

Facsimile

TO: Peter Quigley  
COMPANY:  
FROM: Geoff Horne  
DATE: 22/5/98  
SUBJECT: BLUE GUM PLANTATION

FACSIMILE NUMBER: 51 744 182  
TELEPHONE:  
FACSIMILE: 03 5135 5122  
PAGES (INCL THIS):

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Peter,

As discussed, find attached letter to John Mitchell re the proposed Blue Gum Plantation. I am posting the original today + you should receive it on Monday.

regards

Geoff Horne



22 May, 1998

Mr John Mitchell  
Chief Executive Officer  
Gippsland Water  
PO Box 348  
TRARALGON 3844

Dear John

#### **BLUE GUM PLANTATION - POTENTIAL FIRE RISK**

It has been brought to my attention via a recent article in the La Trobe Valley Express newspaper that Gippsland Water (GW) proposes to enter into an arrangement with Ecogen Energy to establish a Blue Gum plantation at the corner of Princes Freeway and Strzelecki Highway.

This development would place the plantation in close proximity to the northern boundary of Hazelwood Mine, and as such is of considerable concern on account of the significant fuel source this would represent in time of bushfire conditions. In the event of a fire, the proposed plantation is well within recognised distances of fire "spotting" from either native or pine plantations.

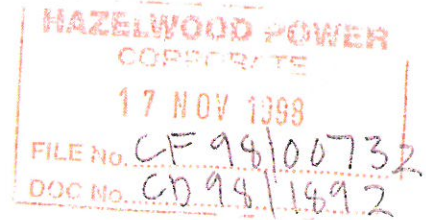
Historically, fires which have approached and threatened the mine have occurred when hot north-westerly winds have been prevalent. The proposal would place the plantation in a direct path to the north west of the mine.

It is for these reasons that I would appreciate the opportunity to meet with you to present Hazelwood Power's concerns prior to GW proceeding any further with the plantation development. I can be contacted on Tele. Ext. 5135 5700 to confirm arrangements for the meeting.

Yours sincerely

Earl Zagrodnik  
DIRECTOR OF MINING

**PO Box 195 Morwell, Victoria, 3840, Australia Phone: 03 5135 5000**



9 November, 1998

NOTE TO JIM TWOMEY

## FIRE RISK

Attached are two peices of correspondence between Earl and Mr. Murray Ravenhall, Risk Manager Gippsland area, concerning establishment of a eucalypt plantation by Ecogen Energy on land owned by Gippsland Water. They are for your information, it would not appear much more action can be taken through Mr. Ravenhall. The letters will be kept on file. We will monitor the situation to assure a fire management plan is developed and adhered to by the plantation owner. Mr. David Eves tells me the trees have already been planted and that mine management did attempt to seek resolution prior to the planting, without success. In a later meeting some time ago Mr Ravenhall apparently made the statement that managed plantations in close proximity to the open cut does not pose a significant fire risk to Hazelwood Power. In the first letter Earl had asked for a written response that would confirm Mr. Ravenhaull's opinion. The second letter is from Mr. Ravenhall explaining his position. Thanks.

JIM



21 October, 1998

Mr Murray Ravenhall  
Risk Manager  
Country Fire Authority, Gippsland Area  
81 Macarthur Street  
SALE VIC 3850

COPY

Dear Murray,

As my assignment in Australia will finish 22 October, I wanted to express my appreciation for your efforts on our behalf to minimise the risk of fire at Hazelwood Mine. Although our association was brief, it was a pleasure working with you and the other members of the CFA. Mr Jim Seely will assume the position of Director Mining effective 23 October, 1998.

I wanted to remind you of a matter that is important to both of our organisations, specifically; your written response to Hazelwood Power which confirms the opinion you expressed in our meeting with Gippsland Water that a managed plantation in close proximity to the open cut does not pose a significant fire risk to Hazelwood Power.

Thank you for your consideration in this matter. Please progress this issue with Mr David Eves, Compliance and Safety Manager, Hazelwood Mine.

Yours sincerely,

Earl Zagrodnik  
DIRECTOR MINING

CC:  
D Eves  
J Seely

Our Ref: F:\WORDPROC\DOCUMENT\MURRAY\DEVESHIP.WPD  
Enquiries:  
Telephone: 0351442933  
Fax: 0351445190  
File:



02 November 1998

Mr David Eves  
Compliance and Safety Manager  
Hazelwood Mine  
Hazelwood Power  
PO Box 195  
MORWELL VIC 3840

Dear David

Re: Plantation Established Adjacent to Hazelwood Power Open-Cut Mine

Some months ago I attended a meeting with your Director Mining Earl Zagrodnik regarding the establishment of a eucalypt plantation by Ecogen Energy on land owned by Gippsland Water adjacent to the southwest corner of the intersection of the Princes and Strezlecki Highways approximately one kilometre from the western edge of the Hazelwood mine. Earl was expressing deep concern at the establishment of the plantation so close to the mine.

CFA is not in a position to determine land usage within the municipality and in this case we are also not a Referral Authority in the Latrobe Planning Scheme. However CFA is very interested in the prevention of fire and the provision of adequate safeguards to inhibit the spread of any fire that may occur.

At the meeting between all parties it was agreed by Ecogen Energy that a fire management plan for the plantation would be developed and provided to all parties for comment. I am confident that with the implementation of a suitable fire management plan any threat to the Hazelwood Mine will be minimal. History indicates that the majority of plantation fire losses occur from fire entering the plantation from external sources and not from internal ignitions.

With proper planning fires can be prevented from entering the plantation in all but severe weather conditions. In the event that a fire does occur in or enter a plantation appropriate fuel management within the plantation causes the potential for crown fires to be minimised. It is crown fires that cause burning embers to travel with the fires convection column.

In the event that a fire management plan is either not developed or not adhered to then the Municipal Fire Prevention Officer, Shire of Latrobe or the CFA Risk Manager have powers conferred by the CFA Act to take action to ensure that adequate works are carried out to achieve a satisfactory level of fire safety. I would remind you that in the first instance it is preferable for neighbours to discuss issues to seek resolution prior to involving council or CFA.

Please feel free to contact Mark Jones Acting Risk Manager Gippsland Area to discuss this or any other issue you may have regarding fire safety of your premises.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Murray Ravenhall'.

Murray Ravenhall  
Risk Manager  
Gippsland Area



## Received mail: APP Document on Reduced Fire risk from Plantations

**Sender:** Polmear Richard  
**Sent:** 14/01/2000 8:08  
**Importance:** Normal  
**Priority:** Normal  
**Sensitivity:** None

**Reply by date:** -  
**Reply to:** -  
**Delivered:** 14/01/2000 8:08  
**Read:** 17/01/2000 8:16  
**Acknowledged:** 17/01/2000 8:16  
**Replaced:** -

### Recipients:

Name	Type	Reply req.
Horne Geoff	To	No
Hibbert Rex	Cc	No

**Attachments (0):** -

Geoff,

Yesterday I spoke to Nick Harman from Marsh (our Insurers). He requested that a copy of the APP document be forwarded after I clear with APP that forwarding is okay. I tried to clear handing over the document prior to my meeting but both Stephen and Phil are away this week.

Can you please have clearance agreed by APP then have Rex Hibbert forward a copy to Nick on my behalf.

Thanks,

Richard M Polmear  
Mine Engineering Manager / Project Manager Mine Development Hazelwood Power  
P.O. Box 195 Morwell 3840  
(03) 5135 5055  
0407 347 545



Australian Paper  
Plantations Pty. Ltd.

ACN 004 285 706  
Agent for Amcor Limited ACN 006 017 372

PO Box 221  
Morwell VIC 3840

Telephone (03) 5134 3433  
Facsimile (03) 5133 7955

Our Ref:

cc.GM, WSM, EDF, PDF, FOF

7 January, 2000

Geoff Horne  
Manager Property  
Hazellwood Power  
PO Box 195  
MORWELL VIC 3840

HAZELWOOD POWER  
CORPORATE

19 JAN 2000

FILE NO: CF2000/0021  
DOC NO: CD2000/0100

Dear Geoff,

RE: FIRE RISK IN EUCALYPT PLANTATIONS

As discussed I have attached some documentation regarding fire behaviour in plantations and Australian Paper Plantations (APP) fire preparedness.

The key points to note are as follow:

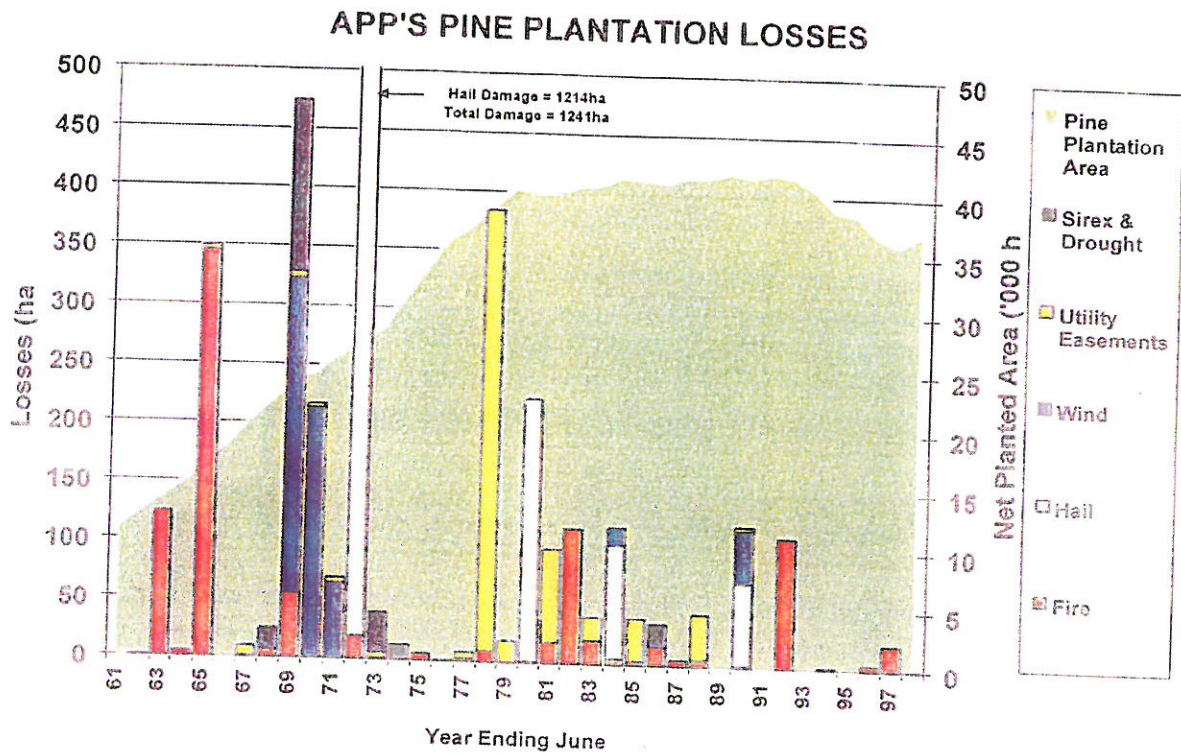
- 1) APP has a very good fire prevention and suppression record and over a 38 year history has only lost on average 24 ha per year out of a total resource now in excess of 50,000 hectares. All of these losses have been pine plantation and the bulk of the loss occurred in one year 1965. APP have been establishing eucalypt plantations since 1962 yet have never had a large fire in any of these areas. The company maintains a very high level of resources and preparedness in case of such an event. The company's fire strategy focuses on training, constant vigilance, early detection and rapid response. This has resulted in most plantation fires being contained before they become large. In addition APP brigades are part of the CFA who also attend fires in the plantation areas. See **Attachment 1**.
- 2) In general four basic principles ensure that plantation fires are generally less threatening than fires in other vegetation types and they are:
  - a) reduced wind speeds
  - b) greater fuel moisture contents
  - c) the reduced availability of dry and elevated fuel
  - d) less fire spotting potential.See **Attachment 2** for more details.
- 3) Experience with fires in blue gum plantations in Western Australia has shown that where attack on the fire in the native forest was not possible, it was quite safe and very effective to do so within the plantation and that plantations actually appear to be effective at stopping major wild fires. See **Attachment 3** for related information.

If you have any more queries regarding this matter please contact Anne Partridge or myself on 51343433.

Yours sincerely

Phil Whiteman  
Plantation Manager  
Australian Paper Plantations

Attachment 1 – APP Losses and Preparedness



APP Fire Detection and Suppression Resources

- CFA Brigades - 6
- Personnel - 65 (35 frontline & 30 management/support)
- Contract - 20 (all frontline firefighters)
- Helicopter - 1 (charter over summer specifically for fire fighting)
- Plane - 1 (charter over summer for fire surveillance)
- Fire Towers - 3
- Fire Tankers - 13
- Dozers - 6 (4 D7s and 2 D3s)
- Skidders - 4
- Graders - 2

Plus an annual operating budget of ~\$900,000 for labour, materials, training, equipment maintenance (including tankers and communication gear), fire break and fire dam maintenance and general suppression costs.



## Attachment 2 – Fire Behaviour in Plantations

Plantations are densely grown trees with a high degree of canopy closure and limited understorey species. The structure of plantations has a considerable effect on fire behaviour in the following ways.

### a) Reduced wind speeds

"wind speeds are widely acknowledged for being the dominant factor sustaining wildfires. However, the density of the canopy exhibits a major effect on the amount of wind reaching the surface and, consequently, fire behaviour.....Furthermore , results indicate that wind speeds were reduced in accordance to the density of the canopy, with a reduction factor of 30-40%"

From: "Wind Speed Reduction Factors in Heathy Woodland" C.Tran & A.Pyrke Australian Bushfire Conference Proceedings, 1999.

### b) Greater fuel moisture contents

It is widely considered that the closed canopies of plantation forests often result in increased fuel moisture contents compared to other vegetation types. The moister forest floor may therefore cause a reduction in fire behaviour and intensity.

### c) Reduced fuel availability

The lack of understorey species and associated dry or elevated fuel loads are a significant factor in reducing fire intensity in plantations.

"In a plantation most of the material is live green material that will not burn unless fuel moisture contents are extremely low (<5%) and then an extreme amount of heat is required for them to be sustaining. Surface fires are most likely in plantations and these surface fires rely on a continuous availability of dry fuel. Without a sustaining ground fire a crown fire is very unlikely unless conditions are extreme."

Pers comms Greg McCarthy, Fire Research Officer NRE, 5/1/99.

Flammability studies undertaken by the CSIRO for APP indicate that green blue gum (*Euclayptus globulus*) leaves are less flammable than green radiata pine (*Pinus radiata*) needles. Whilst we have had a number of fires in pine plantations we have not suffered substantial losses. This indicates a reduced risk in blue gum plantations.

Ref: Gill, A.M. & Pook, E.W., "Flammability of Brown Leaves", CSIRO, 1991 & Gill, A.M., "Flammability of Green Leaves", CSIRO, 1990.

### d) Less fire spotting potential

There has been limited work done on the spotting potential for the primary plantation species and this is because work has concentrated on the known offenders for spotting, namely messmates and stringybarks. These species are characterised by a substantial amount of loose fibrous bark, which is supported high in the canopy and is easily removed in chunks. APPs primary plantation species blue gum and radiata pine do not share these characteristics and by comparison have a lack of material available for spotting.

References: Peter Ellis (CSIRO) pers comms, Greg McCarthy pers comms (NRE) & Overall Fuel Hazard Guide, NRE, 1999.

### Attachment 3 - Extracts from WA Blue Gum Fire Reports

"Eyewitnesses said the fire immediately lost intensity when it entered the plantation. Although protected by a 10-metre firebreak the fire jumped this and continued into the bluegums. The fire front in the neighbouring creekline was crowning, but it immediately fell to the plantation floor on entering the blue gum area.

Full canopy scorch occurred right along the external boundary of the plantation. This is indicative of the intensity of the fire in the adjacent native bush. There was also full canopy scorch adjacent to native *Eucalyptus rudis* trees within the plantation. The reason for this is a greater litter buildup and higher intensity fire under the native trees compared to the plantation trees.

The full canopy scorch continued from the boundary up to 40 metre into the plantation but as the intensity rapidly decreased the plantation trees gradually began retaining a green crown.....

The fire was quickly stopped where fire units could reach. Elsewhere within the plantation the fire was stopped by backburning off a stock track. The fact that backburning did not create more damage to the plantation in the weather conditions being experienced show that there were very low quantities of available fuel under a four year old blue gum plantation.

The two main reasons for the tame fire conditions within the plantation are:

- a) low fuel levels
- b) very slight wind penetration within the eucalypt plantation"

Extract from - "Bonyanup/Argle Fire Report April 12 1994", Malcolm Parker & Russel Walter, Bunnings Tree Farms, 1994.

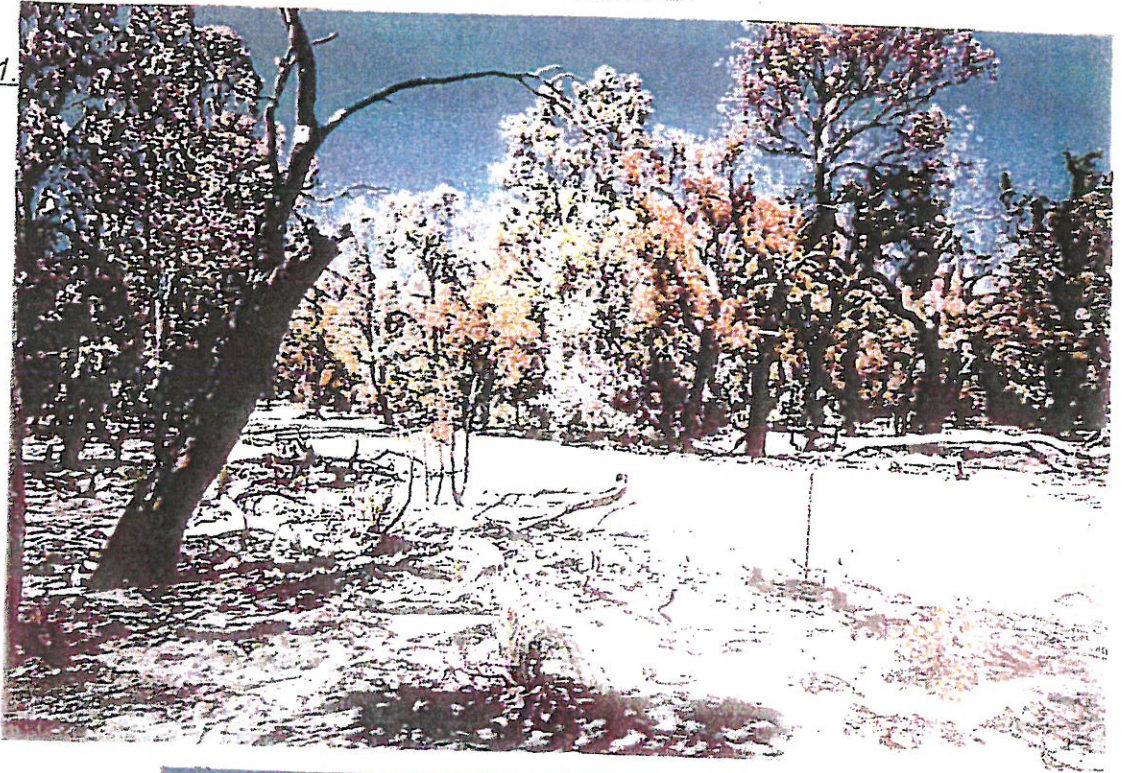
"As the fire approached the plantations it was producing some of the most extreme conditions of the whole fire event, crowning out across its entire front..... Despite the extreme conditions and crowning fire front, the fire failed to maintain this intensity immediately on reaching the blue gum boundary. Despite innumerable burning embers raining deep into the plantation the fire never gained any intensity at all in the blue gum forest..... After several minutes the fire front had passed and the observers expressed extreme surprise that the plantation was still standing, relatively unburnt compared to the neighbouring native forest. The fire had only burnt the very light grass and clover ground cover and the blue gums had not ignited anywhere, suffering only from heat scorch from the grass fire..... The fire intensity within the Blue Gum plantation on this day was low enough to allow vehicle access to attack spot fires."

Extract from - "Pinjarra Fire Report", R.Walter & M.Parker, Bunnings Treefarms, 1995.

NB - Some photos from these reports are also included on the next two pages.

Photograph 11.

Native  
Forest



Photograph 12.

Blue Gum  
Plantation



Photograph 14.

A view from the top of the escarpment clearly shows the differing effects of the wildfire on the native forest and the blue gum plantations. Whereas the native forest suffered almost total crown scorch the plantation has obviously retained its green canopy. Note that the native forest immediately behind the plantation was protected by the plantation and was subsequently unburnt.



## Bibliography

- Ellis, P. pers comms, Fire Research Officer, CSIRO, 5/1/00.
- Gill, A.M. & Pook, E.W., Flammability of Brown Leaves, CSIRO, 1991.
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