant capacity in urban settings to do real time monitoring and risk assessment of air quality associated with emergency incidents in order to protect firefighters and those in the immediate vicinity of fires. EPA may need to consider updating its mobile monitoring and modelling equipment based on history of previous incidents and predictions of future fire events.

Role

175. Throughout the fire EPA worked within the spirit of 'all agencies all hazards' and worked collaboratively with emergency response and recovery agencies. For example, EPA was requested to undertake sampling and analysis of mine water during the event in the context of potential risks to fire-fighters posed from reusing this water in firefighting operations. EPA was criticised for the adequacy and timeliness of that sampling and results. Whilst EPA had the requisite skills to undertake sampling, and was seeking to act collaboratively, it is not a matter for EPA to initiate the assessment of potential OHS risks to fire-fighters. EPA was acting in response to a direct request from a response agency to undertake the sampling. It is suggested that the support role of EPA in monitoring/sampling should be clarified. When undertaking sampling for other agencies, EPA should receive a clear brief regarding the sampling and analysis requirements to ensure EPA services the needs of the response agency.

Communication of Monitoring Results and Interpretation

176. EPA leads public forecasting and reporting on air quality. The focus of ambient air quality management is on long-term, chronic exposure and minimising impacts of

peak events. Advice on actions people can take on poor air quality days comes from DH. It is suggested that EPA and DH investigate the development of protocols and methods for predicting and reporting on smoke plumes and impact of poor air quality on the public.

177. EPA has a long standing monitoring program in the Latrobe Valley air shed due to the presence of coal fired power stations. The historical interaction between EPA and the Morwell community, which has been challenging, influenced engagement and communication over this fire. It is suggested that EPA develop strategic engagement and communication plan in conjunction with the Latrobe City Council, to build improved channels of communication and engagement with the community on air quality monitoring and the role of EPA.

Question 14: Provide a chronological account of the EPA's involvement as a support agency in the emergency response to the fires at the Mine, from 9 February 2014 to date.

178. I have set out above events that describe EPA's involvement in the Hazelwood Mine Fire as best I can in date order.

Question 15: Provide your views on what worked well, what did not work well and what could have been done better in relation to the EPA's involvement in the emergency response to the fires at the Mine.

179. In my view, EPA should review its internal emergency response systems and capacity, and in particular AIIMs and current Victorian emergency management systems and practices. A broader range of EPA staff, including senior leaders and communications staff could be explicitly included in standard emergency management plans. EPA should formalise the structured approach that was adopted during the incident to manage staff deployment, fatigue and welfare during emergency responses.

180. In my view, EPA, working with partner agencies in government, should consider lessons learnt about effective communication and community engagement, and in particular how to communicate findings and results of complex environmental data. This may include improvement to EPA’s website.

181. During the Hazelwood Mine Fire, EPA called upon its interstate counterparts, and academic centres for support, advice and expertise. Tasmanian EPA provided the Travel Blanket. The Australian Environmental Regulators Network (**AELERT**) could establish sharing arrangements for an inventory of emergency skills, expertise and equipment.

182. EPA's strong, expert scientific capability around environmental monitoring, including air quality monitoring, enabled it to be an effective support agency for this unprecedented incident. EPA will need to examine whether it can resource or improve its 'standby' capacity for responding to a wide range of emergency events.

183. Overall, EPA understands its role as an emergency response support agency as shown during the Hazelwood Mine Fire response.

Question 16: Outline the EPA's communications with the community in relation to the fires at the Mine from 9 February 2014 onwards, with reference to the substance, style and mode of communication. Include in this outline the EPA's participation in community meetings in Morwell in February 2014.

184. During the period from 9 February 2014 onwards EPA's communications with the public about the fire and its environmental impact were extensive. I am very pleased with the way EPA responded:

(a) EPA provided daily forecasting and other relevant information to the RCC for inclusion in daily media reports;

(b) EPA issued 69 Smoke Advisories in conjunction with CHO. These advisories were issued twice-daily (at 8.30am and 5.30pm), as well as media alerts around 11am, to announce immediate change in winds impacting smoke conditions. The advisories were uploaded to EPA's Hazelwood microsite daily. The advisories included human health advice from the CHO;

(c) Approximately 4,395 calls were taken through EPA Pollution Hotline;

(d) EPA's call centre logged every public inquiry relating to the incident. This log was (and continues to be) updated daily. The data was then analysed to inform communications efforts – both directly to Latrobe Valley residents, and Victorians more broadly. Inquiries were broken down by type:

(i) calls to the pollution line;

(ii) the number of pollution reports logged relating to the fire;

(iii) emails received relating to the fire; and

(iv) query calls relating to the issues of fire, air, water and health.

185. Phone calls to the pollution hotline were by far the most common form of public inquiry, with 3272 calls recorded as at 23 March 2014. Specifically in relation to the fires, odour from the smoke was the most commonly reported pollution issue, accounting for almost three-quarters of all reports relating to the fires;

(a) On 21 February 2014, EPA established a dedicated microsite web page (see http://www.epa.vic.gov.au/air-quality-latrobe-valley-mine-fire/current-air-quality) to act as its primary communication channel to the public. There were over 126,000 hits in its first 19 days of operation, with a peak of 14,746 hits on 24 February 2014;

(b) EPA undertook a range of direct community engagement activities in which some 80 EPA staff participated in provision of information to the community. These staff were mobilised to provide on ground support to the cross- agency community engagement effort;

(c) Response activities and resources required were planned and coordinated by the CFA as control agency in line with the Regional Emergency Management Joint Public Information Committee Latrobe Valley Coal Mine Community Information and Engagement Plan. Activities undertaken included providing information to the community at the Moe Respite Centre; participating in regular community meetings at the Morwell Neighbourhood House; providing information and support to the community at the Morwell Information Centre; engaging with morning and afternoon commuters between Traralgon and Warrigal train stations; door knocking residents in Morwell; attending community festivals and events; and manning information stations in shopping centres in Traralgon and Morwell;

(d) EPA prepared dedicated fact sheets. EPA also contributed content to several fact sheets prepared by DH, including an explanation of brown coal fires; the potential impacts of brown coal ash on human health; a community update on 17 March 2014; 'cleaning up after the fires'; 'smoke and your health'; 'ash fallout'; 'carbon monoxide' and 'air quality testing';

(e) EPA engaged social media during the incident, with EPA tweeting 173 posts between 11 February 2014 and 23 March 2014. 17 February 2014 was the most active day, with 12 tweets, including retweeting several posts from the CFA's Twitter account on a daily basis; and

(f) EPA had a specific stand at the respite centres and public events and neighbourhood houses with staff deployed to engage with community members coming into the centre and provide them with up to date information on a range of topics.

Question 17: Provide copies of all information, advice and warnings issued by the EPA in relation to the fires at the Mine.

186. A copy of all information, advice and warnings issued by EPA in relation to the fires at the Mine are located in the documents listed in Appendix Four:

- Media releases (Alerts and Advisories) 12 February 2014 to 18 April 2014;
- Community Information Statements dated 26 February 2014, 27 February 2014, February 2014; and
- Latrobe Air Quality dated 27 February 2014.

Question 18: Provide your views on what worked well, what did not work well and what could have been done better in relation to communications with the public about the fires at the Mine in February and March 2014.

187. EPA's primary role as a support agency during the Hazelwood Mine Fire was air quality monitoring and assessment. I was extremely pleased with the way my team worked.

188. EPA's role was air quality monitoring and provision of relevant data. This data allowed the CHO to advise the public about the likely health impacts.

189. EPA provides information on its website by reference to standards which generally relate to ambient air quality. For instance, CO ambient level in the NEPM is 9 ppm. This risk level is set for protection of the public against longer term exposure However, that standard is the goal under the National Environment Protection (Ambient Air Quality) Measure and is not intended as a health standard relating to acute exposure. The occupational health and safety standard for CO is much higher than 9 ppm. Accordingly, the CO protocol agreed and issued by DH during the Hazelwood Mine Fire, set a risk level of 27 ppm. However, explaining these distinctions to a diverse community during the Hazelwood Mine Fire was difficult. It has been suggested that EPA needs to provide a better way for the community of interest to 'understand and comprehend' the data, monitoring and sampling results being placed on websites. EPA, together with DH, should give consideration to thresholds and triggers for advisories for acute pollution events.

190. The inability of EPA staff to answer questions on health issues together with their high visibility in the community as they undertook sampling and engagement activities exacerbated community mistrust in the early weeks. This was a challenge for EPA community engagement teams, who could not provide definitive health impact information that the community was seeking. The inability to answer questions was interpreted by many in the public as a deliberate withholding of information.

Question 19. Outline the EPA's role in regulating the operation of the Mine

191. The Hazelwood power station and mine are licensed by EPA (Licence number 46436). The primary focus of this EPA licence is the power station as outlined below. The mine is included in the licence due to historical discharges of mine waste water to waterways and the potential environmental hazard represented by the mine pondage. Environmental management and performance of the mine is regulated under the *Mineral Resources (Sustainable Development) Act 1990* (Vic).

192. Hazelwood mine reports its environmental performance for the previous financial year in the form of an annual performance statement (**APS**). The APS assesses its performance against each licence condition. The APS requires an explanation of all non-compliance incidents. An APS must be submitted to EPA by 30 September each year via EPA online annual reporting system. APSs apply to the standard financial year reporting period (1 July to 30 June).

193. SEPPs are an integral part of the regulatory framework and provide more detailed requirements and guide the application of the EP Act. SEPPs establish the uses and values of the environment that the community wants to protect, define the environmental quality objectives and describe the attainment and management programs that will ensure the necessary environmental quality is maintained and improved.

Question 20. Is the Mine (a) 'scheduled premises' for the purposes of the Environmental Protection Act 1970?

194. For the purposes of section 20 of the EP Act, Hazelwood Power operates a premises at which activities are undertaken that fall within the definitions in Schedule 1 of the Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 and as such is considered a 'scheduled premises'. The premises plan includes both the power station and the mine. The mine is subject to certain exemptions under the Regulations pertaining to air emissions and waste storage.

Question 21. Is the Mine licensed by the EPA under s20 of the EP Act? If so, explain the scope and purpose of the license and attach a copy.

195. The Mine is not licensed by EPA under section 20 of the EP Act, as distinct from the power station.

Question 22. Since 1995, has any environmental auditor appointed by the EPA conducted an environmental audit of the Hazelwood Coal Mine in relation to:

1) compliance with a rehabilitation plan under the Mineral Resources (Sustainable Development) Act 1990; or

2) the risk of emissions from uncontrolled fire in any part of the Mine, whether disused or operational?

If so, provide a copy of the relevant audit report.

196. According to EPA's records, an audit by an environmental auditor appointed by EPA, Vic Natoli (Maunsell Australia Pty Ltd) was commissioned by International Power Hazelwood (a predecessor to Hazelwood Power) to 'assess compliance of the Power Station and mine operations with legal requirements relevant to the site and its operations'. The audit scope included:

(a) A review of the site's licences granted by EPA and former Department of Primary Industry;

(b) An assessment of available monitoring data with licence and SEPP requirements;

(c) A review of on-site programs to implement the requirements of relevant NEPM; and

(d) An on-site inspection of operations, plant and equipment and interview with environmental personnel.

197. The audit is located in Document **[EPA.0007.002.0001]**.

198. The audit included the environmental aspects of the mine licence and includes consideration of rehabilitation works against plans. It did not consider any issues relating to risks arising from an uncontrolled fire.

199. The audit made recommendations predominantly relating to materials handling on site, and none in reference to rehabilitation.

200. It should be noted that this was not an environmental audit pursuant to Part IXD of the EP Act. Environmental audits pursuant to Part IXD of the EP Act focus on the condition of a segment of the environment and the risk of any possible harm or detriment to a segment of the environment caused by any industrial process or activity, waste, substance or noise, for use in the planning, approving, regulating, managing or conducting of activities and in the protection of the environment (section 53R(b) of the EP Act).

201. I am informed and believe that the only other EPA records that can be located in relation to audits carried out by EPA-appointed auditors on site are two audits (63236-1 and 63236-2) that occurred in relation to Research, Development and

Demonstration Approvals which are undertaken under section 19D of the EP Act for new technologies.

202. In addition, Hazelwood Power has also used EPA-appointed auditors to verify its landfill monitoring program in accordance with Licence condition L1.1. This occurred most recently in July 2012 by Doris Pollozzi, in line with EPA Information Bulletin 1323.2. Again, this verification work does not constitute an environmental audit under Part IXD of the EP Act.

Question 23. Has the EPA taken, or is the EPA considering taking, any compliance action against the occupier of the Hazelwood Coal Mine in relation to emissions from the fires at the Mine, including but not limited to:

1) Proceeding for an offence against section 41 of the EP Act; and

2) Issuing a clean up notice under section 62A of the EP Act.

If so, outline the action taken and the basis for it. If not, explain why no compliance action is being considered at this time.

203. EPA Enforcement Review Panel has approved an official investigation into the Hazelwood Mine Fire. The investigation is at an early stage and extensive investigative work is still to be undertaken. No decision has yet been made regarding any compliance action.

204. To ensure that the investigation (and any future proceedings) against any person is not prejudiced I am unable to provide further information at this stage

205. Remedial measures under the EP Act, including the issuing of a Clean Up Notice, were considered by EPA during and after the Hazelwood Mine Fire. However, none of the options for statutory measures were considered practical in the circumstances.

Dated

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JOHN DAMIAN MERRITT

PART C: APPENDICES

Appendix One: Centre for Applied Science Staff Expertise

Every EPA air quality scientist (6) and technician (6) was involved in the response. This included its EPA Principal Expert – Air Quality (Dr Paul Torre) and its Program Leader Air Quality & Noise (Dr Gavin Fisher).

EPA air technicians are a skilled and experienced group (most with more than 10 years direct experience in air quality monitoring – some more than 30 years). Many freshwater scientists were involved (at least 4) with the scientific response led by EPA Principal Expert – Water Quality who is also Program Leader Water Quality (Leon Metzeling) supported by Team Leader Freshwater Science – Dr Paul Leahy. EPA Principal Expert – Waste (Dr Laura-Lee Innes) lead its scientific response to the possible contamination in soil and ash.

All this was supported by EPA's two most senior applied sciences operational leads (Operational Manager – Mick Ernest and Senior Research & Development Manager – Dr Barry Warwick (himself a qualified chemist)). Almost all of EPA's chemistry team supported the scientific effort with chemical testing (5 people – lead by Dr Sean Shiels and Dr Syed Hasnain).

Group leadership was provided by Dr Anthony Boxshall – Group Manager Monitoring and Assessment; an experienced science leader with over 20 years' experience in Government, University and private sector science.

Appendix Two: Table of Air Monitoring Equipment

Refer document **[EPA.0008.001.0001]**

Appendix Three: Peer Review

Document Id	Main Date	Title
[EPA.0001.007.0001]		Peer Reviews of the EPA Victoria Response to the Morwell Coal Fire Process for Public Health Protection
[EPA.0001.007.0005]	24/02/2014	Peer Reviews of the EPA Victoria Response to the Morwell Coal Fire Process for Public Health Protection
[EPA.0001.007.0010]		Peer Reviews of the EPA Victoria Response to the Morwell Coal Fire Air Quality Assessment and Monitoring Programs
[EPA.0001.007.0014]	6/03/2014	Peer Reviews of the EPA Victoria Response to the Morwell Coal Fire Soil and Ash Monitoring and Assessment
[EPA.0001.007.0016]		Peer Reviews of the EPA Victoria Response to the Morwell Coal Fire Water Monitoring and Assessment

Appendix Four: Media Releases and Advisories

Document Id	Main Date	Title
[EPA.0001.001.0001]	12/02/2014	Further Low Level Bushfire Smoke Advisory Wednesday 12 February 2014
[EPA.0001.001.0002]	13/02/2014	Low Level Bushfire Smoke Advisory Thursday February 13 2014
[EPA.0001.001.0003]	14/02/2014	Low Level Bushfire Smoke Advisory Friday 14 February 2014
[EPA.0001.001.0004]	15/02/2014	Low Level Bushfire Smoke Advisory Saturday 15 February 2014
[EPA.0001.001.0005]	15/02/2014	High Level Bushfire Smoke Advisory Saturday 15 February 2014
[EPA.0001.001.0006]	16/02/2014	High Level Bushfire Smoke Advisory Sunday 16 February 2014
[EPA.0001.001.0007]	17/02/2014	High Level Bushfire Smoke Advisory Monday 17 February 2014
[EPA.0001.001.0008]	17/02/2014	High Level Bushfire Smoke Advisory Monday 17 February 2014
[EPA.0001.001.0009]	18/02/2014	Low Level Bushfire Smoke Advisory 18 February 2014
[EPA.0001.001.0010]	19/02/2014	Low Level Bushfire Smoke Advisory 19 February 2014
[EPA.0001.001.0011]	20/02/2014	Low Level Bushfire Smoke Advisory 0930 Thursday 20 February 2014
[EPA.0001.001.0012]	20/02/2014	Low Level Bushfire Smoke Advisory 0930 Thursday 20 February 2014
[EPA.0001.001.0013]	20/02/2014	EPA Ramps Up Air Monitoring in Morwell Thursday 20 February 2014
[EPA.0001.001.0014]		High Level Bushfire Smoke Advisory Update 1830
[EPA.0001.001.0015]	21/02/2014	Low Level Bushfire Smoke Advisory 0845 Friday 21 February 2014
[EPA.0001.001.0016]	21/02/2014	High Level Smoke Alert - Morwell South and Morwell East Friday 21 February 2014
[EPA.0001.001.0017]	21/02/2014	High Level Bushfire Smoke Alert Friday 21 February 2014
[EPA.0001.001.0018]	22/02/2014	High Level Latrobe Valley Mine Fire Smoke Advisory Saturday 22 February 2014
[EPA.0001.001.0019]	23/02/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory Sunday 23 February 2014
[EPA.0001.001.0020]	23/02/2014	High Level Latrobe Valley Mine Fire Smoke Advisory Sunday 23 February 2014
[EPA.0001.001.0021]	23/02/2014	Immediate Smoke Impacts Alert - EPA Advice 1130 Sunday 23 February 2014
[EPA.0001.001.0022]	23/02/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Sunday 23 February 2014
[EPA.0001.001.0023]	23/02/2014	EPA Launches Hazelwood Open Cut Mine Fire Community Website Sunday 23 February 2014
[EPA.0001.001.0024]	24/02/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Monday 24 February 2014
[EPA.0001.001.0025]	24/02/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1830 Monday 24 February 2014
[EPA.0001.001.0026]	25/02/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Tuesday 25 February 2014
[EPA.0001.001.0027]	25/02/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1900 25 February 2014
[EPA.0001.001.0028]	25/02/2014	Fine Particle PM2.5 Streams to Web Tuesday 25 February 2014
[EPA.0001.001.0029]	26/02/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 0845 Wednesday 26 February 2014
[EPA.0001.001.0030]	26/02/2014	Immediate Smoke Impacts Alert - EPA Advice 1630Hrs Wednesday 26 February 2014
[EPA.0001.001.0031]	26/02/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 2000 Wednesday 26 February 2014
[EPA.0001.001.0032]	27/02/2014	High Level Smoke Advisory -Latrobe Valley Thursday 27 February 2014
[EPA.0001.001.0033]	28/02/2014	High Level Smoke Advisory - Latrobe Valley 0900 Friday 28 February 2014

Document Id	Main Date	Title
[EPA.0001.001.0034]	28/02/2014	Low Level Smoke Advisory - West Gippsland 0930 Friday 28 February 2014
[EPA.0001.001.0035]	28/02/2014	High Level Smoke Advisory - Latrobe Valley 1745 Friday 28 February 2014
[EPA.0001.001.0036]	1/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Saturday 01 March 2014
[EPA.0001.001.0037]	1/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1730 Saturday 01 March 2014
[EPA.0001.001.0038]	2/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Sunday 02 March 2014
[EPA.0001.001.0039]	2/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1830 Sunday 02 March 2014
[EPA.0001.001.0040]	3/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Monday 03 March 2014
[EPA.0001.001.0041]	3/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1830 Monday 03 March 2014
[EPA.0001.001.0042]	3/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory Tuesday 03 March 2014
[EPA.0001.001.0043]	4/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Tuesday 04 March 2014
[EPA.0001.001.0044]	5/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Wednesday 05 March 2014
[EPA.0001.001.0045]	5/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Wednesday 05 March 2014
[EPA.0001.001.0046]	6/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Thursday 6 March 2014
[EPA.0001.001.0047]	6/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Thursday 6 March 2014
[EPA.0001.001.0048]	7/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Friday 7 March 2014
[EPA.0001.001.0049]	7/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Friday 7 March 2014
[EPA.0001.001.0050]	7/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Friday 7 March 2014
[EPA.0001.001.0051]	10/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0830 Monday 10 March 2014
[EPA.0001.001.0052]	10/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Monday 10 March 2014
[EPA.0001.001.0053]	10/03/2014	Morwell Air Quality Significantly Improves but EPA Monitoring to Remain Monday 10 March 2014
[EPA.0001.001.0054]	11/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Tuesday 11 March 2014
[EPA.0001.001.0055]	11/03/2014	Immediate Smoke Impacts Alert - EPA Advice Tuesday 11 March 2014
[EPA.0001.001.0056]	11/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 1745 Tuesday 11 March 2014
[EPA.0001.001.0057]	12/03/2014	High Level Hazelwood Open Cut Mine Fire Smoke Advisory 0845 Wednesday 12 March 2014
[EPA.0001.001.0058]	12/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Wednesday 12 March 2014
[EPA.0001.001.0059]	13/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Thursday 13 March 2014
[EPA.0001.001.0060]	13/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1800 Thursday 13 March 2014
[EPA.0001.001.0061]	14/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Friday 14 March 2014
[EPA.0001.001.0062]	14/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1745 Friday 14 March 2014

Document Id	Main Date	Title
[EPA.0001.001.0063]	15/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 1745 Saturday 15 March 2014
[EPA.0001.001.0064]	15/03/2014	No Smoke Advisory Issued for Hazelwood Open Cut Mine Fire 0900 Sunday 15 March 2014
[EPA.0001.001.0065]	16/03/2014	No Smoke Advisory Issued for Hazelwood Open Cut Mine Fire 0900 Sunday 16 March 2014
[EPA.0001.001.0066]	16/03/2014	No Smoke Advisory Issued for Hazelwood Open Cut Mine Fire 1800 Sunday 16 March 2014
[EPA.0001.001.0067]	17/03/2014	Air Monitoring in Latrobe Valley to Continue Monday 17 March 2014
[EPA.0001.001.0068]	18/03/2014	Low Level Hazelwood Open Cut Mine Fire Smoke Advisory 0900 Tuesday 18 March 2014
[EPA.0001.002.0001]	1/02/2014	AirQuality_CommunityInformation_180214.pdf
[EPA.0001.002.0003]	26/02/2014	AirQuality_CommunityInformation_260214_436.pdf
[EPA.0001.002.0005]	27/02/2014	AirQuality_CommunityInformation_280214_459 V2 - Printed 2000 Copies on 28214.pdf
[EPA.0001.002.0007]	27/02/2014	Latrobe Valley Air Quality

111. In addition EPA prepared a Data Analysis and Monitoring Strategy (DAMS) that was prepared in the template form provided by the Fire Services Commissioner and provided to the RCC throughout the incident. The DAMS were regularly reviewed and updated and reflected the changing assessment requirements and support for the emergency response. There are 8 versions including one draft of the DAMS:

(a) **EPA Data Analysis and Monitoring Strategy - Latrobe Valley Coal Mine Fires Version 1 dated 17 February 2014 [EPA.0001.007.0144];**

(b) **Draft EPA Data Analysis and Monitoring Strategy - Latrobe Valley Coal Mine Fires Version 2 dated 23 February 2014 [EPA.0004.001.0001];**

(c) EPA Data Analysis and Monitoring Strategy - Latrobe Valley Coal Mine Fires Version 3 dated 23 February 2014 [EPA.0001.007.0150];

(d) EPA Data Analysis and Monitoring Strategy - Latrobe Valley Coal Mine Fire Version 4 dated 25 February 2014 [EPA.0009.001.0015];

(e) EPA Data Analysis and Monitoring Strategy - Latrobe Valley Coal Mine Fire Version 5 dated 13 March 2014 [EPA.0009.001.0001];

(f) EPA Data Analysis and Monitoring Strategy - Transition to Recovery Latrobe Valley Coal Mine Fires Version 6 dated 13 March 2014 [EPA.0001.007.0103];

(g) EPA Data Analysis and Monitoring Strategy - Transition to Recovery Latrobe Valley Coal Mine Fires Version 8 dated 13 March 2014 [EPA.0001.007.0117];

(h) EPA Data Analysis and Monitoring Strategy - Transition to Recovery Latrobe Valley Coal Mine Fires First Draft Version 8.1 dated 16 March 2014 [EPA.0001.007.0131].