

HAZELWOOD MINE FIRE OF 9 FEBRUARY 2014

REPORT OF RODERIC INCOLL

CONTENTS

INTRODUCTION	1
QUALIFICATIONS AND EXPERIENCE	1
MY INDEPENDENCE	3
EXPERT WITNESS CODE OF CONDUCT	3
BACKGROUND FACTS AND MATERIAL RELIED ON	4
PART ONE - ADEQUACY OF THE FIRE RISK MITIGATION FRAMEWORK	4
MINE REGULATION	4
<i>Rehabilitation</i>	4
<i>Fire protection</i>	5
<i>Revised work plan 2009</i>	5
<i>Mines Inspectorate</i>	6
IS THE FRAMEWORK FOR MINE REGULATION ADEQUATE	6
OCCUPATIONAL HEALTH AND SAFETY	7
EMERGENCY MANAGEMENT PLANNING	9
<i>LEGISLATION AND CONTROL ARRANGEMENTS</i>	9
<i>FIRE MANAGEMENT PLANNING</i>	10
MUNICIPAL FIRE PREVENTION	12
LAND USE PLANNING	13
PART TWO - ADEQUACY OF THE MEASURES TAKEN TO MITIGATE FIRE RISK	15
INTERNAL POLICIES AND PROCEDURES	15
STAFFING AND RESOURCES	21
RELATIONSHIPS WITH EXTERNAL AGENCIES	22
<i>CFA</i>	22
<i>LATROBE CITY COUNCIL</i>	22
IS THIS AN ADEQUATE FRAMEWORK?	23
PART THREE - GAPS OR SHORTCOMINGS IN THE EXISTING FRAMEWORK	25
EFFECTIVE PROTECTION OF THE WORKED OUT AREA	25
<i>WATER SUPPLY</i>	25
Capacity of system	25
Extent of System	26
<i>CAPPING WITH EARTH</i>	29
<i>THE CONTROL OF VEGETATION WITHIN THE MINE</i>	31
<i>EMBERS FROM EXTERNAL SOURCES IMPACTING HAZELWOOD MINE</i>	32
<i>BACK-UP RESOURCES FOR A DEVELOPING FIRE AT HAZELWOOD MINE</i>	37
PART FOUR - MEASURES TO ADDRESS ANY GAPS OR SHORTCOMINGS IDENTIFIED	39
RISK MITIGATION FRAMEWORK	39
<i>MINES ACT</i>	39
Fire protection protocol as a condition of licence	39
Rehabilitation bond	39
Audit of Effectiveness of an Approved Plan following a Reportable Event	39
Rehabilitation of Northern Perimeter Batters	39
Unauthorised modification of approved Fire Service Network	40

<i>OHS ACT</i>	40
Section 23 Protection Plan	40
Risk framework for external fires	40
<i>EMERGENCY MANAGEMENT FRAMEWORK</i>	40
Fire Prevention processes	40
ADEQUACY OF MEASURES TAKEN AT THE MINE	41
<i>EFFECTIVE PROTECTION OF THE WORKED OUT AREA</i>	41
Water Supply.....	41
Covering of exposed coal.....	41
The control of vegetation within the Mine	41
The control of embers setting fires in Hazelwood Mine	41
Back-up suppression resources for a developing fire at Hazelwood Mine.	41
REFERENCES	42
APPENDICES	43
APPENDIX ONE - CURRICULUM VITAE.....	44
APPENDIX TWO - LETTER OF INSTRUCTION.....	46
APPENDIX THREE - WEATHER RECORD 0400-2400HRS 9 FEBRUARY 2014	50
APPENDIX FOUR - FIRE HISTORY	51
APPENDIX FIVE: - CLAY CAPPING AS A FIRE PREVENTION STRATEGY	52
APPENDIX SIX - HAZELWOOD MINE FIRE INQUIRY REGULATORY STATEMENT	66

HAZELWOOD MINE FIRE - 9 FEBRUARY 2014

REPORT OF RODERIC INCOLL

INTRODUCTION

1. My name is Roderic Alan Incoll. My address is known to the Hazelwood Mine Fire Inquiry.
2. An outline of my qualifications and relevant experience is provided in paras 9 to 28. My curriculum vitae is attached as Appendix One.
3. This report responds to a request from the Board of Inquiry, included as Appendix Two, that I provide my views on the following matters.
4. The overall adequacy of the framework that currently exists for the mitigation of the risk of fire at the Hazelwood Coal Mine, including mine regulation, occupational health and safety, emergency management planning, municipal fire prevention and land use planning.
5. The adequacy of the measures taken by the Mine Operator to mitigate the risk of fire at the Mine, including its internal policies and procedures, staffing and resources, and its relationships with external agencies such as the CFA and Latrobe City Council.
6. Whether in your opinion there are any gaps or shortcomings in the existing framework for mitigating the risk of fire at the Mine that should be addressed.
7. The measures that should be taken to address any gaps or shortcomings that you identify.

QUALIFICATIONS AND EXPERIENCE

8. My qualifications and experience are stated as follows.
9. I commenced tertiary education at the School of Forestry at Creswick, Victoria in January 1956 and graduated with the Diploma of Forestry, Creswick in 1959. From 1960 to 1971 I was employed by the Forests Commission as a forester in Neerim South, Forrest and Bright forest districts. I took part in suppressing many forest fires during this period and conducted low and high intensity prescribed burning.
10. I developed an interest in the efficient management of fire fighting campaigns. To further this interest, I joined the Army Reserve to discover whether military organisation was relevant to fire control. I used this experience to construct an incident management process that was used in many forest districts until a standard interagency protocol was adopted many years later.
11. In 1971 I relocated to the Melbourne office to set up the Fire Training Section in the Division of Forest Protection, where I developed fire training manuals and training aids, including the sound colour training film "Black Out" illustrating manual forest fire fighting techniques. I conducted formal fire training courses throughout Victoria at basic, intermediate, and senior level for Forests Commission and interstate personnel during 1971 and 1972.

12. In 1974 I transferred to Heyfield forest district where I managed mountain logging and the regeneration of logged areas, which required the controlled application of high intensity prescribed fire. I also carried out extensive aerially lit fuel reduction burns. In 1976 I was appointed District Forester, Toolangi Forest District. In this role I was responsible for management of a large multiple use forest area including logging, recreation, personnel, budget, fire and industrial relations management, coordination and cooperation with other agencies, and law enforcement.
13. I was a Central Division Incident Management Team Fire Controller and managed the suppression of two large bushfires in the Mt Disappointment State Forest in the 1970's and 1980's. I was appointed controller of the 1983 Warburton Ash Wednesday bushfire by a decision of the Forests Commission. In 1983 I was awarded the Diploma of Forestry (Victoria) for a thesis about managing the logistics and accommodation aspects of large bushfire fighting campaigns.
14. In 1984 the Victorian Government announced the amalgamation of six Departments into the Conservation, Forests, and Lands Department. The position of district forester became redundant.
15. I subsequently gained employment with the State Electricity Commission. During 1984-1989 I held four positions in the Production Group of Departments in the Latrobe Valley in Victoria. Three positions from 1984 -1988 were within Engineering Services Department. These were Emergency Service Officer in 1984, Superintendent General Services in 1986, and Manager Services Division in 1988.
16. A common element in these positions was responsibility for:
 - management of the three station, three shift SEC Fire and Rescue Service that covered fire protection and emergency rescue in all SECV facilities in the Latrobe Valley except the open cut coal mines, each of which had a dedicated fire service reporting to the Open Cut Manager;
 - management of the Rural Services Group, a team that carried out works relating to rehabilitation, forestry and other land-related activities. All members were trained in forest and general purpose fire fighting;
 - advice to the General Manager Production (GMP) in relation to the external threat of bushfires to brown coal mining operations.
17. In 1985 I wrote a position paper on the protection of SECV Latrobe Valley assets from rural fire and conducted community consultation on this issue. I completed the Policy for the Protection of SECV Latrobe Valley Assets from Rural Fires and it was formally adopted by the Commission in July 1986. In 1987 I gained the Graduate Diploma of Business, from Monash University by part-time studies.
18. In 1989, service functions were regrouped into production centres at Yallourn, Morwell, and Loy Yang as an organisational prelude to the privatisation of power generation.
19. I was appointed Manager Services Division, Yallourn Production Centre, with change management responsibilities, while retaining the role of providing advice to the General Manager Production (GMP) regarding the external threat of bushfires to brown coal mining operations.

20. In 1990 I took up the position of Chief Fire Officer in the Department of Conservation and Environment and several of its successors. In this role I was responsible for policy, strategy and coordination of fire protection in state forests, national parks, and other crown land in Victoria. I visited Western Australia, USA and Canada to review fire fighting technology and equipment development. During this period I commenced the development of Code of Practice for Fire Management, which first came into force in 1995.
21. Initiatives I sponsored included the introduction of fire simulator training to Australian fire agencies, facilitation of the Statewide Radio Network, and a joint incident command protocol with the Chief Officer, Country Fire Authority. I conducted the Australian evaluation of the Canadair CL415 fire bomber, and developed a "critical incident approach" to secure the welfare of fire fighters.
22. During the period to 1990 to 1996 I was a member of the Board of the Country Fire Authority, a foundation Director of the Australian Fire Authorities Council (AFAC), chair of the AFAC Research and Development Committee and a member of the State Emergency Management Council for Victoria.
23. In 1996 I was awarded the Fire Awareness Week Individual Community Service Award, the Fire Awareness Week RACV Insurance Award, and received a commendation for service to the Australasian Fire Authorities Council. I was awarded the Australian Fire Service Medal in the Australian Honours List
24. I resigned from the Department in 1996 to provide bushfire risk appraisal services for a range of private, local government and corporate clients including the provision of expert advice on bushfire and related matters.

MY INDEPENDENCE

25. Since 1996 I have provided independent services to a wide range of private firms, individuals, non-government organisations, and government agencies.
26. I have had no commercial or other alliance with any of the parties to the Inquiry except the CFA at any time. I have not worked for the CFA since 1997.

EXPERT WITNESS CODE OF CONDUCT

27. I have read the "Expert Witness Code of Conduct - Victoria" and agree to be bound by it.
28. I have not conducted tests, inquiries or investigations as part of the report, and where research findings or other material has been referred to they have been fully identified.
29. I am unaware of any qualification of an opinion expressed in the report without which the report is or may be incomplete or inaccurate.
30. I have relied on my own knowledge and experience supported by expert opinion and research where relevant and available. I regard the opinions expressed in the report as concluded opinions based on the data available to me.
31. No matters of significance I regard as relevant have, to my knowledge, been withheld from the Court.

BACKGROUND FACTS AND MATERIAL RELIED ON

32. I have relied upon the documents provided by the Board of Inquiry for the background facts.
33. I have carried out research within the public domain for other relevant information and have identified the source when this was used.

PART ONE - ADEQUACY OF THE FIRE RISK MITIGATION FRAMEWORK

What is the overall adequacy of the framework that currently exists for the mitigation of the risk of fire at the Hazelwood Coal Mine, including mine regulation, occupational health and safety, emergency management planning, municipal fire prevention and land use planning?

MINE REGULATION

34. The basis of mine regulation is the Mining Licence¹.
35. Prior to the issue of an authority to commence work, a licensee is required to provide a Work Plan that details the location of work and how mining it is to be carried out, including an environmental management plan, prescribed mine stability requirements and processes including assessment and controls of mine stability risks, a rehabilitation plan and a community consultation plan.
36. By Order of the Executive Council on 12 November 1996, Mining Licence 5004 was issued to Hazelwood Power Corporation.
37. On 10 December 1996 the Governor in Council approved an authority to commence work on the basis of a "Schedule of Conditions" including a work plan and a rehabilitation plan.
38. The Schedule detailed the method of working, including control of emissions, dust and discharges, the rehabilitation of worked out areas, and the concept of final rehabilitation supported by the relevant plans and maps². A fire protection protocol is not a requirement of the Regulations.

Rehabilitation

39. Section 15 of the Licence Schedule Conditions stated that "progressive rehabilitation will be carried out as per the rehabilitation plan" and "in addition, any further work will be carried out at the direction of an Inspector".
40. The Mine Rehabilitation Policy included three phases of rehabilitation, the Operational phase, the Post Operational phase and the Mine Closure phase.
41. The Post Operational phase provided that during the life of the project, and at the earliest practical opportunity after land is no longer required for operations, the land is shaped, landscaped, re-vegetated and returned to its pre-mined capability³.

^{1,2} More detail in "Regulatory Overview" Appendix 5.

³ Licence p.34

42. This work was to be based on "5-year Rolling Implementation Plans" to be revised annually as required. Detailed plans were to be produced each year and contain sufficient detail to enable field works to be carried out⁴.
43. A rehabilitation bond of \$15,000,000 was lodged for the Hazelwood Coal Mine. It is understood that DSDBI is in process of compiling a methodology to assess the adequacy of bonds applying to all mining operations in Victoria⁵. This was commenced in 2010 and is ongoing.
44. While rehabilitation is the process for restoring land capability after the completion of mining it is relevant to Mine fire protection, since the earth cover applied to worked out areas during rehabilitation satisfies the fire prevention requirement to cover residual coal to prevent its ignition.
45. For this reason the requirement that rehabilitation be carried out at the "earliest possible opportunity" as required by the Schedule of Conditions is also an important fire prevention requirement.
46. According to the Regulator, Hazelwood Mine is currently in compliance with its obligations under the approved rehabilitation plan⁶.

Fire protection

47. The Schedule Conditions of the Mining Licence recognised that the Mine is situated in a high risk bushfire area, and stated that HPC had developed an Emergency Response Plan, but did not provide details. It stated HPC had promulgated a set of Fire Instructions to be updated before each fire season, usually in December, and that all personnel were required to undertake fire training prior to the fire season each year.
48. It was recognised after the 2006 fire that planning for the fire season needed to commence in July, and that the fire season "may need to be designated from October to March"⁷.
49. The documentation stated that HPC adhered to the "Latrobe Valley Open Cut Mines Fires Service Policy" and an "extensive network of water reticulation and sprays had been established in the Mine for fire protection".
50. A plan of the "Fire Service Network Schematic" is included in the Licence documents showing that while the main capability is directed to operating areas, there is a loop servicing the internal overburden dump, and the Northern Batters⁸ (Figure 3, page 27).

Revised work plan 2009

51. Work Plans for the Mine have been revised six times⁹, the latest in 2009.

⁴ Licence p.36

⁵ Statement of Kylie White para 116

⁶ Statement of Kylie White para 111

⁷ Recommendation One, 2006 Mine Fire Investigation October

⁸ Licence p.63, plan is at Licence p.89

⁹ Statement of Kylie West

52. The Plan of 11 May 2009 included progress reports on rehabilitation, an updated rehabilitation policy and plans detailing how the licensee intended to progressively rehabilitate the land and return it to a productive state at the end of the project.
53. The report on rehabilitation in this update stated "The mine permanent Northern Perimeter Batters have not been rehabilitated due to the large amount of infrastructure remaining which is still required for many years to come".
54. While limited rehabilitation of small areas of the Northern Batters was included in the plans, the requirement to retain infrastructure appears to be limiting the effect of the requirement to rehabilitate this area at the "earliest possible opportunity".
55. As the Northern Batters is adjacent to Morwell the exposed coal face of the Northern batters had implications for the level of emissions experienced in the urban area during the fire of 9 February. This issue is explored later in the Report.

Mines Inspectorate

55. The Mineral Resources Sustainable Development Act 1990 establishes an Inspectorate. The Act requires the holder of a mining licence to notify the Chief Inspector of Mines of a "reportable event" as soon as practicable after the event occurs.
56. The Mineral Resources Sustainable Development Regulations define a "reportable event" to include an explosion or a major outbreak of fire. The report may be made orally or in writing, and must include the date, time and place of the event, a description of the event; and the steps taken to minimise the impact of the event.
57. The Chief Inspector of Mines may request a more detailed written report, which must include the date, time and place of the event; the details of the event, including the impact, or likely impact of the event on public safety, the environment or infrastructure; any known or suspected causes of the event; details of the actions taken to minimise the impact of the event; and details of actions taken or to be taken to prevent a recurrence of the event.
58. This requirement to notify reportable events was inserted into the Act in 2010. To date there has only been one notification to the Chief Inspector of Mines of a major outbreak of fire, in relation to the fire that broke out on 9 February 2014.

IS THE FRAMEWORK FOR MINE REGULATION ADEQUATE

59. As to whether the framework for Hazelwood Mine Regulation is adequate, it appears that once an authority to commence work has been granted or a revised plan has been approved, there is little follow-up to ensure that all of the approved policies and plans are implemented as proposed.
60. The main opportunity for monitoring appears to be the occurrence of a reportable incident, in which case the Mine is required to provide details of actions taken or to be taken to prevent a recurrence of the event.
61. There is no indication that an audit of effectiveness or other evaluation of the outcome will follow the provision of this plan.

62. The "Fire Service Network Schematic" approved in the Licence Schedule of Conditions was modified as shown in Figure 4¹⁰ (page 28) without approval in a Work Plan Variation. This apparently escaped the notice of the Inspectorate or was not followed up.
63. The Mining Licence Schedule of Conditions are not prescriptive about fire protection of the Mine. Despite noting that the Mine is located in a "high bushfire risk area", the HPC Work Plan Submission devotes one page in the "Environmental Conformance Program" to a framework covering the "Bushfire Mitigation Program, Emergency Response Plan, Fire Instructions and Fire Protection Policy".
64. Lack of regulatory emphasis of fire protection is remarkable, given the proximity of the residential area of Morwell, the flammable nature of brown coal and the extensive previous fire experience in this Mine and Yallourn Open Cut.
65. The extended timeline for the project to devise a methodology to assess the rehabilitation liability for all mines in Victoria commenced in 2010, suspended in 2012, and re-commenced in 2013 is notable¹¹.

OCCUPATIONAL HEALTH AND SAFETY

66. The Occupational Health and Safety (OHS) Act imposes a duty on Hazelwood Power Corporation (HPC) to its employees, contractors, and subcontractors to provide and maintain a working environment that is, so far as is reasonably practicable, safe and without risks to health.
67. In addition, HPC owes a duty under section 23 of the OHS Act to anyone other than its employees and contractors to ensure so far as is reasonably practicable, they are not exposed to risks arising from HPC's undertaking. The undertaking for these purposes includes not just the operation of the Mine but also fire prevention and suppression¹².
68. People who are protected by this duty include firefighters (paid and volunteer), visitors, and members of the Morwell community.
69. The Act makes it clear that if practicable, a risk must be eliminated. Otherwise, the risk must be reduced so far as is reasonable practicable. The same degree of protection must be provided to all parties including those covered by Section 23.
70. Employers must report incidents, including fires, to the Victorian Workcover Authority immediately with a written report within 48 hours of its occurrence.
71. Additional provisions of the OHS Regulations Part 5.3.3 apply to prescribed mines. Hazelwood is a prescribed mine and as such must:
 - identify all mining hazards at the mine (defined in the OHS Regulations to be "any activity, procedure, plant, process, substance, situation or other circumstance that could pose a risk to health or safety" in relation to a number of listed hazards including "mine fires or hazards") and assess the risks to health or safety associated with all mining hazards at the mine;

¹⁰ Appendix to statement of Ronald Robert Dugan

¹¹ Statement of Kylie West 116-188

¹² Appendix 5 Regulatory Overview

- adopt risk control measures that eliminate (or reduce) so far as reasonably practicable risks to health and safety associated with any mining hazards at the mine;
 - ensure compliance with the requirement that it adopt appropriate risk control measures, review and, if necessary revise, the identification of mining hazards, the assessment of mining hazards and risk control measures adopted.
72. The OHS Regulations also require prescribed mines to establish and implement a Safety Management System (SMS) for the mine, in accordance with certain requirements including that the SMS:
- provide a comprehensive and integrated management system for all risk control measures;
 - contain a comprehensive and systematic Safety Assessment in order to assess the risks associated with "major mining hazards" (being those mining hazards that have the potential to cause an incident that would cause, or pose a significant risk of causing, more than one death);
 - contain a description of the operator's safety policy;
 - sets out the systems, procedures and other risk control measures by means of which risks to health or safety associated with mining hazards are to be controlled (with those risk control measures in turn required to be tested as often as necessary to ensure compliance with relevant OHS Regulations);
 - set out performance standards for measuring the effectiveness of the SMS and the way in which those performance standards are to be met;
 - set out the process, including method and frequency, for the audit of the effectiveness of the SMS against the performance standards.
73. The Mine Health and Safety Policy included in the Revised Work Plan of 11 May 2009 undertakes to establish a third party Health and Safety Management System compliant with the relevant standards.
74. An assessment of Mine Fire as a major mining hazard was finalised in October 2012 to reduce the risk level of all fire related issues to the level of "as low as reasonably practical". A routine of standard safety procedures was developed for 23 groups of potentially fire causing activities.
75. The following documents defined the response to fire in the Mine:
- Fire service policy and Code of practice - 2013
 - Emergency response plan - 2013
 - Fire instructions - 2011
 - Fire training manual
 - Guidelines for season & period specific fire preparedness & mitigation planning
 - Guidelines for season specific fire preparedness & mitigation planning
 - Check list for fire fighting equipment annual audit & inspections
 - Check list for season specific fire preparedness & mitigation planning
76. As to whether the framework for Hazelwood Mine Occupational Health and Safety is adequate, the regulatory framework prescribes that the OHS issues arising during the mining operation, and the mitigation of effects on other parties including the people of Morwell under S23 of the Act for must be provided for.

77. No arrangements are made to address the Section 23 OHS Act requirement to ensure that other parties including the people of Morwell are protected from risks arising from the Hazelwood Mine.
78. The framework for Occupational Health and Safety in relation to fire in the proximity of the Mine has been extensively developed.
79. However the same audit process was not conducted into incursions by external fires, despite the history of rural fire affecting mining operations since at least 1944. Apart from seasonal break preparation and vegetation management, the framework for responding to the external fire threat only commences operation when a fire is a threat to the Mine, that is reactively rather than proactively by identifying and mitigating hazards outside the Mine boundary.

EMERGENCY MANAGEMENT PLANNING

LEGISLATION AND CONTROL ARRANGEMENTS

80. Victoria's emergency management arrangements are based on the systematic identification of risks and measures that can be taken to prevent or mitigate the risk. This takes place at State, regional and municipal levels.
81. Various items of legislation combine to make up the emergency management framework in the State¹³.
82. The Emergency Management Act 1986 (EM Act) is the principal Act applying to emergency management in Victoria. It defines most of Victoria's emergency management structure and assigns roles and responsibilities within it.
83. The role of the Minister (being the Minister for Police and Emergency Services) is to ensure that satisfactory emergency management arrangements are in place to facilitate the prevention of, response to and recovery from emergencies, but carries no operational responsibilities for emergency management. The Minister is advised on such matters by the Victoria Emergency Management Council (VEMC).
84. State Emergency Response Coordinator (SERC) (being the Chief Commissioner of Police) is responsible under the state emergency response plan (see below) for co-ordination of the activities of agencies having roles or responsibilities in relation the response to emergencies. The EM Act requires the SERC, amongst other things, to appoint a member of the police force to be an emergency response Coordinator for each region and municipal district.
85. The Fire Services Commissioner (FSC) has overall control of response activities to a major fire which is burning or which may occur or which has occurred in any area of the State. The FSC may appoint other persons as assistant controllers (known as Deputy State Controllers, Regional Controllers and Deputy Regional Controllers). In the overall control of response activities, the FSC (or a person appointed to perform that role), may exercise the powers and authorities conferred by the Country Fire Authority Act 1958 (CFA Act) on the Chief Officer of the Country Fire Authority (CFA);

¹³ The legislation and key documents for this section are listed in Attachment 5.

86. The FSC also acts pursuant to the Fire Services Commissioner Act 2010 (FSC Act) which provides that the functions of the FSC include to work with fire service agencies to enhance their individual and collective capacity to prepare for the response to days on which it is forecast there is a high risk of major fires occurring and to develop and maintain incident management operating procedures. Amongst the FSC's duties is one to provide warnings and information to the community in relation to fires.
87. The FSC Act also requires the FSC to develop a fire services reform action plan for the purpose of enhancing the operational capacity and capability of fire services agencies and improving the capacity of fire services agencies to operate together in planning and preparing for the response to, and in responding to, major fires.
88. The CFA Act provides for the establishment of the CFA and imposes a general duty "of taking superintending and enforcing all necessary steps for the prevention and suppression of fires and for the protection of life and property in case of fire ... so far as relates to the country area of Victoria" on the Authority. The CFA Act provides that the brigades of the CFA are under the order and control of the Chief Officer of the CFA exercising the powers set out in the CFA Act, save when such powers are exercised by the FSC pursuant to the FSC Act.
89. In relation to the Hazelwood Coal Mine:
- The Mine is located in the Country Area of Victoria, hence the CFA is the responsible agency, except where the fire is or may become a "major fire" in which case the Fire Service Commissioner may assume the role of State Controller;
 - on account of fires already burning in the State and the forecast for extreme fire weather conditions on 9 February 2014, the FSC had already assumed the role of State Controller and in that capacity had already appointed a Regional Controller for Gippsland and an Incident Controller for the fires burning around Morwell prior to 9 February.
90. The Hazelwood Mine Fire Instructions require that any outbreak of fire be reported to the CFA on days of declared Total Fire Ban, or when the Hazelwood Mine has declared a Fire Alert. At all other times, the CFA response is to be requested immediately when the fire becomes beyond the capability of the Mine fire crews in attendance; or the initial response time has exceeded 30 minutes.
91. This framework has been developed over many years by two Royal Commissions and many Statutory and Departmental Inquiries. It is improving in effectiveness. The issues encountered on 9 February 2014 in my opinion lie more within the ambit of the Mine Fire Plan.

FIRE MANAGEMENT PLANNING

92. Under the Emergency Management Act:
- a municipal council must prepare and maintain a municipal emergency management plan (MEMP) that must contain provisions including identifying the municipal resources and other resources available for use in the municipal district for emergency prevention, response and recovery;
 - a municipal council must also appoint a municipal emergency resource officer (MERO) (or officers) and a municipal emergency planning committee (MEPC) (who in turn must prepare a draft of the MEMP for consideration by the council).

93. Fire management planning takes place as part of Integrated Fire Management Planning (IFMP), a process that was commenced following recommendations made by the Report of the Inquiry into the 2002-2003 Victorian Bushfires, chaired by then Emergency Services Commissioner Bruce Esplin. IFMP was encouraged in the final report of the 2009 Victorian Bushfires Royal Commission.
94. Integrated Fire Management Planning takes place in accordance with the Integrated Fire Management Planning Framework for Victoria, which sets out 22 planning strategies.
95. It involves bringing together a range of agencies and organisations responsible for fire prevention, preparedness, response, recovery and cultural and environmental uses of fire. Its objective is to ensure a more strategic and integrated approach to fire management planning, reducing the impact of fire in Victoria, and assisting in establishing a statewide planning approach and developing processes for continuous improvement.
96. It takes place through committees established at state, regional and municipal level, which until recently were supported by the State Fire Management Planning Support Team.
97. At State level, Integrated Fire Management Planning is the responsibility of the State Fire Management Planning Committee, a sub-committee of the Victorian Emergency Management Council.
98. Its role and responsibilities are set out in the Emergency Management Manual Victoria (EMMV), Part 5 at 5.6, and include leading the State in fire management planning and establishing the structures to support fire management planning.
99. The State Fire Management Strategy 2009 is largely concerned with the structures and processes for fire management planning, and does not extend to the identification and treatment of risks.
100. The role and responsibilities of Regional Strategic Fire Management Planning Committees are set out in the EMMV, Part 5, at 5.34.
101. The Gippsland Regional Strategic Fire Management Planning Committee has produced the Gippsland Regional Strategic Fire Management Plan 2011. Attachment A of the Regional Strategy lists regional assets at risk of fire, including "Power generation facilities: coal mines".
102. Guidelines for Municipal Fire Management Planning Committees are contained in Part 6A of the EMMV.
103. The Latrobe Municipal Fire Management Plan is a sub-plan of the Latrobe Municipal Emergency Management Plan. Latrobe's MFMP has prepared a MFMP that was endorsed by the Latrobe City Council on 31 October 2013.
104. There is an overlap between the framework for fire management planning under the Emergency Management Act and the long-established municipal planning process.
105. The fire management planning component of the Emergency Management Act does not interface with fire preparedness at the Hazelwood Mine.
106. The "All Hazards Resilience Framework" of the "Victorian Critical Infrastructure Model" currently being developed by the Victorian Government will include key Latrobe Valley infrastructure in due course¹⁴.

¹⁴ http://www.dpc.vic.gov.au/images/documents/dpc_resources/DPC_Critical_Infrastructure_Resilience

107. This appears likely to lead to the development of an interface between Emergency Management protocols and Hazelwood Mine albeit at a strategic level.

MUNICIPAL FIRE PREVENTION

108. The CFA has power to appoint a regional fire prevention committee (RFPC) for each CFA region. That RFPC includes the officer appointed by the CFA to be the officer in charge of that fire control region (who sits as the executive officer) and representatives of brigades in the region, amongst others¹⁵.
109. The functions of the RFPC include to submit to appropriate authorities recommendations and plans for the burning and clearing of a coordinated system of major firebreaks for the protection of the region and to co-ordinate fire prevention planning in the region.
110. The CFA may appoint a municipal fire prevention committee (MFPC) in respect of any area being within the country area of Victoria and being the municipal Victoria must appoint a municipal fire prevention officer (MFPO).
111. Section 43 of the CFA Act states 'it is the duty of every municipal council and public authority to take all practical steps (including burning) to prevent the occurrence of fires on, and minimise the danger of the spread of fires on and from – any land vested in it or under its control or management, and any road under its care and management'.
112. As Hazelwood Mine is not occupying land vested in or land controlled by Council, or a public authority, it is not caught up by the requirements of Section 43.
113. Each municipal council, district or part of a district that is in the country area of Victoria must appoint a municipal fire prevention officer (MFPO).
114. A MFPO is empowered to issue to the owner or occupier of land in the municipal district a Fire Prevention Notice (FPN) in relation to a fire danger under the control of the owner or occupier. It is an offence against the CFA Act, for the recipient of a FPN to fail to take the action directed by the FPN.
115. The MFPC must consist of persons including the fire prevention officer of the municipal council, a representative of each CFA and industry brigade in the area and a representative of the municipal council.
116. The functions of the MFPC include:
- advising the appropriate authorities as to the existence of and steps to be taken for the removal of fire hazards within the area;
 - advising the MFPO concerning the removal of fire hazards; and
 - recommending any action which the committee deems necessary or expedient to be taken for reducing the risk of an outbreak of fire or for suppressing any fire which may occur within the area to the CFA or other appropriate authorities

¹⁵ The Legislation and key documents for this section are listed in Appendix 5

117. A municipal council must prepare and maintain a municipal fire prevention plan (MFPP) for its municipal district in accordance in the advice and recommendations of the MFPC. An MFPP must contain provisions in accordance with prescribed requirements including identifying areas and land use in the municipal district which are at particular risk in case of fire, specifying how each identified risk is to be treated and specifying who is responsible for treating those risks.
118. The Latrobe City Council has a Municipal Fire Management Planning Committee. It has recently published the Latrobe Municipal Fire Management Plan 2013.
119. The risk of fire in the Hazelwood Power Precinct is identified in Attachment A1 – Register of Assets at Risk – Bushfire, at page 50. Past coal mine fires are listed.
120. However while the committee provides a forum for communication between representatives of many local organisations, it does not interface with or influence fire protection planning at the Hazelwood Mine, which falls outside the ambit of Section 43 of the CFA Act.
121. The Municipal Fire Prevention Officer has power to serve a Notice to Remove a Fire Hazard on the owner or occupier of land within the Municipality¹⁶. In December 2013, the Council issued five fire prevention notices to the operator of the Hazelwood Mine in relation to parcels of land around the Hazelwood Pondage. These notices were complied with¹⁷.
122. There is overlap between the municipal fire prevention scheme in the CFA Act and Integrated Fire Management Planning in the Emergency Management Act. The interaction between the two schemes is unclear. One employee of Latrobe City Council is appointed as MERO, under the EM Act, and the MFPO under the CFA.
123. There is confusion about the overlap and duplication of these processes that must be resolved if fire prevention planning is to be effectively implemented.

LAND USE PLANNING

124. The framework for land use, development planning and environment protection in Victoria is set out in the Planning and Environment Act 1987 (PE Act). This Act requires the relevant planning authority to take significant environmental effects into account when preparing a planning scheme or an amendment and when making a decision on a planning permit application.¹⁸
125. Under the PE Act, planning schemes and amendments are prepared, administered and enforced by a planning authority, relevantly the Latrobe City Council and the Minister for Planning. Planning permits are issued and enforced by the Latrobe City Council as the responsible authority.
126. The Latrobe Planning Scheme comprises both Victoria Planning Provisions (VPPs), determined at State level, and Local Planning Provisions (LPPs), determined by the Latrobe City Council.
127. Thirteen ordinances of the Latrobe Planning Scheme bear on fire risk management, including the following key provisions.

¹⁶ the Country Fire Authority Act 1958 S 41

¹⁷ Statement of Lance King MFPO Latrobe para 42

¹⁸ The Legislation and key documents for this section are listed in Appendix 5

128. The Latrobe Municipal Strategic Statement, LPP clause 21.07 – Economic Sustainability, provides for a buffer of at least 750 metres between urban development and existing or future coal resource development, based on the known impacts of earth subsidence, noise, dust, fire hazard and visual intrusion.
129. The buffer between Hazelwood Mine and houses in Wallace Street Morwell is of the order of 200 metres.
130. The coal buffer policy provides that the distance between urban settlement and any future open cut coal mine should be at least 1 km.
131. VPP Clause 37.01 Schedule 1 for the Special use Zone provides that all of the land used for timber production must be at least 1000 metres from land covered by a mining licence, or Order made by the Governor-in-Council under Section 47A of the Electricity Industry Act 1993.
132. LPP clause 42.01 – Schedule 1 to The Environmental Significance Overlay – Urban Buffer provides for a buffer zone around open cut coal mines, within which a permit is required for certain uses. A development within 1 km of a mining licence is required to have a fire management plan.
133. The Hazelwood Coal Mine falls within Special Use Zone 1 under the Latrobe Planning Scheme (SUZ1), which is a Schedule to the Special Use Zone and for which the Latrobe City Council is both the planning authority and the responsible authority.
134. The primary purpose of SUZ1 is to provide brown coal mining, electricity generation and associated uses. The secondary purpose of SUZ1 is to allow interim non-urban uses that will protect brown coal resources and discourage the use or development of land that is incompatible with future mining and industry. Dwellings are allowed within SUZ1 in restricted circumstances only.
135. Both State and local policies guide decision making in the Latrobe Planning Scheme. The use of land in SUZ1 must not adversely affect the amenity of the neighbourhood, including through the emission of noise, odour, fumes, smoke, vapour, steam, soot, dust and waste products amongst other things. The Latrobe City Council must consider in deciding on an application to use land in SUZ1 various factors including measures to cope with fire, particularly in the vicinity of a brown coal mine.
136. However, VPP clause 52.08 – Earth and Energy Resources Industry provides that no permit is required to use or develop land for mineral extraction licensed under the Mineral Resources (Sustainable Development) Act 1990. The effect of this exemption is that the mine regulator (DSDBI) rather than Latrobe City Council is the relevant authority in relation to the use and development of land within the Hazelwood Mine boundaries
137. It is apparent that Morwell has an inadequate urban buffer to the coal mine. This is not an outcome of the planning framework but of inappropriate planning decisions at the time the Hazelwood Mine was established.
138. As set out later in this report, the establishment of eucalypt plantations north west to south west of the Mine is increasing the risk of ember attack during a high intensity fire.

PART TWO - ADEQUACY OF THE MEASURES TAKEN TO MITIGATE FIRE RISK

What is the adequacy of the measures taken by the Mine operator to mitigate the risk of fire at the Mine, including its internal policies and procedures, staffing and resources, and its relationships with external agencies such as the CFA and Latrobe City Council?

139. Powdered or frittered dry brown coal is readily ignited; fire is a relatively frequent event in open cut mining. All Mine personnel must be aware of fire causing agencies and be able to take immediate and appropriate action when a fire occurs, so the flow of coal into the bunkers remains uninterrupted.

INTERNAL POLICIES AND PROCEDURES

140. A "Mine Fire Service Policy and Code of Practice" for the Hazelwood Mine was issued in 2013 and updated in February 2014. Its stated aims were to achieve the Fire Protection Policy requirements by providing acceptable operating procedures for fire protection services for Mining Operations by establishing a clear strategy and standard of fire protection to:
- Protect all personnel within the Hazelwood Mine;
 - Protect all plant and equipment required for the maintenance of coal winning operations
 - Protect coal reserves to enable continuation of coal winning activities.
 - Ensuring that all personnel associated with the Hazelwood Mine or the Fire Service systems have an understanding and awareness of the effects of fire, the requirements of fire protection, and are aware of their responsibilities.
 - Providing a framework which ensures that fire protection objectives are coordinated, coherent and translatable into action and to ensure that these objectives are carried out.
 - Ensuring that relevant statutory regulations are met and that a cooperative and coordinated approach is undertaken with relevant statutory authorities. i.e. CFA.
 - Ensuring that the equipment used for fire service activities meets relevant operational standards.
 - Setting procedures for the testing of new equipment and practices before being approved....."
141. Fire related duties and responsibilities are allocated to all the Mine workforce by the Policy. The Mine Production manager is responsible for all fire protection within the Mine.

142. The Services Superintendent is responsible for the day to day fire service activities involving:
- Monitoring and reporting on the status of the Hazelwood Mine in relation to this Fire
 - Service Policy and Code of Practice
 - The operation and maintenance of the fire protection installations and related services in the Hazelwood Mine.
 - Fire fighting operations.
 - Reporting all fires.
 - Providing support to the CFA Incident Controller or the Police Coordinator, where required, in the event of an emergency situation.
 - Inspecting all fire fighting equipment.
 - Training all personnel in fire fighting methods.
 - Issuing of welding and burning permits and defining precautions.
 - Arranging approval of vehicles for access onto coal areas within the Hazelwood Mine.
143. The Mining Shift Supervisor is responsible for the activities of the Mine Production manager outside normal work hours.
144. Duties of all personnel are listed in the Hazelwood Fire Instructions.
145. A range of other instructions supplement this policy to minimise the occurrence of fire in the Mine:

DOCUMENT	DATE
Mine Emergency Response Plan	2013
Hazelwood Mine Fire instructions	2011
Fire training manual	?
Guidelines for season & period specific fire preparedness & mitigation	2007 - 2016
Guidelines for season & period specific fire preparedness & mitigation planning	*
Check list for fire fighting equipment annual audit & inspections	*
Check list for season specific fire preparedness & mitigation planning	*

* = To be reviewed by July of each year.

146. In October 2012 an assessment of Mine fire risk was carried out in response to an improvement notice issued by Worksafe Victoria on 21 June 2012 which found that a

“Safety Assessment for the identified Major Mining Hazard “Mine Fires” has not been conducted as per Occupational Health and Safety Regulations 2007 5.3.23¹⁹”

147. As a result, protocols were developed to minimise the following fire causing agencies:

SOURCE OF IGNITION	
Bearing Failure	Grinding/Cutting
Boilermaking	Hot Works
Bunker Fires	Lightning
Bush Fire	Incorrect Storage of Flammable Materials
Cable Repairs	Petrol Driven Equipment
Coal Build Up	Power Tools
Coal Build Up	Plant Vehicles/Exhaust Brakes Fires
Coal Spill / Build Up	Seized Idlers
Electrical Faults	Smoking/Lighters/Matches
Frictional Heating eg, Tools/Pumps/plant	Worn/Damaged Equipment
Frictional Heating eg,Conveyors	

148. To further the purposes of the Inquiry the framework relating to "Bush Fire" is explored.

149. Following a review that included the following protective measures, Worksafe Victoria conducted a further inspection on 8 October 2012 and found that GDF had complied with the improvement notice.

150. The following measures are included in "Preparedness for Protection from Bushfire":

"To reduce the hazard from a fire external to the Hazelwood Mine, control of grassed and forested areas within the 'zone of responsibility'²⁰ is required. A continuous 50 metre wide and permanently maintained fire break corridor around the perimeter of Hazelwood Mine is to exist all year round. The firebreak can include roads and may consist of the following:

- Grass not to exceed 100 millimetres in height;
- No trees, shrubs, scrub are permissible in this area; and
- Constant monitoring of the fire break corridor is required to ensure the above protection is maintained."

¹⁹ GDF.013.001.0045 and Appendix 5

²⁰ 1 km from the mine boundary on north, south and west, 0.5km on the east boundary.

151. Protection of Exposed Coal²¹ - (Operating Area)

- Fire equipment such as fire hoses, fire extinguishers etc., are to be strategically placed throughout the operating area. The operating area is to be protected by wetted corridors established along the working levels. Pipelines and sprays are to be provided such that if all sprays on working levels were to operate simultaneously under light wind conditions:
- A minimum of 50% of exposed coal on working levels would be wetted at a rate of at least 6 mm/hour.
- The wetting down would be such as to provide intersecting corridors of wetted coal.
- The width of the wetted corridors should be a minimum of 50 metres. The unwetted coal areas should not exceed 12,500 m² in area with a maximum dimension in any direction of 250 metres. Portable or readily relocatable sprays are to be used if necessary to achieve this (Figure 1).

152. Protection of Worked out Batters²².

- Worked out batters are defined as batters within the Mine area not regarded as being within operational areas. As a minimum requirement they are to be protected as follows:
- All benches are to be clay covered.
- All berms are to be eliminated by trimming or by filling with clay such as to shed fretted coal provided that batter stability calculations indicate that neither of these options will cause batter failure.
- Tanker filling points are to be provided such that a tanker on any part of the worked out batters is within 5 minutes travel of a tanker filling point. In the absence of tanker filling points a hydrant manifold will suffice.
- Fixed sprays should be used in conjunction with the droppers for the tanker filling points in order to provide wetted breaks.
- Where possible access to areas worked out to be maintained.
- Alternatively, where practicable, fire break zones extending down to full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500 m - (Figure 2).

153. Protection of the worked out floor of Hazelwood Mine²³.

- The worked out floor of the Hazelwood Mine as excavated, normally consists of low grade coal and overburden. Ultimately these areas are used for overburden disposal or water storage which eliminates fire risk.
- Whilst exposed, fire protection is based on the provision of intersecting firebreak zones across the floor of the Hazelwood Mine in the form of clay covering and the provision of tanker filling points as outlined in Clause 3.4. Individual exposed coal areas left by these fire break zones shall be no greater than 12,500 m² in area.
- For the period between exposure of the floor and the completion of clay fire break zones or the establishment of ponds or overburden dumps, protection shall be by the provision of wetted corridors as required for working levels.

²¹ Open Cut Fire Service Policy and Code of Practice 3.1

²² Open Cut Fire Service Policy and Code of Practice 3.4

²³ Open Cut Fire Service Policy and Code of Practice

Appendix A – Fire Services Practices
A3. Examples of Limiting Unwetted Areas

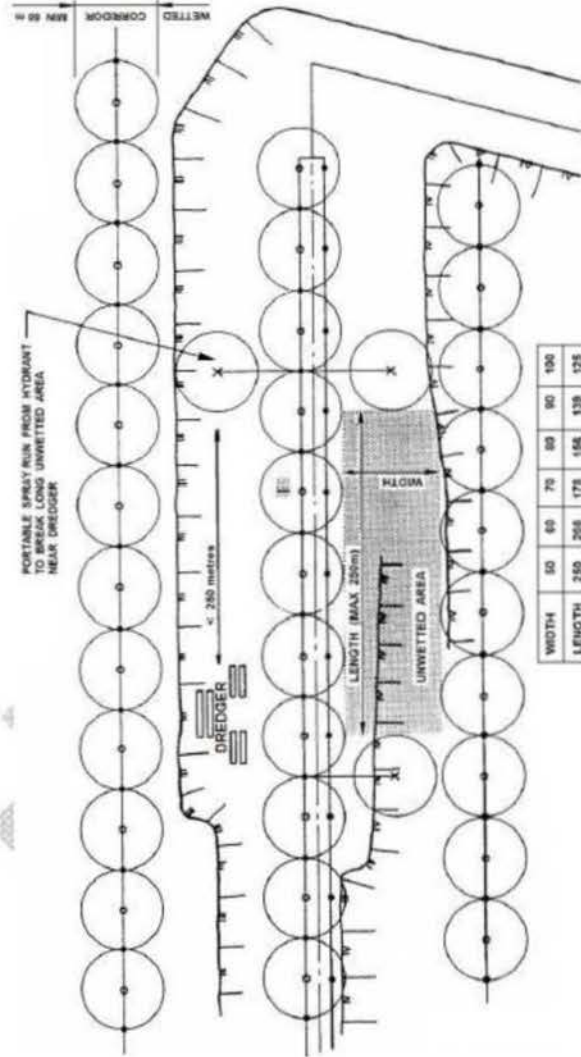


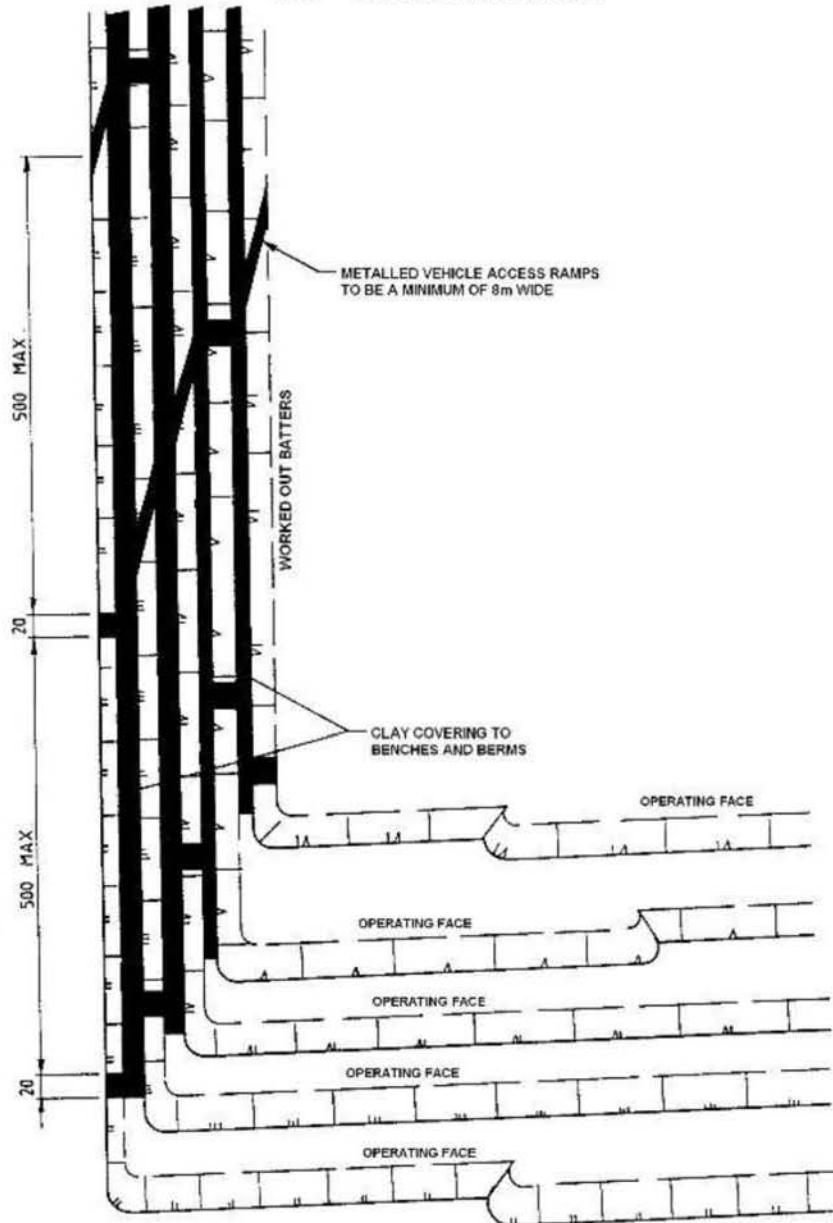
FIGURE 3 - EXAMPLE OF LIMITING UNWETTED AREA TO LESS THAN 12,500 sq metres

Authoriser: Rob Dugan	DocID: 2589	Issued: 12/09/2013
Version: 1.8 CURRENT	Page 42 of 84	Review Date: 27/02/2014

Figure 1 - Limiting of Unwetted Areas on Exposed Coal from Mine Fire Service Policy and Code of Practice Appendix A3

Appendix A – Fire Services Practices

A4. Worked Out Batters



LV1/1-16-3/009

FIGURE 4 - EXAMPLE OF WORKED OUT BATTERS - EXAMPLE OF FIRE PROTECTION

Figure 2 - Treatment of worked out batters from Mine Fire Service Policy and Code of Practice Appendix A4

- To provide protection to the operating levels from fires spreading along the floor of the Hazelwood Mine, a clay fire break zone or a single header with sprays will be provided at no greater than 100 m from the toe of the bottom working level.
154. Fire training: All personnel who work at the Mine, including Contractors, are required to undergo an Annual Fire Training Course, including an assessment.
 155. Mine on-site fire tankers are always to be kept in a state of readiness.
 156. Mobile Water Crane monitors must be tested prior to the fire season. Slip-on tankers must be inspected and tested on a weekly basis during the fire season.
 157. Weather parameters are monitored continuously and a "Fire Alert" is called at Temperature: > 32^oC; Relative humidity: < 25%; Wind speed >30kph
 158. When a Fire Alert has been declared a prepared radio message broadcast on Hazelwood Mine radio frequencies informing personnel of action required. A chain of communication ensures the Fire Alert is communicated site-wide. All personnel must be on the lookout for fire, report any outbreak and must attempt to extinguish or contain any fire immediately. They then carry out the specific actions required of them. This process ensures a higher state of readiness throughout the Mine.
 159. When a fire occurs immediate action must be taken to extinguish it and the Mine Control centre is to be notified. If the fire is not immediately controlled the Fire Services Officer or Shift Supervisor will notify the CFA via 000. During Total Fire bans the CFA will be notified immediately of any fire.
 160. The Production Manager or Director Mining will assess the situation and may declare a State of Emergency and implement the Emergency Response Plan.
 161. Explicit instructions are given about precautions for working when visibility is impaired and when Carbon Monoxide levels are likely to rise.
 162. Detailed instructions are given for the handover to CFA (in the case of bushfires) and briefing and support for the Incident Controller in the Emergency Response Plan.

STAFFING AND RESOURCES

163. Under the conditions of the Mining Licence, Hazelwood Mine is authorised to operate 24 hours a day, seven days a week.
164. The Mine requires a shift workforce with its own supervision.
165. Managers and administrators are not on shift.
166. Every individual on site has a role in fire control. The aim is to prevent or extinguish any fire which may threaten the brown coal winning activities, and to restore normal operating conditions as early as possible after a fire.
167. Training of all personnel in firefighting methods and procedures is an integral part of preparedness for combating fires.

168. Diamond Protection provides contract services for Emergency – Security – Training. This includes development of security and emergency plans, emergency incident management, supply of guard force, fire fighters / rescue personnel and paramedics. In addition, Diamond manages firefighting and rescue equipment including trucks, response vehicle and support equipment.
169. The number of Diamond Protection personnel on shift and back-up resources available for firefighting is not identified in working documents.
170. Specialised plant items are required for combating brown coal fires. These items include dedicated fire tankers, slip-on fire tankers, crane monitors, large bucket loaders, and bulldozers. Hazelwood Mine has these items on strength and ready for fighting.

RELATIONSHIPS WITH EXTERNAL AGENCIES

CFA

171. This is a critical relationship that must work effectively to protect Victoria's electricity supply, which is potentially compromised by a major fire in the Mine.
172. Relationships with the CFA have been the subject of adverse comment in previous incidents, for instance, the 2006 Mine Fire.
173. According to the statement of Fire Commissioner Craig Lapsley²⁴, CFA and the Mine operator have considerably enhanced the frequency of meetings and joint training. He relates that a number of CFA volunteers are employed at the Mine that has further facilitated knowledge sharing.
174. He states that site inductions and visits to the Mine by local brigades are conducted on a regular basis.
175. It is reasonable to conclude that relationships with the CFA have improved. This is a critical relationship since rapid backup with a significant force is essential to prevent a repetition of the events of 9 February 2014 on some future occasion.
176. There an outstanding issue about the community depending on a volunteer community resource, albeit with a full time supplement, to mitigate the effects of an uncontrolled fire in a commercial mining operation that permeates this relationship and requires further exploration.

LATROBE CITY COUNCIL

177. The statutory arrangements under which Hazelwood Mine operates differ from the commercial arrangements of other businesses. This creates a unique relationship between the Mine and Latrobe City Council.
178. Many aspects of Statutory Planning are swept up in the Mining Licence Conditions so in effect the Department of Sustainable Development and Business Infrastructure is in effect the Planning Authority for the Mine.
179. The Mine is neither land vested in or under Council control or management, or a public authority, so the fire prevention planning provisions S43 CFA Act do not apply. The Mine is thus not subject to municipal fire planning processes or required to submit its Fire Prevention Plan to the Committee.

²⁴ VGSO.0004.001.32

180. The requirement to act on a fire prevention notice issued under S41 CFA Act is not affected and the Mine cooperates with this process.
181. The requirements of Integrated Fire Management Planning and the function of the Municipal Fire Management Committee in respect of the Hazelwood Mine are unclear and must be clarified and resourced if they are to be effective.
182. A substantial workload in emergency management and the provision of relief services was incurred by the City of Latrobe in the period following the 9 February incident.
183. In its submission Council is seeking remediation of these and other issues including improved systems and communication.
184. Clarification of Council's role in Emergency Management (Preparation, Prevention, Response and Recovery) and Fire Prevention is an essential requirement for more effective and co-ordinated operation during the next emergency.

IS THIS AN ADEQUATE FRAMEWORK?

185. The framework has been developed and progressively fine tuned on the basis of long experience of dealing with a combustible substance in a difficult working environment. The work force know their job and have a primary focus on the mandatory task of keeping coal running into the bunkers, while managing distractions like fires that would interrupt the production process.
186. Fire is an ever-present hazard and enemy of production that can arise from many causes internally and at times can arise unseen from outside the Mine.
187. One way this can occur is by the ignition of exposed coal in the Mine by fires burning in the rural landscape, either by direct flame attack or ignition by wind-borne burning embers.
188. The main strategy for dealing with external fires has been vegetation management in the rural land surrounding the Mine, by slashing, grazing, and discing firebreaks. However on a number of occasions, including 9 February 2014, this strategy has not prevented the spread of fire within the Mine. If following this fire no changes were made, then a repetition of the same circumstances would produce a similar outcome.
189. The protection of exposed coal that ignites easily on hot, dry windy days is a key issue for resolution.
190. As no fire front entered the Mine on 9 February, and it is clear from a number of sources including²⁵ that burning embers started the blaze, it is appropriate to identify the source of these embers and seek a remedy.
191. It is apparent that the resources available for first attack on a Mine fire of the magnitude of that experienced on 9 February were insufficient to prevent the spread of fire inside the Mine.
192. The back-up response provided by the Mine Fire Policy is support from the CFA. On 9 February the CFA were fully committed and CFA support was not immediately available.

²⁵ Witness Statement Mr Mauger

193. The control of vegetation growth within the Mine is not covered in the Mine Fire Protection Policy. While this has a benefit in soil stabilization, if not controlled and regulated it can also serve as fuel for an internal vegetation fire, and/or prevent access to burning embers by fire fighters as occurred during fighting the fire on 9 February.
194. Issues that are not adequately covered by the existing framework that were highlighted by the Mine fire of 9 February are:
- the effective protection of exposed coal faces in the worked out area;
 - the control of vegetation growth within the Mine;
 - mass ember throw into the Mine from external sources resulting in widespread simultaneous ignitions;
 - the availability of sufficient resources including back-up for rapid and successful first attack on a developing fire.

These issues are considered in Part Three of this Report.

PART THREE - GAPS OR SHORTCOMINGS IN THE EXISTING FRAMEWORK

Whether in your opinion there are any gaps or shortcomings in the existing framework for mitigating the risk of fire at the Mine that should be addressed.

EFFECTIVE PROTECTION OF THE WORKED OUT AREA

195. Coal production from the Hazelwood Mine has supported base load generation for sixty years. During this time more than 5000 ha (5 sq km) of land has been mined. More than 3000 ha (3 sq km) is now regarded as worked out. This includes an internal overburden dump, approved for use on 20 May 1997²⁶.
196. The extent of the area to be protected is a major factor in the challenge of protecting it from fire.
197. Effective fire protection of a mine of this size from ignition by flames or embers from outside the mine can only be achieved by either covering exposed coal with earth and/or a water spray to wet down coal faces.
198. A routine method of covering coal faces with earth is rehabilitation that is mandated to follow coal extraction.
199. Rehabilitation to an approved work plan includes breaking down the batters, covering the new surface profile with soil, and establishing vegetation.
200. Alternatively, clay coverage of exposed coal can be carried out for fire protection purposes.

WATER SUPPLY

Capacity of system

201. A large volume of water is required to extinguish a brown coal fire due to the unlimited quantity of fuel available to feed the combustion process.
202. The Fire Service Policy and Code of Practice ("The Policy") states: "In order to properly protect all parts of the Hazelwood Mine, pipe work and sprays are to be installed as laid down by this Policy. However, it must be understood that a larger water supply system would be required to run all the sprays and protection systems simultaneously. This policy provides for diversity in the simultaneous application of the fire protection water supplies and distribution".
203. In ordinary language this is saying that the mine water supply cannot cope with peak demand.
204. This statement is understood to be based on complex geomorphology necessitating high technology pumping and electronic systems. It is none the less predicating that the water supply is not capable of protecting the Mine during large scale fire scenarios.
205. It transpired that this was the case at critical times during fire of 9 February 2014.
206. Unless the capacity of the present water supply system is increased so that all sectors of the mine with exposed coal faces can be effectively protected with water, a similar outcome to that experienced after 9 February 2014 is invited.

²⁶ Variation to Work Plan approved 20 May 1997 Statement of Kylie White para 45

207. The capacity of the water supply system must be increased to the level that ensures a fail-safe supply of water for effective protection of exposed coal in the Mine, particularly where there is an acknowledged insufficient buffer to residential areas.
- Extent of System*
208. Effective cover of exposed coal surfaces with water sprays requires a reticulation system capable of delivering water in the volumes required for dampening down of exposed coal in all sectors of the Mine.
209. The fire service water reticulation network shown in the Mining Licence Schedule of Conditions 1996 (Figure 3) indicates that water was then supplied to the Northern Batters.
210. The 2014 fire service water reticulation layout²⁷ (Figure 4) shows that the Northern Batters supply is no longer in place.
211. The Policy requires water sprays to be operated in Production Areas as shown in Figure 1 (page 19). Coverage of 50% of coal areas is prescribed (para 151).
212. It further prescribes that in worked out areas, tanker filling points are to be provided at 5 minute tanker travel intervals in conjunction with fixed sprays to provide wetted breaks (no coverage specified).
213. Alternatively, where practicable, "fire break zones" extending down to the full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500 m. The benches are to be clay covered.
214. Notwithstanding that the distance of 500m was adopted following a Review of the December 2005 Mine fire, this distance seems an extensive (potential) face on fire to deal with under hot dry windy conditions.
215. In any case, batter length exceeded 500m as seen in Figure 5²⁸.
216. The Northern Perimeter Batters is a key location for caution and compliance, considering its proximity to Morwell (as seen in Figure 5) and the consequential and predictable effects of known noxious emissions of a coal fire in this area on people living or working in this location.
217. The reduction of water supply to this key area, and non-compliance with prescribed batter length must have been contributing factors to the community impact of the 2014 fire on Morwell that ought to have been reasonable foreseen by Mine management.
218. In my opinion considering the outcome of the recent fire, anything less than 100% spray coverage availability during hot dry windy conditions, or full earth covering of the Northern Batters is inviting a recurrence of the incident with similar outcomes.
219. For this reason this situation must be permanently remedied.

²⁷ from statement of Robert Ronald Dugan

²⁸ Appendix 4

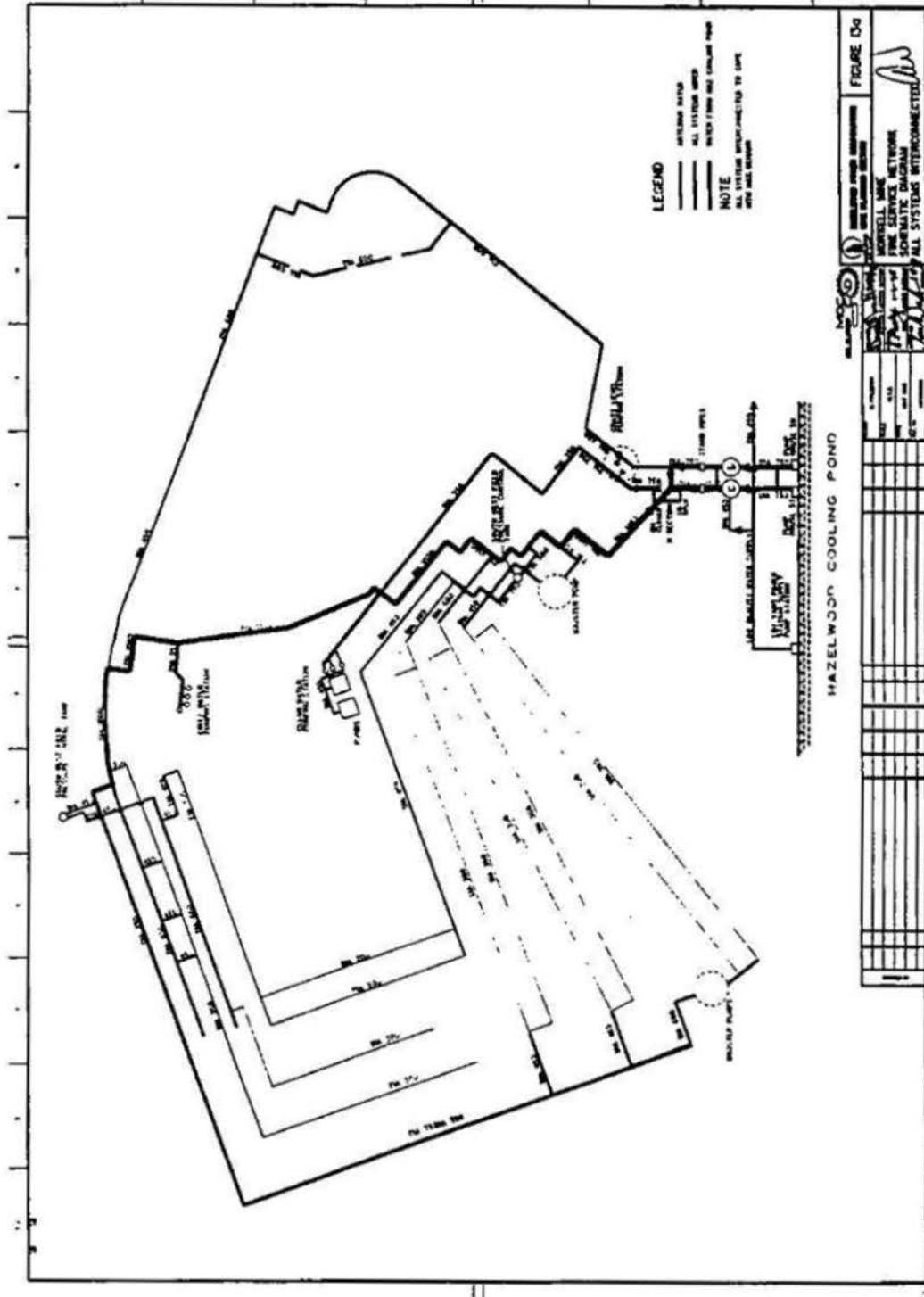


Figure 3: Fire service layout - 1996

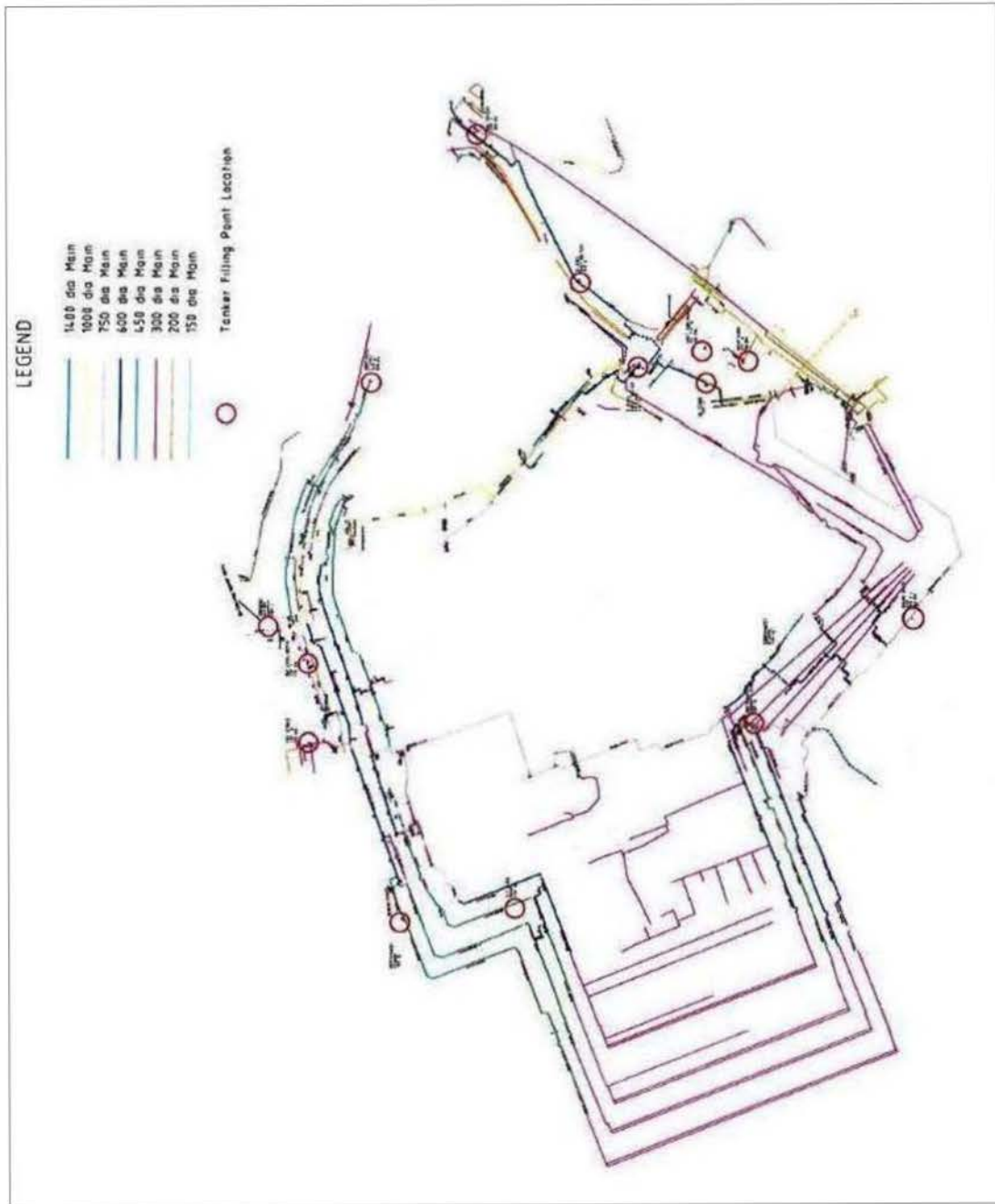


Figure 4: Current Fire Service layout

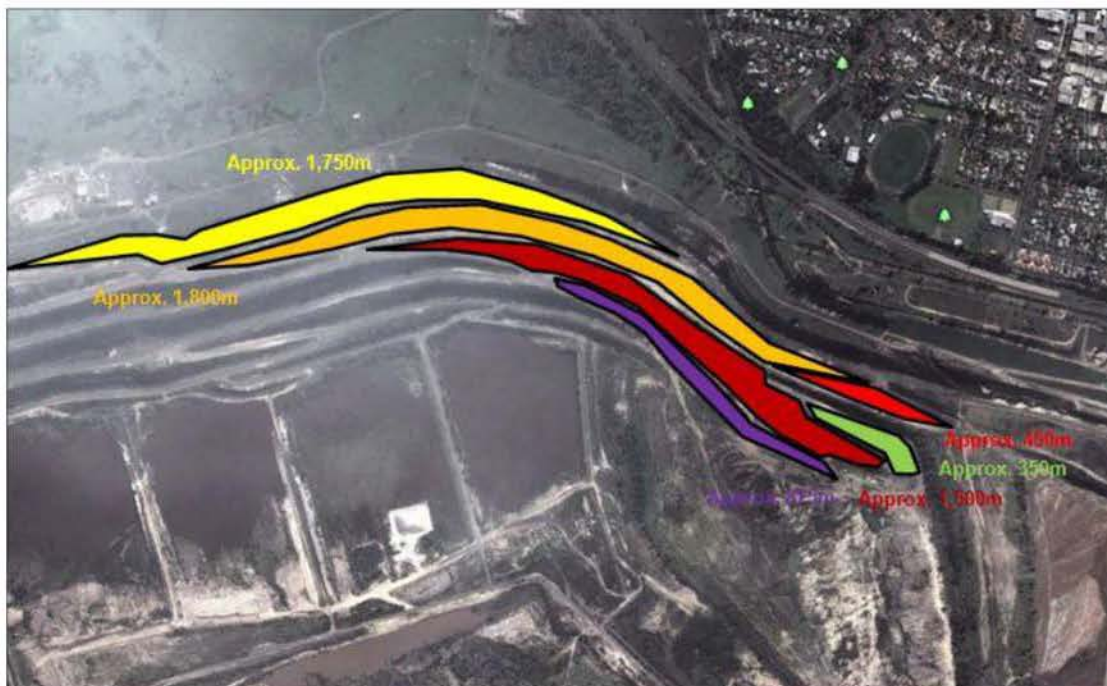


Figure 5: Batter length in February 2014 - 2012 Google Image

CAPPING WITH EARTH

220. Denying or reducing the exposure of fuel to a potential source of ignition is an effective method of preventing or reducing its ignition. In the case of brown coal this involves covering the coal surface with an insulator such as earth.
221. At Hazelwood Mine earth is available from the overburden stripping operation. This contains varying proportions of coal but is much less flammable and combustible than exposed coal. In due course this may in turn be covered with topsoil that contains little if any coal where this is available.
222. The most obvious strategy to apply overburden to coal is the progressive rehabilitation of worked out areas.
223. Section 15 of the Licence Schedule Conditions states that "progressive rehabilitation will be carried out as per the rehabilitation plan". Detailed plans have been approved for rehabilitation, the last being in the 2009 Work Plan Variation. According to the Regulator, Hazelwood Mine is currently in compliance with its obligations under the approved rehabilitation plan²⁹.
224. Rehabilitation is intended to recover land capability following mining rather than for fire protection. Progressive rehabilitation may not be the most practical solution in open cut mining activities, depending on the mine layout and design and the stage of development.
225. Alternatively, exposed coal may be capped with earth specifically for fire protection purposes.

²⁹ Statement of Kylie White para 111



Figure 6: Infrastructure on Northern Perimeter Batters

226. Progress on rehabilitation of various worked out areas is outlined in the Plan. The Plan also states that the Mine permanent Northern Perimeter Batters have not been rehabilitated due to the large amount of infrastructure remaining that is "still required for many years to come".
227. The location of much of this infrastructure is shown in Figure 6 between the Princes Freeway diversion and the Mine perimeter. The legend on Figure 6 lists power lines and drainage features. The electric trolley line to the Energy Brix is also located in this strip.
228. This worked out coal face is approximately 200m from the urban area boundary at its closest point and the effects of burning coal in this area would have impacted significantly on the urban area.
229. To prevent a occurrence of noxious emissions affecting the urban area in future, a permanent solution must be developed and implemented for protecting the exposed coal face along the entire length of the Northern Perimeter Batter.



Figure 7: Vegetation on Northern batters on 16 May 2014

THE CONTROL OF VEGETATION WITHIN THE MINE

230. The Mine Fire Service Policy and Code of Practice for land within the Director of Mining's control states that
- "vegetation should consist primarily of scattered, tall, clean barked trees that have firm bark and an overall crown cover of less than 35% (over any given treed area) with a minimum of 3 metres of open space between crowns of individual trees; and grass and herbaceous understoreys that are kept short by grazing or mechanical means during those periods of high rural fire risk"
231. It seems incongruous that the level of non-conforming vegetation shown in Figures 7 and 8 on the Northern Batters is allowed on batters and along benches.

232. While the plant roots provide stability for earth on batter slopes, vegetation of the nature and density of that shown in Figures 7 and 8 obstructs access for fire fighting and if ignited under hot dry windy conditions may become a scrub fire .
233. Dense vegetation resulted in difficulties accessing embers with water sprays during the first attack on the fire on February 9³⁰.
234. This is a issue that is not addressed in the Mine fire policy framework that requires attention.



Figure 8: Vegetation on batters 16 May 2014

EMBERS FROM EXTERNAL SOURCES IMPACTING HAZELWOOD MINE

235. There is a classic land use conflict in siting eucalypt plantations so that extreme fire weather is able to project embers into an open cut brown coal mine.
236. This happens because extreme fire danger weather in southern Australia is characterised by a strong to gale force wind, which blows from the north to west quarter as shown in Figure 9.
237. A fire occurring under these conditions rapidly extends a narrow wind-driven front to the south and east of the fire origin under the influence of the north west wind.
238. This is often followed by a strong south west wind change. The strong and blustery winds associated with this change extend the eastern flank of the fire over an extensive area to the east and north. The most severe and turbulent fire behaviour occurs during and after the wind change, while fuel dryness remains at pre-change levels.

³⁰ Statement of Mr Mauger

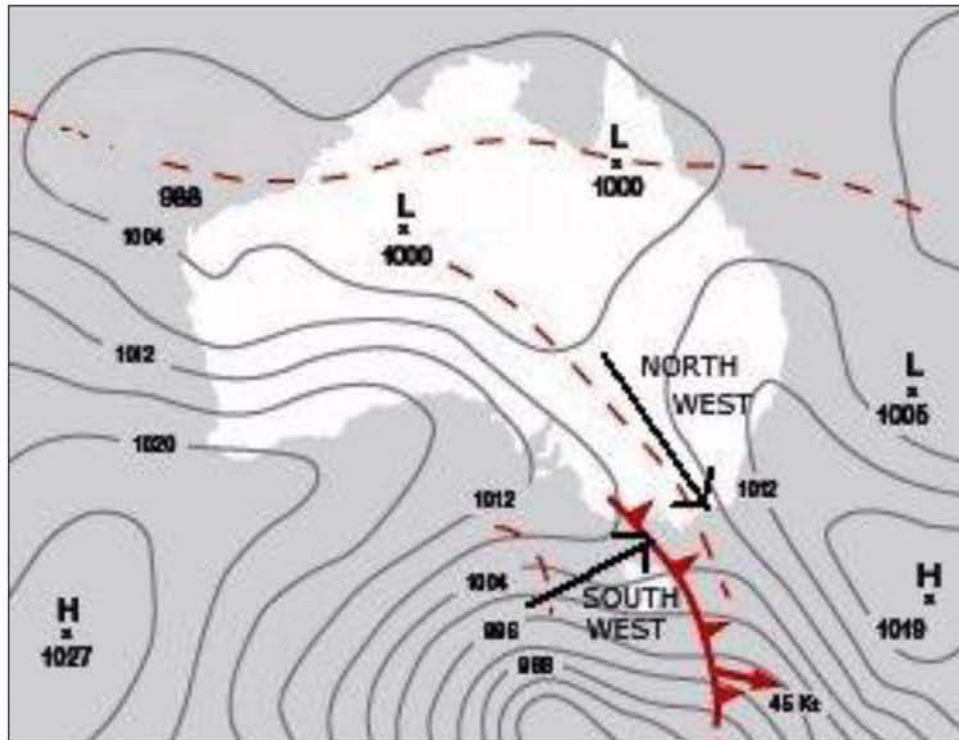


Figure 9: Typical weather pattern during high intensity bushfires in Victoria.

239. In my experience tree bark is responsible for most spotting or ember throw ahead of a bushfire. This phenomenon is a characteristic of fast running and destructive fires, verified by McArthur (1967), Luke and McArthur (1978), and Wilson 1992).
240. A blue gum plantation on Applegates Road, Hazelwood approximately 2km south of the Mine is shown in Figure 10. Ribbons of bark can be seen suspended in the crown and caught in the upper branches of these trees. This is typical of all smooth bark plantation eucalypts.
241. As smooth barked Eucalypts grow in diameter they shed bark annually, and particularly in a close planted plantation, the result is an accumulation of bark ribbons caught in the upper branches. This is perfectly placed for ignition in a high intensity fire.
242. In my opinion the bark fuel suspended in the crowns of this stand is of the order of 3 - 5 tonne/ha interpolating Table 9.2 of McCarthy et al (2010).
243. The ribbons are readily ignited in a fire of the intensity experienced on 9 February. Ribbons can stay alight for relatively long periods (exceeding 30 minutes) and in strong winds can be swept typically 1 - 5 km in large quantities to start new fires. When elevated in convection columns these bark ribbons can drop out to start new fires at distances in the range of 20 - 30 km and beyond.
244. A blue gum stand on Strzelecki Highway burnt in the fire on 9 February 2014 stripped of its crown and the elevated bark fuel is shown in Figure 11.
245. At least two fires were burning in the vicinity of Hazelwood Mine on 9 February 2014 around the time of the wind change that occurred between 1330hrs and 1337hrs as recorded at Traralgon airport. (Although 10 km distant, there would be little time difference at Morwell at the wind speed prevailing, see Appendix 3).

246. It appears that the Hernes Oak fire was heading south east towards the Hazelwood Mine at the time of the wind change and was burning through eucalypt plantation for part of that time. The wind change turned the front of the fire northeast towards Morwell residential area, but not before casting many embers into the Hazelwood Mine³¹.
247. A second fire was burning in the Driffield location on the Strzelecki Highway at the time of the wind change. This was propelled north east towards the Mine by the south west wind after the change and may have also been responsible for embers entering the Hazelwood Mine.

DATE	TEMP °C	WIND SPEED kmh		RH%	FFDI		Spotting Distance km
		average	gusts		average	gusts	
9 Feb 14 1347 hrs	33.8	43	63	32	32	54	3.23
7 Feb 09 1816 hrs	37.4	44	63	15	73	114	7.9

Table 1 - Comparison of weather 9 February 14 and 7 February 09 at the time of the wind change, BOM AWS Latrobe Valley Airfield, source: Weatherzone archive.

248. At the time of the wind change at 1347hrs the wind was 43 kmh gusting to 63 kmh, temperature was 33.8°C, Relative Humidity (RH) of 32% and Forest Fire Danger Index (FFDI) of 32 (or FFDI 54 in wind gusts to 63 kmh) were recorded on 9 February 2014 (Appendix 3). Under these conditions the spotting distance (McArthur Mk5³²) was 3.23km.
249. While this is an "Extreme" fire danger rating it is not the "Worst Case Scenario" that should form the basis of bushfire risk exposure assessment for the Hazelwood Mine.
250. On Saturday 7 February 2009 ("Black Saturday") at the time of the wind change wind speeds were similar, the RH was 15%, the temperature at LVA was 37.4°C, for an FFDI of 73 (or 114 in gusts). Under these conditions the spotting distance (McArthur Mk5) increased to 7.9 km as shown in Table 1.
251. In the event of convection column development, spotting distances for eucalypt ribbon bark could be several times the figures quoted depending on the atmospheric wind mechanisms prevailing at the time.
252. This is not to say that than the weather measured on "Black Saturday" reflects the Worst Case Scenario. More severe conditions could be experienced under "Code Red" and "blocking high" weather extremes.
253. At all the above FFDI's fires cannot be suppressed until either the weather or fuel conditions moderate.
254. It should be borne in mind that even if the plantations could be removed by the wave of a magic wand, there are numerous windbreaks and belts of remnant roadside vegetation within spotting distance on freehold rural land that would still pose an (albeit reduced) hazard to Hazelwood Mine operations during the passage of high intensity rural fires.

³¹ Witness statement of Mr Mauger

³² McArthur Mk5 spotting distance is regarded as conservative



Applegates Road, Morwell



Estimated at 3- 5 tonne/hectare

Figure 10- Suspended ribbon bark in a blue gum plantation



Figure 11 - Aftermath of fire, trees on Strzelecki Highway, Morwell, opposite road entry to drill depot.



Figure 12- Distance of established eucalypt plantations from Hazelwood Mine (Google Image)

255. The presence of eucalypt plantations in the north-to-south-west proximity of the Mine, while in conformity with the planning rules, provides a ready source of firebrands under high fire danger weather conditions (for example, see Figure 12). Significant quantities of suspended bark fuel capable of forming firebrands that could be propelled into the Mine under fire conditions are present and obvious in eucalypt plantations west of the Mine.
256. This is not novel or unusual and in my opinion amounts to a foreseeable risk.
257. This is an issue that is not effectively addressed by the Mine fire policy framework or necessarily by the local planning rules. It emphasises the obligatory nature of water spraying or earth covering of exposed coal faces in the Mine during hot dry windy weather.

BACK-UP RESOURCES FOR A DEVELOPING FIRE AT HAZELWOOD MINE.

258. The Hazelwood Mine policy of using its existing workforce as the fire fighting force for outbreaks in the Mine is eminently sensible. The Mine personnel work as a team, know the Mine, and can operate the equipment, much of which is unique to the operation. They are on site, have been trained for their specific fire fighting roles, and are in the best position to vigorously attack a fire outbreak, which they are instructed to do as soon as it is detected.
259. An escalating system of alerts operates as the fire danger increases which includes a procedure for communication with the CFA, the responsible authority. Good relations have been developed through co-operation on liaison visits, joint exercises and working through and resolving issues that have occurred in the past. The Mine employs a number of CFA volunteer fire fighters. This works in the joint interests of both parties.
260. In ordinary circumstances the system works effectively as reported in the submission of Fires Services Commissioner Lapsley, with 24 CFA attendances at the Mine since 2010.
261. On 9 February 2014 with multiple fires burning in the region, extreme fire weather was forecast for Saturday. On this account, the Fire Services Commissioner had moved Metropolitan Fire Brigade units from Melbourne to support of local units fighting the bushfires.
262. During the late morning, the Hernes Oak fire broke out from its control lines and moved rapidly south east towards the Mine, throwing embers ahead of the front as it did so. Another fire started in the Driffield area. The southwest change moved through the area around 1350 hrs and turned the Hernes Oak fire towards the Morwell urban area. There were other fires at Yallourn Open Cut and Maryvale Paper Mill. All available fire fighting forces were fully committed.
263. When ignition of the Hazelwood Mine occurred around 1400 hrs, CFA was not in a position to supply backup forces to the Mine.
264. This left the Hazelwood Mine crew and whatever additional resources they could call in with an impossible work load, as a result of which large areas of exposed coal in worked out areas ignited despite their best efforts.

265. A key principle for success in fire suppression is fast, determined first attack. Experience in past Mine fires has shown that major damage can be inflicted quickly. For example, in the 2006 Mine fire "within 20 minutes the fire had spread over 1.5 km and destroyed the conveyor. Then Dredger number 11 and the conveyor drive were burnt. The fire then jumped to the next level of the batter and set fire to that level and the conveyors³³".
266. The Mine Fire Policy instals an elevated level of fire preparedness when weather conditions exceed a threshold and a "Fire Alert" is declared. At this time ancillary personnel including contractors leave the operating levels and operate as "fire scouts³⁴". These people know the mine layout and are likely to be first on the scene of any outbreak. They are trained and are able to work on fires while calling for backup.
267. It is when this system does not succeed in putting out small fires that the situation escalates. On 9 February 2014 there were many embers setting fires in the mine and as a result first attack was unable to extinguish all the fires, leading to the development of widespread coal batter fires in the worked out areas.
268. It is understood that the first CFA crews arrived at the Mine around 1800 hrs. In the intervening period extensive fire spread had occurred. This initiated an extensive operation that lasted until 25 March.
269. As previously stated, in my opinion this situation should not be regarded as the worst case scenario; Code Red weather conditions would have more serious implications for all parties involved in this incident.
270. It is "odds-on" that when a similar external fire scenario next occurs, CFA forces will again be combating high priority local fires, immediate backup will not be available, and yet again extensive fire development will take place within the Mine.
271. In my opinion the ability to rapidly back-up first attack by mine fire fighters is an issue that is not addressed by the Mine fire policy or CFA policy. This is a serious outstanding issue and lends weight to the value of earth or spray covering for all exposed coal.

³³ Statement of Robert Ronald Dugan para 18

³⁴ Transcript of proceedings 28 May p416 Dugan xn Richards

PART FOUR - MEASURES TO ADDRESS ANY GAPS OR SHORTCOMINGS IDENTIFIED.

The measures that should be taken to address any gaps or shortcomings that you identify.

RISK MITIGATION FRAMEWORK

MINES ACT

Fire protection protocol as a condition of licence

272. To address the relevance and importance of fire protection in open cut mining in rural Victoria, the Schedule Conditions of the Mining Licence should include a detailed fire protection protocol.

Rehabilitation bond

273. A rehabilitation bond of \$15,000,000 has been lodged for the Hazelwood Coal Mine. It is understood that DSDBI is in process of compiling a methodology to assess the adequacy of bonds applying to all mining operations in Victoria³⁵. This was commenced in 2010 and is ongoing. This Review should be expedited and a revised bond calculated for the Hazelwood Mine at the earliest opportunity.

Audit of Effectiveness of an Approved Plan following a Reportable Event.

274. An audit of effectiveness should follow the implementation of an approved plan submitted to prevent the recurrence of a Reportable Event at the Mine.

Rehabilitation of Northern Perimeter Batters

275. The report on rehabilitation in the 2009 Work Plan Update stated "The mine permanent Northern Perimeter Batters have not been rehabilitated due to the large amount of infrastructure remaining which is still required for many years to come". As the Northern Batters is adjacent to Morwell the exposed coal face of the Northern batters had implications for the level of emissions experienced in the urban area during the fire of 9 February. An OHS Assessment of the Northern Batters as a Major Mining Hazard should be conducted with a view to achieving a solution that delivers a high degree of confidence that this area will not burn in future Mine fires.

³⁵ Statement of Kylie White para 116

Unauthorised modification of approved Fire Service Network

276. The "Fire Service Network Schematic" approved in the Licence Schedule of Conditions was modified as shown in Figure 4³⁶ (p. 28) without approval in a Work Plan Variation. This apparently escaped the notice of the Inspectorate or was not followed up. Recommended that DSDBI review be conducted to determine the circumstances and recommend the action needed to ensure that such events do not occur in future.

OHS ACT

Section 23 Protection Plan

277. A protocol should be established under the auspices of Worksafe Victoria to demonstrate how the parties identified by Section 23 of the OHS Act are to be protected from risks arising from HPC's undertaking.

Risk framework for external fires

278. A comprehensive risk assessment should be conducted under the auspices of the Department of Transport, Planning and Local Infrastructure, the Local Planning Authority, and the Mine to ensure that as far as is reasonably practicable, all possible statutory planning and regulatory measures required to minimise the carriage of embers from external rural fires into Open Cut Mines are put in place.

EMERGENCY MANAGEMENT FRAMEWORK

Fire Prevention processes

279. Urgent action should be undertaken by Emergency Management Victoria to clarify the operation of the fire prevention planning provisions of the Emergency Management Act and the municipal fire prevention provisions of the Country Fire Authority Act, to remove the existing duplication and confusion.

³⁶ Appendix to statement of Ronald Robert Dugan

ADEQUACY OF MEASURES TAKEN AT THE MINE

EFFECTIVE PROTECTION OF THE WORKED OUT AREA

Water Supply

280. Revision of the Hazelwood Mine Fire Services Policy is required to ensure that ensure that spray coverage is available for all exposed coal surfaces in the Mine when weather conditions are conducive to the spread of fire. An amended work plan to this effect should be requested by DSDBI .

Covering of exposed coal

281. Areas of exposed coal not irrigated by water sprays should covered to a safe depth with an earth cover pending ultimate rehabilitation. This issue should be undertaken as an extension of the Review referred to in Para 275.

The control of vegetation within the Mine

282. The Mine Fire Service Policy and Code of Practice should be amended and action taken to ensure that spurious vegetation is removed from all surfaces within the Mine so it conforms at least to the same criteria as set down for external land. The work should be carried out without delay.

The control of embers setting fires in Hazelwood Mine

283. In my opinion this is an issue that is not addressed by the Mine fire policy framework. A recommendation has been made at para 278.

Back-up suppression resources for a developing fire at Hazelwood Mine.

284. A review of options for the timely provision of backup fire fighting capability to the Hazelwood Mine under worst case scenario conditions when other fires are burning in the local area should be carried out under the auspices of the Fire Services Commissioner.
285. The review referred to in para 284 should also examine and make recommendations about the long term viability of asking a volunteer fire brigade created for the protection of the local area, albeit with a full time supplement, to mitigate the effects of an uncontrolled fire in a specialised and hazardous commercial mining operation on a 24/7 basis.
286. The review referred to above should also explore the issue of the cost of extended fire suppression and recovery operations, much of which is borne by the community and the public purse. A process of determining the viability of a user-pays contribution by Industry for this service should be examined.

REFERENCES

Luke R H and McArthur A G (1978). Bushfires in Australia Australian Government Publishing Service, Canberra 359pp.

McArthur, AG (1967), Fire behaviour in eucalypt forests Leaflet No. 107, Forestry and Timber Bureau, Forest Research Institute, Commonwealth of Australia.

Hines F, Tolhurst K, Wilson A, McCarthy G (2010) Overall fuel hazard assessment guide 4th edition Fire and adaptive management, report no. 82

Wilson A A G (1992) Eucalypt Bark Hazard Guide Research Report No 32, Department of Natural Resources and Environment.

APPENDICES

APPENDIX	PAGE	TITLE
1	44	CURRICULUM VITAE RODERIC INCOLL
2	46	LETTER OF INSTRUCTION
3	50	WEATHER RECORD for 9 February 2014
4	51	BUSHFIRE HISTORY 1921 - 1983
5	52	CLAY CAPPING AS A FIRE PREVENTION STRATEGY IN WORKED OUT BATTERS - INQUIRY DOCUMENT
6	66	REGULATORY OVERVIEW - INQUIRY DOCUMENT- PDF FILE

APPENDIX ONE - CURRICULUM VITAE

RODERIC INCOLL AFSM

CURRENT**Bushfire Risk consultant**

Services provided: Expert opinion in bushfire related litigation; Site inspections, Fire management planning and implementation; Bushfire Risk Assessment, Bushfire Attack Level (BAL) and Bushfire Management Statements (BMS). For example:

- A range of private and corporate clients including WorkSafe Victoria, in relation to forest related personal injury claims and as expert witness in bushfire matters including the Kilmore East Black Saturday bushfires class action.
- City of Whitehorse - (1997-ongoing) Strategy for Fire Management of Bushland Reserves - prepare, consult, revise Strategy, prepare Fire Risk Management plans, train workforce, implement plans
- Latrobe University – range of assessment and appraisal projects with town planning implications
- City of Maroondah – appraisal of fire risk and recommendations
- Shire of Nillumbik Ratepayers' Assoc (2003)- prepare risk appraisal

1990 – 1996**Chief Fire Officer, Department of Natural Resources and Environment**

Responsible for bushfire protection for publicly owned lands, 34% of Victoria. Major achievements included setting up Code of Practice for Fire Management on Public Lands in Victoria, managing the Australian evaluation of the Canadair CL-415 fire bomber, and introducing a critical incident debriefing program.

Board member, Country Fire Authority of Victoria.

Director, Australasian Fire Authorities Council Ltd.

AFAC is Australia's national association of fire agencies. Also convened Research and Development Committee of AFAC.

Member, State Emergency Management Council for Victoria.

This Council managed emergency arrangements in Victoria under the Emergency Management Act.

1984-1989**Production Group of Departments, State Electricity Commission, Latrobe Valley.****Engineering Services Department 1984 -1988; three positions**

These were Emergency Service Officer in 1984, Superintendent General Services in 1986, and Manager Services Division in 1988. A common element was responsibility for management of the shift SEC Fire and Rescue Service that covered all SECV facilities in the Latrobe Valley except the open cut coal mines, each of which had a dedicated fire service; management of the Rural Services Group, a team that carried out rehabilitation, forestry and other land-related activities; and advice to the General Manager Production (GMP) in relation to the external threat of bushfires to brown coal mining operations.

In 1985 I wrote a position paper on the protection of SECV Latrobe Valley assets from the rural fire threat and conducted community consultation on this issue. I completed the Policy for the Protection of SECV Latrobe Valley Assets from Rural Fires in July 1986 and it was formally adopted by the Commission

Yallourn Production Centre 1989-1990

Manager Services Division, Yallourn Production Centre with change management responsibilities, and the role of providing advice to the General Manager Production (GMP) regarding the external threat of bushfires to brown coal mining operations.

1976-1984**District Forester, Toolangi, Forests Commission, Victoria.**

Responsible for management of a large multiple use forest area including fire management, logging, recreation, personnel, budget, and industrial relations management; coordination and cooperation with many other agencies; and enforcement, including prosecution of offences magistrates court. Appointed Controller of the Warburton fire on "Ash Wednesday" 16 February 1983 by the Forests Commission.

1971-1972**Fire Training Officer, Fire Protection Branch, Forests Commission:**

Set up the Fire Training Section, developed manuals and training aids including a sound colour training film "Black Out"; managed delivery of training state-wide.

1960-1976**Forester**

Experience in fire and natural resource management with extensive fire control responsibilities. Work experience as a field Forester in a range of locations dates from 1960. Military experience Army Reserve 1963-1974 - command, control and logistics, officer training.

EDUCATION

Bachelor of Arts in Social Science, Monash (1994)

Graduate Diploma of Business, Monash (1987)

Diploma of Forestry, Victoria, (1983)

Diploma of Forestry, Creswick, (1959)

Cert of Institute of Fire Engineers UK

AWARDS

- Fire Awareness Week Individual Community Service Award and RACV Insurance Award 1996
- Australian Fire Service Medal, National Medal
- Commendations from AFAC and DNRE

PUBLICATIONS – SHORT LIST

Incoll, R A (1997) *City of Whitehorse Bushland Reserves Fire Management Strategy*, and 2001 and 2010 Revisions of the Strategy. (Online)

Incoll, R A (1995) *Firebombing in Australia*, Wildfire, December 1995

Incoll, R A, (1994) *Asset Protection in a fire-prone environment*. Paper presented to the Victorian National Parks Association Seminar on Fire and Biodiversity, October 1994, 7 pp.

Incoll, R A (1994) (editor) *Use of Aircraft for Firebombing in Australia*. Position paper, Australian Fire Authorities Council.

Incoll R A & Grant S (1994) *The Wildfire Simulator and its future for both rural and urban Fire Services*. Proceedings of the Australian Fire Authorities Council Conference "Fire Services for now and the future", Fremantle, November 1994.

Incoll R A (1994) *Effectiveness of Firebombing in Victoria, Australia*. Proceedings of The Australian Fire Authorities Council Conference "Fire Services for now and the future", Fremantle, November 1994.

Incoll R A (1994) *Some aspects of providing for the health and safety of forest firefighters*. Worksafe Australia Seminar Sydney 3 June 1994.

Incoll R A (1994) "What can we do about Wildfire?" *The Fireman*, September 21

Incoll R A (1993) *A Multi Agency Incident Control System for use at Wildfires in Victoria*. Proceedings 10th Annual Conference, AARFA.

Rothsay H & Incoll R A (1993) *Cooperation for Wildfire Suppression in Victoria*. Proceedings 9th Annual Conference AARFA.

Incoll R A (1986) Policy for the protection of SECV Latrobe Valley assets from Rural fires, SECV.

Incoll R A (1985) The protection of SECV Latrobe Valley assets from the rural fire threat, discussion paper for community consultation, SECV.

APPENDIX TWO - LETTER OF INSTRUCTION



14 May 2014

Mr Roderic Incoll
11 Mystery Basin Rise
BRIGHT VIC 3741

By email: rincoll@exemail.com.au

Dear Mr Incoll

Hazelwood Mine Fire Inquiry

We refer to previous correspondence in relation to your engagement to provide expert assistance to the Board in the area of bushfire risk management.

As you know, the Board of Inquiry is examining the fire the burned at the Hazelwood Coal Mine in February and March 2014 (**'the fire'**).

The Board wishes to utilise your expertise to assist it to address two of its terms of reference. Those terms are as follows:

2. *The adequacy and effectiveness of the measures taken by or on behalf of the owner, operator and licensee of the Hazelwood Coal Mine to prevent the outbreak of a fire, and to be prepared to respond to an outbreak of a fire including mitigating its spread and severity, in the Hazelwood Coal Mine, including whether the owner, operator and licensee of the Hazelwood Coal Mine, or any person or entity acting on behalf of any of them:*
 - i. *implemented the recommendations arising from reviews of previous events; and*
 - ii. *...*
3. *The adequacy and effectiveness of the application and administration of relevant regulatory regimes in relation to the risk of, and response to, fire at the Hazelwood Coal Mine*

To this end, the Board of Inquiry requests that you provide a written report that addresses the following matters:

1. An outline of your qualifications and relevant experience, and attach your curriculum vitae.

1300 442 972
hazelwoodinquiry.vic.gov.au
PO Box 3460
GIPPSLAND MC VIC 3841
20 Hazelwood Road
Morwell VIC 3460

2. Your views on the overall adequacy of the framework that currently exists for the mitigation of the risk of fire at the Hazelwood Coal Mine, including mine regulation, occupational health and safety, emergency management planning, municipal fire prevention and land use planning.
3. The adequacy of the measures taken by the Mine operator to mitigate the risk of fire at the Mine, including its internal policies and procedures, staffing and resources, and its relationships with external agencies such as the CFA and Latrobe City Council.
4. Whether in your opinion there are any gaps or shortcomings in the existing framework for mitigating the risk of fire at the Mine that should be addressed.
5. The measures that should be taken to address any gaps or shortcomings that you identify.

Documents

The following documents are provided for your information:

Emergency management and fire prevention

1. Emergency Management Manual Victoria Parts 2 and 6A;
2. Latrobe City Municipal Fire Prevention Plan 2011;
3. Latrobe City Municipal Fire Management Plan 2013;
4. Emergency Response Plan – Hazelwood Mine, revised May 2013, including Appendix One – CFA District 10 Standard Operating Procedures, revised August 2013;
5. Mine Fire Policy & Code of Practice, revised July 2013;
6. Hazelwood Mine Fire Instructions issued 27 July 2011;
7. Guidelines for Season and Period Specific Fire Preparedness and Mitigation Planning, issued 24 November 2008;

Land use planning

8. Latrobe City Planning Scheme extracts:
 - Victorian Planning Provision (VPP) clause 10 - Operation Of The State Planning Policy Framework
 - VPP clause 13 – Environmental Risks
 - VPP clause 20 - Operation Of The Local Planning Policy Framework
 - Local Planning Provision (LPP) clause 21 – Municipal Strategic Statement, comprising:
 - LPP clause 21.01 – Municipal Profile
 - LPP clause 21.02 – Municipal Vision
 - LPP clause 21.03 – Natural Environment Sustainability
 - LPP clause 21.04 – Built Environment Sustainability;
 - LPP clause 21.05 – Main Towns
 - LPP clause 21.06 – Small Towns
 - LPP clause 21.07 – Economic Sustainability.
 - LPP clause 21.08 – Liveability
 - VPP clause 37.01 – Special Use Zone
 - LPP clause 37.01 – Schedule 1 to the Special Use Zone – Brown Coal
 - VPP clause 42.01 – Environmental Significance Overlay

- LPP clause 42.01 – Schedule 1 to The Environmental Significance Overlay – Urban Buffer VPP clause 44.06 – Bushfire Management Overlay
- VPP clause 52.08 – Earth and Energy Resources Industry
- VPP clause 52.47 – Bushfire Protection: Planning Requirements
- VPP clause 52.48 – Bushfire Protection: Exemptions

Mining regulation

9. Mining Licence 5004;
10. Revised Work Plan for the Hazelwood Coal Mine, approved 11 May 2009;

Occupational Health and Safety

11. OHS Assessment Major Mining Hazard 7 – Mine Fire (Major Fire), Parts 1 and 2

Previous reviews

12. Report of the Royal Commission into the Place of Origin and the Causes of the Fires which commenced at Yallourn on the 14th of February, 1944;
13. Final and Summary Reports of the Review Committee in relation to the Morwell Open Cut Fire on 4, 5 and 6 November 1977;
14. Final Report into the IPRH Mine Coal Fire December 2005;
15. International Power Hazelwood October 2006 Mine Fire Incident Investigation Report;
16. International Power Hazelwood September 2008 Mine Fire Incident Investigation Report;
17. 11 Dredger Centre Chute Fire Incident – Final Incident Investigation Report (January 2012);

Public submissions to the Inquiry

18. David Langmore;
19. Roger Jones;
20. Samantha Hepburn;
21. Andrew Tegart, Deanmac Enterprises;

We are preparing an overview of the relevant regulatory framework that we will provide to you separately.

The Inquiry has requested statements from the various agencies involved in fire risk mitigation, including the Fire Services Commissioner, Latrobe City Council, the Department of State Development, Business and Innovation (the mine regulator), the Victorian WorkCover Authority and GDF Suez Energy Australia (the mine operator). We will provide these statements to you as they become available.

You may be assisted by the **attached** Expert Witness Code of Conduct, that applies to expert witnesses giving evidence in the Supreme Court of Victoria. While it is not directly applicable to the Inquiry, it gives a concise explanation of what is expected of an expert witness and the matters that should be included in your report.

We request that you provide your report by Monday, 26 May 2014.

In turn, we will provide your report to the parties with leave to appear before the Inquiry before you give evidence to the Board. It is proposed that your evidence will be called during the Board's public hearings in the week starting 9 June 2014, possibly on Thursday, 12 June 2014.

If you have any queries in relation to this request, please contact me on 9223 1706.

Kind regards



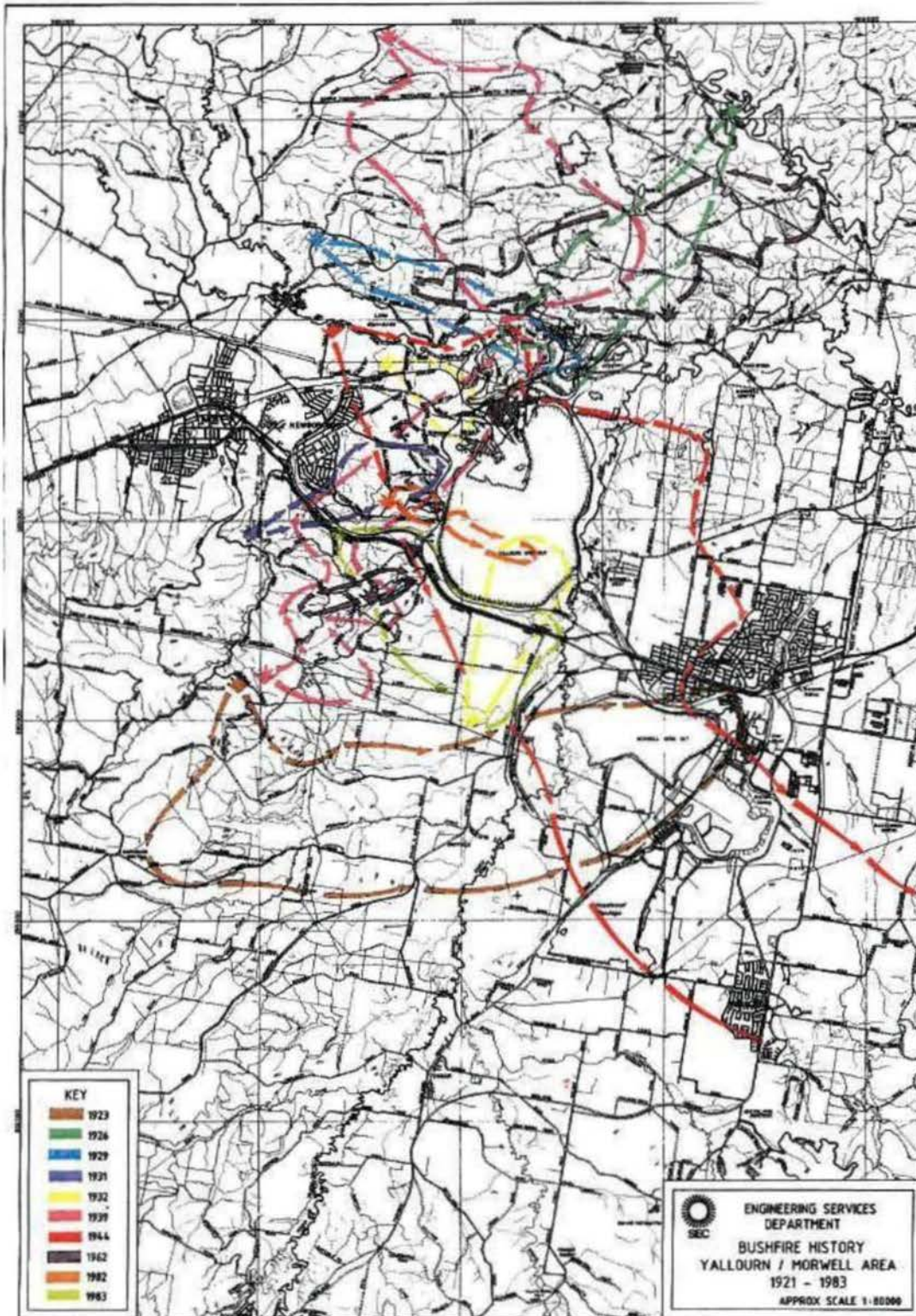
Justine Stansen
Principal Legal Advisor

APPENDIX THREE - WEATHER RECORD 0400-2400hrs 9 February 2014

1	time	wind dir	wind spd km/h	wind gust km/h	tmp C	dew pt C	feels like C	rh %	fire	rain mm	rain 10' mm	pres hPa
2	Mon											
3	00:00	W	13	17	14.9	7.2	14.1	60	4	0	0	1020.3
4	23:30	W	19	24	15.6	7.4	15.6	58	4	0	0	1020.3
5	23:00	W	19	22	15.6	7.1	15.6	57	5	0	0	1020.3
6	22:30	W	20	26	16.5	7.2	16.5	54	5	0	0	1020.4
7	22:00	W	19	24	16.8	6.9	16.8	52	6	0	0	1020.4
8	21:30	WSW	28	43	17.6	5.9	17.6	46	9	0	0	1019.9
9	21:00	WSW	24	35	18.2	6.4	18.2	46	8	0	0	1019.1
10	20:30	WSW	28	41	18.9	6.7	18.9	45	10	0	0	1018.2
11	20:02	WSW	35	56	19.5	5.9	19.5	41	13	0	0	1017.3
12	20:00	WSW	35	44	19.6	6	19.6	41	13	0	0	1017.2
13	19:30	WSW	41	57	20.3	7	20.3	42	15	0	0	1016.6
14	19:06	WSW	43	54	21	7.3	21	41	17	0	0	1015.7
15	19:00	WSW	41	56	21.2	7.1	21.2	40	17	0	0	1015.5
16	18:37	WSW	52	65	21.3	7.5	21.3	41	21	0	0	1014.9
17	18:30	WSW	50	65	21.4	7.3	21.4	40	21	0	0	1014.6
18	18:04	WSW	46	67	22.4	6.6	22.4	36	23	0	0	1014
19	18:00	WSW	48	63	22.7	7.3	22.7	37	23	0	0	1013.9
20	17:58	WSW	48	65	22.3	7.7	22.3	39	21	0	0	1013.8
21	17:30	WSW	52	65	22.4	9.2	22.4	43	20	0	0	1013.4
22	17:00	WSW	54	67	22.4	9.6	22.4	44	20	0	0	1012.7
23	16:45	WSW	54	69	22.6	10.4	22.6	46	19	0	0	1012.7
24	16:31	WSW	52	65	23.3	10.7	23.3	45	19	0	0	1012.6
25	16:30	WSW	52	65	23.4	10.8	23.4	45	19	0	0	1012.7
26	16:00	SW	48	67	23.2	11.6	23.2	48	16	0	0	1012.3
27	15:38	SW	52	70	23	11.7	23	49	17	0	0	1011.8
28	15:30	SW	50	67	24	12.3	24	48	17	0	0	1011.8
29	15:00	SW	52	67	24.5	13.4	24.5	50	17	0	0	1011.1
30	14:38	SW	50	69	26.8	14.5	27	47	20	0	0	1010.4
31	14:31	SW	56	69	26.9	15.3	27	49	21	0	0	1009.9
32	14:30	SW	56	69	26.8	15.2	27	49	21	0	0	1009.9
33	14:28	SW	56	69	26.5	15.2	27	50	20	0	0	1009.8
34	14:00	SW	50	74	29.5	15.6	29	43	25	0	0	1007.8
35	13:57	SW	48	74	27.9	15.2	28	46	20	0	0	1007.8
36	13:56	SW	46	74	28.2	15.1	28	45	20	0	0	1007.9
37	13:52	SSW	41	63	29.3	15.1	29	42	20	0	0	1007.6
38	13:47	WSW	43	63	33.8	14.8	33	32	35	0	0	1007.7
39	13:30	NW	33	57	40	4	37	11	71	0	0	1006.6
40	13:00	NW	37	57	40	4	37	11	78	0	0	1007
41	12:38	NW	35	54	40.5	5.6	38	12	73	0	0	1006.9
42	12:30	NW	35	50	39.6	4.9	37	12	71	0	0	1006.9
43	12:24	NNW	31	50	39.8	5.1	37	12	66	0	0	1006.9
44	12:00	NW	33	50	39	4.4	36	12	67	0	0	1006.9
45	11:33	NNW	28	46	38.8	5.4	36	13	56	0	0	1007
46	11:30	NNW	24	56	39.3	5.8	37	13	52	0	0	1007.2
47	11:00	N	44	63	37.9	3.6	35	12	83	0	0	1006.6
48	10:59	N	43	63	37.8	3.5	35	12	80	0	0	1006.7
49	10:52	N	37	67	38.3	5	36	13	69	0	0	1006.6
50	10:30	NNW	44	70	37.6	3.4	35	12	83	0	0	1006.9
51	10:00	NNW	37	76	37.7	3.4	35	12	70	0	0	1007.5
52	09:50	NNW	28	48	37.5	4.4	35	13	54	0	0	1007.7
53	09:30	W	13	28	36.4	7.4	34	17	32	0	0	1007.9
54	09:00	S	7	17	33	8.5	31	22	21	0	0	1008
55	08:54	SW	11	20	32.2	8.4	30	23	22	0	0	1008.1
56	08:30	SSW	6	9	27.1	13.1	27	42	8	0	0	1008.3
57	08:21	SSW	7	11	25.7	14.2	26	49	7	0	0	1008.2
58	08:00	W	9	15	20.7	15.9	20.7	74	2	0	0	1008.3
59	07:30	SW	4	9	18.1	15	18.1	82	2	0	0	1008.2
60	07:00	SSW	4	9	16.2	13.9	16.2	86	1	0	0	1008.3
61	06:30	ENE	2	7	17.9	14.4	17.9	80	2	0	0	1008.1
62	06:00	NW	2	7	17.5	14.4	17.5	82	1	0	0	1008
63	05:30	SSW	7	9	18.9	14.2	18.9	74	2	0	0	1008
64	05:00	W	9	17	18.1	14	18.1	77	2	0	0	1007.8
65	04:30	NE	11	15	18.5	15	18.5	80	2	0	0	1007.3
66	04:00	ENE	9	13	18.7	14.6	18.7	77	2	0	0	1007.5

Source: Weatherzone Archive

APPENDIX FOUR - FIRE HISTORY



APPENDIX FIVE: CLAY CAPPING AS A FIRE PREVENTION STRATEGY IN WORKED OUT BATTERS

Review Committee report into 1977 coal mine fire

In its Final Report into the Morwell Open Cut Fire on 4-6 November 1977, the Review Committee recommended to: “*establish and implement a specific policy for the clay covering of dormant batters and levels. In developing this policy, consideration should be given to operational feasibility and economics of batter redesign to facilitate the application of clay cover.*” (see Recommendation 24 of the Final Report at p 16, **GDF.0019.001.0486 at .501**)

The Review Committee found that immediately following the 1977 fire “*an accelerated programme of covering dormant levels and ramps within the Morwell Open Cut was implemented and achieved during the summer period.*”

However, the cost of providing a stable clay covering in the worked-out open cut area had been assessed at \$8M for clay excavation, transport and covering, plus additional costs of about \$5M-\$10M for relocation of existing infrastructure (roads, power lines, drainage etc). As a potentially more economical alternative, investigations had begun to explore the feasibility of flattening existing coal batters to allow for a thinner stable clay covering layer.

1984 SECV Fire Protection Policy

The Review Committee's inquiry into the 1977 fires led to State Electricity Commission of Victoria (**SECV**) to implement in December 1981 the “*Latrobe Valley Open Cuts – Fire Protection Policy*” (**SECV Policy**). Following an internal audit of the 1981 version of the SECV Policy, a further revision of the policy was published in November 1984 (see “*Latrobe Valley Open Cuts – Fire Protection Policy (Revision 1)*”, at **GDF.0019.001.0242**).

Revision 1 of the SECV Policy was created in order to clarify or provide alternative procedures for several aspects of the policy, which that internal audit had found were not being fulfilled (**GDF.0019.001.0243**).

Among the revised sections included section 1.1.4 of the SECV Policy, which deals with worked-out batters (**GDF.0019.001.0244**). Section 1.1.4 of Revision 1 of the SECV Policy provides that:

As a minimum requirement worked out batters are to be protected as follows-

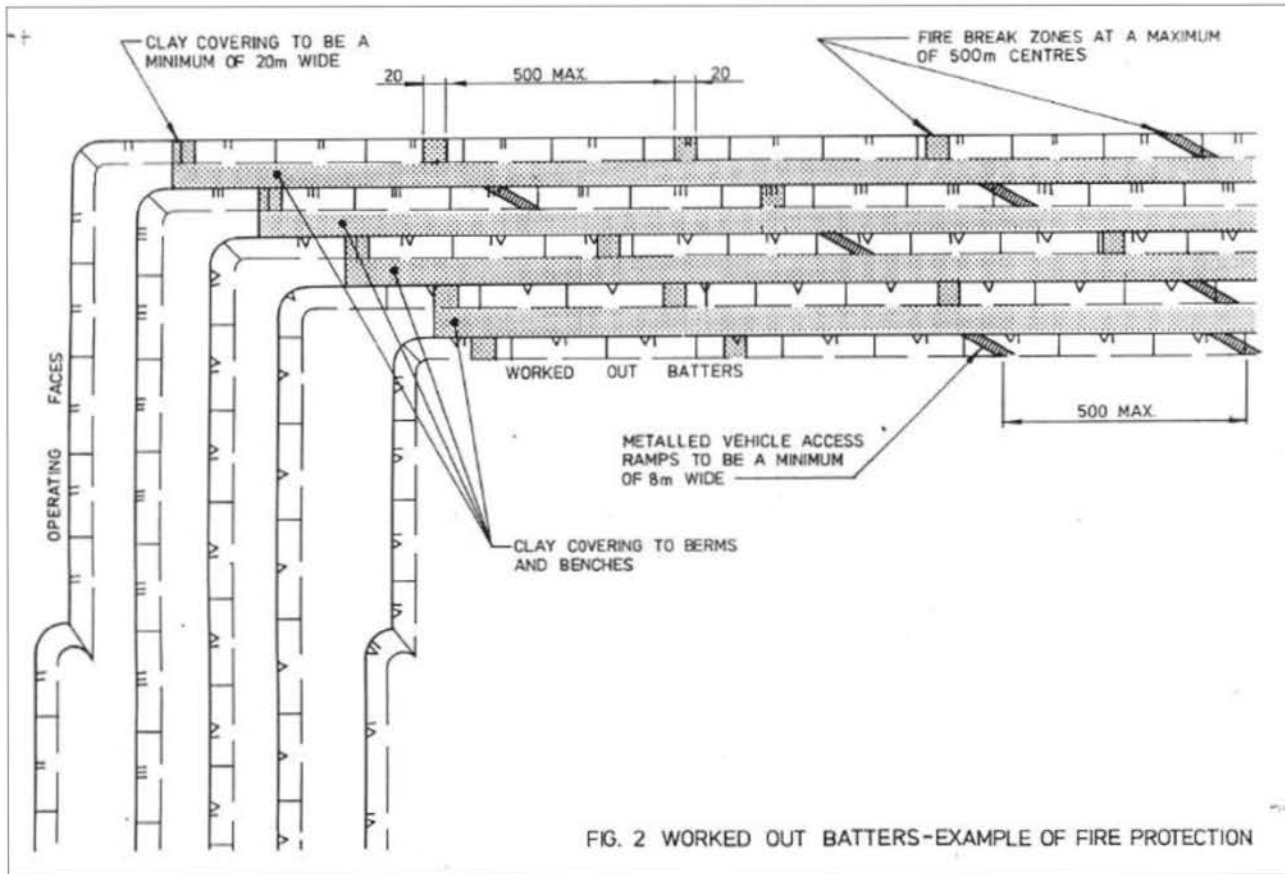
- *All benches are to be clay covered.*
- *All berms are to be eliminated by trimming or by filling with clay such as to shed fretted coal provided that batter stability calculations indicate that neither of these options will cause batter failure.*
- *Fire break zones extending down to full depth of batter should be established such that the length of exposed coal in any one batter is not greater than 500m. These zones can be in the form of metallised vehicle access ramps, a minimum of 8m wide or the form of a 20m width clay covering.*
- *Alternatively, fixed spray breaks may be used, but it should be noted that water for these sprays has not been included under the maximum demand conditions, and this protection should not be considered as reliable as clay fire breaks or vehicle access ramps.*
- *Figure 2 shows an example of this protection.*

(at p. 3-4, **GDF.0019.001.0251-252**)

Emphasis should be drawn to the priority given by section 1.1.4 to the use of fire break zones as a fire prevention strategy in non-operational areas of mines in the Latrobe Valley.

The introductory notes to the policy note that “[a]lthough the vehicle access ramp is less than previous standard fire break width of 20m, the access ramp allows water tankers to spray coal on both sides of ramp to give an equivalent protection.” (**GDF.0019.001.0244**).

Figure 2 illustrating the use of fire break zones is shown below:



1994 Generation Victoria Fire Service Policy and Code of Practice

The SECV Policy formed the basis of the "Fire Service Policy and Code of Practice" adopted in April 1994 by Generation Victoria, the interim government authority responsible for management of power generation in the state prior to privatisation (**GV Policy**) (**GDF.0019.001.0290**)

Section 4.4 of the GV Policy provides (at pp. 10-11):

As a minimum requirement worked out batters are to be protected as follows:

- *All benches are to be clay covered.*
- *All berms are to be eliminated by trimming or by filling with clay such as to shed fretted coal provided that batter stability calculations indicate that neither of these options will cause batter failure.*
- *Tanker filling points are to be provided such that a tanker on any part of the worked out batters is within 5 minutes travel of a tanker filling point. Fixed sprays should be used in conjunction with the droppers for the tanker filling points in order to provide wetted breaks.*

Alternatively:

- *Where practicable, fire break zones extending down to full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500 m. These zones can be in the form of metallised vehicle access ramps or clay covering, a minimum of 8 m wide.*
- *Appendix A.4 shows examples of this protection.*

(GDF.0019.001.0310-0311)

The GV Policy departs from the priority given by the SECV Policy to the implementation of fire breaks as the primary fire protection measures in worked-out batters. The water supply requirements are also less stringent, requiring only 5 minutes travel to tanker filling points, rather than fixed spray breaks. While there are general water supply requirements in the policy, the only requirement specifically directed to non-operational areas of the mine, is section 8.2.5 which provides that tanker filling points are to be provided for worked out batters in accordance with section 4.4 (**GDF.0019.001.0326**). Section 8.2.5 also notes that "*consideration should be given to ease of access, location and reliability of water design in the design of filling points (see section 4.4).*" (**GDF.0019.001.0326**)

In terms of water reticulation requirements generally:

- the GV Policy specifies that "[t]he whole system is to be such as to optimise the hydraulic efficiency with regard to performance and cost." (section 8.2.1, **GDF.0019.001.0325**)

- section 8.1.2 provides that:

The system should be designed to supply sufficient water to operate whichever is the greater of either Option A or Option B described below. The maximum demand criteria do not provide for coincident maximum demands above and below grass level of an open cut. (Both Options A and B define use of fire service networks below grass level in the mine.)

Option A – Consisting of the sum of the following:

- *An allowance to operate rotary sprays to provide cover to 50% of exposed coal and all machine and conveyor protection sprays on the working levels.*
- *An allowance to operate three hydrants on one header on each of the working levels.*
- *An allowance to operate the rotary sprays protecting one quarter of the length of the trunk conveyor system below grass level.*

Option B – Consisting of the sum of the following:

- *An allowance to operate rotary sprays to provide cover to 25% of exposed coal and all of the machine protection sprays on the working levels.*
- *An allowance to operate three hydrants on one header on each of the working level.*
- *An allowance to operate the rotary sprays protecting one half of the length of the trunk conveyor system.*
- *An allowance to operate three hydrants per header for the headers protecting half of the length of the trunk conveyor system.*

(p. 23, **GDF.0019.001.0323**)

- Whether the requirements in section 8.1.2 are intended to apply only to operational areas of the mine, or also to exposed coal levels in worked out batters, is unspecified but the reference to “working levels” appears to suggest it was intended to apply to operational areas.
- These water supply requirements mirror the provisions in the SECV Policy.

1995-? Hazelwood Power Corporation - Fire Service Policy and Code of Practice

Community witness, William Brown, has provided us with a copy of the Hazelwood Power Corporation “Fire Service Policy and Code of Practice” issued 8 November 1995 and revised on 4 December 1995 (**HPC Policy**) (**Ringtail ID TBC**).

The HPC Policy replicates section 4.4 of the GV Policy, but adds a note that a 4 hydrant manifold can be used in the absence of tanker filling points. Section 3.4 of the HPC Policy provides (at p. 20):

As a minimum requirement worked out batters are to be protected as follows:

- All benches are to be clay covered.
- All berms are to be eliminated by trimming or by filling with clay such as to shed fretted coal provided that batter stability calculations indicate that neither of these options will cause batter failure.
- Tanker filling points are to be provided such that a tanker on any part of the worked out batters is within 5 minutes travel of a tanker filling point. **NOTE:** in the absence of tanker filling points a 4 hydrant manifold will suffice. Fixed sprays should be used in conjunction with the droppers for the tanker filling points in order to provide wetted breaks.

Alternatively:

- Where practicable, fire break zones extending down to full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500 m. These zones can be in the form of metallised vehicle access ramps or clay covering, a minimum of 8 m wide.

Appendix A.4 shows examples of this protection.

2005-2006 Mine Fire

Between 30 December 2005 and 1 January 2006, there was a major fire in the worked out coal batters in the South East Field. Extreme weather conditions (40-42°C with strong NW winds between 35-70kph) ignited a well-known old fire hole area between levels 3 and 5. CFA crews took 48 hours to bring fire under control.

IPRH produced an internal report into the incident entitled "*Final Report – IPRH Mine Coal Fire – December 2005*" (**GDF.001.001.0009**). The IPRH Panel of Inquiry, consisting of the Production Manager, Mine Operations/Fire Service Co-Ordinator, Mine-Planning Engineering representative and a health and safety representative, made a number of recommendations arising out of the incident.

Relevantly, the Panel of Inquiry:

- Noted that "[a]lthough water supply was reliable within the designated fire area, further consideration should be given to ease of access, location and reliability of water supply in other worked out section of the mine, specifically the northeastern batters of the mine" (section 5.2 on p. 7,

GDF.0019.001.0015)

- Recommended that "[w]here ever [sic] practically possible fire break zones extending the full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500m. These zones can be in the form of metallised vehicle access ramps or clay covering a minimum of 8m wide." (section 6.3.1 on p. 9, GDF.0019.001.0017).

This latter recommendation reflects and utilises similar language to existing protections mentioned in the various iterations of the mine fire service policy dating back to the SECV Policy.

However, despite this recommendation, the use of fire break zones remained an alternative strategy, rather than the primary fire prevention strategy for worked-out batters as originally envisaged in the SECV Policy.

2008-2013 GDF Suez Hazelwood Mine - Mine Fire Service Policy and Code of Practice (Paradigm doc #2589)

The GV Policy formed the basis of the GDF Suez "Mine Fire Service policy and Code of Practice," which has been the subject of several revisions, the most recent in July 2013 (**GDF Policy**) (**GDF.0019.001.1029**).

The GDF Policy replicates the HPC Policy's requirements concerning worked-out batters, with the additional requirement that access worked out batters is to be maintained where possible, as follows (section 3.4):

As a minimum requirement worked out batters are to be protected as follows:

- *All benches are to be clay covered.*
- *All berms are to be eliminated by trimming or by filling with clay such as to shed fretted coal provided that batter stability calculations indicate that neither of these options will cause batter failure.*
- *Tanker filling points are to be provided such that a tanker on any part of the worked out batters is within 5 minutes travel of a tanker filling point.*

NOTE: in the absence of tanker filling points a hydrant manifold will suffice. Fixed sprays should be used in conjunction with the droppers for the tanker filling points in order to provide wetted breaks.

- *Where possible access to areas worked out to be maintained.*

Alternatively:

- *Where practicable, fire break zones extending down to full depth of each batter may be utilised such that the length of exposed coal in any one batter is not greater than 500 m.*

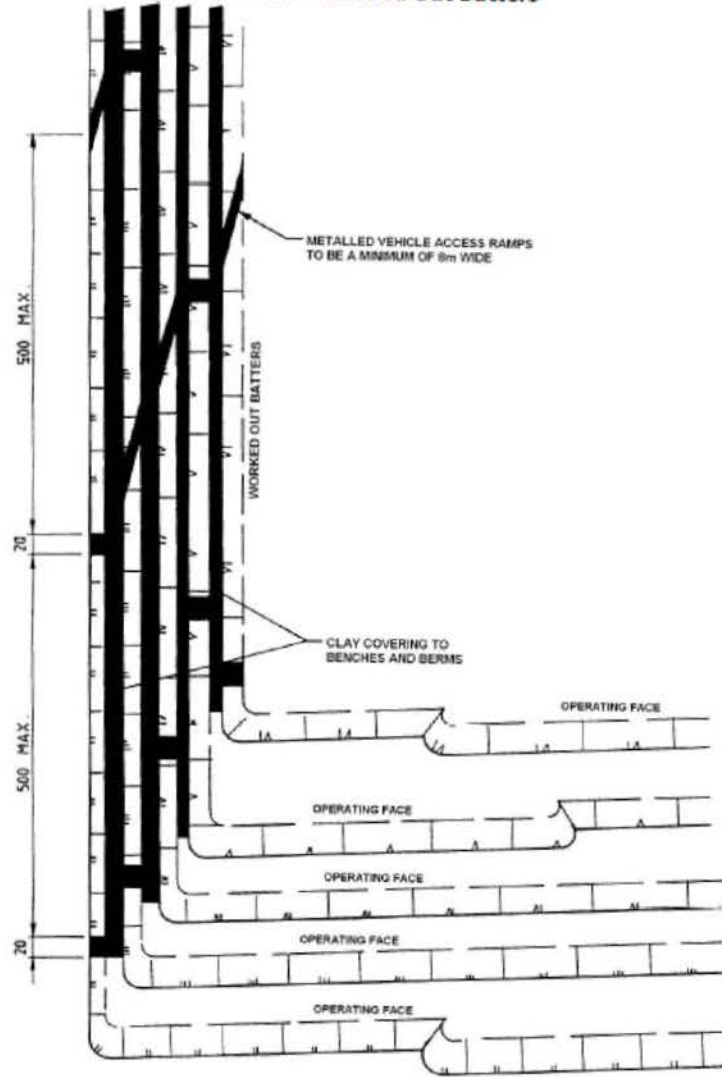
These zones can be in the form of metalled vehicle access ramps or clay covering, a minimum of 8 m wide.

Appendix A – Part 4 shows examples of this protection

- **(GDF.0019.001.1045)**

The diagram in Appendix A Part 4 of GDF Policy (**GDF.0019.001.1071**) is illustrated below. This is substantially the same as Appendix A.4 of the GV Policy and HPC Policy, as well as figure 2 of the SECV Policy, including a reference to 20m clay fire break widths, despite that requirement from the SECV Policy not forming part of the later policies.

Appendix A – Fire Services Practices A4. Worked Out Batters



LV117-16 J1009
FIGURE 4 - EXAMPLE OF WORKED OUT BATTERS - EXAMPLE OF FIRE PROTECTION

The GDF Policy replicates the water supply requirements in the GV Policy (see in particular sections 7.1.2, 7.2.1 and 7.2.5).

GDF Suez OH&S Risk Assessment and System Controls

A number of OH&S risk assessments have been carried in respect of the Hazelwood mine.

The most recent assessment of mine fire risk was carried out on 22 October 2012, in response to an improvement notice issued by Worksafe Victoria on 21 June 2012 (**GDF.013.001.0045**), which found that "*Safety Assessment for the identified Major Mining Hazard "Mine Fires" has not been conducted as per Occupational Health and Safety Regulations 2007 5.3.23*" (p. 2, **GDF.013.001.0046**)

A GDF working party was formed to review existing control measures – see minutes of working party meetings on 4-5 October 2012 at **GDF.012.001.0052**.

The reviewed risk assessment "bowtie" diagram (**GDF.010.001.0003**) identifies two relevant potential causes of a major mine fire: bush fire and spontaneous combustion. Among the system controls identified to address the risk of mine fires from these two sources include:

- Design - Fire breaks (Mine Fire Service Policy & Code of Practice) (referred to as system control 0071); and
- Procedure – covering waste coal on the overburden dump (referred to as system control 0075).

The system controls are described in detailed as follows:

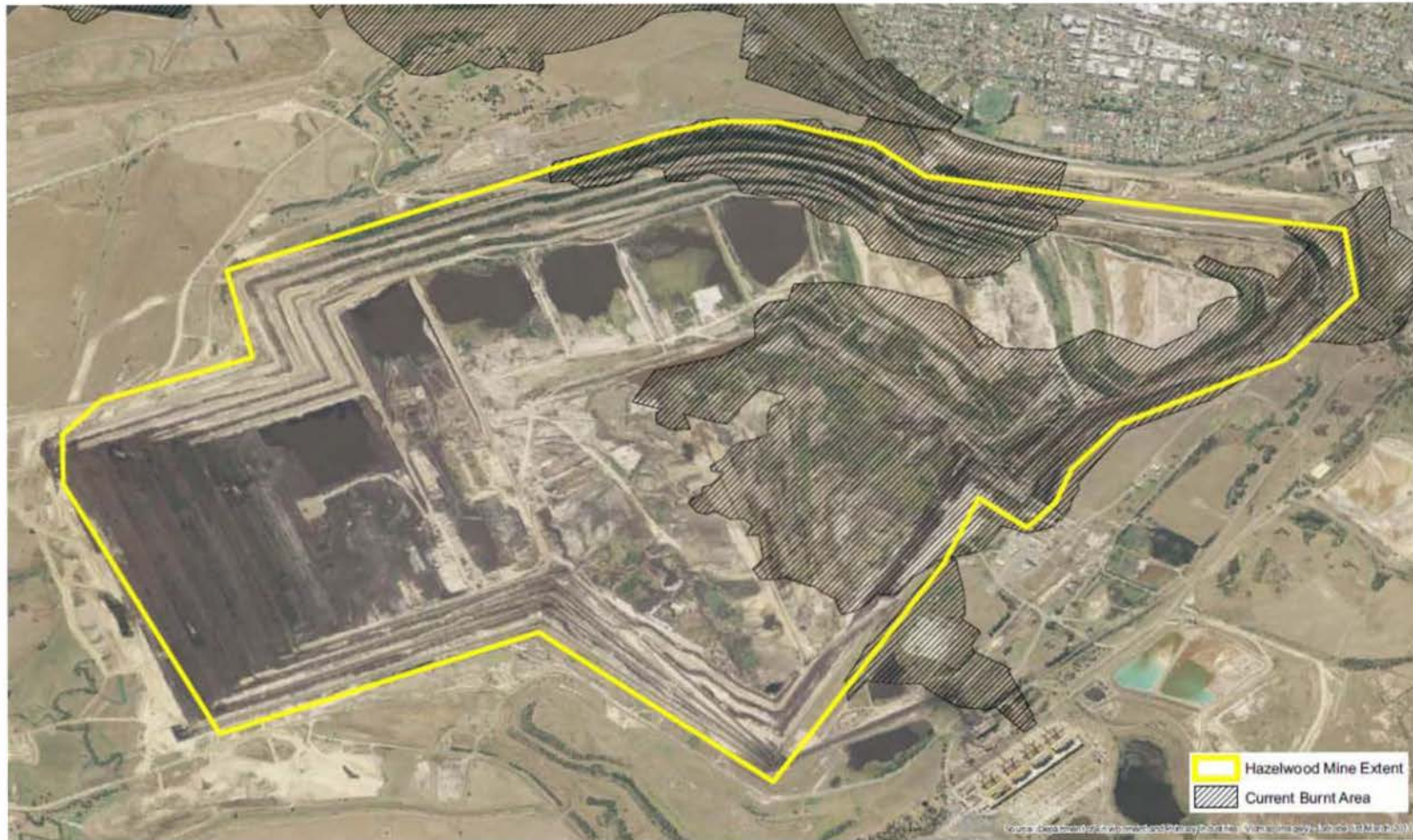
- Fire breaks – appropriate fire breaks and control of grassed and forested areas within the mine perimeter (no mention of internal fire breaks within worked out batters) (**GDF.011.001.0045**)
- Covering of waste coal on the overburden dump. While the title of the system control refers only to the overburden dump, the more detailed description details the objective of this measure is to "ensure that waste coal at worked out batters/mine floors and overburden dump is to be covered with clay" (**GDF.011.001.0053**). Performance of this system control involves "compliance with Mine Fire Service Policy and Code of Practice" and its effectiveness is to be measured by the Operations Superintendent to perform ongoing visual inspection to that "all waste coal has clay cover" (**GDF.011.001.0054**).

Following the amended risk assessment bowtie, Worksafe Victoria conducted a further inspection on 8 October 2012 and found that GDF had complied with the improvement notice. In his entry report (**GDF.013.001.0052**), the inspection noted that "*[i]t is Management's belief that the risk associated with each scenario as documented within the Bow-Tie diagram for the Safety Assessment for Major Mining Hazard 9 – Mine Fire (Major Fire) is as low as reasonably practicable.*" (see p.2, **GDF.013.001.0053**)

Implementation of fire break zones/clay capping in worked out batters

North batters

The extent of the Hazelwood Mine Fire is illustrated in the following diagram provided by the Fire Services Commissioner (FSC.001.001.0001):

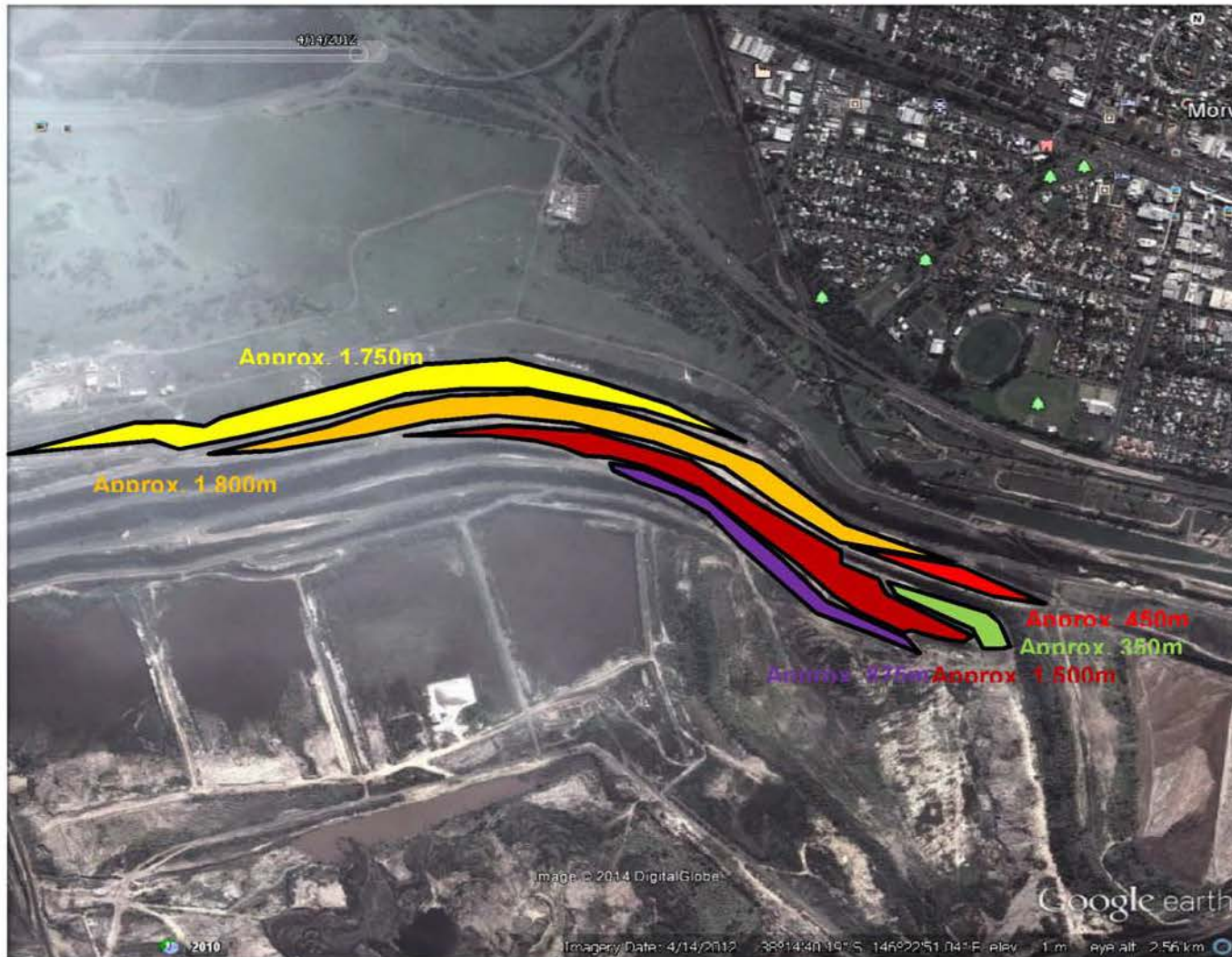


The boundary of the fire in the north batters appears to follow roughly the line of the service road, acting as a fire break preventing the fire from spreading west into the north west batters.

A close-up is depicted below:



Utilising satellite images and measurement features from Google Earth, the length of each uninterrupted length of exposed coal face in this area is depicted below:





APPENDIX SIX - HAZELWOOD MINE FIRE INQUIRY REGULATORY STATEMENT

See attached PDF file