HAZELWOOD MINE FIRE INQUIRY REPORT 2015/2016

VOLUME I – ANGLESEA MINE

Hazelwood
Mine Fire
Inquiry

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HAZELWOOD MINE FIRE INQUIRY REPORT 2015/2016 VOLUME 1 – ANGLESEA MINE

THE HON. BERNARD TEAGUE AO – CHAIRPERSON

PROF. JOHN CATFORD – BOARD MEMBER

MRS ANITA ROPER – BOARD MEMBER

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Mine Fire
Inquiry

LETTER OF TRANSMISSION

The Honourable Linda Dessau AM
Governor of Victoria
Government House
Melbourne VIC 3004

31 August 2015

Your Excellency

In accordance with the Terms of Reference dated 26 May 2015, we have the honour of presenting to you the first volume of the report of the 2015/2016 Hazelwood Mine Fire Inquiry.

This volume addresses paragraph 11 of the Terms of Reference relating to decreasing fire risks at the Anglesea coal mine. It includes background information about the Anglesea coal mine and fires in the area, and details of the fire mitigation plans that the mine operator has undertaken, or proposes to undertake.

The Board affirms the mine operator's actions announced or underway, and makes a recommendation that the mine operator publish two reports on its website to inform the community of its completion of commitments.

Undertaking this work has been a privilege and we would like to thank the people of Anglesea for their hospitality and generosity. We also appreciate the contribution of the community, industry and government agencies to the Inquiry's conclusion and recommendation.

Yours sincerely

The Hon. Bernard Teague AO | Prof. John Catford | Mrs Anita Roper

Victoria Government Gazette

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Inquiries Act 2014

APPOINTMENT OF A BOARD OF INQUIRY INTO THE HAZELWOOD COAL MINE FIRE

Order in Council

The Governor in Council, on the recommendation of the Premier under section 53(1) of the **Inquiries Act 2014**, appoints:

- the Honourable Bernard George Teague AO;
- Professor John Charles Catford; and
- Mrs Anita Michele Roper

to constitute a Board of Inquiry to inquire into and report on the terms of reference specified in paragraphs 6 to 11 of this Order.

The Honourable Bernard George Teague AO is appointed as Chairperson of the Inquiry.

This Order comes into effect on the date it is published in the Government Gazette.

BACKGROUND

1. In early February 2014 a fire ignited which, on or about 9 February 2014, took hold in the Hazelwood Coal Mine.
2. The Hazelwood Coal Mine Fire impacted the Latrobe Valley communities.
3. In March 2014, a Board of Inquiry was established to inquire into and report on the following specified matters:
    1. *The origin and circumstances of the fire, including how it spread into the Hazelwood Coal Mine.*
    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. *in the opinion of the Board, breached or did not comply with the requirements of (or under) any relevant statute or regulation, including any notification or directive given under such statute or regulation and any code of practice, management plan or similar scheme, developed and/or implemented due to such requirements.*
    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.*
    4. *The adequacy and effectiveness of the response to the Hazelwood Coal Mine Fire by:*
        i. the owner, operator and licensee of the Hazelwood Coal Mine;
        ii. the emergency services; and
        iii. other relevant government agencies, including environmental and public health officials,

    and in particular, the measures taken in respect of the health and well-being of the affected communities by:

SPECIAL

iv. informing the affected communities of the Hazelwood Coal Mine Fire and about its known effects and risks; and

v. responding to those effects on, and risks to, the affected communities.

5. *Any other matter reasonably incidental to the matters specified in paragraphs 1 to 4.*

4. That Inquiry's report was tabled in the Victorian Parliament on 2 September 2014.

5. Since that report was tabled, further concerns have been raised about the potential health impacts of the fire on the Latrobe Valley communities and future options for rehabilitating Victorian mines in the Latrobe Valley.

TERMS OF REFERENCE

You are required to inquire into and report on the following terms of reference:

6. Whether the Hazelwood Coal Mine Fire contributed to an increase in deaths, having regard to any relevant evidence for the period 2009 to 2014;

7. Short, medium and long term measures to improve the health of the Latrobe Valley communities having regard to any health impacts identified by the Board as being associated with the Hazelwood Coal Mine Fire;

8. Short, medium and long term options to rehabilitate:

(a) land on which work has been, is being or may lawfully be done in accordance with a Work Plan approved for the Hazelwood Mine, the Yallourn Mine, and the Loy Yang Mine; and

(b) land in relation to which an application for variation of the Work Plan is under consideration for the Hazelwood Mine, the Yallourn Mine, or the Loy Yang Mine;

9. For each rehabilitation option identified under paragraph 8:

(a) whether, and to what extent, the option would decrease the risk of a fire that could impact the mine and if so, the cost of the option relative to the cost of other fire prevention measures;

(b) whether, and to what extent, the option would affect the stability of the mine;

(c) whether, and to what extent, the option would create a stable landform and minimise long term environmental degradation;

(d) whether, and to what extent, the option would ensure that progressive rehabilitation is carried out as required under the **Mineral Resources (Sustainable Development) Act 1990**;

(e) the estimated timeframe for implementing the option;

(f) the option's viability, any associated limitations and its estimated cost;

(g) the impact of the option on any current rehabilitation plans for each mine;

(h) whether, and to what extent, the option would impact the future beneficial use of land areas impacted by the mines; and

(i) whether the option is otherwise sustainable, practicable and effective;

10. Having regard to the rehabilitation liability assessments that have been or will be reported in 2015 by the operators of each of the Hazelwood Mine, the Yallourn Mine, and the Loy Yang Mine, as required by the **Mineral Resources (Sustainable Development) Act 1990**, and to the outcome of the Rehabilitation Bond Review Project:

(a) whether the rehabilitation liability assessments referred to above are adequate;

(b) whether the current rehabilitation bond system, being one of the measures to provide for progressive rehabilitation by end of mine life as required under the **Mineral Resources (Sustainable Development) Act 1990**, is, or is likely to be, effective for the Hazelwood Mine, the Yallourn Mine, and the Loy Yang Mine; and

(c) any practical, sustainable, efficient and effective alternative mechanisms to ensure rehabilitation of the mines as required by the **Mineral Resources (Sustainable Development) Act 1990**;

11. Sustainable, practical and effective options that could be undertaken by the mine operator to decrease the risk of fire arising from or impacting the Anglesea Mine for the 2015/2016 summer season, noting the impending closure of the mine on 31 August 2015; and

12. Any other matter that is reasonably incidental to those set out in paragraphs 6 to 10.

REPORTING DATES

You must report your findings and any recommendations to the Governor as soon as possible, and not later than:

(a) 31 August 2015, in respect of the Anglesea mine Term of Reference in paragraph 11 of this Order, and any reasonably incidental matters;

(b) 2 December 2015, in respect of the Health Terms of Reference, and any reasonably incidental matters; and

(c) 15 March 2016, in respect of the Mine Terms of Reference, and any reasonably incidental matters.

CONDUCTING THE INQUIRY

13. You may:

(a) conduct your inquiry as you consider appropriate, subject to the requirements of procedural fairness, including by adopting any informal and flexible procedures to: engage with the relevant local communities; ascertain the relevant facts as directly and effectively as possible; and avoid unnecessary cost or delay;

(b) have regard to any research, past inquiries, reports and evaluations that may inform your inquiry and avoid unnecessary duplication;

(c) have regard to any documents, things or evidence received by, and any matters submitted to, the Board of Inquiry referred to in paragraph 3 as if those documents, things or evidence had been received by you, or those matters had been submitted to you, as the case may be, for the purposes of your inquiry and any report or reports under this Order;

(d) consult with the relevant local communities; and

(e) consult with and engage experts (including Australian legal practitioners) as necessary to provide relevant advice and assistance.

14. You must conduct your inquiry in accordance with this Order, the **Inquiries Act 2014**, and all other relevant laws.

15. It is anticipated that in conducting your inquiry you will, to the extent you think it appropriate, work co-operatively with, and seek not to prejudice, any ongoing response or recovery activities or investigations into the Hazelwood Coal Mine Fire.

16. The powers of the Board of Inquiry, at the discretion of the Chairperson may, at any time, be exercised by one or more Inquiry members.

BUDGET

17. You may incur expenses and financial obligations to be met from the Consolidated Fund up to $3.378 million in conducting this Inquiry.

DEFINITIONS

18. In this Order:

Anglesea Mine means the land the subject of the Mines Aluminium Agreement (Agreement 6829) as in force from time to time, which was ratified by the **Mines (Aluminium Agreement) Act 1961**;

Hazelwood Coal Mine Fire means the fire that took hold in the Hazelwood Mine on or about 9 February 2014;

Hazelwood Mine means the land the subject of Mining Licence Number 5004, as in force from time to time;

Health Terms of Reference means the terms of reference in paragraphs 6 and 7 of this Order;

Loy Yang Mine means the land the subject of Mining Licence Number 5189, as in force from time to time;

Mine Terms of Reference means the terms of reference in paragraphs 8, 9 and 10 of this Order;

Rehabilitation Bond Review Project means the current review into rehabilitation bonds and the methodology by which they are calculated, as referred to at page 1612, lines 7–8 of the transcript of the Hazelwood Mine Fire Inquiry dated 10 June 2014;

Work Plan means a work plan approved under the **Mineral Resources (Sustainable Development) Act 1990** or endorsed pursuant to clause 21A of the Agreement set out in Schedule 1 to the **Mines (Aluminium Agreement) Act 1961**, as amended by the Amendment Agreement set out in Schedule 2 to that Act, as the case may be;

Yallourn Mine means the land the subject of Mining Licence Number 5003, as in force from time to time.

Dated 26 May 2015

Responsible Minister:
THE HON DANIEL ANDREWS MP
Premier

YVETTE CARISBROOKE
Clerk of the Executive Council

CONTENTS

GUIDE TO READING THIS REPORT

This report constitutes the Board of Inquiry's response to paragraph 11 of the Hazelwood Mine Fire Inquiry's Terms of Reference. Paragraph 11 requires the Board to inquire into, and report on sustainable, practical and effective options that could be undertaken by Alcoa of Australia Limited (Alcoa) to decrease the risk of fire arising from or impacting the Anglesea mine for the 2015/2016 summer season, noting the impending closure of the mine on 31 August 2015.

The report takes into account information provided at community consultations, through public submissions, witness statements and expert reports, and at public hearings held in Anglesea on 30 and 31 July 2015 and in Melbourne on 6 August 2015.

In this report, the term 'State' is used broadly to refer to the Victorian Government, the Victorian public service, and public entities such as Emergency Management Victoria, the Country Fire Authority, and the Victorian WorkCover Authority (also known as WorkSafe Victoria). Paragraph 11 of the Terms of Reference is limited to options that could be undertaken by Alcoa. The Board has not been directed to inquire into or report on the adequacy or effectiveness of measures carried out or proposed to be undertaken by the State. However, the response of the State is relevant to this report in so far as the State has a role in monitoring and enforcing regulatory compliance by Alcoa, and actions taken by the State impact on the overall risk profile of fire arising from or impacting the Anglesea mine.

Part 1 of the report provides an overview of the Inquiry.

Part 2 of the report contains important background information relevant to the Anglesea mine, including key facts regarding the town of Anglesea and surrounding geography, and the history of fires in the mine and the Anglesea area.

Part 3 provides an overview of the regulatory framework relevant to the prevention and mitigation of fire risk at the Anglesea mine.

Part 4 of the report examines the measures taken by Alcoa to prevent and mitigate the risk of fire at the Anglesea mine site during the operation of the mine and power station.

Part 5 describes the plan that Alcoa is developing and implementing for the shutdown of the mine and power station on 31 August 2015. This plan includes actions taken by Alcoa since the announcement on 12 May 2015 that the mine and power station were shutting down, as well as actions that will be taken after 31 August 2015 until the mine's closure plan is finalised. The main components of the shutdown plan include an overburden strategy to deal with most of the exposed coal in the mine, the maintenance of onsite firefighting equipment and water supply after 31 August 2015, the onsite presence of mine personnel and contracted staff, and the updating of fire-mitigation documents relating to the Anglesea mine.

Part 6 of the report sets out the Board's conclusion, affirmations and recommendation, including an assessment of the adequacy of measures adopted by Alcoa to plan for the 2015/2016 fire season and further options for consideration. In summary, the Board concludes that Alcoa has either implemented, or is in the process of implementing, a range of fire minimisation strategies that are sustainable, practical and effective. These strategies, when fully implemented, should reduce the risk of fire at the Anglesea mine so far as is reasonably practicable.

PART ONE
INTRODUCTION TO THE INQUIRY

PART 1 INTRODUCTION TO THE INQUIRY

The 2014 Hazelwood Mine Fire Inquiry was held from February to September 2014. On 26 May 2015, The Honourable Lily D'Ambrosio MP, Minister for Energy and Resources, and The Honourable Jill Hennessy MP, Minister for Health, announced the re-opening of the Inquiry to investigate and report on whether there has been an increase in deaths following the 2014 Hazelwood mine fire, measures to improve the health of the Latrobe Valley, rehabilitation options for Latrobe Valley coal mines, and minimising fire risks at Anglesea coal mine for the 2015/2016 summer season.

TERMS OF REFERENCE

This report addresses paragraph 11 of the Hazelwood Mine Fire Board of Inquiry's Terms of Reference. The Board is to inquire into, and report on, and make any recommendations that it considers appropriate in relation to sustainable, practical and effective options that could be undertaken by the mine operator to decrease the risk of fire arising from or impacting the Anglesea Mine for the 2015/2016 summer season, noting the impending closure of the mine on 31 August 2015.

ESTABLISHMENT OF THE INQUIRY

THE BOARD

On 26 May 2015, the Governor in Council established the Hazelwood Mine Fire Board of Inquiry and appointed the following Board members:

BERNARD TEAGUE, CHAIRPERSON

Justice Bernard Teague AO was a Supreme Court Judge from 1987 to 2008. During this period he also chaired the Adult Parole Board and the Victorian Forensic Leave Panel, and was a council member at the Institute of Forensic Mental Health. Prior to his appointment to the Supreme Court, Justice Teague was a solicitor specialising in defamation and other civil law.

Justice Teague was Chair of the 2009 Victorian Bushfires Royal Commission and Chair of the 2014 Hazelwood Mine Fire Inquiry.

JOHN CATFORD, BOARD MEMBER

Professor Emeritus John Catford is a registered medical practitioner and the Executive Director, Academic and Medical, of the Epworth HealthCare Group.

Professor Catford has been a professor of public health for 30 years and has held senior academic and health service management positions in Australia and the United Kingdom, and with the World Health Organisation. In 2008, Professor Catford led the establishment of the School of Medicine – Deakin University in Geelong. He was appointed Vice President and Deputy Vice Chancellor of Deakin University in 2011.

Professor Catford was a Board member of the 2014 Hazelwood Mine Fire Inquiry.

ANITA ROPER, BOARD MEMBER

Mrs Anita Roper is an experienced director with a strong background in sustainability. She has over 30 years of experience in senior management roles working with business, government, communities and multi-lateral agencies in Australia and internationally.

Mrs Roper assisted in the establishment of the International Council on Mining and Metals and held the roles of Deputy Secretary General, Chief Operating Officer and Acting Secretary General between 2001 and 2003.

Mrs Roper was the Director of Sustainability for Alcoa Inc. (New York) from 2004 to 2008, the Chief Executive Officer of the Victorian statutory authority Sustainability Victoria from 2008 to 2011, and a former Director of the international renewable energy company Pacific Hydro Pty Ltd.

HAZELWOOD MINE FIRE INQUIRY SECRETARIAT

The Hazelwood Mine Fire Inquiry Secretariat was established to support the Board of Inquiry. The Secretariat was headed by Ms Genelle Ryan and was based at 222 Exhibition Street, Melbourne. Members of the Secretariat are listed in Appendix A. The Board thanks them for their dedication and commitment to this Inquiry. The Board also thanks K&L Gates for contributing their legal expertise.

COUNSEL ASSISTING

Counsel Assisting, Mr Peter Rozen and Ms Ruth Shann, provided the Board with legal advice and guidance throughout the Inquiry. The Board was greatly supported by Mr Peter Rozen, who managed the Inquiry's public hearings in Anglesea and Melbourne. The Board thanks Counsel Assisting for their assistance.

ACKNOWLEDGEMENTS

The Board thanks the Victorian Government Solicitor and his office, other contributing government departments and agencies, and Alcoa of Australia Limited (Alcoa) and its solicitors, Ashurst Australia, for their assistance throughout the Inquiry.

THE BOARD'S APPROACH

The Board recognised that effectively conducting this Inquiry required genuine engagement with the Anglesea community. The Board emphasised transparency and accessibility throughout this Inquiry and endeavoured to hear and understand the concerns of the Anglesea community relevant to paragraph 11 of the Inquiry's Terms of Reference. Members of the Board, Counsel Assisting, Secretariat staff and an independent expert visited the Anglesea mine as part of this Inquiry.

COMMUNITY CONSULTATIONS

Two consultation sessions with the Anglesea community were held on Sunday 28 June 2015 at the Anglesea Memorial Hall, with a total of 30 participants.

Participants who attended these sessions included representatives of Alcoa, ANGAIR Inc., Anglesea Surf Life Saving Club, the Anglesea Visitor Centre, Business and Tourism Anglesea, Surf Coast Air Action Inc., Surf Coast Shire Council and the Country Fire Authority. Permanent and transient town residents, and visitors to Anglesea also participated in these sessions.

At the consultations, the Board provided an overview of the Inquiry and invited participants to discuss:

1. their concerns about potential fire risks close to or inside the mine for the 2015/2016 fire season after mine shutdown
2. additional information the community may require in relation to the impending shutdown of the Anglesea mine on 31 August 2015.

Issues raised by community participants during these consultations and considered by the Board as part of this Inquiry, include potential fires that may affect the mine, mine site security, the differences between the Anglesea mine and the Hazelwood mine, access to information about the mine's shutdown, and the roles and responsibilities of various agencies in relation to managing fire risk at the mine.

PUBLIC SUBMISSIONS

Individuals and organisations further contributed to the Inquiry by making public submissions. Written submissions specific to paragraph 11 of the Terms of Reference were accepted by the Board until 20 July 2015. Board members read and considered all 10 written submissions received from individuals and organisations (Appendix B). The common themes in these submissions include concern about mine fires, rehabilitation of the mine site, and conservation of the Anglesea Heath.

COMMUNICATIONS

A website (http://hazelwoodinquiry.vic.gov.au/) was established for the 2014 Hazelwood Mine Fire Inquiry. This website was updated when the Inquiry was reopened, and has since been continuously updated to provide information to the Anglesea and broader Victorian community about the Board, Terms of Reference, public submissions, community consultations and public hearings. Members of the public were able to contact the Inquiry by phone (1300 556 034) and email (info@hazelwoodinquiry.vic.gov.au) for the duration of the Inquiry.

INDEPENDENT EXPERT

The Board engaged Mr Roderic Incoll, Bushfire Risk Consultant, to provide information and advice to the Inquiry as an independent expert. The Board thanks Mr Incoll for his expertise and reports.

PUBLIC HEARINGS

The public hearings involved two days in Anglesea on 30 and 31 July 2015, and one day in Melbourne on 6 August 2015. Counsel Assisting, Mr Peter Rozen, led evidence and made final submissions to the Board. Leave to appear before the Inquiry was granted to the Victorian Government and Alcoa.

The Board heard evidence from Alcoa senior management personnel, senior government officials from a wide range of government departments and agencies, an independent expert Bushfire Risk Consultant, and a consultant Mining Engineer. Appendix C lists witnesses who appeared at the public hearings. Appendix D lists exhibits that were tendered at the public hearings.

PART TWO
BACKGROUND INFORMATION

PART 2 BACKGROUND INFORMATION

ABOUT ANGLESEA

Anglesea is a seaside town situated 110 kilometres south-west of Melbourne between the nearby coastal towns of Torquay and Aireys Inlet on Victoria's Great Ocean Road.[1]

There are approximately 2,500 permanent residents in Anglesea. During the summer months the population can increase to 10,000 due to an influx of holiday homeowners, campers and tourists. Anglesea has bushland areas suitable for hiking, trail bike and bicycle riding, and beaches suitable for fishing, swimming and surfing.[2]

Over 30 per cent of Anglesea residents are aged 60 years or older. Most employed residents work within the construction, health care, social assistance or retail trade sectors.[3]

A brown coal mine owned by Alcoa of Australia Limited (Alcoa) is located 1.5 kilometres north of the town of Anglesea.[4]

ANGLESEA LANDSCAPE

Anglesea is bordered by coastline to the south, bushland to the east, and heathland (Anglesea Heath) to the north and west. The Anglesea town and the Anglesea Heath sit within the Great Otway National Park, which stretches from Torquay through to Princetown along the coastline, and north through the Otway hinterland towards Colac.[5]

Figure 1. Anglesea coastline on the Great Ocean Road.

Heathlands are fire-dependent ecologies containing many living species.[6] The Anglesea Heath is amongst Victoria's most biologically diverse areas and its unique vegetation distinguishes it from other Australian heathland. The Anglesea Heath accommodates a quarter of Victoria's plant species including nine rare or vulnerable plant species, 16 plant species with disjunct (or location specific) populations, and over 80 types of orchids. It is also home to more than 100 native bird species, 29 native mammalian species and a variety of insects.[7] The Victorian Government has committed to incorporating the Anglesea Heath into the Great Otway National Park.[8]

The Anglesea Heath overlays freehold land owned by Alcoa and land leased by Alcoa under the *Mines (Aluminium Agreement) Act 1961* (Vic) (Anglesea Mine Act). The Anglesea Heath is a protected area managed by the Department of Environment, Land, Water and Planning (DELWP), Parks Victoria, and Alcoa under a Cooperative Land Management Agreement established in 2000.[9]

THE ANGLESEA MINE

Exploration for brown coal in Anglesea began in the late 1950s, in response to dwindling brown coal reserves in Victoria's Barwon region from the Benwerrin, Deans Marsh and Wensleydale mines.[10] A drilling program conducted in the 1950s and 1960s determined reserves of approximately 120 million tonnes of coal in Anglesea.[11]

In 1961, under an Agreement with the Victorian Government (later ratified by the Anglesea Mine Act), Alcoa was granted a right to explore and extract brown coal on approximately 7,500 hectares of leased unreserved Crown land in Anglesea. This lease was for an initial 50-year term and included the option of an additional 50-year term. Alcoa also owns 144 hectares of freehold land within the Anglesea mine site.[12]

Since February 1969, Alcoa has extracted coal from the Anglesea mine at an average rate of 1.1 million tonnes per annum.[13] Until August 2014, coal from the mine was used to produce electricity at the onsite Alcoa-owned power station for Alcoa's Point Henry aluminium smelter. The power station had a single steam turbine with the capacity to generate 150 megawatts of electricity (200,000 horse power), supplying 41 per cent of the power needs of the Point Henry aluminium smelter via a 45-kilometre long high voltage line.[14]

In 2011, Alcoa exercised its option to extend its lease term but restricted its future coal mining operations to a defined area of 665 hectares within the 7,145 hectare leased area.[15] Figure 2 shows the Alcoa lease boundary in red and coal mine area in yellow, and the proximity of the mine to the Great Otway National Park and Anglesea town.

Figure 2. Map showing Alcoa lease area including the Anglesea Heath (red outline), Anglesea coal mine area (yellow outline), surrounding Great Otway National Park and the town of Anglesea.[16]

On 18 February 2014, Alcoa announced that its Point Henry aluminium smelter would be closed on 1 August 2014 and that the Anglesea power station and Anglesea mine would be offered for sale.[17] The Anglesea power station continued to generate electricity to supply the National Electricity Market after the closure of the Point Henry aluminium smelter.[18]

On 12 May 2015, Alcoa announced that following an unsuccessful sale process, the Anglesea power station and Anglesea mine would shut down on 31 August 2015.[19]

COAL

Coal is a combustible mineral that is widely used as a fuel.[20] Coal forms over millions of years when vegetable matter partially decomposes under suitable environmental conditions such as restricted air, increased pressure and temperature.[21]

Coal progressively transforms through stages–from peat, to brown coal or lignite, to black coal (which includes sub-bituminous coal, bituminous coal and anthracite).[22] Coal is formed in beds with depths ranging from a few millimetres to many metres. Coal beds thick enough to be mined are referred to as coal seams. The vertical exposed working surface of coal in a mine is called the coal face or batter. The topsoil, sand, clay and other non-coal material that must be removed to expose the coal seam for mining is called overburden.[23]

Coal was extracted from the Anglesea mine using an open-cut mining method. This involved stripping the overburden to reach the coal without using underground tunnels or blasting. Coal recovered from the batters by excavators was loaded onto haul trucks to be transported to the primary crusher before it was conveyed to stockpiles. Stockpiled coal was then fed into secondary crushers where it was broken into smaller pieces, and stored in hoppers for pulverisation into a fine powder. This coal powder then fuelled the boiler of the Anglesea power station.[24]

DIFFERENCES BETWEEN THE ANGLESEA MINE AND THE HAZELWOOD MINE

There are many differences between the Anglesea mine and Hazelwood mine. Major differences between these mines relate to coal quality and age, coal sulphur content, coal seam thickness, exposed coal batter size, scale of operation, and overburden availability and progressive rehabilitation practices. Table 1 summarises the key differences between the two mines, which will be discussed in turn.

Table 1. Summary of key differences between the Anglesea mine and the Hazelwood mine.

	Anglesea mine	Hazelwood mine
Coal quality	Higher	Lower
Coal sulphur content	3.9% dry basis	0.33% dry basis
Coal seam thickness	Average 27 metres	Up to 200 metres
Exposed coal batter size	Up to 10 metres	Up to 100 metres
Scale of operation	1.1 million tonnes/year	16.5 million tonnes/year
Perimeter of open cut	5.3 kilometres	18 kilometres
Overburden layer	Up to 80 metres	Average 10 to 20 metres

COAL QUALITY AND AGE

The first difference between the Anglesea mine and the Hazelwood mine is the quality of coal each mine produces. Ms Jane Burton, Director of Coal Resources, Energy and Earth Resources Division, at the Department of Economic Development, Jobs, Transport and Resources (DEDJTR), explained to the Board of Inquiry that coal quality is assessed based on its moisture, mineral, organic, sulphur and volatile matter content, and its ash quantity and composition.[25] According to Ms Burton, Anglesea coal is the highest-grade brown coal mined in Victoria and has a lower average moisture content, a higher net wet specific energy and approximately 10 times higher sulphur content than coal from the Hazelwood mine.[26]

Mr Christopher Rolland, Mine Manager at Alcoa, informed the Board that Anglesea coal is older than coal from the Latrobe Valley (where the Hazelwood mine is located), and has less potential for spontaneous combustion because it contains fewer volatile organic compounds and has less moisture.[27] Spontaneous combustion is discussed in more detail under the heading 'Fire Affecting the Anglesea Mine'.

Mr Cameron Farrington, Mining Engineer at Mining One Consultants, agreed that Anglesea coal was older than Latrobe Valley coal, and that the age of coal affects its combustibility. Mr Farrington stated to the Board that younger coal, such as that mined in the Hazelwood mine, tends to be more porous due to its higher moisture content. Mr Farrington explained that the air pockets that form when this coal dehydrates may increase the risk of the coal catching fire.[28]

COAL SEAM THICKNESS

The second difference between the Anglesea mine and the Hazelwood mine is the thickness of the coal seams found in these mines. Anglesea mine has two coal seams—the upper main seam, referred to as Seam A, and the lower seam, referred to as Seam B. Seam A has an average thickness of 27 metres and was the only coal seam to be mined at Anglesea.[29] In contrast, the coal seams in the Hazelwood mine range in thickness from 100 to 200 metres.[30] This means there is less coal overall at the Anglesea mine site and that the comparatively smaller voids created from mining can be backfilled with overburden more readily.[31]

EXPOSED COAL BATTER SIZE AND FEATURES

The third difference between the Anglesea mine and the Hazelwood mine is the respective size of exposed coal batters in these mines. As a consequence of the smaller size of its coal beds, the batters in the Anglesea mine are considerably smaller than those in the Hazelwood mine. The Anglesea mine has exposed coal batters of approximately 10 metres that are easily accessible by an excavator or bulldozer.[32]

In contrast, the Hazelwood mine has batters of over 100 metres, with multiple levels of exposed coal. Between the batter levels at the Hazelwood mine sit berms. Berms are relatively flat surfaces created between working levels in the mine.[33]

Mr Farrington explained to the Board that berms catch falling materials, including coal fines, and could become a resting place for embers from bushfires. He also agreed with the evidence given to the Board by Mr Robert Barry, Assistant Chief Officer of CFA Barwon South West Region, that the significant vegetation growth on uncovered batters and berms in the Hazelwood mine was a source of ignition across the batter and assisted in the spread of fire during the 2014 Hazelwood mine fire.[34]

Mr Farrington told the Board that in contrast to the Hazelwood mine, the Anglesea mine has no berms for vegetation growth or to catch coal fines and embers.[35]

SCALE OF OPERATION

The fourth difference between the mines is the size and scale of their operations.

The Anglesea mine produced 1.1 million tonnes of coal per year when it was operating. In contrast, the Hazelwood mine produces 16.5 million tonnes of coal per year.[36] The surface area of exposed coal at the Anglesea mine is nine times smaller than the Hazelwood mine.[37]

The perimeter of the Anglesea open cut mine is 5.3 kilometres (see Figure 3 below). The perimeter of the Hazelwood open cut mine is over 18 kilometres. Mr Roderic Incoll, Bushfire Risk Consultant, stated to the Board that he could see the whole operation at the Anglesea mine from standing at the edge of the open cut, whereas only about a third of the Hazelwood open cut could be seen from any one place.[38]

Figure 3. The Anglesea mine site on 1 January 2015 (also in Appendix E).[39]

OVERBURDEN AVAILABILITY AND USE IN PROGRESSIVE REHABILITATION

The final major difference between the Anglesea mine and the Hazelwood mine, is the amount of overburden available for backfilling at the mine sites. The Anglesea mine has a higher overburden to coal ratio because it has an overburden layer of up to 80 metres in depth, covering an average coal seam thickness of 27 metres. In contrast, the Hazelwood mine's thinner overburden layers of 10 to 20 metres cover its thicker coal seams of up to 200 metres.[40]

Mr Rolland stated to the Board that Alcoa used the abundant overburden material available at the Anglesea mine site to progressively rehabilitate areas where coal has been mined out.[41] Figure 3 shows two rehabilitated areas where coal has been mined out. Mr Incoll informed the Board that in contrast, the northern area of the open cut at the Hazelwood mine was a 'cliff of coal' comprising coal batters of up to 100 metres that had not been rehabilitated after mining moved on from this area.[42] Mr Incoll considered that this difference means a fire like that of the 2014 Hazelwood mine fire could never occur at the Anglesea mine.[43]

FIRES AFFECTING ANGLESEA

All fires need heat, oxygen and fuel to ignite and continue burning.[44] Bushfires can be accidentally or deliberately ignited, for example, by lightning, arson, controlled burns, campfires, cigarettes, electrical asset faults or flammable chemicals.[45]

Anglesea is one of the most at-risk towns for bushfire in Victoria because it is surrounded by heathland and bushland. Many trees in the Anglesea Heath have low canopies or crowns that encourage fast-moving crown fires to spread through the treetops. Loose fibrous material from Stringybark eucalypts in the Anglesea Heath contributes to ember production, which in turn can start spot fires that damage property ahead of a main fire front. Anglesea is prone to bushfires from early spring to late autumn, and especially in summer when it is hot and dry.[46]

The Ash Wednesday fires are the most significant bushfires impacting Anglesea to date. They occurred across Victoria and South Australia on 16 February 1983, claiming 75 lives in total—47 in Victoria and 28 in South Australia.[47] In the Otways area (where Anglesea lies), a total of 782 properties were destroyed and three people lost their lives.[48] Dr Paul Smith, Deputy Secretary of Land, Fire and Environment at the Department of Environment, Land, Water and Planning (DELWP), advised the Board that the entire Anglesea Heath was burnt in the Ash Wednesday fires but that the area's flora diversity has since recovered to pre-fire levels.[49]

Other major bushfires occurred in Anglesea in 1908, 1966 and 1982. There were no fatalities as a result of these fires, and significantly fewer properties were damaged than occurred in the Ash Wednesday fires.[50]

In addition to bushfires, Anglesea is at risk of fire and smoke from peat igniting in the Anglesea and Salt Creek river systems.[51] Peat is an acidic high-carbon soil composed of partially decomposed plants, which can smoulder for a long time and release a pungent odour when ignited. Peat fires are an environmental and health hazard.

Coogoorah Park, beside the Anglesea River, is a peat-rich area that caught fire during Ash Wednesday and burned for a significant period of time. The Coogoorah Park fires could only be extinguished by artificially flooding the area, which was then transformed into a recreational zone to reduce future fire risk.[52]

Mr Jamie McKenzie, Senior Instructor – Wildlife/Leadership Development and Anglesea CFA volunteer, confirmed for the Board that peat fires pose a major risk to the Anglesea Heath. He informed the Board that he has attended to a number of fires in the Anglesea Heath, including controlled burns, minor fires, and a fire caused by lightning in 2003.[53]

FIRE RISK MANAGEMENT IN THE ANGLESEA HEATH

The Anglesea Heath falls under the Barwon Otway bushfire risk landscape, which is one of seven bushfire management areas on 7.6 million hectares of public land across Victoria.[54] Dr Smith advised the Board of Inquiry that DELWP and Parks Victoria have managed fire risks in the Anglesea Heath in previous fire seasons, and will continue to do so during the 2015/2016 fire season.[55] Figure 4 shows vegetation in the Anglesea Heath.

Figure 4. Anglesea Heath.[57]

Dr Smith described for the Board that under governing documents including the Strategic Bushfire Management Plan Barwon Otway Bushfire Risk Landscape and the Code of Practice for Bushfire Management on Public Land, the main fire management strategies for the Anglesea Heath are prevention, preparedness, fuel management or controlled burning, fire response and recovery after fire.[56]

FIRES AFFECTING THE ANGLESEA MINE

Alcoa's fire risk assessment, dated 3 December 2014, identifies potential causes of fire that may impact the Anglesea mine.

Potential causes of fire outside the mine but impacting the mine are identified as:

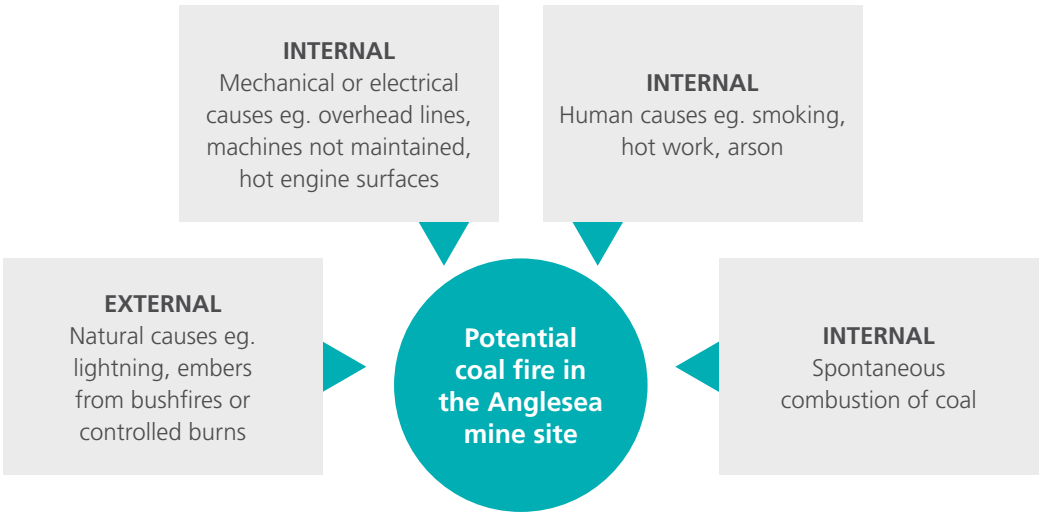
1. embers from bushfires, including controlled burning by government agencies, which can start spot fires on exposed coal surfaces
2. direct lightning strike to exposed coal surfaces in weather conditions favouring fire.

Potential causes of fire arising inside the mine are identified as:

1. sparks from 'hot work' landing on coal surfaces ('hot work' includes welding, cutting, grinding or digging that are part of day-to-day equipment maintenance and mining activities)
2. machines catching fire from inadequate machinery maintenance or coal particles and hydraulic oil in contact with hot engine parts, which may spread fire onto exposed coal faces
3. faulty overhead electrical lines causing a bushfire with ember attacks to coal faces in the mine
4. arson in weather conditions favouring fire
5. fire started by a person smoking on or near exposed coal surfaces
6. spontaneous combustion or self-heating and burning of coal.[58]

Mr Incoll confirmed in his report to the Board that the internal and external potential fire causes identified above are consistent with his expert opinion.[59] Figure 5 shows potential causes of fire at the Anglesea mine.

Figure 5. Potential external and internal causes of fire at the Anglesea mine.[62]



Spontaneous combustion of coal is a natural oxidative process whereby coal self-heats when exposed to air. Moisture has a unique influence on coal combustion. It can contribute to heating the coal, but can also act as a fire suppressant depending on the amount present. Coal particle size is also significant to spontaneous combustion—the smaller the coal particle, the greater the surface area available for oxidation. Coal generally oxidises at a faster rate when first exposed to air. The rate of reaction slows over time, making older coal less susceptible to spontaneous combustion. Coal fines and coal dust are more likely to spontaneously combust than intact coal seams.[60]

Mr Rolland informed the Board that spontaneous combustion of coal occurs in three phases:

- heat haze emanates from the coal, referred to as 'steamy coal', in the initial phase
- odour emanates from the coal, referred to as 'blue smoke/odour coal', in the intermediate phase
- coal ignites, referred to as 'open flame coal' in the final phase.[61]

ANGLESEA MINE FIRE HISTORY

Mr Rolland informed the Board that the Anglesea mine has a minimal fire history.[63] The mine has been affected by coal fires associated with spontaneous combustion and ember attack from the Ash Wednesday fires, as well as mobile equipment fires that did not impact coal faces in the mine.[64]

Mr Rolland estimated that there have been approximately 12 occurrences of the initial phase of spontaneous combustion or 'steamy coal' every year at the Anglesea mine, and mine personnel have managed to cool the hot coal by spreading and rolling it before it reached the intermediate phase or 'blue smoke/odour coal'.[65]

Mr Rolland stated that, to his knowledge, there have only been three spontaneous combustion incidents leading to coal fire in the Anglesea mine. In 1997 and 2013, coal fires occurred in the cracked strata between coal blocks that allowed oxygen to enter and cause the coal to self-heat. In 2003, a small coal fire occurred in a pile of disturbed coal fines. All three fires were extinguished by mine personnel.[66]

Mr Rolland further informed the Board that Alcoa has experienced mobile equipment fires at the Anglesea mine site, caused by accumulated coal dust and hydraulic oil leakage on the excavators. These fires were also extinguished by mine personnel using fire suppression equipment.[67]

Mr Rolland stated that spot fires ignited on coal faces when the Anglesea mine experienced ember attacks from the Ash Wednesday fires. These fires were extinguished by mine personnel before major fire outbreaks could occur.[68]

To assist the Inquiry, Mr Incoll reviewed Alcoa's records of fire history for the Anglesea mine and agreed that there has been a low incidence of fires associated with coal mining at Anglesea during its operation. All coal fires were able to be controlled by Alcoa's workforce without the fires moving outside the mine boundary or requiring assistance from external firefighting agencies.[69]

The Anglesea mine's minimal fire history in over 50 years of operation, with three 'open flame coal' incidents and some spot fires from the Ash Wednesday fires, stands in stark contrast to that of the Hazelwood mine. In addition to the 2014 Hazelwood mine fire, there were between 200 and 400 fires every year at the Hazelwood mine before it was privatised.[70]

Alcoa's fire risk management strategies during the operation of the Anglesea mine are discussed in detail in Part 4 of this report. The fire risk management strategies and plans that Alcoa will adopt in relation to the shutdown of the mine are discussed in Part 5.

PART THREE
REGULATORY FRAMEWORK

PART 3 REGULATORY FRAMEWORK

Two principal regulatory mechanisms apply to Alcoa of Australia Limited (Alcoa) in relation to the Anglesea mine:

- mining laws and legislation specifically enacted for the Anglesea mine
- occupational health and safety laws.

This Part discusses these regulatory mechanisms in so far as they relate to fire risk management at the Anglesea mine, as well as the role of the Coal Mine Emergency Taskforce.

MINING REGULATION IN VICTORIA

Coal mining activities in Victoria are regulated under the *Mineral Resources (Sustainable Development) Act 1990* (Vic) (Mineral Resources Act) and the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2013 (Vic).

The Minister for Energy and Resources is responsible for administering the Mineral Resources Act and related regulations. Prior to 1 January 2015, the Earth Resources Regulation Branch (ERR Branch) of the Department of State Development, Business and Innovation (DSDBI) oversaw administration of the Mineral Resources Act. From 1 January 2015, the DSDBI and the ERR Branch were incorporated into the new Department of Economic Development, Jobs, Transport and Resources (DEDJTR). The ERR Branch, now forming part of DEDJTR, remains responsible for the regulation of mines in Victoria as the Minister's delegate.[71] In this Part, the ERR Branch (and its various predecessors) are referred to as the 'Mining Regulator' (noting that other government departments and agencies also have responsibility for aspects of the regulation of mines in Victoria).

SPECIFIC LEGISLATION GOVERNING THE ANGLESEA MINE

Unlike other Victorian coal mines, mining rights were granted to Alcoa for the Anglesea mine pursuant to an agreement with the State of Victoria. The agreement dated 22 November 1961 (1961 Agreement), granted Alcoa the exclusive right to 'search, work, mine for, win, carry away and dispose of…all coal on or in the leased area' for an initial term of 50 years.[72] The 1961 Agreement was ratified by the *Mines (Aluminium Agreement) Act 1961* (Vic) (Anglesea Mine Act). A copy of the 1961 Agreement is Schedule 1 to the Anglesea Mine Act.

The 1961 Agreement was amended pursuant to a further agreement between Alcoa and the State of Victoria dated 19 October 2011 (2011 Agreement), which extended the term of the agreement by a further 50 years.[73] The Anglesea Mine Act was also subsequently amended to ratify the 2011 Agreement, which has been incorporated as Schedule 2 to the Anglesea Mine Act.

The 2011 Agreement removed most of the provisions governing the manner in which mining work needed to be carried out under the 1961 Agreement. The rehabilitation requirements of the 1961 Agreement were also omitted. They were replaced with a mine work plan submitted by Alcoa and endorsed by the Mining Regulator on 22 September 2011 (2011 Work Plan).[74] The 2011 Work Plan was approved subject to a range of conditions, including that Alcoa must:

- take all reasonable measures to prevent the ignition and spread of fire[75]
- ensure that all buildings, fixed plant and mobile equipment are fitted with firefighting equipment, such as fire extinguishers, fire blankets, knapsack spray pumps and rake-hoes[76]
- develop and implement an appropriate fire response and readiness plan[77]
- ensure that progressive rehabilitation of disturbed land is carried out as soon as possible[78]
- ensure that final rehabilitation is in accordance with the work plan.[79]

OCCUPATIONAL HEALTH AND SAFETY

The *Occupational Health and Safety Act 2004* (Vic) (OHS Act) and Occupational Health and Safety Regulations 2007 (Vic) (OHS Regulations) apply to the Anglesea mine in the same manner as they apply to other Victorian mines.[80]

The Victorian WorkCover Authority (VWA), also known as WorkSafe Victoria, is responsible for administering and enforcing the OHS Act and OHS Regulations.[81]

The OHS Act obliges all employers to provide and maintain, so far as is reasonably practicable, a working environment that is safe and without risks to health.[82] This protection extends to employees, independent contractors engaged by the employer, and the employees of independent contractors.[83]

Under the OHS Act, employers are also under a broader duty to ensure that, so far as is reasonably practicable, persons other than employees are not exposed to risks to their health or safety.[84] In relation to the Anglesea mine, duties owed to persons other than employees would extend to firefighters (career and volunteer) who might be required to attend any fires at the mine.

As the operator of a 'mine', Alcoa must comply with several requirements under the OHS Regulations. The operator of a mine must, so far as is reasonably practicable, identify all mining hazards at the mine and assess the risks to health or safety associated with all mining hazards at the mine. Mining hazards are defined to include 'mine fires or explosions'.[85]

The operator of a mine must also adopt risk control measures that eliminate, so far as is reasonably practicable, risks to health or safety associated with any mining hazards at the mine, or if it is not reasonably practicable to eliminate those risks, reduce those risks so far as is reasonably practicable.[86] All risk control measures must be reviewed and revised at least every three years and after any incident involving a mining hazard.[87]

Unlike the Hazelwood mine, the Anglesea mine is not a 'prescribed mine' under Part 5.3 of the OHS Regulations. Mr Robert Kelly, Acting Director of the Hazardous Industries Group at the VWA, explained to the Board that this was because the VWA considered the Anglesea mine to present a lower level of risk than the Hazelwood mine.[88]

COAL MINE EMERGENCY TASKFORCE

On 16 September 2014, the Victorian Government established the Coal Mine Emergency Taskforce in direct response to recommendations made in the 2014 Hazelwood Mine Fire Inquiry report.[89] Its role is to determine and coordinate emergency management priorities for the Latrobe Valley and Anglesea for the 2014/2015 and 2015/2016 fire seasons.[90]

The Coal Mine Emergency Taskforce comprises separate regional taskforces for the Latrobe Valley (for the Hazelwood, Loy Yang and Yallourn mines) and the Surf Coast (for the Anglesea mine).[91] The Surf Coast Taskforce includes representatives from Alcoa, Country Fire Authority (CFA), DEDJTR, DELWP, Emergency Management Victoria, Environment Protection Authority, Surf Coast Shire Council, VWA, and the Department of Health and Human Services.[92] The Coal Mine Emergency Taskforce will be in operation until December 2015.

Mr Craig Lapsley, Emergency Management Commissioner of Victoria and Chair of the Coal Mine Emergency Taskforce, stated to the Board that the Coal Mine Emergency Taskforce is a collaborative partnership that allows for members to discuss priorities, directions and the resolution of issues, but it does not replace the regulatory framework or the role of regulators in managing fire risk.[93]

PART FOUR
FIRE RISK MANAGEMENT DURING OPERATION OF THE ANGLESEA MINE

PART 4 FIRE RISK MANAGEMENT DURING OPERATION OF THE ANGLESEA MINE

The management of fire risks by Alcoa of Australia Limited (Alcoa) at the Anglesea mine has been principally addressed by the Anglesea Emergency Plan, Alcoa's Standard Work Instruction – Management of Hot Coal and Coal Fires, and the Alcoa Anglesea Country Fire Authority Pre-Incident Plan. Alcoa has also completed fire risk assessments and adopted other fire mitigation practices at the mine.

This Part discusses fire risk management as it applied when the Anglesea mine was operational. Proposed updates to fire risk management, to be applied after shutdown of the mine and power station on 31 August 2015, are discussed in Part 5 of this report.

ANGLESEA EMERGENCY PLAN

Alcoa's Anglesea Emergency Plan comprises a number of procedures and equipment requirements relevant to preventing and managing fires in the Anglesea mine.

INDUCTION, TRAINING AND ACCESS ARRANGEMENTS

The Anglesea Emergency Plan provides for all Alcoa staff working at the Anglesea mine and power station to undertake induction to familiarise themselves with the site's facilities, and workplace safety and emergency management procedures. The Emergency Plan provides for staff to participate in evacuation drills and ongoing training relevant to their roles as Emergency Response Team members, emergency coordinators and mine operators.[94]

The Emergency Plan states that staff should be trained to call 000 and to contact the Victorian WorkCover Authority (VWA) and the Country Fire Authority (CFA) in appropriate circumstances.[95] The Emergency Plan further states that Alcoa will maintain a working relationship with the Department of Environment, Land, Water and Planning (DELWP) so that mine staff are aware of the status and extent of all controlled burns near the mine site.[96]

There are protocols under the Emergency Plan to facilitate access to the Anglesea mine site during emergencies. These include that Alcoa provide induction and site orientation sessions to external agencies such as Victoria Police, the CFA and Victoria State Emergency Service, and that Alcoa conduct joint training exercises in firefighting and other emergencies for Alcoa staff and emergency services, so that they are prepared for working together in the event of an emergency.[97]

HOT WORK PERMIT

Under the Emergency Plan, Alcoa mine staff are required to obtain a permit from a manager before conducting any hot work that generates sparks—such as welding, grinding or cutting. The permit holder is required to wet down the work area, ensure fire suppression equipment is available and conduct checks after work completion. Hot work is restricted during fire danger periods.[98]

VEGETATION MANAGEMENT PRACTICE

The Emergency Plan requires mine staff to maintain the height and density of vegetation in the mine site, to reduce the risk of fire spreading from outside into the mine and vice versa. This includes annual slashing of vegetation beneath power lines and within 50 metres of the northern diversion channel to reduce plant matter that may fuel fire.[99]

EQUIPMENT

The Emergency Plan states that firefighting equipment, including fire extinguishers, fire pumps, a fire truck and a 60,000-litre water cart, be available onsite at all times, and that excavators and dozers used in the mine can be used for fighting coal fires.[100] The Emergency Plan requires that water sprinklers and smoke detection systems are linked to the mine's control room and that foam suppression units are installed in all mobile mine equipment.[101]

FIRE STRATEGIES

Alcoa's strategy for responding to bushfire, as documented in the Emergency Plan, requires staff to evacuate early or take shelter in the power station until a bushfire front passes. Safety allowing, the mine's Emergency Response Team would then patrol the site and suppress any spot fires threatening coal surfaces and other assets. The Emergency Plan notes the hazards of radiant heat and smoke.[102]

The Emergency Plan directs staff to follow the Standard Work Instruction – Management of Hot Coal and Coal Fires when responding to spontaneously combusting hot coal and coal fires.[103]

STANDARD WORK INSTRUCTION – MANAGEMENT OF HOT COAL AND COAL FIRES

Alcoa's Standard Work Instruction – Management of Hot Coal and Coal Fires directs mine personnel on the management of hot coal, coal fires and machinery fires.[104]

MANAGEMENT OF HOT COAL

The Standard Work Instruction specifies that Alcoa staff should perform hot coal checks in the morning, when steam being emitted from spontaneously combusting coal is more obvious in the cool air.[105] Mine staff are also required to check for odour emanating from the coal, as this too is indicative of spontaneous combustion.[106] The Standard Work Instruction identifies coal fines (coal dust) heaped beside the haul road, coal stockpiles, loose coal at the base of coal batters and cracked surfaces on the coal batters, as key areas to check for spontaneous combustion.[107]

To minimise the risk of coal combusting, the Standard Work Instruction states that Alcoa staff should dig out cracked surfaces of coal batters, collect and dispose of coal fines and loose coal in the mine, and cover mined-out coal batters with overburden at the earliest possible opportunity.[108] Where hot coal is identified, the Standard Work Instruction requires staff to separate it from other coal, and to use available methods to minimise the fire risk, such as spreading and rolling the hot coal on a track, cooling it with water, or burying it with overburden material.[109]

MANAGEMENT OF COAL FIRES

The Standard Work Instruction states that when coal fires occur, mine staff must approach the fire from an up-wind direction with thorough consideration given to their distance from the fire, selecting appropriate firefighting equipment, testing for toxic gases in the air and the use of respirators.[110] Standard procedure is to extinguish the fire either by wetting the coal or placing it into a body of water.[111]

COUNTRY FIRE AUTHORITY PRE-INCIDENT PLAN

Mr Robert Barry, Assistant Chief Officer of CFA Barwon South West Region, informed the Board of Inquiry that the Alcoa Anglesea CFA Pre-incident Plan outlines the CFA's response to a fire at both the Anglesea coal mine and the power station. The Pre-incident Plan contains information relevant to wildfires, open cut coal fires, structural fires, hazardous material events and rescue events.[112] The Pre-Incident Plan forms part of a broader suite of CFA planning documentation for the town of Anglesea and the surrounding region.[113]

Mr Barry informed the Board that CFA staff called to attend fire events at the Anglesea mine site could obtain details of the site from the Pre-incident Plan, including maps of the mine, floor plans of the power station and general facilities, and the location of dangerous goods. Other information in the Pre-incident Plan relates to site access, staging and evacuation locations, the location of critical infrastructure and water supplies, and protective measures to be taken to prevent exposure to carbon monoxide.[114]

OTHER ALCOA POLICIES AND PRACTICES

Mr Christopher Rolland, Mine Manager at Alcoa, informed the Board of Inquiry that Alcoa practised additional fire risk management strategies during the mine's operation. These included a non-smoking policy in mine areas, proactive ember patrols by Emergency Response Team members when bushfires occurred near the mine site, equipment function checks prior to commencing works, and regular equipment maintenance and cleaning.[115]

PART FIVE
FIRE RISK MANAGEMENT AFTER SHUTDOWN OF THE ANGLESEA MINE

PART 5 FIRE RISK MANAGEMENT AFTER SHUTDOWN OF THE ANGLESEA MINE

On 12 May 2015, Alcoa of Australia Limited (Alcoa) announced that the Anglesea mine and power station would shut down on 31 August 2015.[116]

Alcoa informed the Board of Inquiry that it is developing a 'safe, environmentally sound and efficient' shutdown plan for the Anglesea mine and power station, and that the processes identified in the plan will remain in place until Alcoa implements a closure plan, which will include final rehabilitation of the mine site.[117] Alcoa's proposed shutdown plan includes the following main components:

- Alcoa's overburden strategy
- maintenance of onsite firefighting equipment and water supply
- mine site personnel and accountabilities
- updating fire-related documents.[118]

The Board heard evidence from independent expert, Mr Roderic Incoll, Bushfire Risk Consultant, on the adequacy and effectiveness of the shutdown plan. The Board also heard from representatives from various government agencies and committees that are involved in the review or development of the shutdown plan. The components of the Plan are discussed in turn below.

The Board notes that Alcoa has commenced developing a site closure and final rehabilitation plan.[119] Consideration of this plan is not within the scope of this Inquiry.

ALCOA'S OVERBURDEN STRATEGY

Alcoa's 'overburden strategy' is to cover all exposed horizontal coal surfaces with one metre of overburden.[120] This strategy is not intended to constitute full rehabilitation of the Anglesea mine site, but rather is directed to decreasing fire risk for the upcoming fire season.[121]

In June 2015, Alcoa engaged Mining One Consultants (Mining One), to undertake an independent review and evaluation of its overburden strategy and to identify potential risks or alternative methods.[122] Mr Cameron Farrington, a Mining Engineer from Mining One, visited the Anglesea mine site on 23 June 2015.[123] Mining One produced a report dated July 2015.[124]

The Mining One report records that there is a low risk of a fire igniting in the Anglesea mine.[125] This opinion is supported by an internal fire risk assessment undertaken by Alcoa in July 2015 and by Mr Incoll.[126]

Mr Farrington states in the Mining One report that Alcoa's overburden strategy needs to address different areas in the mine based on the respective risk profile of the coal in that area, and the time available for undertaking the overburden strategy. These areas are coal fines, horizontal areas of exposed coal (the floor of the mining area or pit) and vertical areas of exposed coal (the 'walls' of the mining pit).

Mining One endorses Alcoa's intention to cover all horizontal areas of exposed coal, and makes several recommendations in relation to other aspects of Alcoa's overburden strategy.[127] Mr Incoll expressed his full agreement with Mr Farrington's conclusions in the Mining One report.[128]

COAL FINES

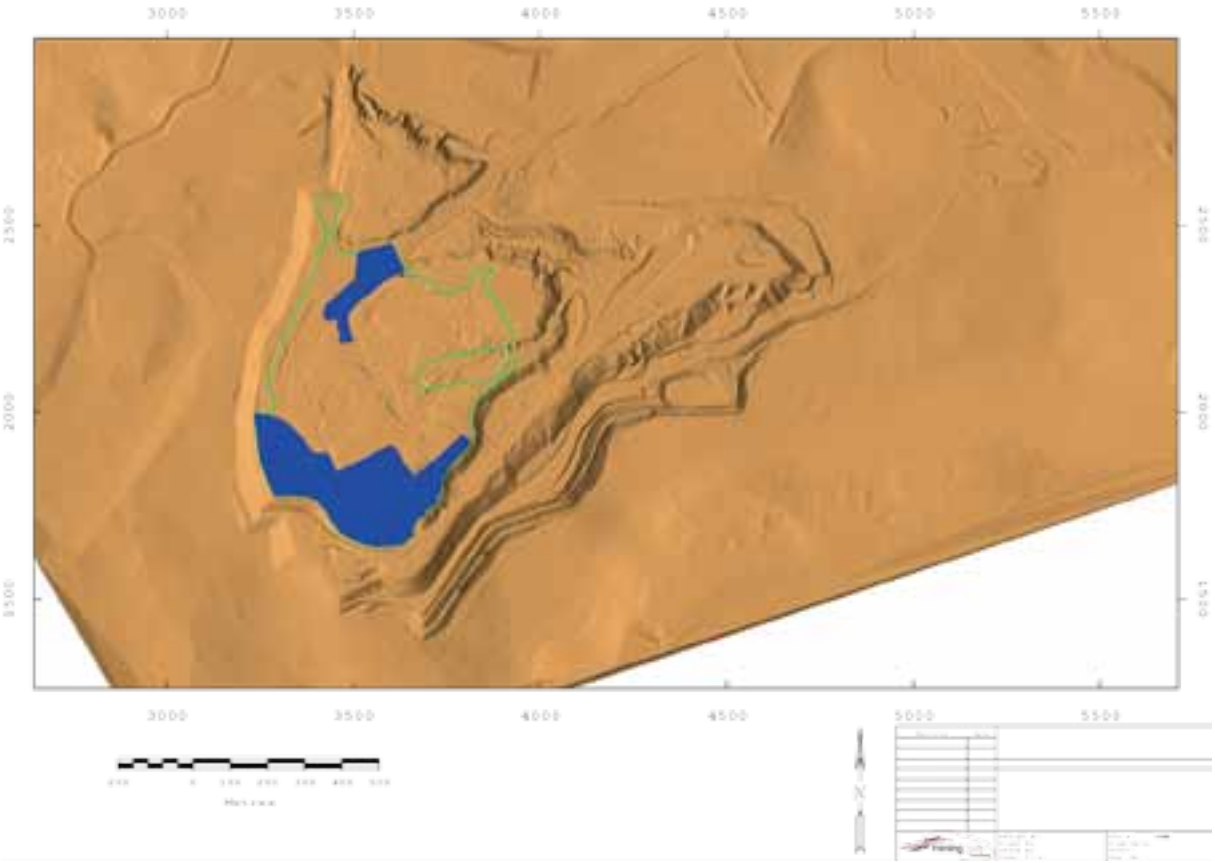
In the Mining One report, Mr Farrington states that during his visit to the Anglesea mine he noticed coal fines heaped on the floor of the open mining pit and along the edges of a coal seam that had recently been mined.[129] Coal fines are finer particles of coal or coal dust.[130] Mr Farrington states that coal fines are more likely to spontaneously combust because they are smaller in particle size, enabling increased oxidisation to take place.[131] Mr Farrington recommends that Alcoa remove all coal fines in and around the mine site and dispose of them through the power station.[132] He also emphasises the need to continually dispose of new coal fines that are generated in the mine as a result of erosion from heavy rainfall.[133]

Alcoa confirmed to the Board that all heaped coal fines would be flattened and compacted prior to covering with overburden material (discussed further below).[134] In its public submission to the Board, Alcoa stated that it will remove an emergency stockpile of loose coal by 31 July 2015.[135]

HORIZONTAL AREAS OF EXPOSED COAL

During his site visit, Mr Farrington identified approximately 41 hectares of horizontal surface on the Anglesea mine pit floor that requires covering with overburden.[136] In the Mining One report, Mr Farrington draws attention to two particular areas of the mine floor where the risk of spontaneous combustion is greater because un-mined or partially mined coal remains. These areas represent approximately 30 per cent of the horizontal surface of the pit and are filled in blue, within the mine pit outlined in green, in Figure 6.[137]

Figure 6. Blue areas showing unmined or partially mined coal seam.[138]



Mr Farrington recommends that Alcoa cover the blue areas of the mine pit with a minimum of one metre of compacted overburden material containing at least 10 per cent clay.[139] The report notes that most of the overburden material available onsite at the mine is ideal for covering the coal as it has an estimated 20 per cent clay content that is well blended through.[140]

At the public hearing, Mr Farrington explained to the Board that clay content in the overburden material used to cover exposed coal is important because clay is elastic and provides some tolerance to cracking; and it retains moisture to create a cling wrap-like seal on top of the coal, which minimises oxygen entry and allows heat to dissipate from the coal. He also stated that the small particle size of the overburden material at the Anglesea mine enhances its suitability as overburden material.[141] The Mining One report emphasises that overburden must be compacted to remove air and provide a strong seal over the coal.[142]

The Mining One report suggests that the remaining exposed horizontal surface of the pit floor, where there is no longer any coal, should be covered with at least one metre of compacted overburden material containing either clay or sand. These areas are less at risk of spontaneous combustion.[143]

The Mining One report makes clear that one metre of overburden is the minimum depth of cover required.[144] This depth will enable Alcoa to identify any problem areas in the coal and easily remove the overburden to address these areas.[145]

Mr Farrington recommends ongoing weekly inspections of the covered horizontal areas of the mine pit after the mine's shutdown to ensure there is no erosion or cracking of the overburden cover or signs of spontaneous combustion.[146] Mr Farrington emphasises that additional inspections of the overburden will be required whenever there is significant rainfall or a bushfire.[147]

Mr Incoll endorsed Mining One's recommendations and advised the Board that bushfire cannot ignite coal under one metre of overburden.[148] Further, Mr Incoll rated the probability of a coal fire following the disturbance of the overburden cover as unlikely.[149] However, he emphasised that on total fire ban days, inspection of the horizontal areas should be more frequent.[150] Mr Incoll also recommended that Alcoa pay attention to germination of vegetation on the overburden cover of horizontal surfaces, and continue to maintain all vegetation at the mine site to regulation height in order to minimise fire fuel.[151]

Mr Warren Sharp, Manager of Alcoa's Anglesea Operations, informed the Board that he anticipates all horizontal areas will be covered by 31 August 2015 and that Alcoa has engaged earth-moving contractors to expedite the process.[152] Mr Christopher Rolland, Mine Manager at Alcoa, reported to the Board that as of 29 July 2015, 23 of the 41.3 hectares of the mine site had been covered with overburden.[153]

In response to the recommendations made by Mining One and Mr Incoll, Alcoa also confirmed that overburden material exceeding 10 per cent clay will be consistently used to cover all coal seam areas.[154] Mr Sharp advised the Board that compaction of the overburden will be achieved by driving dump trucks over the applied cover on all horizontal areas.[155] He stated that Alcoa has placed pegs with one-metre markings in all areas that need overburden cover, to ensure consistency in the depth of cover.[156]

At the public hearing, Mr Sharp reassured the Board that from 31 August 2015 onwards, the covered horizontal areas will be inspected at least twice daily, and more frequently on total fire ban days.[157] Figure 7 shows Alcoa's progress of covering the pit floor with yellow overburden as at 29 July 2015, with some dark areas of exposed coal yet to be covered. The dark wall on the left of the photo is the western wall (to be discussed in 'Vertical areas of exposed coal').

Figure 7. Panoramic photograph of the Anglesea mine showing the progressive coverage of the pit floor by overburden as at 29 July 2015.[158]

VERTICAL AREAS OF EXPOSED COAL

The Mining One report also recommends that Alcoa cover all exposed vertical coal surfaces with five metres of overburden.[159] Vertical faces of coal that have been exposed for more than two years can be left exposed but should be monitored weekly for signs of spontaneous combustion.[160] In addition, the Mining One report also recommends that a water cart or chemical fire suppressants be on stand-by in the event of spontaneous combustion in exposed coal.[161]

Mr Farrington explains in the report that coal generally oxidises at a faster rate when first exposed to air. Oxidation then slows down over time making older coal less susceptible to spontaneous combustion.[162]

During his site visit, Mr Farrington identified the south-western coal edge as an area where the coal has only recently been exposed. He recommends that this coal batter be covered prior to shutdown of the mine with either at least a metre of compacted overburden material containing at least 10 percent clay, or at least five metres of overburden pushed over the top of the coal batter wall with a bulldozer.[163]

The Mining One report notes that if vertical coal faces exposed for less than two years cannot be covered with five metres of overburden before 31 August 2015, then they can be left exposed on the condition that daily inspections take place for signs of spontaneous combustion.[164]

Mr Farrington gave evidence to the Board at the public hearings that there was little risk that the Anglesea mine coal faces would ignite in the same way that the coal faces did in the Hazelwood mine fire, if left exposed. As discussed in Part 2, the fact that the Anglesea mine does not have berms on which coal fines can accumulate and vegetation can grow means that there is little risk of an ember attack starting a fire in the Anglesea mine.[165] Mr Incoll rated the likelihood of fire igniting in the western coal face as 'rare'.[166]

Mr Sharp stated to the Board that Alcoa intended to cover the western wall by 31 August 2015, but became unable to do so, 'due to its proximity to the Cultural Heritage Management Plan boundary (which prevents earth being pushed down from above), the short time remaining to 31 August 2015, and the significant work required to cover the horizontal coal surfaces'.[167]

Given the difficulties described, Mr Farrington recommends that Alcoa implement a strict monitoring regime involving daily inspections of the western wall for the first three months after shutdown. If no spontaneous combustion events occur in this time, Alcoa can reduce its inspections of the western wall to twice weekly.[168] When the western wall has been exposed for two years or more with no spontaneous combustion events, then inspections can be further reduced to weekly until the mine is fully rehabilitated according to the final mine closure plan.[169] Mr Farrington recommends that a daily monitoring regime be recommenced if there is any spontaneous combustion event at the mine.[170]

As recommended in relation to the horizontal areas of the mine, Mr Incoll also recommended that vertical coal surfaces be inspected more frequently on total fire ban days.[171]

As with the covered horizontal areas, Mr Sharp told the Board that the exposed vertical areas of the mine will be inspected twice daily, and more frequently on total fire ban days after the mine's shutdown.[172]

Table 2 below summarises Mining One's recommendations in relation to Alcoa's overburden strategy and Alcoa's response.

Table 2. Mining One's proposed coal treatment and inspection regime for the Anglesea mine.[173]

Area	By 31 August 2015	Inspection frequency (spontaneous combustion and overburden cover erosion)	Alcoa's response
Coal fines	Disposed through power station	Inspect exposed vertical batters for new fines from erosion	Inspect twice daily from 1 September 2015 and more frequently on total fire ban days.
Horizontal surfaces with coal	Covered with compacted overburden material containing at least 10% clay	Weekly, with additional inspections after rain and when bushfires occur	
Horizontal surfaces without coal	Covered with compacted overburden material and/or sand	Weekly, with additional inspections after rain and when bushfires occur	
Vertical coal batters more than two years old	Not covered	Weekly until final mine closure and rehabilitation	
Vertical coal batters less than two years old	Not covered	Daily for three months from 1 September 2015, then twice a week until the surfaces are two years old, then weekly. Inspection frequency to revert to daily if spontaneous combustion occurs.	

ONSITE FIREFIGHTING EQUIPMENT AND WATER SUPPLY

Mr Sharp informed the Board that a 60,000-litre water cart, an excavator and a wheel dozer will remain on site for firefighting purposes after the mine's shutdown, and gave assurances that these items of equipment will be maintained and regularly tested to ensure functionality.[174] He also stated that firefighting equipment operators will be contracted locally to respond appropriately if a fire response plan is triggered after 31 August 2015.[175]

Mr Sharp informed the Board that water sources available during the 2015/2016 fire season will include the mine's fire service dam, ash pond Number 2 and the town water supply tank.[176] Mr Robert Barry, Assistant Chief Officer of Country Fire Authority (CFA) Barwon South West Region, agreed with Mr Sharp that the amount and quality of water from these supply sources are appropriate for firefighting on the condition that Alcoa install fire hydrants at the fire service dam and town water supply tank, and a diesel pump at the mine's ash pond Number 2.[177] Mr Barry confirmed to the Board that Alcoa has agreed to the CFA's requests.[178]

Mr Incoll recalled for the Board how fire hoses did not fit water points at the Hazelwood mine during the 2014 fire.[179] He strongly recommended that CFA fire hose thread compatibility at Anglesea mine water points be tested prior to the start of the 2015/2016 fire season.[180] Mr Barry confirmed that CFA fire hoses fit the water points at the Anglesea mine.[181]

Mr Incoll recommended that Alcoa use infrared or thermal imaging cameras to detect spontaneous combustion within the mine. Mr Rolland described his experience with an infrared camera to the Board. He found the camera to be ineffective because he had to get so close to the coal that he could physically detect the emanating heat anyway.[182] Nevertheless Alcoa has committed to a further trial of infrared sensors by 31 October 2015.[183]

In the Mining One report, Mr Farrington suggests that Alcoa use fire-retardant or chemical suppressant products according to the manufacturer's instructions to combat any signs of spontaneous combustion.[184] Mr Sharp told the Board that Alcoa has previously looked at using such products, but considers that the equipment and fire mitigation measures Alcoa will put in place after the mine's shutdown are adequate for dealing with any fire event without using chemical suppression.[185]

MINE SITE PERSONNEL AND ACCOUNTABILITIES

Mr Sharp advised the Board that responsibility for the Anglesea mine site will be transferred to Alcoa's Eastern Australian Asset Planning and Management Group (APM) (based at the Point Henry site) on 1 September 2015. The APM will provide services relating to decommissioning the Anglesea power station and rehabilitation of the mine site.[186]

Mr Sharp will become the Accountable Asset Manager for the Anglesea mine site after the mine's shutdown. He will be based at both Point Henry and Anglesea to fulfil this role.[187] On 1 September 2015, Mr Christopher Rolland's role as Mine Manager will cease but he will remain at the Anglesea mine as the Anglesea Rehabilitation Supervisor. He informed the Board that his new responsibilities will include providing technical oversight at the mine, engaging stakeholders, and preparing the final closure and rehabilitation plan for the mine site.[188]

Mr Rolland will be supported at the Anglesea mine site by other Alcoa employees, including Mr Bryce Hutton, who will be in charge of dismantling the power station; and Mr Dean Schmidt, who will be the onsite electrical engineer.[189] Mr Sharp stated to the Board that internal expertise will remain available to staff in Anglesea after mine shutdown.[190]

In addition to retained Alcoa staff, Mr Sharp informed the Board that Alcoa will contract a security service to monitor the mine site and power station 24 hours a day seven days a week from 1 September 2015. He advised the Board that the security service would be engaged before 31 August 2015 to enable induction and training alongside the CFA in mid-August.[191]

Mr Sharp indicated that Alcoa would train the security service staff to identify early signs of spontaneous combustion, such as odour changes, that are easy to detect without the need for extensive technical training and experience. He also assured the Board that Mr Rolland will personally inspect the overburden cover for erosion, given his mining experience, and will manage and supervise contracted security staff.[192]

Mr Sharp confirmed that security staff would be able to readily contact the CFA and vice versa, and that Alcoa will provide adequate and appropriate resources to support them.[193]

Mr Rolland stated that the earth-moving contractors engaged to assist with the overburden strategy may be a potential workforce for operating the firefighting equipment available onsite after the mine's shutdown.[194]

In his supplementary report, Mr Incoll specified a list of minimum competency qualification units that contracted security staff and equipment operators should achieve.[195] However, he indicated to the Board that he is comfortable with Alcoa's arrangement for senior management to be present on site to supervise and train contractors.[196]

UPDATING FIRE-RELATED DOCUMENTS

Alcoa advised the Board of its intention to work with the CFA to review and update the Anglesea Emergency Plan and the Alcoa Anglesea CFA Pre-Incident Plan.[197]

Mr Barry stated to the Board that following Alcoa's announcement of the shutdown of the Anglesea mine, the CFA began a process of reviewing the Pre-Incident Plan.[198] As part of this process, representatives from the CFA and Alcoa met on 8 July 2015 to discuss access, emergency services escorts, communication and firefighter safety.[199]

Mr Barry informed the Board that the CFA and Alcoa would update their joint fire response arrangements to account for the following:

- CFA staff and security personnel will need to undergo training, including a site induction and new arrangements for CFA contact and access to the site.[200]
- The CFA will require 24-hour contact telephone numbers for security staff present at the Anglesea mine.[201]
- Radio communications between the Anglesea fire station and the Anglesea mine control room will need to be replaced with portable radio equipment, as the control room will no longer operate following the mine's shutdown.[202]
- Once an emergency event has been identified, the site's main gate at Coalmine Road will need to be left open to allow access to additional crews if security personnel are already committed to the event or to guide other CFA appliances.[203]
- Alcoa will continue to maintain a sufficient road network for CFA appliances and other vehicles to access the Anglesea mine, including the western wall of the mine.[204]

Mr Barry informed the Board that Alcoa will provide six carbon monoxide monitors for CFA firefighters to use for monitoring their exposure levels when attending to fires at the mine site after shutdown.[205] The significance of carbon monoxide monitoring for firefighter health was discussed in the 2014 Hazelwood Mine Fire Inquiry Report.[206]

Mr Sharp advised the Board that the mine's internal Standard Work Instruction – Management of Hot Coal and Coal Fires will also be reviewed and updated to reflect the different risk profile and circumstances of the Anglesea mine after shutdown and to provide ready instructions for managing hot coal and coal fires.[207]

Mr Sharp further informed the Board that Alcoa has committed to developing a Target Action Response Plan (TARP) as recommended by Mr Farrington in the Mining One report.[208] The TARP will be used to provide appropriate corresponding management procedures when certain triggers such as nearby bushfires and heavy rainfall are identified.[209]

AGENCY INVOLVEMENT IN THE MINE'S SHUTDOWN

On 12 May 2015, the State established the Anglesea Committee to provide a single government contact point for Alcoa, and to assist in the coordination of the State's response to the mine's shutdown and eventual closure.[210] The Anglesea Committee convened regularly throughout May, June and July 2015.[211]

The Anglesea Committee is chaired by the Deputy Secretary of Energy and Resources at the Department of Economic Development, Jobs, Transport and Resources (DEDJTR)[212] and comprises representatives from:

- DEDJTR
- Department of Education and Early Childhood Development
- Department of Environment, Land, Water and Planning (DELWP)
- Emergency Management Victoria
- Environment Protection Authority
- Victorian WorkCover Authority (VWA).[213]

The Victorian Government advised the Board of Inquiry that these government departments and agencies will oversee Alcoa's plans and all other regulatory and administrative requirements relevant to closure and rehabilitation of the mine site.[214]

The Surf Coast Taskforce (Taskforce) continues to hold discussions with Alcoa regarding fire prevention and mitigation processes for the Anglesea mine.[215] Mr Craig Lapsley, Emergency Management Commissioner, stated to the Board that Mr Peter Schmidt, the Director of the Taskforce, has maintained constant communication with Alcoa to monitor and support the process of reviewing their emergency plan and risk analysis.[216]

Mr Ross McGowan, Executive Director of Earth Resources Regulation at DEDJTR, informed the Board that DEDJTR will ensure that the Anglesea mine's shutdown proceeds in accordance with applicable laws and the endorsed workplan.[217] According to Mr McGowan, DEDJTR and Alcoa have discussed, and will continue to discuss, how Alcoa will implement appropriate interim measures to prevent and manage fire risk at the Anglesea mine. DEDJTR will also work with Alcoa in relation to its mine closure plan to ensure that it appropriately addresses final rehabilitation of the Anglesea mine site.[218]

Mr Robert Kelly, Acting Director of the Hazardous Industries Group at VWA, advised that VWA would continue to monitor the Anglesea mine during its shutdown process.[219] Mr Kelly informed the Board that VWA is currently reviewing Alcoa's proposed strategy of capping exposed horizontal coal surfaces at the mine with one metre of overburden, and that this review would consider Alcoa's fire history, its updated fire risk assessment, implementation of the Mining One recommendations, and the industry practice of covering exposed coal.[220]

As mentioned in Part 2 of this report, DELWP has specific fuel reduction activities in place under regional fire plans. These plans are updated annually to detail planned activities for the following three years.[221] Dr Paul Smith, Deputy Secretary of Land, Fire and Environment at DELWP stated to the Board that DELWP will supplement its permanent firefighting workforce by recruiting 80 seasonal firefighters for the Barwon South West Region for the 2015/2016 fire season.[222] He anticipates Parks Victoria will employ approximately 10 additional staff to assist with patrolling and fire response in the Anglesea Heath.[223] Additional resources will be mobilised if an incident occurs within the region of a sufficient magnitude to escalate coordination of the emergency response to State-level.[224]

Dr Smith stated that DELWP and Alcoa have agreed to continue joint management of the Anglesea Heath after 31 August 2015, in accordance with to the Cooperative Land Management Agreement, and that both parties will determine what parts of the current mining areas are eventually transferred to DELWP.[225] He confirmed for the Board that fire management in the Anglesea Heath is the responsibility of DELWP and Parks Victoria.[226]

Dr Smith anticipates that DELWP will work with Emergency Management Victoria to ensure rehabilitation of the Anglesea mine is taken into account with respect to future fire planning.[227]

FINAL MINE CLOSURE AND REHABILITATION

Mr Sharp informed the Board that Alcoa will develop a longer-term mine closure plan relevant to decommissioning and rehabilitating the mine site, after the mine and power plant have ceased operating. He informed the Board that this plan will be consistent with the approved work plan (referred to in Part 3) and that it will be prepared in consultation with appropriate government departments, the community and other stakeholders.[228]

PART SIX
CONCLUSION, AFFIRMATIONS AND RECOMMENDATION

PART 6 CONCLUSION, AFFIRMATIONS AND RECOMMENDATION

The Board is required to inquire into and report on the sustainable, practical and effective options that could be undertaken by the mine operator to decrease the risk of fire arising from or impacting the Anglesea mine for the 2015/2016 summer season, noting the impending closure of the mine on 31 August 2015.

The following aspects of this Term of Reference are noteworthy:

- investigation by the Board is limited to options that could be taken by Alcoa alone
- concern is with the risk of fire both arising from the mine and impacting on it (for example by ember attack)
- scope is limited temporally to the 2015/2016 summer season.

The Inquiry was conducted against the backdrop and in the context of the disastrous Hazelwood mine fire of February–March 2014. That fire was the subject of a separate Board of Inquiry, which reported to the Governor of Victoria in August 2014. All the evidence before that earlier Inquiry is taken to be evidence in this Inquiry.[229] This includes comparing fire risks at the Anglesea mine with fire risks at the Hazelwood mine.

To consider the adequacy of measures undertaken and committed to by Alcoa to decrease the risk of fire in the upcoming fire season, it is necessary to consider the probability of fires arising from and impacting on the Anglesea mine in the 2015/2016 summer season. Measures could then be tested against those risks.

THE ANGLESEA AND HAZELWOOD MINES

The evidence before the Board made clear that there are significant differences between the Anglesea mine and the Hazelwood mine. Importantly, these differences demonstrate that the fire risks associated with the Anglesea mine are considerably less than those associated with the Hazelwood mine. The Board notes that:

- The Anglesea mine is much smaller in size and scale of operation than the Hazelwood mine.[230]
- The overburden to coal ratio at the Anglesea mine is considerably higher than that at the Hazelwood mine, which has facilitated more progressive rehabilitation of the Anglesea site relative to the Hazelwood site.[231]
- The moisture content of the coal mined at Anglesea is lower than that mined in the Latrobe Valley,[232] which means that Anglesea coal has less potential for spontaneous combustion.[233]
- In contrast to the history of significant fires at Hazelwood,[234] there have been very few fires at Anglesea and none that have impacted on the coal or required the attendance of the Country Fire Authority (CFA).[235]
- Contrary to the experience at Hazelwood on 9 February 2014, the extreme Ash Wednesday fires of 1983 did not result in ignition of the coal at Anglesea even though there was some spotting into the mine.[236]

The Board also heard evidence that the Anglesea mine is subject to a lower level of occupational health and safety regulation than the Hazelwood mine by virtue of it not being a 'prescribed mine' under the Occupational Health and Safety Regulations 2007 (Vic). It is not a prescribed mine because the Victorian WorkCover Authority (VWA) has assessed the Anglesea mine as presenting a lower level of risk than the Hazelwood mine (which is a 'prescribed mine').[237]

RISK OF FIRE ARISING FROM OR IMPACTING ON THE ANGLESEA MINE

The Inquiry heard from two expert witnesses—Mining Engineer, Mr Cameron Farrington and Bushfire Risk Consultant, Mr Roderic Incoll.

RISK OF FIRE ARISING FROM THE MINE

Both Mr Farrington and Mr Incoll examined the risk of a fire arising from the mine as a result of coal spontaneously combusting. Mr Christopher Rolland, Mine Manager at Alcoa, informed the Inquiry that there is some history although only three spontaneous combustion incidents have resulted in 'flame events'.[238]

Mr Incoll considered that it was 'unlikely' that a fire would commence due to spontaneous combustion or as a result of worker carelessness or non-observance of permit conditions.[239] In relation to the western coal face (discussed below), Mr Incoll rated the probability of fire as 'rare'.[240]

Mr Farrington also considered future fires from spontaneous combustion to be 'unlikely'.[241] Alcoa's risk assessment of July 2015 reached similar conclusions.[242]

Mr Craig Lapsley, Emergency Management Commissioner, noted that the shutdown of the mine on 31 August 2015 'will significantly reduce its risk profile'.[243]

RISK OF FIRE IMPACTING THE MINE

Mr Incoll examined the risk of a fire at the Anglesea mine site caused by ember or ash attack.[244] After examining the history of planned burning in the Anglesea Heath, Mr Incoll stated to the Board that 'the likelihood of a high intensity bushfire impacting the [Anglesea] mine during the 2015/2016 fire season is considered to be rare'.[245]

Referring to both the risk of fire from within the mine and from outside the mine, Mr Incoll concluded:

> The analysis of fire risk on the mine site after 31 August 2015 has indicated that at the worst case, a fire outbreak in coal or vegetation at the mine after shutdown is 'unlikely', and should an incident occur, any risk of fire spread beyond the mine is 'insignificant'.[246]

ALCOA'S STRATEGY FOR MINIMISING THE RISK OF FIRE AFTER 31 AUGUST 2015

The evidence before the Board establishes that Alcoa is in the process of implementing a detailed and comprehensive strategy for minimising the risk of fire at the mine after it is shut down. Alcoa's strategy includes the following features:

- covering most of the exposed coal ('overburden strategy')
- updating its internal risk assessment[247]
- updating its Anglesea Emergency Plan[248]
- co-operating with the CFA in the updating of the Alcoa Anglesea CFA 'Pre-Incident Plan'[249] and addressing practical issues such as access to water for firefighting
- updating its Standard Work Instruction – Management of Hot Coal and Coal Fires[250]
- putting in place staffing arrangements addressing site security, plant maintenance and operation, and the implementation of Mining One's recommendations concerning inspection of the mine post-shutdown.[251]

THE CAPPING OF THE COAL – OVERBURDEN STRATEGY

A significant part of Alcoa's overall fire risk management is its 'overburden strategy', which primarily consists of covering most of the exposed coal at the mine (measured at 41 hectares) with one metre of overburden. This strategy has been the subject of a detailed assessment by Mining One Consultants.[252] Mining One identified the following three areas within the mine that needed to be addressed:

- management and disposal of coal fines in and around the mine
- covering the mine floor with overburden
- covering vertical coal faces with five metres of overburden or, where that is not possible, conducting an inspection regime depending on how long the coal has been exposed for, and whether spontaneous combustion events occur.[253]

Alcoa has committed to flattening and compacting all heaped coal fines prior to covering them with overburden.[254]

In relation to covering the coal on the mine floor, Mining One considered the quantity and quality of the overburden being used and ultimately endorsed Alcoa's approach. In the Mining One report, Mr Farrington endorses 'the minimum capping levels, as on-going monitoring provides an opportunity to identify any problematic areas'. He explains in the report that 'if there are problem areas the 1.0 m of capping is easily removed to access the area to be addressed'.[255]

Alcoa has committed to covering coal seam areas in the mine floor with one metre of overburden with at least 10 per cent clay content. Alcoa has further committed to ensuring that the overburden will be appropriately compacted.[256] As at 29 July 2015, Alcoa had capped 23 of 41 hectares of the coal on the mine floor.[257] Alcoa has sourced external earth moving contractors to ensure that the entire area is covered by 31 August 2015.[258]

Alcoa told the Inquiry that due to a combination of time constraints and its proximity to 'the approved Cultural Heritage Management Plan boundary', an area of exposed vertical coal known as the west wall will not be covered before 31 August 2015.[259]

In the Mining One report, Mr Farrington expresses the view that 'the long term exposure of this coal presents minimal combustion risk' and proposes that 'the vertical faces be left exposed in the period between the interim closure work and final rehabilitation'.[260] However Alcoa needs to ensure that:

- an inspection regime is implemented
- a water cart and an appropriate management strategy for tackling coal fire and spontaneous combustion is maintained on site
- a 'Target Action Response Plan' (TARP) is developed.[261]

Alcoa has committed to covering all vertical coal faces, excluding the west wall of the mine, by 31 August 2015. Alcoa has further committed to conducting twice daily inspections of the west wall after 31 August 2015 to check for signs of spontaneous combustion. Those inspections will also involve looking for signs of erosion in the overburden and the build-up of any coal fines around the west wall. Alcoa has committed to retaining the 60,000-litre water cart on the mine site.[262]

Mr Incoll endorsed this strategy and the opinions expressed in the Mining One report.[263]

WORK IN PROGRESS

One of the clear themes in the evidence is that most of the work that Alcoa is doing to mitigate the risk of fire post-shutdown has not yet been completed. Alcoa has helpfully provided a table dated 29 July 2015 to the Board (Appendix F), which sets out 39 recommendations made variously by Mining One, Mr Incoll, Mr Robert Barry, Assistant Chief Officer of CFA Barwon South West Region, and Mr Ross McGowan, Executive Director of the Earth Resources Regulation Branch, Department of Economic Development, Jobs, Transport and Resources (DEDJTR). In relation to each recommendation, Alcoa has set out what it intends to do to implement the recommendation. In the majority of cases, the date by which the work is to be completed is 31 August 2015, the date of the mine's shutdown.[264]

With a reporting date of 31 August 2015, the Board has not been able to hear new evidence after 31 July 2015.[265] This means that it will not hear evidence of the outcomes of the various scheduled meetings and other work committed to by Alcoa and the various government agencies that regulate and interact with Alcoa. The Board was told that:

- The CFA Pre-Incident Plan was to be discussed and revisions finalised by Alcoa and the CFA on 3 August 2015.[266]
- The Anglesea Emergency Plan was also to be discussed at that meeting[267] and Alcoa has set a target date of 14 August 2015 for finalisation of the Plan.[268]
- Alcoa is yet to make final decisions about who will maintain and operate its equipment onsite, including its firefighting equipment.[269]
- Alcoa is developing the TARP recommended by Mr Farrington and is considering what needs to be in place by way of pre-planning on days of high fire danger.[270]
- Alcoa is yet to engage and train security staff who will have the important tasks of inspecting the mine site, escorting the CFA in an emergency and addressing spontaneous combustion events.[271]

Simply put, the Board cannot know what has been and will be done after 31 July 2015. It is the Board's view that there was a clear theme in the evidence that, as the well respected and highly experienced Mr Lapsley puts it, Alcoa is a 'good corporate citizen within the community'.[272]

The senior officers of the government agencies that regulate and interact with Alcoa have echoed these sentiments in their evidence. Mr McGowan said that he has been 'extremely satisfied' in relation to his interactions with Alcoa.[273] Mr Barry said that 'Alcoa are very positive in their arrangements with [the CFA] for post-closure'.[274]

Mr Incoll, referring to Alcoa's response to his recommendations, said that 'generally speaking they've satisfied the main thrust of my issues'.[275] He noted that he was unable to assess certain aspects of Alcoa's response, such as the TARP because it was not yet available.[276] Mr Incoll stated to the Board:

> …so I can't know what is in them, but the fact that [Alcoa is] producing something that deals with the issue that I have raised gives me a sense of comfort in that everything else they have said they'd do they have done up to date, so I assume on that basis, that it is going to happen henceforth.[277]

Mr Incoll concluded his contribution to the Board with the observation that he would 'be comfortable that the end result will be satisfactory'.[278]

In light of all of the evidence it has heard, the Board has a sense of comfort that Alcoa will deliver on the commitments it has made.

In particular, the Board notes that Alcoa's operations at Anglesea are being competently regulated by two relatively well-resourced and active government agencies. These agencies are well aware of the deficiencies in their regulation of the risk of fire at the Hazelwood mine that were discussed at length in the 2014 Hazelwood Mine Fire Inquiry Report.[279] The DEDJTR Earth Resources Regulation Branch has been extensively involved in the shutdown of the Anglesea mine since 18 May 2015. That involvement is detailed in the statement of Mr McGowan.[280] The other mine regulator is the VWA (also known as WorkSafe Victoria). Mr Robert Kelly, Acting Director of the Hazardous Industries Group at WorkSafe Victoria, explained the VWA's role since June 2015 in relation to the imminent shutdown of the mine. He explained that the VWA's role is ongoing and that his staff are meeting with Alcoa on 10 August 2015 to discuss the capping (overburden) strategy amongst other parts of Alcoa's post-shutdown plans.[281]

In addition, Alcoa, the various agencies and the Emergency Management Commissioner all participate in the Surf Coast Taskforce (Taskforce). The Taskforce (and its Latrobe Valley counterpart) was established on 16 September 2014 'with the aim of implementing the improvement plans and recommendations detailed in the "Hazelwood Mine Fire Inquiry Report Victorian Government Implementation and Monitoring Plan October 2014" to the Hazelwood Coal Mine Fire Inquiry'.[282] Mr Lapsley, the Chair of the Taskforce, stated that Alcoa's involvement in the Taskforce has been 'a very positive experience'.[283]

Mr Lapsley informed the Inquiry that at its next meeting, the Taskforce will consider Alcoa's risk assessments 'and ensure that everyone's got ownership and understanding and what are the other risks that need to be considered'.[284]

The Board anticipates that this level of regulation and oversight will continue through the month of August and beyond, providing the Board a further level of comfort.

The second important aspect of the evidence concerns Alcoa's staffing plans at the mine post-shutdown. In particular, the Board has been told that Mr Christopher Rolland, the highly experienced Mine Manager, will remain on the site as the Mine Rehabilitation Supervisor. His role will include supervision of the fire minimisation strategy.[285] He will have an experienced team to support this work.[286] The Anglesea team will in turn be supported by Mr Warren Sharp, Manager of Alcoa's Anglesea operations, and the health and safety and environmental professionals in Alcoa's Eastern Australian Asset Planning and Management Group.[287]

Mr Farrington was asked if the ongoing involvement of Mr Rolland was beneficial to the oversight of the inspection regime and maintenance issues he had identified in his report. His response was:

> Based on my exposure to Chris he is very confident, has a very good understanding of the site and its characteristics and I think he would be an ideal person to maintain vigilance on the operation as a whole.[288]

Similarly, Mr Incoll described Mr Rolland as 'an experienced and competent person', and added that Mr Rolland's appointment would be a 'significant bolster for the company's plans'[289] and that his appointment would add 'quality assurance'.[290]

Mr Incoll was asked whether the measures taken and planned to be taken by Alcoa are sustainable, practical and effective to mitigate the risk of fire at the Anglesea mine.[291] After outlining Alcoa's actions and proposed actions, he concluded as follows:

> From an emergency management viewpoint, these arrangements follow a rational path and appear to be both sustainable and practical. As to their effectiveness, the sole comment is that the contribution an experienced manager makes in an emergency was highlighted by less than effective management when senior managers were not available in the early stages of the Hazelwood mine fire. This should be borne in mind when planning incident response at Anglesea.[292]

Alcoa's resourcing plans, and in particular the ongoing role of Mr Rolland, address Mr Incoll's concern.

THE BOARD'S CONCLUSION

During this Inquiry, Alcoa expressed a commitment to undertake numerous actions to decrease fire risks affecting the Anglesea mine for the 2015/2016 fire season after mine shutdown on 1 August 2015 (Appendix F).

The Board concludes that Alcoa has either implemented, or is in the process of implementing, a range of fire minimisation strategies that are sustainable, practical and effective. These strategies, when fully implemented, should reduce the risk of fire at the Anglesea mine site so far as is reasonably practicable. The Board has not identified any options over and above those developed by Alcoa, in conjunction with the regulators, which the Board considers should be implemented at the mine site.

Given Anglesea is prone to bushfires, the Board advocates prudent assessment of rehabilitation options for the Anglesea mine site, so that the final decision does not unintentionally lead to increased fire risks for Anglesea.[293]

AFFIRMATIONS

The Board affirms Alcoa's actions by way of responding to the recommendations of Mining One, Mr Incoll, Mr Barry and Mr McGowan (Appendix F), and Alcoa's undertaking to complete these by 31 August 2015 (unless specified otherwise). In summary, the actions and undertakings are:

OVERBURDEN STRATEGY

- Alcoa to cover all coal fines, horizontal coal surfaces and vertical coal surfaces except the west wall.

PROCEDURAL DOCUMENTS

- Alcoa to update and finalise its Anglesea Emergency Plan and the Alcoa Anglesea CFA Pre-incident Plan in tandem with the CFA
- Alcoa to update and finalise its internal documents Standard Work Instructions –Management of Hot Coal and Coal Fires, daily mine inspection checklist and twice daily monitoring regime
- Alcoa to prepare a Target Action Response Plan to address triggers such as rainfall, erosion and weather changes for additional mine site inspections.

PERSONNEL ARRANGEMENTS

- Alcoa to contract security staff to work under the supervision of Alcoa senior manager Mr Christopher Rolland (as Anglesea Rehabilitation Supervisor)
- Alcoa to engage fire management equipment operators.

EQUIPMENT AND FACILITIES

- Alcoa to establish a track network on the covered horizontal coal surface to allow site inspection while minimising erosion
- Alcoa to install compatible fittings on onsite water source access points for firefighting
- Alcoa to trial infrared sensors to detect spontaneously combusting coal (by 31 October 2015).

The Board affirms the regulatory approaches of DEDJTR and VWA towards the Anglesea mine shutdown. It affirms Alcoa's preparation of a closure and final rehabilitation plan in line with the requirements of these agencies, as well as in consultation with other stakeholders.

The Board also affirms the Surf Coast Taskforce overseeing the Anglesea mine shutdown and expects Alcoa to provide an update at the next meeting.

Where Alcoa has taken action or has given undertakings to directly address fire risk management after mine shutdown, the Board affirms the appropriateness of these actions and undertakings, and does not make any recommendations as to the same.

RECOMMENDATION

Accordingly, the only recommendation that the Board makes in relation to this aspect of its Terms of Reference is to recommend that Alcoa publish a progress report by 15 September 2015, to be updated on 15 November 2015, detailing the steps it has taken since 31 July 2015 to implement its fire minimisation strategies as set out in the list of the commitments it provided to the Board (Appendix F). These reports published on the Alcoa website will provide important information to the community and to regulators.

The Board recommends that Alcoa publish a progress report detailing the steps it has taken to implement its fire minimisation strategies by 15 September 2015, to be updated by 15 November 2015, on the Alcoa website.

APPENDICES

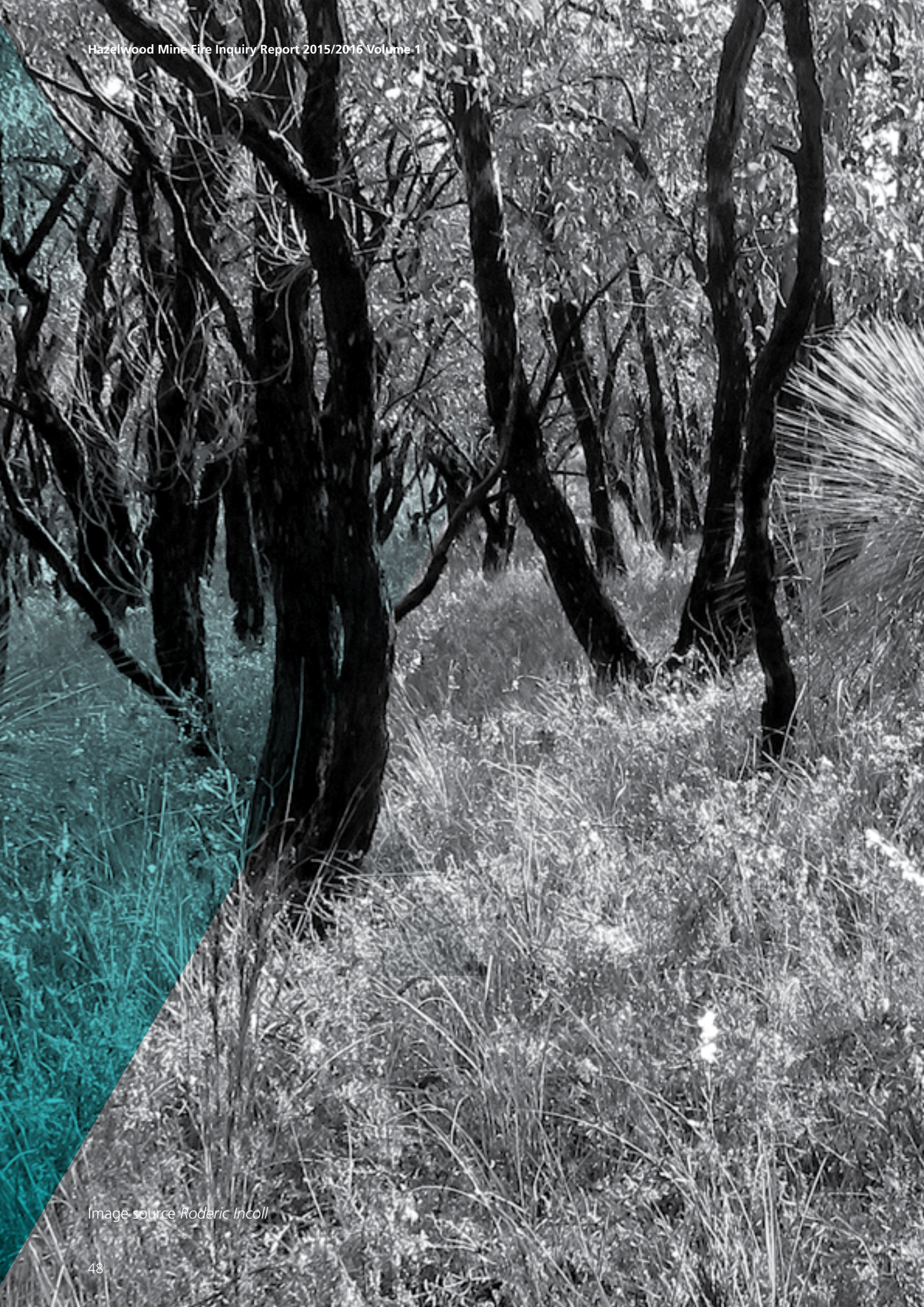


Image source *Roderic Incoll*

APPENDICES

APPENDIX A: INQUIRY PERSONNEL

NAME	ROLE
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RADOJKOVIC, Andrew	Technical Officer – Mines
ROZEN, Peter	Counsel Assisting
RYAN, Genelle	Head of Secretariat
SEAH, Shyuan	Project Officer – Mines
SHANN, Ruth	Counsel Assisting
STANSEN, Justine	Principal Legal Advisor
STOCK, Kristen	Business Support

APPENDIX B: PUBLIC SUBMISSIONS

ORGANISATIONS	INDIVIDUALS
Alcoa of Australia Limited	FENTY, Emma
ANGAIR Inc.	MORAHAN, Jacinta
Environment Victoria	RICARDO, Alanna
Surf Coast Air Action Inc.	
Surf Coast Shire Council	
Public Health Association Australia	
Victorian Government	

APPENDIX C: WITNESSES APPEARING AT THE ANGLESEA PUBLIC HEARINGS

NAME	ROLE
BARRY, Robert	Assistant Chief Officer, Country Fire Authority Barwon South West Region
BURTON, Jane	Director of Coal Resources, Energy and Earth Resources Division, Department of Economic Development, Jobs, Transport and Resources
FARRINGTON, Cameron	Mining Engineer at Mining One Consultants
INCOLL, Roderic	Expert witness; Bushfire Risk Consultant
KELLY, Robert	Acting Director of the Hazardous Industries Group, WorkSafe Victoria
LAPSLEY, Craig	Emergency Management Commissioner
MACKENZIE, Roderick	Senior Instructor – Wildlife/Leadership Development and Anglesea volunteer, Country Fire Authority
MCGOWAN, Ross	Executive Director, Earth Resources Regulation Branch, Department of Economic Development, Jobs, Transport and Resources
ROLLAND, Christopher	Mine Manager at Alcoa
SHARP, Warren	Manager of Alcoa's Anglesea Operations

APPENDIX D: EXHIBITS TENDERED AT THE ANGLESEA PUBLIC HEARINGS

EXHIBIT	TITLE
Exhibit 1	Witness statement of Jane Elizabeth Burton dated 17 July 2015
Exhibit 2	Witness statement of Christopher John Rolland dated 22 June 2015
Exhibit 3A	Photograph of Alcoa mining lease boundary, power station, freehold land, Anglesea Heath and Anglesea town dated 2000
Exhibit 3B	Close up photograph of mining area dated 1 January 2015
Exhibit 4	Pre, During and Post Shift Hazard and Environmental Impact Checklist
Exhibit 5	Anglesea Risk Assessment dated 3 December 2014
Exhibit 6	Letter from Mr John Mitas to Alcoa dated 27 July 2015
Exhibit 7A	Photograph of western wall dated 29 July 2015
Exhibit 7B	Photograph (ALCOA.0001.005.0010)
Exhibit 8	Submission of Alcoa of Australia Limited dated 20 July 2015
Exhibit 9	Witness statement of Warren Steven Sharp dated 22 June 2015
Exhibit 10	Supplementary witness statement of Warren Steven Sharp dated 14 July 2015
Exhibit 11	Alcoa's response to recommendations
Exhibit 12	Alcoa Work Pack Specification for Security Services at Anglesea Power Station and Mine, Anglesea for Alcoa of Australia Ltd
Exhibit 13	Witness statement of Ross Gregor McGowan dated 17 July 2015
Exhibit 14	Alcoa Anglesea Coal Mine Endorsed Work Plan dated September 2011
Exhibit 15	Witness statement of Robert James Kelly dated 21 July 2015
Exhibit 16	Witness statement of Paul Bruce Smith dated 28 July 2015
Exhibit 17	Witness statement of Robert Lindsay Barry dated 16 July 2015
Exhibit 18	Witness statement of Roderick James (Jamie) MacKenzie dated 16 July 2015
Exhibit 19	Aerial photograph: 'Fuel reduction history, 2006 to 2015'
Exhibit 20	Witness statement of Craig William Lapsley dated 20 July 2015
Exhibit 21	Mining One Anglesea Mine Coal Coverage Project Review, Technical Review for Alcoa
Exhibit 22	Expert report of Roderic Alan Incoll dated 21 July 2015
Exhibit 23	Supplementary expert report of Roderic Alan Incoll dated 27 July 2015
Exhibit 24	Australia/New Zealand Standard Risk Management 4360:2004 (ISO30001/2009)
Exhibit 25	Strategic Bushfire Management Plan Barwon Otway Bushfire Risk Landscape

APPENDIX E: EXHIBIT 3B – CLOSE UP PHOTOGRAPH OF MINING AREA DATED 2015

APPENDIX F: EXHIBIT 11 – ALCOA'S RESPONSE TO RECOMMENDATIONS

PARAGRAPH	SOURCE	RECOMMENDATION
2 (Page 21)	Mining One Consultants Report	During the site visit there was evidence of heaped coal fines located along coal edges and within the pit floor area. These piles of fines pose a spontaneous combustion risk and should be minimised as far as practicable prior to encapsulation of the pit floor.
3 (Page 21)	Mining One Consultants Report	The risk associated with ash attack is limited to the summer period and therefore encapsulation of all horizontally exposed coal is recommended with at least one metre of waste material and this will also provide encapsulation of the coal to prevent oxidation of the coal and foreseeable spontaneous combustion events.
4 (Page 21)	Mining One Consultants Report	Where coal seams are being covered, it is advised that the capping material contain not less than 10% clay to help retain moisture and seal the seam against oxidation.
6 (Page 21)	Mining One Consultants Report	Compaction is recommended and can be achieved using either loaded trucks or the water cart during the placement of the material. Failing this a vibrating roller would be recommended.
7 (Page 21)	Mining One Consultants Report	Where practical, the preferred method of securing the exposed seams in the pit faces (vertically exposed coal) is to encapsulate this with waste material by dozing over the exposed areas, this is more critical for vertical faces that have been exposed for less than two years. However due to timing constraints and the practicalities of this, the following mitigation can be adopted as an optional strategy: • Leave the vertically exposed coal open to the elements. For faces that have been exposed for less than two years daily monitoring must be conducted for the initial three months post closure and then twice weekly thereafter. For faces that have been exposed for more than two years the face must be inspected at least once a week for signs of spontaneous combustion. • If a heating event does occur daily inspection must resume for a period of three months after the event the twice weekly until the face has shown no spontaneous combustion issues for more than two years.
10 (Page 21)	Mining One Consultants Report	Maintain a water cart on standby primarily for addressing ash attack and consider a product such as RST's "Flame-out" product if signs of spontaneous combustion become evident. Use this in accordance with the manufacturer's recommendations to quell any potential coal combustion risk.
1 (Page 22)	Mining One Consultants Report	On-going monitoring of the site must be maintained throughout the interim shutdown period as to ensure unplanned events are mitigated. It is also advised that the local CFA be made aware of the current coal coverage strategy and are familiar with the location of all infrastructure and equipment to assist if an unplanned event occurs.

	ALCOA'S RESPONSE	ALCOA'S ACTIONS	DATE	PERSON RESPONSIBLE
	• All heaped coal fines to be flattened and compacted prior to covering with overburden material as part of the coal coverage project.	• Complete coal covering with overburden	• 31/08/2015	Chris Rolland (CR)
	• Coverage of horizontally exposed coal will be completed using approximately one metre of over burden waste material with the exception of the west batter (see 5 below). As at 29 July 2015 approximately 23ha of an estimated 41.3ha has been covered. Additional contract resources will commence on Friday 31 July 2015 in order to achieve the commitment of 31 August 2015.	• Refer to item 1 above	• 31/08/2015	CR
	• Capping material to be selected by CR based on clay content to exceed the minimum 10% content when covering coal seam areas.	• Refer to item 1 above	• 31/08/2015	CR
	• Compaction is achieved by being wheel rolled by either loaded trucks or the water cart. Current standard dumping procedure leads to compaction by loaded trucks as part of the ongoing coal coverage project. Compaction on vertical faces is not possible however allowances for this is made by ensuring a thicker level of overburden coverage of not less than 1.5 metres.	• Refer to item 1 above	• 31/08/2015	CR
	• This recommendation is made on the basis that many of these faces have been exposed to the elements for up to 28 years with no heating events being recorded. In addition the risks associated with a fire event have not changed from when the mine was operating and therefore these mitigation strategies are in line with historic actions. • Alcoa will cover all vertically exposed coal faces with the exception of the west wall face (approx 850m long by 5 – 15m high). • Twice daily inspections will be maintained post the 31st August 2015 mine and power station shutdown by appropriately trained resources using standard checklists that cover things including: signs of spontaneous combustion, erosion of the coal coverage material that exposes coal, cracks and fines build up on the west batter etc.	• Complete all vertical face coverage (except west wall) by 31st August 2015 as part of coal coverage project. • Update daily checklist. • Maintain daily inspection regime. • Develop and conduct training by qualified trainer.	• 31/08/2015 • 7/08/2015 • 21/8/15 • 28/8/2015	CR
	• Water cart (60,000 litres capacity) already allocated to remain onsite post 31 August 2015. • Alcoa has considered products such as RST's "Flame Out" product for use at Anglesea, however its view is that water and earthmoving equipment is sufficient to manage any fire event given site history and current coal coverage strategy.	• Retain water cart.	• Complete	CR
	• Maintain twice daily inspections per item 5 above. • Local and regional CFA visit is being scheduled for mid August to review updated PIP and tour mine area to ensure familiarity with post shutdown site status.	• Per item 5 above. • Complete CFA site visit between 17/8/15 and 21/8/15	• Per above. • 21/8/15	CR

PARAGRAPH	SOURCE	RECOMMENDATION
2 (Page 22)	Mining One Consultants Report	As a minimum, weekly inspections of the mining area must be carried out to ensure the encapsulation has not been compromised and that there are no signs of spontaneous combustion:
3 (Page 22)	Mining One Consultants Report	The site must be inspected shortly after all significant rain events to inspect the coal encapsulation for water erosion as the waste material at site will be susceptible to coal being exposed due to erosion.
4 (Page 22)	Mining One Consultants Report	During fire events the fire brigade must be notified and frequent inspections of the pit made to ensure ash attack has not occurred. The event of an unplanned fire event is a low probability however it is recommended that a TARP (Target Action Response Plan) be prepared to ensure appropriate actions are taken in the event of a local bush fire.
196 (page 30)	Rod Incoll Report dated 21 July 2015	Germination of residual and wind-borne seed is possible on the newly spread overburden areas during the spring and early summer of 2015.
197 (page 30)	Rod Incoll Report dated 21 July 2015	Growth should be monitored and reduced to regulation height before the 2015/16 fire danger period if necessary.
198 (page 30)	Rod Incoll Report dated 21 July 2015	Grades and irregularities in the newly filled mine surface may channel run-off and cause soil erosion after heavy rain. This could uncover coal in some areas.
199 (page 30)	Rod Incoll Report dated 21 July 2015	Inspection of all fill over coal and remediation of soil erosion should be carried out after rainfall.
200 (page 30)	Rod Incoll Report dated 21 July 2015	The existing track network may not serve the needs of fire patrol on the overburden fill areas.

	ALCOA'S RESPONSE	ALCOA'S ACTIONS	DATE	PERSON RESPONSIBLE
	• Maintain twice daily inspections per item 5 above.	• Per item 5 above.	• Per above	CR
	• Maintain twice daily inspections per item 5 above.	• Per item 5 above.	• Per above	CR
	• Maintain twice daily inspections per item 5 above. • CFA to be notified in the event of a fire/local bush fire event as is the current practice, to be included in Emergency Management Plan. • TARP will be established to include updated Anglesea Emergency Plan, PIP and SWI-Management of Hot Coal and Coal Fires together with help chain and associated resourcing.	• Refer to item 5 above. • Update EMP. • Develop TARP	• Per above. • 14/8/15 • 7/8/15	CR Bryce Hutton (BH) CR
	• Based on its prior experience, Alcoa considers that it is highly unlikely that the newly spread overburden material will support any growth in the 2015/2016 period given that the area that the material is being sourced from has no growth after several years. This, together with the slow growing nature of the newly rehabilitated areas, leads Alcoa to conclude that vegetation growth will not be an issue for the 2015/16 fire season. • Alcoa will however continue to complete vegetation audits that are currently conducted for the site with outcomes of these audits continuing to determine the appropriate fuel load reduction strategy, such as the current slashing program deployed for certain sections of the site.	• Documented vegetation management program to be maintained.	• 21/8/15	CR
	• Vegetation management program as per item 196 above.	• Refer to item 196 above.		
	• Coverage of horizontally exposed coal is being done sympathetically to future potential drainage and erosion issues and runoff will be directed to non-impactful routes where possible. Additionally, when the coal coverage project is nearing completion, the entire area will be wheel rolled along the contours, where access allows, to ensure final compaction and to minimise erosion perpendicular to the contours. Experience to date with the area already covered and with the rainfall to date, shows little to no erosion. • Maintain twice daily inspections and develop TARP including rainfall trigger and erosion inspection requirements.	• Update daily checklist. • Maintain daily inspection regime. • Develop and conduct training by qualified trainer. • Develop TARP including rainfall trigger and erosion inspection requirements.	• 7/8/2015 • 21/8/2015 • 28/8/2015 • 7/8/2015	CR
	• Refer to item 198 above.	• Refer to item 198 above.		
	• Once the horizontal coal areas are covered, an appropriate track network will be established to an appropriate level of inspection and maintenance access without causing any unnecessary erosion.	• Track network to be established.	• 28/8/2015	CR

PARAGRAPH	SOURCE	RECOMMENDATION
201 (page 30)	Rod Incoll Report dated 21 July 2015	The track network should be reviewed in terms of the pit locations and track constructed as indicated.
206 (page 31)	Rod Incoll Report dated 21 July 2015	The probability of coal heating and vegetation fire spread increases as the temperature and surface wind rises and the relative humidity falls.
207 (page 31)	Rod Incoll Report dated 21 July 2015	Suitable weather parameters and a set of appropriate responses should be set up as a local mine fire alert and monitored on site.
208 (page 31)	Rod Incoll Report dated 21 July 2015	Heated coal areas may develop undetected.
209 (page 31)	Rod Incoll Report dated 21 July 2015	Details of GDF Suez's experience with hand held infrared heat detection should be sought.
210 (page 31)	Rod Incoll Report dated 21 July 2015	The probability of a fire incident rises on a declared total fire ban day.
211 (page 31)	Rod Incoll Report dated 21 July 2015	The level of patrol activity should be set higher for a Total Fire Ban Day.

	ALCOA'S RESPONSE	ALCOA'S ACTIONS	DATE	PERSON RESPONSIBLE
	• Refer to item 200 above.	• Refer to item 200 above.		
	• Consistent with paragraph 79 of Rod Incoll's report dated 21 July, Alcoa considers that the one metre overburden coverage of the coal will satisfactorily address the risk of ambient weather conditions increasing the probability of coal heating. • Alcoa will however develop a TARP that will include the relevant weather condition triggers (as referenced in Rod Incoll's supplementary report dated 26 July 2015 para 42) that will influence the appropriate response and resource plan.	• Develop TARP including weather triggers.	• 7/8/2015	CR
	• As per item 206 above.	• Refer to item 206 above.		
	• Alcoa has previously discussed the use of infrared sensors with representatives from the Latrobe Valley mines with varying opinions as to the success of sensors. • Alcoa has found that these may be appropriate for high extensive batter monitoring but will not be appropriate for use at Anglesea given the dimensional difference and the minimal risk in comparison to the Latrobe Valley mines. A hand held infrared heat detector kept at the Anglesea site was used during the most recent fire event and found to be of little benefit in detecting any hot spots over and above visual sighting methods. • Maintain twice daily inspections will be maintained.	• Alcoa to conduct further trial of infrared sensors	• 31/10/2015	CR
	• As per item 208 above.	• Refer to item 208 above.		
	• Resourcing for Total Fire Ban days and other extreme risk days is recognised in the Anglesea Emergency Plan and will be included in the current review being undertaken of this document to reflect conditions post 31 August 2015. • Review Emergency Management Plan and maintain requirement to ensure total fire ban days are subject to more frequent inspections. • Alcoa will develop a TARP that will include the relevant weather condition triggers that will influence the appropriate response and resource plan.	• Review EMP. • Develop TARP including weather triggers.	• 14/8/2015 • 7/8/2015	BH CR
	• Refer to item 210 above.	• Refer to item 210 above.		

PARAGRAPH	SOURCE	RECOMMENDATION
212 (page 31)	Rod Incoll Report dated 21 July 2015	An incident is most likely to occur at the mine when bushfires are burning elsewhere, in which case the CFA will be fully committed and unable to attend to an incident in the mine.
213 (page 31)	Rod Incoll Report dated 21 July 2015	Additional Company personnel should be on standby on extreme fire danger days to turn out to the mine if required.
214 (page 31)	Rod Incoll Report dated 21 July 2015	Experienced senior managers may not be available on Total Fire Ban days when fire development is most probable.
215 (page 31)	Rod Incoll Report dated 21 July 2015	Managers should be rostered for availability on Total Fire Ban days.
216 (page 32)	Rod Incoll Report dated 21 July 2015	Even though the coal floor has been covered with fresh earth, vehicles fitted with catalytic converters may start vegetation fires in other areas.
217 (page 32)	Rod Incoll Report dated 21 July 2015	Vehicles fitted with catalytic converters should be excluded from the mine site.
218 (page 32)	Rod Incoll Report dated 21 July 2015	Hose thread compatibility issues have been experienced by CFA Brigades when assisting other parties.
219 (page 32)	Rod Incoll Report dated 21 July 2015	Hose thread compatibility with mine water points must be verified prior to the fire danger period.

	ALCOA'S RESPONSE	ALCOA'S ACTIONS	DATE	PERSON RESPONSIBLE
	• The Anglesea Emergency Management Plan recognises that resourcing levels for Total Fire Ban days and other extreme risk days will be greater than on other days. The EMP is currently being reviewed, in conjunction with the CFA, and necessary resourcing levels to reflect conditions post 31 August 2015 will form part of this review. • The required resourcing and broader response will be commensurate with the risk (noting that the CFA has never been called on to assist with a coal fire event in the mine in 46 years of operation and due to the coal coverage project). • Update Emergency Management Plan to ensure appropriate resourcing available on extreme fire danger days, including communication processes with CFA.	• Update EMP.	• 14/8/2015	BH
	• Refer to item 212 above.	• Refer to item 212 above.		
	• The Anglesea Emergency Management Plan recognises that resourcing levels for Total Fire Ban days and other extreme risk days will be greater than on other days. The EMP is currently being reviewed, in conjunction with the CFA, and necessary resourcing levels to reflect conditions post 31 August 2015 will form part of this review. • Update Emergency Management Plan to ensure appropriate resourcing available (including Alcoa's senior management) on extreme fire danger days, including communication processes with CFA.	• Update EMP.	• 14/8/2015	BH
	• Refer to item 214 above.	• Refer to item 214 above.		
	• Alcoa has not used petrol vehicles with catalytic converters for 25 years and has specified diesel vehicles for the mine and will continue to do so post 31 August 2015, even though the risks will be significantly reduced due to the coal coverage project.	• Complete	• Complete	
	• Refer to item 216 above.	• Refer to item 216 above.		
	• Alcoa has always utilised the 3 thread CFA hose cock specification on all of the fire service ring main outlets, inclusive of appropriate hose fittings located near the outlets. DELWP and Parks Victoria carry adaptors to fit the 3 thread CFA hose cocks. • As part of PIP update (meeting scheduled for 3/8/15) Alcoa and the CFA will complete their review of proposed water source access points and ensure compatible fittings are installed.	• Ensure compatible fittings installed.	• 17/8/15	CR/BH
	• Refer to item 218 above.	• Refer to item 218 above.		

PARAGRAPH	SOURCE	RECOMMENDATION
220 (page 32)	Rod Incoll Report dated 21 July 2015	Individuals from the Anglesea Community have raised issues about access to current information on the mine closure process.
221 (page 32)	Rod Incoll Report dated 21 July 2015	To enhance the Company's reputation in the community a public information strategy should be drawn up and implemented.
222 (page 32)	Rod Incoll Report dated 21 July 2015	The issue of statutory responsibility for fire protection of the site following the withdrawal of the Company needs to be resolved.
223 (page 32)	Rod Incoll Report dated 21 July 2015	Clarification of statutory responsibility for fire protection needs to be included in the final rehabilitation plan.
22.2 (page 7)	Robert Lindsay Barry (CFA)	In relation to Alcoa maintaining a 60,000 litre water cart (with truck), an excavator and a bulldozer on site, operators will need to be called in order to make use of these resources in the event of a fire as there will be no operators on site.
22.3 (page 7)	Robert Lindsay Barry (CFA)	In relation to maintaining fire water dam and Ash Pond 2 for an adequate supply of on-site firefighting water, there are two limitations which are the subject of ongoing discussion: • A millcock or hydrant will need to be installed at the standpipe (necessary to assist CFA appliances to re-fill water supplies). • The connection from the town water supply will have one hydrant point from a 100mmm supply pipe with limited pressure. It has been proposed that Alcoa install a diesel pump at Ash Pond 2 to assist in making use of the available water supplies.
52 (page 11)	Ross Gregor McGowan (DEDJTR)	Given that the current endorsed rehabilitation plan requires consideration of ongoing fire risk management, the final rehabilitation plan will similarly be required to address ongoing fire risk management at the rehabilitated mine site.
63 (page 12)	Ross Gregor McGowan (DEDJTR)	During this preparation stage [of the final closure plan] Alcoa would also be in regular consultation with Local, State and Commonwealth authorities with relevant expertise in, or whose endorsement would be required, in order to close the Anglesea coal mine.
64 (page 12)	Ross Gregor McGowan (DEDJTR)	After the mine closure plan is completed it will be submitted to the ERR Branch as a work plan variation for approval. If and when it is approved, final rehabilitation of the Anglesea coal mine will be able to begin in accordance with the approved work plan variation.

ALCOA'S RESPONSE	ALCOA'S ACTIONS	DATE	PERSON RESPONSIBLE
• Alcoa has a community engagement process in place. For example, on 13 July 2015 Alcoa held a Community Consultation Network (open to all the public) which was attended by 50 persons. Alcoa provided an update on a number of issues, including shut down milestones, future fire risk management, water issues and the future closure process. The CCN meetings are generally held on a quarterly basis and the next meeting is scheduled for 10 August 2015.	• Complete	• Complete	
• Refer to item 220 above.	• Refer to item 220 above.		
• Alcoa expects the current roles and responsibilities will remain unchanged for foreseeable future.			
• Refer to item 222 above.	• Refer to item 222 above.		
• Alcoa is currently undertaking a process to identify and engage adequately trained contractor personnel to operate this equipment. Alcoa has an existing arrangement with a contractor who is currently assisting with the coal covering project. Alcoa is also examining other potential resources to perform this task. These arrangements will be in place before 28 August 2015.	• Establish contracting strategy and resources for retained equipment.	• 28/08/2015	CR
• Alcoa has always utilised the 3 thread CFA hose cock specification on all of the fire service ring main outlets, inclusive of appropriate hose fittings located near the outlets. DELWP and Parks Victoria carry adaptors to fit the 3 thread CFA hose cocks. • As part of PIP update (meeting scheduled for 3/8/15) Alcoa and the CFA will complete their review of proposed water source access points and ensure compatible fittings are installed.	• Ensure compatible fittings installed.	• 17/8/15	CR/BH
• Alcoa expects this issue to be a consideration in the formulation of the final closure and rehabilitation plan.			
• Alcoa expects this issue to be a consideration in the formulation of the final closure and rehabilitation plan.			
• Alcoa expects this issue to be a consideration in the formulation of the final closure and rehabilitation plan.			

SHORTENED FORMS, GLOSSARY AND BIBLIOGRAPHY

SHORTENED FORMS

SHORTENED FORM	CONTRACTIONS
Alcoa	Alcoa of Australia Limited
Anglesea Mine Act	*Mines (Aluminium Agreement) Act 1961* (Vic)
APM	Alcoa's Eastern Australian Asset Planning and Management Group
CFA	Country Fire Authority
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
DSDBI	Department of State Development, Business and Innovation
EMV	Emergency Management Victoria
EPA	Environment Protection Authority
ERR	Earth Resources Regulation Branch of DEDJTR
Mineral Industries Regulations	Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2013 (Vic)
Mineral Resources Act	*Mineral Resources (Sustainable Development) Act 1990* (Vic)
OHS Act	*Occupational Health and Safety Act 2004* (Vic)
OHS Regulations	Occupational Health and Safety Regulations 2007 (Vic)
Pre-incident Plan	Alcoa Anglesea CFA Pre-incident Plan
Standard Work Instruction	Alcoa's Standard Work Instruction – Management of Hot Coal and Coal Fires
Taskforce	Surf Coast Taskforce, regional taskforce of the Coal Mine Emergency Taskforce
VWA	Victorian WorkCover Authority (also known as WorkSafe Victoria)

GLOSSARY

TERM	EXPLANATION
Ash Wednesday bushfires	Refers to the bushfires occurring across Victoria and South Australia on 16 February 1983.
batter	An area of the Anglesea mine, also referred to as the mine wall or a section of the mine wall. The batters may refer to either the individual steeply sloping surfaces between working levels of the mine or the overall mine wall from the bottom of the mine to grass level consisting of individual batters, benches and berms. Also referred to as 'coal face'.
berms	The relatively flat surfaces created in batters between working levels of the Hazelwood mine to stabilise the batter or intercept fretted material.
coal face	See 'batter'.
coal fines	Small coal particles or coal dust.
fire season	The fire season is also known as the Fire Danger Period. The CFA declares the Fire Danger Period for each municipality (shire or council) at different times in the lead up to the fire season. The Fire Danger Period may be declared as early as October in some municipalities and typically remains in place until the fire danger lessens, which could be as late as May.
ember attack	Occurs when embers carried by the wind ignite spot fires ahead of the main fire.
embers	Burning twigs, leaves and other debris that are carried by the wind.
hot works	Hot works at the Anglesea mine refer to cutting, grinding or welding.
mined out or worked out areas	The areas within the mine where coal mining no longer takes place.

Mining Regulator	The Earth Resources Regulation Branch (ERR) of the Department of Economic Development, Jobs, Transport and Resources (DEDJTR).
net wet specific energy	The energy value of coal when it is wet and freshly mined.
overburden	The clay, gravel and soil that covers coal and which is removed in the mining process.
spontaneous combustion	A natural oxidative process where coal self-heats when exposed to air.
spot fire	Spot fires are new fires that occur ahead of the main fire front. They are usually started by embers.
total fire ban	Total fire bans are declared on days when fire is likely to spread rapidly and be difficult to contain.

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